1-1-2008

Childhood Obesity and Depression

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Thesis submitted to
The Graduate College of
Marshall University

In partial fulfillment of the
Requirements for the degree of
Education Specialist
School Psychology

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April 1st, 2008

Abstract
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Obesity is a commonly experienced health issue. Children who suffer from obesity may experience medical concerns such as type 2 diabetes and hypertension (American Obesity Association, 2006). Obese children may also face psychological consequences. An overweight child may experience criticism from peers while finding it difficult to participate in age-related activities. Considering this fact, one can understand why psychological effects of childhood obesity are of concern. The purpose of this study is to examine the links between obesity and childhood depression, rated by the Childhood Depression Inventory (CDI-2). Twenty-nine children were administered the CDI-2. Activity level and age of children was collected. Current weight and height was also collected. The results of this study indicated that there was no relationship between CDI-2 scores and weight. Furthermore, surprisingly there was no relationship between exercise, time spent watching TV/computer time verses CDI-2 scores. There was a relationship between weight and sports participation.

Acknowledgements

I would like to thank my committee—To Dr. O'Keefe, thank you for being such a strong child-advocate, To Dr. Krieg, thank you for providing invaluable insight into the profession and to Dr. Stroebel, thank you for your patience, understanding and advice. It has meant so much.

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It has been documented that obesity is an area of major concern in adults as well as children. The incidence of obesity is increasing at an alarming rate (Comer, 1992). Much is known about the physical consequences of obesity. Obesity leads to such medical concerns as type 2 diabetes, asthma and hypertension (American Obesity Association, 2006). What stills needs to be determined are the possible psychological consequences of obesity. More research is needed to determine if obesity is related to depression in young children. This study attempts to clarify the relation between obesity and depression by evaluating overweight children in elementary grades with a depression measure.

Childhood Obesity

The prevalence of obesity in children has been rapidly increasing in the last two decades, reaching epidemic proportions (Phillippas & Clifford, 2005). Childhood obesity has an immediate impact on a child's physical appearance and can result in additional psycho-social consequences, such as low self-esteem, social alienation, and lack of self-confidence (Doak & Visscher, 2006). Consequently there is a great need for understanding risk factors along with possible related concerns. The rapid increase in the prevalence of obesity is alarming considering the medical and psychosocial consequences of obesity in children (Phillippas & Clifford, 2005).

Obesity is a major physical concern of children who are overweight. Increasing reports show us that obesity is becoming an epidemic in the United States (Phillippas & Clifford, 2005). It is suggested that contributing factors to childhood obesity includes

both genetics and the family environment (Kendall & Serrano, 2006).

The rising epidemic reflects the profound changes in society and in behavioral patterns over recent decades (World Health Organization [WHO], 2006). As incomes rise and people become busier, diets high in complex carbohydrates give way to more varied diets with higher proportions of fats and sugars (WHO, 2006). Today's fast-paced society leaves little time for cooking neither well-balanced meals nor adequate amounts of physical activity. Many of today's children consume more calories than they expend in physical activity thus leading to an increase in weight gain. Since the late 1970's, obesity rates have more than doubled among children 6 to 11 years of age and more than tripled among those 12 to 19 years of age (Nestle, 2006). An estimated 22 million children under the age of five are estimated to be overweight worldwide (Nestle, 2006). In the USA the number of overweight children has doubled and the number of overweight adolescents has tripled since 1980 (Nestle, 2006).

Along with the rise in childhood obesity, there has been an increase in the incidence and prevalence of medical conditions in children and adolescents that had been rare in the past (American Obesity Association, 2006). These medical concerns just compound the psychological implications of depression concerning children. Pediatricians and childhood obesity researchers are reporting more frequent cases of obesity-related diseases such as type 2 diabetes, asthma and hypertension that once were considered adult conditions (American Obesity Association, 2006). Also, overweight and obesity can lead to adverse metabolic effects on blood pressure, cholesterol, triglycerides and insulin resistance (World Health Organization, 2006).

