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Analysis of association between childhood overweight/obesity with screen time, sedentary life style and low levels of physical activity

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Abstract

The escalating prevalence of childhood obesity, affecting nearly 40 million children under five globally, has become a pressing public health concern. The high incidence of obesity in this population can be attributed to numerous factors, such as unhealthy eating habits, lack of physical activity, sedentary lifestyle, and increased screen time, which were exacerbated by worldwide lockdowns during the Covid-19 pandemic. These factors, together with obesity, can potentially predispose these children to non-communicable diseases such as coronary artery disease, type 2 diabetes, and cancer, thereby increasing morbidity and mortality rates. This capstone project aims to globally assess the prevalence of obesity or overweight status in children, establish a relationship between screen usage, physical activity levels, and sedentary behavior, and examine the impact of Covid-19 lockdowns on these parameters. The study methodology includes a comprehensive literature review and data collection from global studies on childhood obesity. Findings from this study could be instrumental in identifying risk factors and developing interventions to mitigate the rising rates of childhood obesity, ultimately supporting the WHO's goal of "no rise in childhood overweight by 2025". Additionally, the study would provide valuable recommendations to decrease sedentary behavior in children and increase physical activity levels, promoting healthier lifestyle choices in children.

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Chapter 1: Introduction

1.1 Background

Childhood obesity has been increasingly common in recent decades. Around forty million children under the age of five are overweight, accounting for 6% of all children in this age range worldwide. Overweight is projected to affect 18% of children aged 5 to 19. This equates to almost 340 million youngsters. [1]It has become a growing threat to children's health all across the world, owing to improper eating habits, a lack of physical activity, and a sedentary lifestyle. Childhood obesity can lead to the development of no communicable diseases such as coronary artery disease, type 2 diabetes, cancer, and so on, all of which contribute to increased morbidity and mortality rates in both childhood and adulthood. [1][2] Fast food exposure, a busy lifestyle, socioeconomic level, media influence, parenting actions, and other factors all have a part in the development of obesity in children. Worldwide lockdowns during the Covis-19 epidemic had a significant effect on ordinary life, leading to a rise in sedentary behavior among children and increased screen time on games, social media, and television. [6]

This capstone project's findings support the idea that increased screen time, low levels of exercise, and a sedentary lifestyle all play a part in the emergence of childhood obesity. [3]Obesity is typically caused by an imbalance in calorie intake and expenditure of energy. Evidence suggests that youngsters who have an addiction to electronic gadgets use less energy for physical activity, which contributes to weight increase.[29] They spend the most of their time staying in the same spot, watching television, playing online games, and scrolling through social media. The restrictions enforced during the Covid 19 pandemic exacerbated the situation. Reduced movement outside the house, and physical activity was restricted. Even before the outbreak of Covid 19, caregivers used to give their children electronic devices like tablets,

phones, and video game consoles to assist with keeping them under control. This has now created a grave situation in society. Excessive weight growth in children has both long-term and short-term repercussions, lowering their quality of life and increasing rates of morbidity and mortality in the general population.

As an expanding global issue, WHO has designated "no rise in childhood overweight by 2025" as one of its six global dietary targets? The findings of this investigation will be critical in stratifying risk variables and developing interventions to reduce rates of childhood obesity that result from low physical activity, screen time, and sedentary lifestyle. [30]

1.2 Purpose of the study

The goal of this capstone project is to;

Assess the prevalence of obesity or overweight status among young people globally/regionally/by country.

Establishing a link between screen usage, physical activity levels, and sedentary behavior among kids with childhood obesity. The impact of Covid 19 lockdowns on raising screen time, lowering physical activity levels, and increasing childhood obesity/overweight rates. Finally, recommendations for minimizing inactive behavior in children and increasing physical activity levels will be included in this study.

Method A survey of the pertinent literature. Data collection from global studies on childhood obesity.

Chapter 2: Materials and methods

2.1 Implemented methods

The goal of this capstone project is to investigate how inactive lifestyles like screen usage may lead to childhood overweight. To collect data on inactive or sedentary behaviors and obesity among children, I performed a comprehensive examination of research papers that had been published. The goal of this literature review is to give a comprehensive overview of major published material on sedentary behaviors in children and adolescents. The presented overview of the literature examines the multiple aspects of screen time and additionally looks for strategies to use screen time to reduce childhood obesity, particularly through the use of active video games. [10]

