

A Meta-Data Analysis on the Primary and Secondary Health Care Needs to Prevent Obesity among the High School Students in the United States

Jessica Evangelin Emmanuel-Janagan*

Sophomore at Pineville High School, Pineville-LA 71360, USA

Abstract: Obesity in schools has grown to become one of the most dramatic features of the global obesity epidemic, with long-term consequences. It has become a public health challenge globally. This study is a meta data analysis of recently published articles in the refereed journals. Fifteen articles were purposively selected based on the criteria of obesity among the high school students and were analyzed to find the recent changing trends of obesity in schools. The analysis of studies demonstrates that school-aged children in the United States have a high prevalence of obesity. The findings provide evidence for prevention intervention strategies to reduce obesity in school-age children. The finding shows that there is a need for more greater awareness of the issues of obesity in schools and the author recommends the ways and means to reduce the obesity in schools in the United States. It is recommended that a healthy lifestyle during high school age is a must for teenagers to avoid obesity.

Keywords: Obesity, adolescent, health, education, high school.

INTRODUCTION

Obesity is a universal challenge in both developed and developing countries due to the changes in lifestyles. Obesity has become a global epidemic with rates having risen to alarming levels in both developed and developing countries. Specially in developed countries like United States a greater number of people are having obesity. The recent statistics says that the U.S. has the world's eighteenth-highest rate of obesity .32% of adults with obesity in the US in 2021 (USA facts, 2023). More than two-thirds of adults in the US are overweight or have obesity.

LITERATURE REVIEW

A study conducted by Kelly *et al.* (2023), among the children and adolescents with overweight and obesity have an impaired health-related quality of life (HRQoL). However, it is unclear which of these children are most affected in their physical, psychological, and social functioning. This study aimed to evaluate HRQoL in treatment-seeking children and adolescents with overweight, obese, and severe obesity. A cross-sectional study was performed at the Centre for Overweight Adolescent and Children's Healthcare (COACH). Their major findings were that the HRQoL of treatment-seeking children and adolescents with overweight and obesity was most affected in children and adolescents with the most severe grade of obesity According to these findings, lifestyle intervention programs targeting childhood obesity should be aware

of this even more vulnerable group so that treatments can be tailored according to their needs.

In recent years' research has shown a prevalence in childhood obesity, referring to the world health organization 2017 report; in 2016 41 million children under the age of 5 years were obese and over 340 million children and adolescents aged 5 to 19 were overweight or obese. These alarming statistics are a direct reflection of how food addiction is rampant amongst children as well. While the resiliency theory is not structured to explain the addictive behavior of food addiction, it can however explain a child's ability to recover from such an addiction (Hopkinson and Johnson, 2017). Pediatric obesity now reaches epidemic proportions in the country. High stress levels, sedentary and changing lifestyles and various chemicals used in food contribute to premature ageing (Ekatha, 2013). Another study conducted by Skvortsova *et al.* (2023) highlights that the peak debut of obesity occurs at an early school age. over the past 15 years, there has been an increase in the prevalence of overweight. The peak of the onset of obesity at the age of 7 years indicates the shortcomings of the existing organizational approaches to the medical examination of schoolchildren and the prevention of obesity in children. Considering the increasing prevalence of overweight and obesity among school-age children, this problem should remain one of the priorities.

Obesity as a Health Problem

In a study conducted by Benjamin *et al.* (2023), the authors identify Obesity as a disease with a major

*Address correspondence to this author at the Sophomore at Pineville High School, Pineville-LA 71360, USA; E-mail: jessyemmanuel16@gmail.com

negative impact on human health. However, people with obesity may not perceive their weight to be a significant problem and less than half of patients with obesity are advised by their physicians to lose weight. They found that obesity is strongly related to >50 medical conditions, with many of them having evidence from Mendelian randomization studies to support causality. The clinical, social, and economic burdens of obesity are considerable, with these burdens potentially impacting future generations as well.

Another study conducted by Beynon (2023) highlights that obesity and mental health problems in children are both significant and growing public health issues. There is mixed evidence on the relationship between obesity and mental health in children. This study found a small but significant positive association between mental health and childhood obesity. The focus must remain on reducing health inequalities as this is a more important driver of child health and well-being. However, as a precautionary measure it may be worth considering if children living with obesity who present for weight-management services may benefit from a review of their mental health status to identify if further support is needed, if capacity allows, and this can be done in a supportive way.