Studies indicate that certain genetic characteristics may increase an individual's susceptibility to becoming overweight (U.S. Obesity Trends, 2006). However, this genetic susceptibility may need to exist in conjunction with contributing environmental and behavioral factors (such as high-calorie food supply and minimal physical activity) to have a significant effect on weight (U.S. Obesity Trends, 2006). Because the factors that contribute to childhood overweight interact with each other, it is not possible to specify one behavior as the "cause" of being overweight. However, certain behaviors can be identified as potentially contributing to an energy imbalance and, consequently, to being overweight such as consuming large proportions of unhealthy foods, lack of participation in exercise and too much sedentary behavior (U.S. Obesity Trends, 2006). Home, child care, school and community environments can influence children's behaviors related to food intake and physical activity as well (U.S. Obesity Trends, 2006).

An increase concerning inactivity in children appears to be common due to the observed shift towards less physically demanding work and leisure worldwide (World Health Organization [WHO], 2006). Moves toward less physical activity are also found in the increasing use of automated transport, technology in the home, and more passive leisure pursuits (WHO, 2006). Studies conducted in the last 20 to 30 years show a strong correlation between obesity and lack of physical activity. Nearly half of youths aged 12 to 21 years old are not vigorously active on a regular basis (Kendall & Serrano, 2006). If not reinforced at a young age, children may not develop a healthy lifestyle pattern in the future. Exercise has long been touted as a way to maintain physical fitness and help prevent high blood pressure, diabetes, obesity and other diseases. (Mayo Clinic, 2007) A

prevent high blood pressure, diabetes, obesity and other diseases. (Mayo Clinic, 2007) A growing volume of research shows that exercise also can help improve symptoms of certain mental conditions, such as depression and anxiety (Mayo Clinic, 2007).

Depression

Depressive Disorders are among the most common psychiatric disorders characterized by feelings of sadness, lack of interest in formerly enjoyable pursuits, sleep and appetite disturbance, feelings of worthlessness, and thoughts of death and dying (American Psychiatric Association, 2000). Depression can be conceptualized as a chronic disease because of the severity and disabling nature of symptoms (Sokolova, 2003). An estimated 10 million people in the United States suffer from clinical depression each year (Comer, 1992). For those who have experienced depression, it can become a very difficult obstacle to overcome. Of those with major depression, approximately half will relapse (i.e. they will meet full criteria for a major depressive disorder again) and after two recurrent episodes (i.e. they meet full criteria for a major depressive disorder at least three times during their life) of depression, 70% of patients will go on to have future episodes (Sokolva, 2003). With this in mind, one can begin to understand how difficult facing and dealing with depression can become. There have been countless studies aimed at uncovering the cause and treatment of depression that affects both adults and children. There are many factors that appear to contribute to the onset of depression. The most notable therapeutic approaches each theorize about the underlying cause of depression and the best, most effective ways it can be treated. The most effective strategies are those with multiple components, including patient education, coordination of care between

primary care and mental health specialists, and ongoing evaluation and feedback (Kramer, Beaudin &Thrush, 2005).

Depression is one of the leading causes of disability worldwide, contributing to high medical expenditures, poor clinical outcomes, low productivity, and compromised quality of life (Kramer, Beaudin & Thrush, 2005). For someone dealing with depression, everyday tasks such as going to work or personal hygiene become increasingly difficult to undertake. Like other chronic diseases, the course of depression waxes and wanes, with increased risk for multiple episodes with each new onset or exacerbation of symptoms (Kramer, Beaudin & Thrush, 2005).