In order for carrying out the review of literature, the topic of capstone project, which is the relationship between screen time and childhood obesity, will be defined. Following that, databases such as PubMed, centers for disease control and prevention, the Public Health Database, UNICEF, Google Scholar, will be used to find papers of relevance. I utilized the following search terms, keywords, and phrases throughout these databases: Screen time; childhood obesity; screen time and eating habits; the impact Parental influence on obesity; socioeconomic circumstances and obesity; television use in homes; parental influence on television use; for encouraging physical activity; exercise guidelines; screen time recommendations; technology and obesity The literature review took place over the period of a year, and all of the sources mentioned above were used.[10]

Chapter 3: Literature review

3.1 Defining childhood Overweight/Obesity

Obesity is defined as an excessive or abnormal buildup of fat that may be detrimental to one's health. Obesity in childhood is a medical disease that mostly affects children and adolescents. [1] Obesity in children is characterized differently than it is in adults. BMI Categorization of - Children (BMDBMIC) - was developed for kids and teens aged 2 to 19 years at the time of the examination. The measurement criteria depends on the CDC's growth chart, comprising "BMI-for-age charts, between two and twenty years, by gender and age." [2]

Overweight Obesity is defined in children under the age of five as having more than three standard deviations above the WHO Child Growth Standards the median. [3] Overweight and obesity are characterized as follows for children aged 5 to 19: Obesity is characterized as having a BMI for age that is more than two standard deviations higher than the WHO Growth Reference median. Overweight is defined as a BMI for age greater than one standard deviation above the WHO Growth Reference median deviations above the median of the WHO Growth Reference. [3] Overweight and obese children frequently battle with weight as they grow into adulthood, and they are at a higher risk of having additional comorbid diseases.[4] These disorders, which are becoming more common in children, such as diabetes type 2, breathing problems, and hypertension, used to mostly impact adults and are related with rising obesity rates. Worse, therapies based on food and exercise have shown extremely modest effects on weight loss in youngsters. [5][6]

3.2 The prevalence of overweight/obesity in children

Since 1975, global obesity has nearly tripled. In 2016, approximately 1.9 billion adults aged 18 and up were overweight. Over 650 million of them were overweight. In 2016, 39% of

adults who were 18 and above were overweight, with 13% being obese. Overweight or obese persons kill more people than underweight people in a majority of the world's countries. 39 million kids under the age of 5 were overweight or obese in 2020. Nearly 340 million children and adolescents aged between the ages of 5 and 19 were overweight or obese in 2016. [3] Childhood obesity is an important issue for the public in the United States, endangering children and adolescents. Obesity is still common in children and teenagers. Obesity existed in 19.7% of young people aged 2 to 19 years in 2017-20201, effecting around 14.7 million of children. Obesity prevalence among children aged 2 to 5 was 12.7%, 20.7% among kids aged between the ages of 6 and 11, and 22.2% among children who were twelve to nineteen. Certain groups are also predisposed to childhood obesity. Obesity was present in 26.2% of Hispanic children, 24.8% of non-Hispanic Black children, 16.6% of non-Hispanic White children, and 9.0% of non-Hispanic Asian children. [7]

Obesity is defined as a BMI of 95th percentile and higher on the sex-specific BMI-for-age 2000 CDC Growth Charts.[8] Figure 1 shows time trends of overweight and obesity in children in USA.[8] Figure 2 shows sex ratios in childhood obesity and ever weight rates.[8],[9]