A study conducted by John *et al.* (2021) states that obesity is consistently related to non-communicable disease, especially diabetes. Risk increases across all levels of obesity but increases exponentially for extreme obesity. Population-wide increases are due to a complex system of environmental, societal, economic, and cultural factors, and these need to be addressed in implementing upstream primary prevention solutions. Working outside of the health sector will be required, posing a challenge to the implementation of national obesity prevention plans.

Conceptual Clarifications and Background Information

Obesity is caused due to several reasons that includes changes in the Metabolism—how your body changes food and oxygen into energy it can use, eating and physical activity behaviors, Community and neighborhood design and safety, short sleep duration and negative childhood events. Obesity can be managed by a strict diet and regular exercise. Obesity is traditionally defined as a rise in body weight that was higher than 20% of a person's ideal body weight. The weight links with the reduced risks of death were found by some factors such as height, gender, and age.

Based on factors, overweight might be defined as 15-20 % higher than ideal body weight. Therefore, current definitions of obesity and overweight are based on the measure of weight and height, not morbidity. Such measures are used to calculate a known number as Body Mass Index (BMI). Body mass index (BMI) determines the body size of a person by using his/her height and weight. In adults, obesity is explained as having a BMI of 30.0 or more reliable source, similar to the Centers for Disease Control and Prevention (CDC, 2023). Obesity is related to a higher risk for dangerous diseases, such as type 2 diabetes, heart disease, and cancer. Obesity is the most occurring disease. The CDC evaluates that 42.2 % of Americans 20 years old and elders had obesity in 2017 to 2018. However, BMI is not overall. It has few restrictions as a metric. Factors like muscle mass, sex, age, and ethnicity will change the relationship between BMI and body fat. In addition, BMI does not differentiate among excessive muscle, bone mass, or fat, and it does not give any demonstration of the division of fat between human beings (betahealthy.com).

Body Mass Index

Traditionally, people with a BMI of over thirty points are obese in the medical field. However, it has become known that BMI may not be an accurate measure of obesity and several other health conditions. Through the lens of symbolic interactionism, obesity which is a major factor/contributor to a high body mass index (BMI) and vice versa, and which predisposes people to lifestyle and chronic diseases. Knaak *et al.* (2017) suggested that, while a BMI in the 25-35 range indicates obesity,

Risks of Obesity

Obesity may increase your risk of serious health problems, including heart disease. Diabetes. Abnormal cholesterol — a high triglyceride level but a low level of high-density lipoprotein (HDL, or "good") cholesterol. High blood pressure

METHOD

The researcher selected fifteen journal articles published during the period from 1999 to 2015 that fall under a specific criterion of obesity among the high school students were selected and all other articles on obesity were purposively excluded from this study. The selected articles were analyzed to find the recent changing trends of obesity in schools. Google scholar

and research Gate were used as the searching tools to select these articles. Though there are hundreds of articles on obesity, the researcher focused on obesity in high schools.

Obesity in Schools

According to the Division of Population Health, National Center for Chronic Disease Prevention and Health Promotion, In the United States, the percentage of children and adolescents affected by obesity has more than tripled since the 1970s.¹ In 2017–2018, about 1 in 5 school-aged children were affected by obesity (20.3% of all 6–11-year-olds, 21.2% of all 12–19-year-olds). The prevalence of obesity among 2–19-year-old children was 25.6% for Hispanic children, 24.2% for Black children, 16.1% for White children, and 8.7% for Asian children.

Food Addiction

While the scientific study of food addiction is new and not without controversy, much has been learnt in recent years about this form of addiction. The conceptual model of substance addictions has begun to change, however, with researchers placing an increasing emphasis on the behavior of substance use rather than the chemical properties of the substances themselves. It is also becoming clear that continuous partaking in many behaviors can lead to physiological changes in the brain like those observed in drug dependent individuals. According to recent models, addiction is a syndrome that can be expressed through a variety of specific behaviors. Overeating may be one of those behaviors (Barry, Clarke & Petry, 2016).