Contributing causes of depression include: genetics, life circumstances and what is going on in their body (Healthy Place Depression Community, 2006). Recently, there has been a great deal of research conducted on the etiology of depression in connection with genetics. Depression is believed to be genetically influenced and this can serve as screening criteria when family risk factors are present (Kramer, Beaudin &Thrush, 2005). Historically, the principal method for studying the genetic influence of depression is twin studies. Because frequency of twin births is low, genetic researchers also observe rates of depression disorder in first-degree relatives (often parents and children) (Stice & Marti, 2006). Family studies also find that onset of depression is more likely in people with depressed relatives than in those who do not have depressed family members (Stice & Marti, 2006). If one of the parents of a child experience depression, about 40% of these children will experience depression sometime before their 20th birthday (Healthy Place Depression Community, 2006). According to the 1992 National Co-morbidity Survey, at

children will experience depression sometime before their 20th birthday (Healthy Place Depression Community, 2006). According to the 1992 National Co-morbidity Survey, at any given time, nearly 2% of children ages 7-12 in the United States have major depression (Stice & Marti, 2006). The genetic contribution to mood disorders is especially high when the symptoms first appear in childhood or adolescence (Stice & Marti, 2006). For children with a depressed parent, the risk of depression is much higher than average. A family history of personality disorders, panic disorder, or alcoholism also raises the risk of early depression (Stice & Marti, 2006). Thus, examining the family dynamics of the depressed individual becomes increasingly important. The heritability (proportion of individual differences in susceptibility associated with genetic difference) of childhood depression is estimated at 50% (Stice & Marti, 2006).

What causes a genetically vulnerable individual to develop the symptoms is not known, although both common sense and psychological theory have suggested many possibilities: the death of a loved one, an inability to conform to an unattainable ideal or live according to rigid moral convictions, failure to establish bonds early in life or too much punishment (Wardle & Williamson, 2006). Wardle and Williamson (2006) stated a genetic predisposition is often referred to as a diathesis and which leaves an individual vulnerable to a stressful life event. Sexual or physical abuse may lead to depression by causing lasting changes in the regulation of stress-related hormones and neurotransmitters.

In addition to life stressors, biological and genetic causes of depression, there is also the cognitive behavioral theory first proposed by Aaron Beck. Cognitive-Behavioral

Therapy is based on a theory of personality which maintains that people respond to life events through a combination of cognitive, affective, motivational, and behavioral responses (Corsini & Wedding, 2000). Beck's system deals with the way that individuals perceive, interpret, and assign meanings to events (Corsini & Wedding, 2000). Beck believed that those who are depressed suffer from thinking that is negative and distorts reality. The negative feelings, Beck believes, can lead to a more negative view of the world and feelings of worthlessness and inferiority (Comer, 1992). Beck states that people learn how to be depressed by believing that they are a failure and that there is nothing he or she can do to change. Thus, Beck seemed to believe that children who become depressed have learned to view themselves in a negativistic fashion, thus leading to a poor self-image.

Childhood depression is a serious concern. Depression compromises the developmental process, with associated difficulties with concentration and motivation, leading to poor academic performance, impaired social functioning, poor self-esteem, and a higher risk of suicide (Dopheide, 2006). An increasing body of knowledge confirms that depression is a common and persistent illness in youth, affecting 0.3% of preschoolers, 2% of elementary school aged-children, and 5-10% of adolescents (Dopheide, 2006). An estimated 10-20% of adolescents have had at least one major depressive episode by age 18years (Dopheide, 2006). Mental illnesses in children are so complex that health-care professionals can not always detect them (Sokolova, 2003). Depression often manifests itself differently in children than adults. Because of this, children who are depressed may go without treatment allowing symptoms to become

increasingly worse. Children with depressive disorders lack interest in activities that they previously enjoyed, criticize themselves and become pessimistic and hopeless about the future (Sokolova, 2003). Depressed children are generally listless, withdrawn, and seemingly unable to concentrate or enjoy life (Wardle & Williamson, 2006). As many as one in every 33 children and one in eight adolescents may have depression (Sokolova, 2003). One study of 9863 students age 10-16 years found that 29% of American Indian youth exhibited symptoms of depression, compared with 22% of Hispanic, 18% of Caucasian, 17% of Asian-American, and 15% of African-American youth (Dopheide, 2006). Hormonal and environmental influences are thought to contribute to the increased frequency of depression in female adolescents (Dopheide, 2006). Suicide is the third leading cause of death for 15 to 24 year-olds and the sixth leading cause of death for 5 to 14 year olds (Sokolova, 2003).