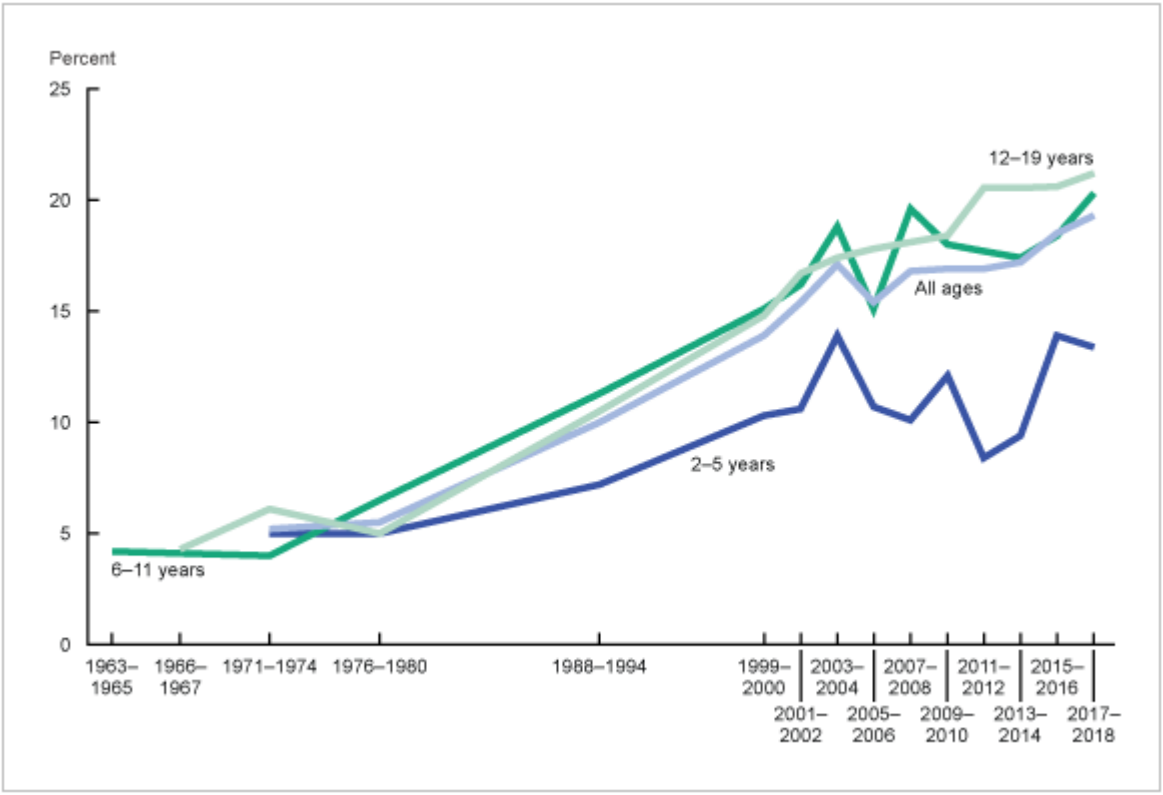

Figure 1: Obesity and overweight rates in children and adolescents aged 2- 19 years, by age: US, 1963 to 2018

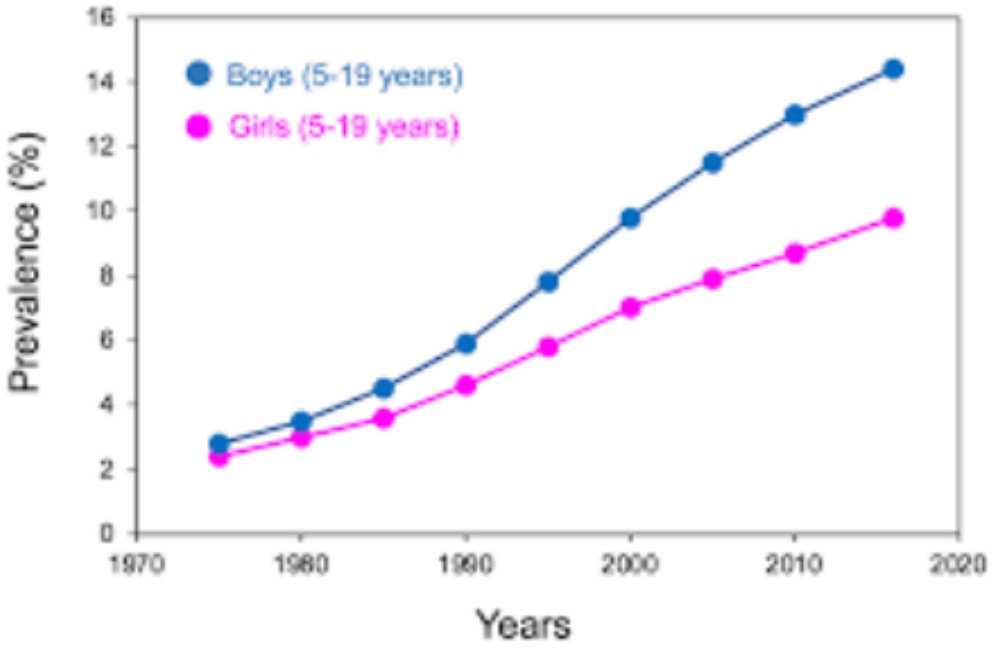

Figure 2: Childhood obesity sex ratios in time trend

3.3 Drivers of sedentary behavior

Sedentary behavior in children and teenagers is influenced by a variety of factors. In order to devise effective interventions and methods to battle this epidemic, health practitioners must assess the social, ecological, psychological, and financial aspects that may influence unhealthy habits. The home has long been recognized as having a strong impact on physical activity and screen time. [11] According to research, the level of support provided by parents, as well as the degree to which they become positive role models, can influence children's levels of physical activity and screen time. Parents have an important role in their children's exposure to things that can be deemed obstacles or facilitators to the level of activity in which their children participate. [6] If a parent believes in their ability to encourage moderate levels of exercise, their children are more likely to involve in labor activities and have a decreased likelihood of getting obese or having sedentary habits. [12] For example, research suggest that children with late bedtime habits have a great deal of screen time. Because parents have the authority to control bedtimes and time spent on screen use, they can play an important role in minimizing screen utilization in kids. [13]