Scientifically, food addiction is a cluster of chemical dependencies on specific foods or food in general; after the ingestion of high palatable foods such as sugar, excess fat and/or salt the brains of some people develop a physical craving for these foods. Over time, the progressive eating of these foods distorts their thinking and leads to negative consequences which they do not want but cannot stop (Food Addiction Institute, 2017). For the purpose of this paper, food addiction as a form of substance abuse is going to be examined as it is evident there is a correlation between the two. In recent years' research has shown a prevalence in childhood obesity, referring to the world health organization 2017 report; in 2016 41 million children under the age of 5 years were obese and over 340 million children and adolescents aged 5 to 19 were overweight or obese. These alarming statistics are a

direct reflection of how food addiction is rampant amongst children as well. While the resiliency theory is not structured to explain the addictive behavior of food addiction, it can however explain a child's ability to recover from such an addiction.

Though the term "food addiction" does not differentiate which foods may be associated with addictive-like eating, the construct posits that certain foods with added fat and/or refined carbohydrates like white flour or sugar (e.g., pizza, chocolate, chips) may uniquely activate the reward system in a manner similar to drugs of abuse, which may trigger problematic eating behavior in susceptible individuals (Gearhardt *et al.*, 2009; Gearhardt, Davis, *et al.*, 2011; Schulte *et al.*, 2015). Backing this theory, laboratory animal models have been used to study food addiction. Applying the animal model, the study was done using rats, which showed that rats can become physically addicted to food in the same way people become addicted to drugs as the study was originally designed to understand drug dependency. Obesity is another dietary problem that is responsible for increased morbidity and mortality from hypertension, type-II diabetes, stroke, osteo-arthritis, gall-bladder diseases, coronary-heart diseases, sleep-apnea, respiratory problems, and certain type of cancers.

Impact of Digital Technology

Recent numbers show that more children and youth are becoming obese. This is mostly because they prefer to spend more time in front of the TV or laptop and, not. Spend enough time exercising and leading a healthy lifestyle. One of the major concerns about the overuse of digital technology is the decrease in direct face-to-face interaction. There is a strong connection between excessive screens time, especially in the early years, and increased sleep problems, obesity, lower academic achievement, behavior problems, increased high-risk behaviors, depression, and lower self-esteem (American College of Pediatrics). Preschool children learn pre-academic social skills such as sympathy, empathy, adjustment, altruism, self-regulation, and problem-solving through exploration from their natural environment, play, and interaction with peers and adults. Play is an essential part of childhood development. Children learn many of their social skills through playing with others. This study shows that preschool children who spend more time on screen devices are less able to perform basic tasks such as using building blocks, and even some older children are unable to complete traditional pen-and-paper

Table 1: Results of the Meta-Data Analysis of the Fifteen Articles on Bullying in Schools in America