Children who have chronic medical problems are much more likely to experience depression symptoms (Healthy Place Depression Community [HPDC] 2006). Severe asthma, severe head injury, diabetes, epilepsy and many of the less common chronic childhood diseases can result in depression (HPDC, 2006). Children with the following neuropsychatric illnesses are more likely to experience depression: Attention deficit hyperactivity disorder, learning disabilities, tourettes, anxiety disorders, eating disorders, obsessive compulsive disorder and pervasive development disorders (HPDC, 2006).

Depression can be found at almost any age in children. Preschoolers may persistently show suicidal or self-destructive themes in play, or parents and caregivers may notice that a physically healthy child is uninterested in play (Dopheide, 2006).

Depression in children 8 years or younger may not be recognized because this age group is less likely to verbalize the emotional symptoms of depression and more likely to display symptoms of anxiety (e.g., phobias, separation anxiety), somatic complaints (e.g., "my tummy hurts," I don't feel good"), and auditory hallucinations (Dopheide, 2006). In children and adolescents, the mood may be irritable rather than sad (American Psychiatric Association, 2000).

Since depression affects most areas of a child's life, it should be obvious that depression impacts school performance. Students experiencing symptoms of depression usually have difficulty completing schoolwork and are at risk for academic under-achievement (How Depression Affects School Performance [HDASP], 2007). Students are asked to participate in various activities throughout a typical school day, which may prove stressful for the already depressed student. The depressed student may often be preoccupied with negative thoughts and feelings and finds it hard to put his/her full attention on schoolwork (HDASP, 2007). Also, when a student is depressed, he/she has little energy to apply to tasks that are perceived as being stressful or of low interest. A depressed student may withdraw from typical activities and become resistant to teacher requests to participate in classroom activities (HDASP, 2007).

The medical implications and possible causes have been studied extensively. Yet, what is the psychological outcome of being overweight? There appears to be a lack of studies that address this exact topic. However, if we think of our society's view of obesity, we can anticipate mental health problems. It is obvious that we live in a world obsessed with beauty and physical appearance. Thinness is portrayed in magazines and

on popular television programs as a desired physical attribute. Knowing this, it is understandable that an overweight child would experience more than health issues when dealing with obesity. A child may feel as though they are not "beautiful" if they do not resemble those presented by today's media. It is clear that not only does childhood obesity have effects on the overall physical health of the child, but also the mental well-being. An overweight child may face criticism from peers as well as finding it difficult to participate in age-related activities such as sports and other forms of recreation. Peer teasing is commonplace in schools. Teasing in childhood is associated with body dissatisfaction, binge eating and emotional difficulties in obese adults (Wardle & Williamson, 2006). Low self-esteem and symptoms of depression are possible outcomes of obesity in childhood (Burrows & Cooper, 2002).

When understanding the effects of being overweight, one must identify any possible contributing factors. One such reason is an increase in the amount of sedentary activities readily available to children. These include: use of the internet, video games and television. Recent students have shown kids who are watching over 6 hours a day have more problems with depression, anxiety and aggression (Healthy Place Depression Community, 2006). Also, advertisements for food chains and products appear in high frequency during children's television programs. Average American children spend millions of dollars annually on fast foods, and most company's design advertisements to tap this market (Nestle, 2006). Since 1994, U.S. companies have introduced about 600 new children's food products; half of them have been candies or chewing gums, and another fourth are types of sweets or salty snacks (Nestle, 2006). Companies support

sales of "kids' foods," with marketing budgets totaling an estimated $10 billion annually (Nestle, 2006). It appears apparent that marketing targets children with fun and catchy advertisements. On average, one food commercial is shown every five minutes during Saturday morning cartoons (Media and Childhood Obesity, 2008). Children are exposed to such advertisements every time they sit down to enjoy a favorite television program. Children under the age of eight do not recognize the persuasive intent of ads and tend to accept them as accurate and unbiased (Children Now, 2008). Further, a 30-second commercial can influence brand preferences in children as young as two years old (Children Now, 2008). With this type of marketing aimed toward impressionable minds, it leaves little to wonder where today's children are learning poor eating habits.