Studies have indicated that positive encouragement, such as promoting children to participate in sports, purchasing sporting goods, and offering transportation for extracurricular events, can significantly increase a child's physical activity levels. [10][14][15]

In modern times, technology is a crucial component of children's daily lives. As a result, public health specialists have begun to investigate the link between technology use and poor health outcomes in young people and teens. Weight gain and obesity have been linked to media consumption, as have emotional instability, sadness, mental health difficulties, loneliness, anxiety, and impulsivity. [16][17] A research conducted involving children and teens has found

if the electronics like televisions, computers tablets are inside children's room it will have a huge impact for increased screen time in children. As well as this study has found incidence of media usage increases with increasing age of the child. [18] A survey conducted by Australian government health and aging department has found that at least among 98% of children aged 5-14 the most common leisure time activity is watching television. [19]

3.4 Association between screen time and childhood overweight

If we look at the mechanisms how screen time affects children's weight gain there are numerous mechanisms linked. Physically activities or exercises are substituted by technology, children and adolescents tend to spend lots of hours playing video games, watching television and watching videos on tablets. [20] They do not move for hours when addicted to these hobbies. Eating while looking at screen and decreased levels of sleep also contributes for the development of obesity. Figure 3 shows how screen time has an impact on children's weight. [20] [21]

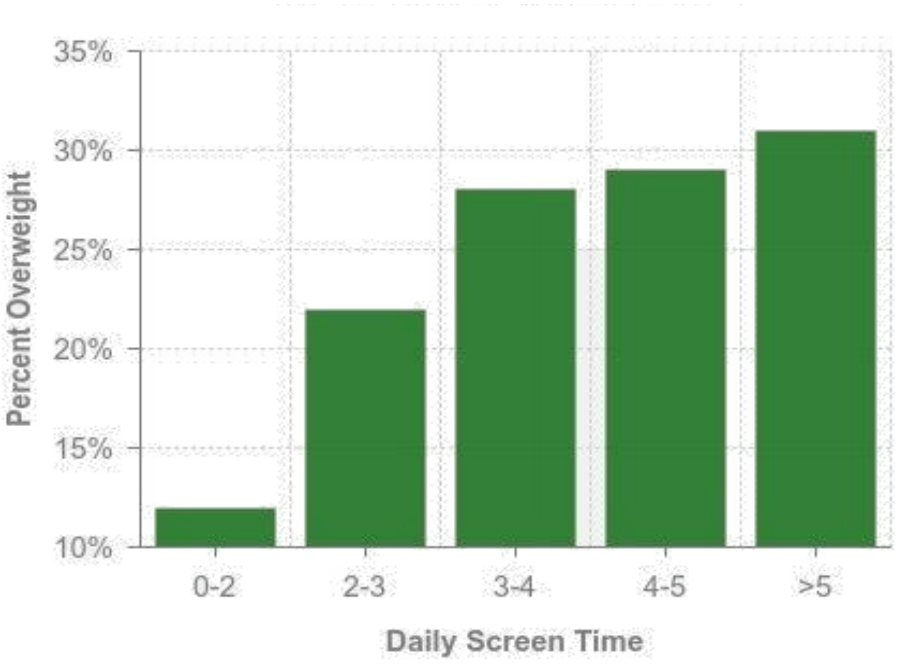

Figure 3: Relationship between prevalence of obesity and daily screen time.

Research has found that main mechanism of gaining weight associated with increased screen time s high energy intake. Epidemiological analyses shows children who are exposed to high levels of media usage tend to eat fewer vegetables are fruits but eat more high fat fast food, snacks and drinks soda. [20] They have a higher energy intake as a result.

Decreased sleep is another cause for developing overweight associated with high media usage in children. Especially for the children who are aged 3-7 there is a strong connection between gaining weight and inadequate sleep. [20] A study done in Network found that 3 or more hours of daily screen time doubles the risks of insomnia when compared with those who have less than 1 hour of screen exposure. Sleep depreciation can provoke appetite regulating hormones to misbalance resulting in increased hunger and decreased fullness. [20][22]

Chapter 4: Evaluation and recommendations

4.1 Summary

Obesity among children is a global problem that is expected to increase the prevalence of a variety of chronic diseases, including coronary artery disease, diabetes type 2, and others. Over one in every six children in the United States is obese, according to the CBC, which is three times greater than the rate in the 1970s. This Capstone project explored the association between childhood and adolescent obesity and sedentary activities, namely screen use. In this Capstone, sedentary activities (watching television, playing online games, using computers, using electronics, etc.) were identified as a severe public health issue. The data is clear, implying that sedentary behavior is a major contributor to childhood obesity. [23] [24]

