Apr 27th, 3:15 PM - 4:30 PM

The Effects of COVID-19 on Childhood Obesity: A Quasi-Systematic Review

Gwyneth Hadasa
Ouachita Baptist University

Maria Urbina
Ouachita Baptist University

Erica Gaddie
Ouachita Baptist University

Detri Brech
Ouachita Baptist University

The Effects of COVID-19 on Childhood Obesity: A Quasi-Systematic Review

Gwyneth Hadasa, Maria Urbina, Erica Gaddie, Detri Brech, PhD

Ouachita Baptist University

Abstract

Background: Childhood obesity has been an ongoing public health concern through the years. As a result of the COVID-19 pandemic, schools went online causing changes in diet and physical activity of children. Children had a higher sedentary lifestyle than usual causing a decline of physical activity. This led to an increase on the prevalence of childhood obesity.

Objective: The purpose of this research was to determine the effects of the COVID-19 pandemic on lifestyle changes in childhood obesity regarding nutrition status and physical activity.

Method: A quasi-systematic review was conducted. ProQuest, EbscoHost, PubMed and journals such as the American Journal of Clinical Nutrition and the International Journal of Obesity were utilized to collect data. A total of 70 scholarly journals were used to assess factors that had impacts on childhood obesity.

Results: Overall, there was an increase in childhood obesity. The four main factors were food intake, physical activity (PA), other health aspects, and school closures. A higher consumption of ultra-processed foods, snacking, and home-cooked meals was detected. There was an increase on sleep time and schedule, screen time (ST), and a decrease of PA. The closing of schools played a role on weight gain as a result of reduced movement.

Conclusion: Childhood obesity has increased as an effect of COVID-19. Negative lifestyles were developed such as an increase of sedentary behaviors and unhealthy eating patterns.

Objective

The purpose of this research was to determine the effects of the COVID-19 pandemic on lifestyle changes in childhood obesity regarding nutrition status and physical activity.

Introduction

Childhood obesity is a worldwide problem that has increased at an alarming rate throughout the last five years. The World Health Organization reported in 2019 that an estimated 38.2 million children under the age of five years were either overweight or obese, according to their body mass index (BMI). As a result of the COVID-19 pandemic, schools across the world were forced to resume classes remotely which caused half of the world's students to decline in education, nutritional health, and physical activity level. The prevalence of childhood obesity in the United States is 19.3% and affects approximately 14.4 million children and adolescents. According to the Arkansas Center for Health Improvement (ACHI-AR), 40% of students were classified as overweight or obese in the 2019-2020 school year with a higher increase of obesity found in boys than in girls. However, 18% of the girls were classified as overweight compared to 16% of the boys. There has been a correlation regarding obesity and race. A total of 50.6% Hispanic students reported a classification for obese and overweight levels. Students of African American (43.2%), Native American (40.4%), and other races (43.3%) reported high percentages of overweight and obese as well. Asian students had the lowest percentage (28.3%) of children in the overweight and obese levels followed by 36.4% of Caucasian. The ACHI-AR stated that 31.3% of kindergarten students entered school being overweight or obese. Sixth graders had the greatest percentage, with 44.4% of them in the overweight or obese category. Within the five school districts in Arkadelphia, AR, Central Primary School reported the lowest number of students (29.91%) in the overweight and obese range followed by Louisa Perritt Primary (38.39%) and Arkadelphia High School (39.66%). The schools with the greatest number of students in overweight and obese categories were Peake Elementary School with 41.12% and Goza Middle School with 45.38%.

References

- Obesity and overweight. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight. Updated June 9, 2021. Accessed June 28, 2021.
- Education: From disruption to recovery. UNESCO. https://en.unesco.org/covid19/educationresponse. Updated June 2, 2021. Accessed June 28, 2021.
- Obesity, Race/Ethnicity, and COVID-19. Centers for Disease Control and Prevention. https://www.cdc.gov/obesity/data/obesity-and-covid-19.html. Updated March 22, 2021. Accessed June 28, 2021.
- Assessment of childhood and adolescent obesity in Arkansas: Year 17 (Fall 2019-Spring 2020). Arkansas Center for Health Improvement. https://bmi.achi.net/BMIContent/Documents/210217A_FINAL_DRAFT_Year_17_(2019-20)_Arkansas_BMI_Report.pdf. Updated March 2021. Accessed June 28, 2021.

Methodology

A quasi-systematic review was conducted. Online databases were searched from June 7-18, 2021, for scholarly peer reviewed articles published in ProQuest, EbscoHost, PubMed and journals such as the American Journal of Clinical Nutrition and the International Journal of Obesity beginning the search with ProQuest. The original search was performed using search terms such as "COVID-19 AND 'childhood obesity'" as well as "COVID-19 AND childhood obesity". Restrictions were placed on language, date, and source types. The selected restrictions were English language, published in the last 12 months, and scholarly journals.