Earlier studies failed to detect significant associations between the two disorders (obesity and depression), while more recent studies have reported a relation between obesity and depression in some samples (Heo, Pietrobelli & Fontaine, 2006). One variable assumed to impact how one feels about their appearance is gender. One previous national study examined the association between body mass index (BMI: kg/m2) and depressive symptoms as measured by the Center for Epidemiological Studies Depression Scale (CED-S), reporting a significant positive finding in women but not men (Heo, Pietrobelli & Fontaine, 2006). Another study suggested the reason for this observed sexual disparity in the association between depressive mood and obesity status could be due to disparity in: stigmatization; perceived barriers to adequate treatments; access to health care systems; preference to treatment and provider options; and biological factors underlying psychopathological pathways (Heo, Pietrobelli & Fontaine, 2006). For

instance, biological factors such as genetic variation in susceptibility to depression and obesity may also be different between men and women (Heo, Pietrobelli & Fontaine, 2006). Woman may feel more pressure from societal influences to be thin. During adolescence, girls experience increasing pressure to be physically attractive, and, according to our current weight-based model of health and beauty, this demands a physique much slimmer from the norm (Grant, Lyons & Landis, 1999). Further, pressures to be thin increase for girls just as their bodies gain the weight and fat associated with pubertal development (Grant, Lyons & Landis, 1999). Whereas pubertal changes in males tend to be valued by society and by males, pubertal changes in girls (i.e., increased body fat) are often devalued by society and by girls themselves (Grant, Lyons & Landis, 1999).

Hypothesis

The purpose of this study was to investigate the extent to which childhood obesity is related to the onset of childhood depression. As discussed in the literature review, childhood obesity plays a role in certain medical conditions. Current research suggests that children who experience childhood obesity may experience symptoms associated with depression (Heo, Poetrobelli & Fontaine, 2006). This study is designed to analyze the relationship between childhood obesity and depression. Based on the reviewed literature, the followed hypotheses are proposed:

1. There is a relationship between obesity and depression. Children who obese will be more depressed than their lower weight peers.
2. Obese females will be more depressed than males
3. Obese children will watch more television than non-obese children
4. Obese children will participate in fewer sports than non-obese children

5. Children's weight will be related to participation in sports.

Method

Subjects

Subjects for this study include those students, both male and female, in grades 3rd through 5th. Subjects were recruited from the Marshall University Summer Enrichment program and Kershaw Elementary in Lancaster, SC. A total of 29 students, 10 male and 19 female, from these three grade-levels were included in this study.

Instruments

The Child Depression Inventory, 2nd Edition (CDI-2) is a 27-item rating instrument written at the lowest reading level of any measure of depression for children (Maria, 2003). This instrument contains 27 items, each of which consists of three statements. For each item, the individual is asked to select the statement that best describes his or her feelings for the past two weeks. The assessment is designed for a variety of situations, including schools, child guidance clinics and child psychiatric settings (Person Assessments, 2007). In addition to gathering data using the CDI-2, a questionnaire completed by the parent was used in order to collect information pertaining to the amount of time a student spent watching television or if the student engaged in sports. Parents indicated if student did or did not participate in sports and were asked to indicate how many hours per week a student might spend watching television.

Procedure

Permission was obtained from both participating sites and parents before administration of the instrument. Body mass index (BMI) according to age was used to identify overweight children. BMI was calculated from the children's height and weight

in order to obtain an index of the degree of obesity. Overweight was defined as BMI for age that is greater than the 95th percentile. Growth charts for age and gender were consulted. Each student received a consent form, which was signed by the parent/legal guardian before participating in the study and completing the CDI-2. On the form, parents/guardians were asked to indicate the weight, height, and gender of the child. Parents and students were also informed that participation was not mandatory. Only those students's who returned a completed consent form and agreed to completing the assessment were included in the study. This information was used to classify children into two separate categories based on their BMI: obese or not obese (as described in results section). The CDI-2 was then given only to students with consent from parents/guardians who themselves assented to participate. Numbers were assigned to those students who returned a signed consent form. Students were then asked to assent to participating and were given the CDI-2 to complete. Children were not to write any identifying information on the form. Forms were then collected and sorted by number. A randomized sample of children who did not qualify as overweight was randomly chosen for research (control) purposes.