This Capstone project demonstrates that various entities are required to encourage physical activity and minimize sedentary behaviors among children and adolescents. Individual lifestyle elements. Exercise and nutritious food are essential for change. However, because

children are frequently dominated by parents, caregivers, teachers, administrators, and so on, their sense of self-efficacy is greatly influenced by these adults. Guardians, parents, and school authorities serve as important role models for teenagers because they spend a great deal of their daytime hours at home or at school. [25]

4.2 Recommendations

They ought to encourage children to be active at home and school through educating them with the benefits of exercising as early as feasible. Day care centers, nurseries and after-school activities, for example, must provide many planned activity opportunities during the school or nursery, such as two half an hour playground breaks or four 15-minute exercise intervals. Adults should avoid allowing their children to have televisions in their bedrooms, and television usage should be limited based on age. [25]

Adolescents aged 12 and younger, for example, should be restricted to one hour of television viewing every day. To avoid the start of childhood obesity, children in nursery school settings (ages 2 to 5) should be targeted. [26] According to the CDC (2016), over sixty percent of kids under six spend about of 30 hours a week without parent's care. This is because many parents work (roughly 40 hours each week). Physical activity should be promoted in elementary and middle schools, extracurricular activities, and recreational centers for children and adolescents aged 5 to 12. [25][26]

Because media plays such an essential part in the lives of children, it is critical to employ multimedia as a method to enhance physical activity levels. Public health campaigns can be an effective intervention method for children and adolescents.

These campaigns use media like television, the internet, radio, and movie theater trailers to disseminate messages. [27] Young people should participate in no less than one hour of

exercise per day, according to US regulations. Walking is a wonderful approach for kids and adolescents to attain the necessary physical activity levels because it is easy on the muscles and joints and can be done anywhere. The public may use a multimedia campaign to encourage children to walk. In the past, the public has experienced success with campaigns like this.

The American Academy of Pediatrics states unequivocally: For youngsters aged 3 to 12, a maximum of than one hour of spent on screens per day is permitted. Children under 2 years should not get exposed to mobile screens or televisions, Limit the use of computers and mobile devices in a child's room, do not allow a television in a child's room. Allow no usage of digital media during mealtimes or assignments. Eat family meals on a regular basis. Promote physical activity. Set a consistent bedtime for your child. Set boundaries .Set a positive example for your youngster to follow. [20]

Chapter 5: Conclusion and discussion

My Capstone project aims to investigate the relationship between too much screen time and overweight in kids and teens, as well as to investigate how to use screen time to battle obesity. In recent years, there is a considerable progression on fight against childhood over weight. The CDC's Vital Signs report (2013) says. According to evidence gathered from the literature study, sedentary activities in teenagers are related with poor health outcomes. Excessive television viewing (over two hours per day) has been associated to weight gain in the literature, and teenagers aged 12 to 17 far exceed media consumption recommendations. Targeting parents' conduct appears to be a promising technique for reducing sedentary tendencies in teenagers. Parents can combat sedentary behavior in their children through motivating them to involve in sport activities, and involving in exercises with their children. Income, physical surroundings, and level of education are all socioeconomic factors that might encourage or

discourage parents and adolescents from partaking in physical activities. The analysis of the literature found that adolescents' usage of technology is a significant daily element of their life. The use of portable electronics such as tablets, mobile gaming devices, and smartphones in particular is increasing. [28]

Combating the obesity epidemic is fraught with difficulties. Prevention is often regarded as one of the most successful techniques to reversing sickness rates, but prophylaxis must occur at numerous levels to be successful. Obesity prophylaxis must occur at the personal, organizational, community, and national levels. Research and initiatives to get a better knowledge of the techniques of supporting changes in behavior that will effect childhood obesity should be the focus of literature. Common sense suggests that reducing energy intake and increasing the consumption of energy will result in a decrease in and/or management of adolescent obesity. [28][29]

The findings of my capstone project support the hypothesis that physical inactivity and screen usage are associated with weight gain and obesity in youths. Despite advances, the rate of obesity among children and adolescents remains unacceptable, and evidence indicates that obesity is connected with significant health concerns. When roughly twenty percent of American children are obese. [30][31] It is critical to develop effective methods of avoiding obesity and assisting people who are currently obese in maintaining an appropriate weight. Avoiding the development of chronic diseases is still a critical public health obligation.

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