The articles were first screened based on the title, abstract, and keywords used to describe the articles. All types of studies were selected with the following criteria: (1) research populations which involved children (0-18 years old) or parents who had children, and (2) both COVID-19 and obesity were mentioned. Articles that did not mention obesity but were related to factors of obesity were also included. The factors were but not limited to diet/nutrition, physical activity, mental health, and school closures. Review of literature and research protocol articles were included for the second screening. Duplicates within and across the databases were excluded. The second screening involved the full text. Studies were excluded from the review if the studies examined the impact of obesity on COVID-19 infections or if the studies did not examine factors that were not directly related to obesity. Additional duplicates during analysis were found and excluded.

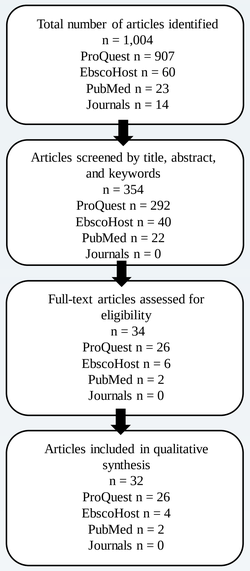

Figure 1. Flow diagram of the literature search and filtering results for a review using search terms: COVID-19 AND "childhood obesity"

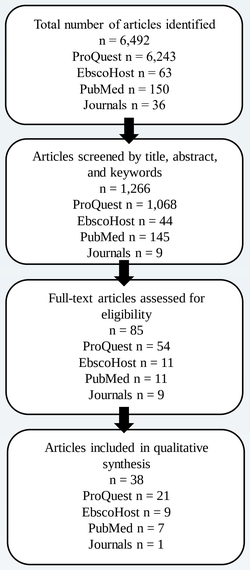

Figure 2. Flow diagram of the literature search and filtering results for a review using search terms: COVID-19 AND childhood obesity

Four categories regarding effects of COVID-19 on children's lifestyle behaviors were developed: (1) effects on food and nutrition, (2) effects on physical activity, (3) effects on other parts of health, and (4) direct effects of school closure

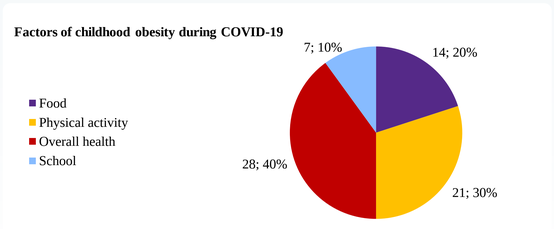

Figure 3. Number of articles found for each category of COVID-19 effects

Results

Diet quality and food behaviors worsened due to home confinement measures. The consumption of junk foods, ultra-processed foods, fried foods, and sweet foods increased and became more accessible through online services. Several studies found that children were consuming more. The higher caloric intake raised the risk of obesity. With more time for cooking, healthy food such as fruits and vegetables increased. One study reported that children were meeting water and milk requirements. However, the habits did not increase overall diet quality as many older children replaced mealtimes with high energy-dense and low nutrient-dense snacks.

School-aged children went from having physical education classes, recesses, and the constant moving to having no required physical activity (PA). Consequently, PA was reduced causing an increase on sedentary lifestyle. A larger decrease in PA was observed in the urban areas due to the limited space to perform PA causing families in this living environment to be more susceptible to weight gain. Several studies reported an increase in screen time such as watching television and using computers/tablets/cellphones.

Interventions such as parental support groups and daily integration of children activity video programs were suggested to aid in obesity management.

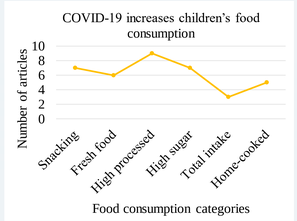

Figure 4. Number of articles directly mentioning an increase of various food consumption

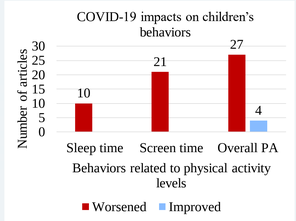

Figure 5. Number of articles directly mentioning a change in children's' activities

Table 1. Effects of food intake on childhood obesity based on different study locations

Country	Key findings	Obesity prevalence
Italy	5.2% (n = 75) of the patients ate breakfast regularly, and 64.3% (n = 72) consumed fruit as an afternoon snack	Decreased
	72.7% children reported a decrease on eating	Decreased
Brazil	Hamburgers, sweets, soft drinks and sugar-sweetened beverages were consumed more frequently by adolescents than children	Increased
Brazil, Chile, Colombia, Spain, Italy	There was a high proportion of adolescents who consumed sweets, soft drinks, sweet cookies, and sausages (50.9%, 37.2%, 33.6%, and 18%, respectively)	Increased (higher in Latin America)
	Modified consumption of fried food, sweet food, legumes, vegetables, fruits.	Increased
US	About 1/3 of families increased the amount of high-calorie snack foods, desserts/ sweets, and fresh foods in their home	- 2/3 decreased - 1/3 increased
	Most children had regular mealtimes and irregular snack times mostly caused by stress	Increased
Saudi Arabia, Britain, and Turkey	60% reported their children were eating fresh, unprocessed foods	Decreased