Results

A total CDI-2 score was computed for each participant. The differences in the average scores for the study and control groups were compared using a one way, analysis of variance between means. Table 1 provides total means as well as level of significance for comparison purposes. The CDI-2 scores of children with average BMI scores were compared to the CDI-2 total scores of those found to be obese, according to their BMI.

For the purpose of this study, subjects who were found to have a Body Mass Index of 26 and greater were labeled “obese”. Subjects found to have a BMI of 25 and less were labeled “no obese”. The CDI total scores of those identified as “obese” were then compared to those of the subjects who were labeled “not obese”. Within this study, 12 subjects were found to qualify as “obese” with a BMI of 26 and greater. An analysis of variance between the two groups was utilized to compare means. It was discovered that the mean of the obese subjects were 44.57 while the not obese mean was 46.66.

According to these findings, a significant difference was not discovered between the total CDI-2 score of subjects who are obese to those who are not obese. The total CDI-2 score of obese subjects was not significantly lower than the total scores of the not obese subjects. These findings allow us to conclude that children who are obese do not experience significantly more symptoms of depression than not obese children.

Within this study, 12 subjects were found to qualify as “obese” with a BMI of 26 and greater, 6 females and 6 males. An unpaired t- test was used to compare means between genders. It was discovered through this analysis that the mean score for female subjects was 32.18 while the male group had a mean score of 31.25. According to these findings, there is not a significant difference between the presence of depressive symptoms of obese female children and the presence of depressive symptoms of male children in the current study.

To examine the possible relationship between obesity and time spent watching television, an un-paired t-test was performed to identify any statistical significant correlation between the two groups. The average weight for those students with high-

television time was 110.66 compared to those with low-television time who had a mean of 112.44.Results did not suggest a correlation between time spent watching television and rate of obesity in our study.

To further examine the possible relationship between CDI scores and participation in sports, an unpaired t- test was used to compare total CDI scores of those students who did not participate in sports verses those who do participate in sports. The average CDI score of those who participate in sports was 45.91 compared to those who do no participate in sports with a mean of 43.88. Based on the results of this statistical analysis, there was not a significant difference found between these two groups.

To examine a possible relationship between the weight of subjects who do not participate in sports verses those who participate in sports, an unpaired t-test was performed to compare means of these two groups. The average weight of those who do participate in sports is 84.45 compared to those who do not participate in sports with a mean of 185.41. Statistical analysis of means reveals there is a significant difference in weight between these two groups. Thus, student's who participate in sports tend to weigh less than those who do not. This finding supports hypothesis 5: that children's weight will be related to participation in sports.

Discussion

The lack of correlation found between obesity in children and the presence of depression symptoms can be viewed in a positive light as the rate of obesity in children is steadily on the rise. However, the absence of a relationship between these two variables is surprising, considering the presented literature. Current literature states low self-esteem

and symptoms of depression are possible outcomes of obesity in childhood (Burrows & Cooper, 2002). In addition, if we think of our society's view of obesity, we may anticipate mental health problems. Considering this information, one is left to wonder what other variables impacted the lack of relationship between these variables. One influence could be how obesity is viewed within a small cohort; a local community, for example. If the norm within the community is not in agreement with the media portrayal of obesity, then the psychological impact of obesity may be lessened. If the majority of the community is overweight, the obese child is accepted as normal.