Name of the Journal	Authors	Major findings
The American journal of clinical nutrition	Caballero, B.H., Clay, T.E., Davis, S.M., Ethelbah, B., Rock, B.H., Lohman, T.G., Norman, J.E., Story, M.D., Stone, E.J., Stephenson, L., & Stevens, J. 2003.	A significant reduction in the percentage of energy from fat was observed in the intervention. The intervention had four components: 1) change in dietary intake, 2) increase in physical activity, 3) a classroom curriculum focused on healthy eating and lifestyle, and 4) a family-involvement program school. Total energy intake (by 24-h dietary recall) was significantly reduced in the intervention schools, but energy intake (by direct observation) was not. Motion sensor data showed similar activity levels in both the intervention and control schools. Several components of knowledge, attitudes, and behaviors were also positively and significantly changed by the intervention.
Journal of Child Health Care.	Hohensee, C.W., & Nies, M.A. 2014.	The international physical inactivity epidemic among children has contributed to child obesity. Schools can be an effective source of physical activity opportunity. A cross-sectional sample of 1306 American children was drawn from the Panel Study of Income Dynamics – Child Development Supplement. Children who had no physical activity during physical education (PE) were much more likely to be obese than normal weight in comparison with those who met the US national requirements. This study suggests that meeting US national guidelines for PE-related physical activity may be effective in preventing obesity.
The American journal of clinical nutrition.	Gittelsohn, J., & Rowan, M.2011.	Obesity, diabetes, and other diet-related chronic diseases persist in American Indians at rates that are significantly higher than those in other ethnic minority populations. Environmental interventions to improve diet and increase physical activity have the potential to improve these health outcomes, but relatively little work has taken place in American Indian communities. Need to focus on supply and demand, institutional and multilevel approaches, and the identification of institutional bases to sustain program.
Journal of Obesity.	Zephier, E., Himes, J.H., & Story, M.D. 1999.	This study estimated the prevalence of overweight and obesity in American Indian children and adolescents attending schools in the Aberdeen area Indian Health Service. Prevalence of obesity in males increased systematically with age and exceed prevalence in females at many ages. Overweight and obesity based on elevated BMI are highly prevalent among American Indian youth. Even at the youngest school ages, overweight is more than twice as likely as national patterns and obesity is more than three times as prevalent. Primary prevention must begin early among these children
Pediatric Health Conditions in Schools.	Gray, J.S., Lee, A.J., & Pont, S.J. 2019.	Obesity is a highly prevalent concern in American schoolchildren and is associated with a myriad of chronic health issues, such as type 2 diabetes, asthma, sleep problems, and premature mortality. Furthermore, obesity is associated with adverse psychological factors, including symptoms of depression, disordered eating, low self-esteem, poor quality of life, social isolation, and avoidance of healthcare services. It is therefore critical that school professionals understand the problem of childhood obesity as well as effective strategies for addressing the problem and its social impact.
Childhood Obesity.	Matsuzaki, M., Sánchez, B. N., Acosta, M. E., & Sanchez-Vaznaugh, E. V.2021.	The evidence of beneficial changes was strongest among children attending schools located in rural areas, and boys in suburban and urban areas. Despite evidence of beneficial policy impact, childhood obesity prevalence remains high, especially in urban areas in California. Additional policies and environmental interventions are recommended to address obesogenic risk factors.
The Milbank quarterly	Wolfson, J.A., Gollust, S.E., Niederdeppe, J., & Barry, C.L. 2015.	The authors identified the attribution of blame and responsibility to parents was consistently high, regardless of parental status or gender. Support for policies to curb childhood obesity also did not differ notably by parental status or gender. High parental responsibility was linked to higher support for school-targeted policies but generally was not associated with policies outside the school setting. Attribution of greater responsibility to entities external to children and their parents (schools, the food and beverage industry, and the government) was associated with greater support for both school-targeted and population-based obesity prevention policies.

(Table 1). Continued.