Table 2. Effects of physical activity on childhood obesity based on different study locations

Country	Key findings	Obesity prevalence
Croatia	PA decreased especially in urban areas	Increased
England	PA reduced from 69.4% to 28.7%	Increased
Italy	No significant relationship between ST and BMI	N/A
Netherlands	62% decreased PA, ST and sedentary increased	Increased
Spain	ST inversely correlated with PA, and screen time was increased.	Increased
Sweden	Both PA and ST increased. 19.4% met WHO movement guidelines.	Increased
Greece, Sweden, Ireland	Decreased PA in urban, slight increase in suburbs	Increased in urban areas, no change in suburban areas
Brazil	No PA children 1.37x more likely to be anxious. Anxious children are 3.12x more likely to have appetite changes.	Increased
Canada	Loss of structured activities and destinations for PA led to decreased PA	Increased
US	More time spent in PA lowers anxiety. More anxiety and decreased PA during the pandemic.	Increased
South Korea	Reduced PA	Increased
Palestine	45% had no PA, 75% increased ST	Increased
Tunisia	ST increased, PA decreased, poor sleep	Increased
14 Various countries	Outdoor space and supports for parents are important to promote healthy movement behaviors to preschoolers	Increased in higher income countries

Results

Children with overweight or obese BMI reported more stress linked to the deprivation of social interactions and anxiety of higher vulnerability to severe COVID-19 infections. Food insecurity increased as unemployment rose due to shutdown of businesses. Other systematic reviews indicated that inadequate purchasing power of nutrient-dense foods intensified stress. Overeating of high caloric processed foods were identified as a coping mechanism. Boredom was also associated with increased eating and obesity prevalence. Children with obesity visited the pediatrician less often, worsening obesity management. All these behaviors above resulted in an excess body weight and nutritional inadequacy.

Table 3. Effects of mental health on childhood obesity based on different study locations

Country	Key findings	Obesity prevalence
Sweden	32 % children reported anxiety	Decreased
China	Schoolchildren with overweight had significantly higher levels of COVID-19 infection fear, stress, depression, perceived weight stigma, and problematic social media use than those without overweight	Increased

Table 4. Other factors impacting childhood obesity based on different study locations

Country	Key findings	Obesity prevalence
US	Less pediatric visits worsen obesity management	Increased
India	Food insecurity increased from 21% to 80%. Households with food insecurity were more likely to have low diet quality.	Varied among households

Table 5. Effects of lifestyle quality on childhood obesity based on different study locations

Country	Key findings	Obesity prevalence
Greece	Sleep duration, screen time, consumption of fruits, snacking, fast food consumption, and body weight increased while PA decreased	Increased
Italy	Fruit intake, snacking, red meat and sugary drinks, screen time, and sleep increased while PA decreased	Increased
Portugal	The importance of intervention to manage children's obesity, nutrition, PA	Decreased
US	PA levels, snacking, and screen time increased, shift in sleep schedule	Increased

School closures resulted in the absence of physical activity, healthy eating habits, and access to mental health support, all of which contributed to prolonged sedentary periods and increased weight gain among children. Children usually experience weight gain and an unhealthy sleeping schedule during the summer but tend to lose weight throughout the school year. Yet, the pandemic prevented the return to normal schooling.

Table 6. Effects of school closures on childhood obesity based on different study locations

Country	Key findings	Obesity prevalence
China	After the lockdown was lifted, the youths showed a significant increase in BMI on average	Increased
South Korea	The duration of school closure was significantly associated with an increased BMI and being normal weight did not exclude the risks for gaining weight	Increased
US	Adolescent athletes who played a sport during the COVID-19 pandemic reported fewer symptoms of anxiety and depression and higher PA	Decreased

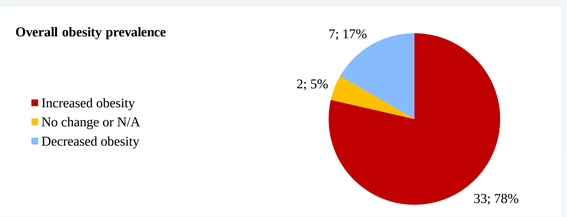

Figure 6. Obesity prevalence as observed in the quasi-systematic review

Conclusion

Childhood obesity became more prevalent as a result of COVID-19 pandemic. The pandemic caused negative lifestyle changes in diet and PA. Diets were altered into an increased consumptions of junk, ultra-processed, fried, and sweet foods. Increasing gaming hours, watching TV, and screen time led to a decrease in PA. Stress, anxiety, fear, and food insecurity were all effects of COVID-19 that contributed to behaviors that promoted obesity. Preventive measures are needed to limit the growth of obesity and encourage healthy lifestyle behaviors in children and their parents.

Acknowledgements

- Dr. J.D. Patterson Summer Research Grant
- Ouachita Baptist University