Another surprising outcome was the lack of relationship found between genders within our obese subjects. Concerning our sample, perhaps age is a factor. Preadolescent children are not as aware of their own body image. As presented in the literature review, a previous study examined the association between body mass index and depressive symptoms as measured by the Center for Epidemiological Studies Depression Scale (CED-S), reporting a significant, positive finding in women but not men (Heo, Pietrobelli & Fontaine, 2006). Also, biological factors such as genetic variation in susceptibility to depression and obesity may also be different between men and women (Heo, Pietrobelli & Fontaine, 2006). During adolescence, girls experiencing pressure to be physically attractive, and, according to our current weight-based model of health and beauty, this demands a physique much slimmer from the norm (Grant, Lyons & Landis,1999). Further, pressures to be thin increase for girls just as their bodies gain the weight and fat associated with pubertal development (Grant, Lyons & Landis, 1999).

To expand upon this study, the hypothesis could be re-tested using a larger sample

size that included a broader-age group. Doing so would allow us to determine if developmental changes are at work with the psychological effects of obesity. Any trends concerning age, weight and CDI-2 scores could be examined. Perhaps hormonal differences that create gender differences at later ages are not present in the elementary years and should be considered in a future study.

The lack of relationship between obese verses control subjects who reported high levels of television/computer time verses those who reported low television/computer time was surprising given the literature that supports an increase in sedentary activity increases the rate of obesity. As stated in the literature review, studies conducted in the last 20 to 30 years show a strong correlation between obesity and lack of physical activity. Additionally, the literature reported a reason in the increase is the amount of sedentary activities readily available to children. These include: use of the internet, video games and television. Recent studies have shown kids who are watching over six hours a day have more problems with depression, anxiety and aggression (Healthy Place Depression Community, 2006). This finding may indicate that there are other extraneous variables that yield a greater impact on the rate of obesity than simply time spent on sedentary activity.

A relationship was not observed between the CDI-2 scores of those subjects who participated in sports verses those who did not. This outcome was also surprising given the reviewed literature that reported depression is associated with an increase in the amount of sedentary activities readily available to children. Nearly half of youths aged 12 to 21 years old are not vigorously active on a regular basis (Kendall & Serrano, 2006).

The presented literature reports that exercise can help improve symptoms of certain mental conditions such as depression and anxiety (American Obesity Association, 2006). Considering this, it is plausible to assume the lack of physical activity may increase the likelihood of depression.

The lack of findings may indicate other physical activities besides participation in sports should be considered. For example, a child playing after school with friends can be just as active as a child participating in an organized sport. An additional study can expand upon this study's definition of physical activity by utilizing questions to better determine the activity level of the child.

The only significant relationship found existed between the weight of subjects and if they participated in sports. Those students who participated in sports were found to have a lower weight than those who did not participate in sports. This finding is supported in the literature. As stated in the literature review: participating in physical activity is important for children and teens as it may have beneficial effects on body weight (U.S. Obesity Trends, 2006).

Limitations

One significant limitation was not being able to obtain height and weight measurements in school. Information was obtained from parents and as such, there may have been errors in the accuracy of data reported. As mentioned above, using participation in sports, as an indicator of level of physical activity may be a limitation due to the narrow definition of what being physically active entails.

Recommendations

The lack of relationship found in this study suggests that there are other important contributing issues impacting depression and obesity in children. Continued research aimed at understanding, identifying and treating childhood depression and obesity are needed to ensure attention is given to this disorder. Childhood obesity is a pressing issue needing continued research, especially given the rise in obesity rates. Understanding what are not significant contributing factors allow us to focus on other possible causes of childhood depression. A focus shifted to understanding the impact one's community has on the acceptance of obesity may prove beneficial to understand the surprising lack of a relationship between obesity and depression. A greater knowledge of these issues will help ensure proper intervention helping to foster healthier, more successful and happy children.

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Table 1: T-TEST TO COMPARE MEANS

Variable	Mean	Level of Significance
CDI-2 Total Score Obese Non-obese	 44.57 46.66	 NS
Weight Male Female	 31.25 32.18	 NS
Obese High TV Low TV	 110.66 112.44	 NS
Sports Obese Non-Obese	 45.91 43.88	 NS
Weight High Sports Low Sports	 84.45 185.41	 p=0.05