Name of the Journal	Authors	Major findings
Journal of Health Care for the Poor and Underserved,	Knowlden, A.P., & Sharma, M.K. 2013.	The authors recommended that the efficacy of school-based interventions targeting minorities can be enhanced through explicit operationalization of behavioral theories, incorporation of systematic process evaluation, long-term follow-up of intervention outcomes, and inclusion of the family and home environment to avoid obesogenic risk factors in the schools.
Education	Gregory Green, C. Riley, Brenda H. Hargrove 2012.	This study highlights that due to the severe consequences and publicity associated with childhood obesity, health and physical education specialists across the nation have focused their attention on strategies and solutions for reducing the prevalence of obesity among children and adolescents. The problem of obesity affects girls because they increasingly become preoccupied with their body image and their developing body during adolescence; body image and self-esteem tend to be highly related for many developing children. Advertisements inevitably influence the food choices of children and adolescents, and the food is consumed excessively when watching television. Many of the food items in advertisements contain foods that are high in fat, sugar, and calories.
Education.	Walker, P. 2011.	American children are at the epicenter of a global childhood obesity epidemic. Due to increased adiposity, school-aged children are being routinely diagnosed with adult illnesses like Type II diabetes, hypertension, and elevated cholesterol levels. The keys to combating these epidemiological trends are prevention and early intervention. Since many American children are enrolled in school, school-based interventions offer enormous potential in teaching lifelong health habits and curbing the incidence of childhood obesity, especially when these habits are taught proactively as a component of early childhood education.
Education.	Cawley, J., Meyerhoefer, C.D., & Newhouse, D. 2006.	This study recommends for evaluations of innovative PE curricula designed to encourage exercise suggest that PE classes do increase physical activity but have no noticeable effect on student weight. Still, little research has systematically examined how much PE (as it is currently constituted) contributes to weight loss or lowers the risk of obesity, and what little research there is finds no association between PE and weight loss and obesity.
American journal of health behavior.	Grant, V.M., Tomayko, E.J., & Kingfisher, R.D.	In this study, the authors examined patterns of obesity, physical activity (PA), sleep, and screen time in urban American Indian (AI) youth in the sixth-eighth grade. The results show that approximately 42% of participants were overweight or obese. Weekday to weekend shifts in PA and sleep must be considered when designing targeted obesity prevention interventions.
Health Education Journal.	Urrutia-Rojas, X., Ahmad, N., Bayona, M., Bae, S., Rivers, P., & Singh, K.P. 2008.	This study determined the specific risk factors associated with obesity among African American, Hispanic, and Caucasian children. A specific risk factor seen in the African American children was the frequent use of sweets and sugar-sweetened drinks, which increased the odds of obesity three-fold. In the Caucasian children, the odds of obesity increased over two-fold because of frequent consumption of snacks with a high fat content. In Hispanic children, specific risk factors included physical inactivity and frequent consumption of multiple servings of fruit, which increased the odds of obesity approximately two-fold and 68 per cent, respectively.
The American journal of clinical nutrition.	Liu, J., Lee, Y., Micha, R., Li, Y., & Mozaffarian, D. 2021.	This study found that in both children and adults, junk food intake was higher among non-Hispanic white and Black Americans compared with Mexican Americans, among those with higher compared with lower education, among women compared with men, and among older compared with younger adults.
Research, Education, and Action	Choudhry, S.L., McClinton-Powell, L., Solomon, M.C., Davis, D.S., Lipton, R.B., Darukhanavala, A., Steenes, A., Selvaraj, K., Gielissen, K.A., Love, L., Salahuddin, R., Embil, F.K., Huo, D., Chin, M.H., Quinn, M.T., & Burnet, D.L. 2012.	This study highlights that child in the Power-Up program reduced mean BMI z scores significantly. The after-school venue proved feasible. The use of CBPR principles helped to integrate Power-Up into school activities and contributed to the likelihood of sustainability. Engaging parents effectively in the after-school time proved challenging; additional strategies to engage parents are under development. Plans are underway to evaluate this intervention through a randomized study. Collapse

activities because of their excessive usage of screen-based technology (Paton, 2014). Excessive screen time in young children is associated with obesity and aggressive behavior and may negatively impact attention span, language development, and cognitive development (Carson & Janssen, 2012).

Nevanpera *et al.* (2012), study “Occupational burnout, eating behavior, and weight among working women” investigates associations among occupational burnout, eating behavior and weight among working women. Women experiencing burnout at baseline had significantly higher scores in emotional eating ($P = 0.002$) and uncontrolled eating ($P = 0.001$) than did those without burnout. A significant difference was found between the change in uncontrolled eating with and without burnout ($P = 0.05$). Uncontrolled eating decreased significantly among those without burnout at baseline ($P < 0.001$). They Concluded from their study, those experiencing burnout may be more vulnerable to emotional eating and uncontrolled eating and have a delayed ability to make changes in their eating behavior. They recommend that burnout should be treated. First, burnout and eating behavior should be estimated in obesity treatment.

RECOMMENDATIONS AND CONCLUSION

It is recommended that a healthy lifestyle during high school age is a must for teenagers to avoid obesity. Healthy diet, regular exercise, avoiding junk food, limiting screen time, and adequate sleep. It is also recommended that high school students engage in more group activities and outdoor activities that will certainly help them to avoid obesity.

The analysis of studies demonstrates that school-aged children in the United States have a high prevalence of obesity. The findings provide evidence for prevention intervention strategies to reduce obesity in school-age children. Despite the alarming statistics reported by the world health organization 2021, little has been done to combat these figures. In 2006 George Alleyne, director emeritus of the Pan America Health Association (PAHO) called for more attention to be paid to Chronic Non-Communicable Diseases (CNCD's). He argued that “obesity was a growing concern, even among children” and diabetes was the steady cause of death among many in the Caribbean (Samuel, Kirton & Guebert, 2014). Controlling the number of soft drinks and unhealthy food choices in school canteens and the school feeding program may influence the obesity rate since children spend most of

their waking hours at school. No one is stating that everything that is “unhealthy” must go, however we must create a balance for the vulnerable population (Johnson and Rodrigues, 2016). It is also important to have Food and Nutrition classes that does not only teach you how to cook but also teach you the importance of a balanced healthy diet. Provision of educational sessions for parents on the importance of a balanced diet (emphasis placed on obesity and risks involved) can also aid in reducing the rate of obesity which is linked to food addiction. Adolescents are disputably “hyper consumers” of media, and a better understanding of the influence of advertising/marketing of appetitive/hedonic products (e.g., alcohol, tobacco, palatable foods) on adolescent addictions is warranted, especially in the realm of nonsubstance appetitive behaviors (Samuel, Kirton & Guebert, 2014, Johnson and Emmanuel Janagan, 2024).

CONFLICT OF INTEREST

The author has no conflict of interest in this study.

REFERENCES

- Beynon, C. 2023. Association between children living with obesity and Mental Health problems: a data analysis of the Welsh Health Survey, UK. *BMC Public Health* 23, 383
<https://doi.org/10.1186/s12889-023-15293-8>
- Caballero, B.H., Clay, T.E., Davis, S.M., Ethelbah, B., Rock, B.H., Lohman, T.G., Norman, J.E., Story, M.D., Stone, E.J., Stephenson, L., & Stevens, J. 2003. Pathways: a school-based, randomized controlled trial for the prevention of obesity in American Indian schoolchildren. *The American journal of clinical nutrition*, 78 5, 1030-8.
<https://doi.org/10.1093/ajcn/78.5.1030>
- Carson, V., & Janssen, I. 2012. Associations between factors within the home setting and screen time among children aged 0–5 years: A cross-sectional study. *BMC Public Health*, 12(1), 539.
<https://doi.org/10.1186/1471-2458-12-539>
- Cawley, J., Meyerhoefer, C.D., & Newhouse, D. 2006. Not Your Father's PE: Obesity, Exercise, and the Role of Schools. *Education Next*, 6, 60-66.
- Choudhry, S.L., McClinton-Powell, L., Solomon, M.C., Davis, D.S., Lipton, R.B., Darukhanavala, A., Steenes, A., Selvaraj, K., Gielissen, K.A., Love, L., Salahuddin, R., Embil, F.K., Huo, D., Chin, M.H., Quinn, M.T., & Burnet, D.L. 2012. Power-Up: A Collaborative After-School Program to Prevent Obesity in African American Children. *Progress in Community Health Partnerships: Research, Education, and Action*, 5, 363 - 373.
<https://doi.org/10.1353/cpr.2011.a462764>
- Gittelsohn, J., & Rowan, M. 2011. Preventing diabetes and obesity in American Indian communities: the potential of environmental interventions. *The American journal of clinical nutrition*, 93 5, 1179S-83S.
<https://doi.org/10.3945/ajcn.110.003509>
- Grant, V.M., Tomayko, E.J., & Kingfisher, R.D. 2020. Sleep and Physical Activity Patterns in Urban American Indian Children. *American journal of health behavior*, 44 1, 67-75.
<https://doi.org/10.5993/AJHB.44.1.7>

- Green, Gregory *et al.* 2012: "Physical Activity and Childhood Obesity: Strategies and Solutions for Schools and Parents." *Education* 3-13 132 915-920.
- Hohensee, C.W., & Nies, M.A. 2014. Physical activity in American schools and body mass index percentile. *Journal of Child Health Care*, 18, 192 - 201.
<https://doi.org/10.1177/1367493513485650>
- Hopkinson, Debbie Patricia, Johnson, Emmanuel Janagan. 2017. Exploring Parenting Practices of Guyanese Parents based on their Upbringing: The connections to their Children's Wayward and Wandering Behaviors, *Early Child Development and Care*.
<https://doi.org/10.1080/03004430.2017.1389917>
- Johnson, Emmanuel Janagan, Jessica Evangelin E.J. 2024. Prevention strategies and effect of alcohol among adolescent school students. *Alcohol*: Elsevier Group (Impact factor 2.3).
<https://doi.org/10.1016/j.alcohol.2024.03.009>
- Johnson, Emmanuel Janagan., Rodrigues, Vincent 2016: Primary Health Care: Expectations and Tasks for Public Health in Trinidad and Tobago: *Journal of Community Health*, vol.41.3 (pg, 645-649)
<https://doi.org/10.1007/s10900-015-0140-z>
- Knaak, M., N. Goldaracena, A. Doyle, M. S. Cattral, P. D. Greig, L. Lilly, I. D. McGilvray, G. Levy, A. Ghanekar, E. L. Renner, and others. 2017. "Donor BMI >30 Is Not a Contraindication for Live Liver Donation." *American Journal of Transplantation* 17 (3): 754-60.
<https://doi.org/10.1111/ajt.14019>
- Knowlden, A.P., & Sharma, M.K. 2013. Systematic Review of School-based Obesity Interventions Targeting African American and Hispanic Children. *Journal of Health Care for the Poor and Underserved*, 24, 1194 - 1214.
<https://doi.org/10.1353/hpu.2013.0129>
- Lam, Benjamin Chih Chiang, Lim, Amanda Yuan Ling, Chan, Soo Ling, Yum, Mabel; Koh, Natalie Si Ya, Finkelstein, and Eric Andrew 2023. The impact of obesity: a narrative review. *Singapore Medical Journal* 64(3): p 163-171,
<https://doi.org/10.4103/singaporemedj.SMJ-2022-232>
- Liu, J., Lee, Y., Micha, R., Li, Y., & Mozaffarian, D. 2021. Trends in junk food consumption among US children and adults, 2001-2018. *The American journal of clinical nutrition*.
<https://doi.org/10.1093/ajcn/nqab129>
- Matsuzaki, M., Sánchez, B. N., Acosta, M. E., & Sanchez-Vaznaugh, E. V. 2022. Competitive Food and Beverage Policies and Obesity among Middle School Students: Variability by Urbanicity in California. *Childhood obesity* (Print), 18(1), 41-49.
<https://doi.org/10.1089/chi.2021.0025>
- Nevanperä NJ, Hopsu L, Kuosma E, Ukkola O, Uitti J, Laitinen JH. 2012. Occupational burnout, eating behavior, and weight among working women. *The American journal of clinical nutrition*. Vol. 95(4): Pp. 934-943.
<https://doi.org/10.3945/ajcn.111.014191>
- Paton, G. 2014. Infants 'unable to use toy building blocks' due to iPad addiction. *The Telegraph*, 15.
- Samuels, T., Kirton, J., & Guebert, J. 2014. Monitoring compliance with high-level commitments to health: the case of the CARICOM Summit on Chronic Non-Communicable Diseases. *Bulletin of The World Health Organization*, 92(4), 270-276B.
<http://dx.doi.org/10.2471/blt.13.126128>
- Skvortsova O.V., Migacheva N.B., Mikhailova E.G., Katkova L.I. Assessment of the prevalence of overweight and obesity among school-age children in the city of Samara.2022.*Medical Bulletin of the South of Russia*. 2022;13(4):106-113.
<https://doi.org/10.21886/2219-8075-2022-13-4-106-113>
- Urrutia-Rojas, X., Ahmad, N., Bayona, M., Bae, S., Rivers, P., & Singh, K.P. 2008. Risk factors associated with obesity in children of different racial backgrounds. *Health Education Journal*, 67, 121 - 133.
<https://doi.org/10.1177/0017896908089391>
- Van de Pas K, G, de Krom M, A, Winkens B, van Dielen F, M, H, Vreugdenhil A, C, E: 2023. Health-related quality of life in children and adolescents with overweight, obesity and severe obesity: a cross-sectional study. *Obesity Facts*.
<https://doi.org/10.1159/000529560>
- Walker, P. 2011. Winning the War against Childhood Obesity: The Role of Teachers and Schools in Early Childhood Education.
- Wass, John A.H. and others (eds), 2022. 'Obesity as a Public Health Problem', in John Wass, Wiebke Arlt, and Robert Semple (eds), *Oxford Textbook of Endocrinology and Diabetes 3e*, 3 edn (Oxford, 2022; online edn, Oxford Academic, 1 Jan. 2022).
<https://doi.org/10.1093/med/9780198870197.003.0223>
- Wolfson, J.A., Gollust, S.E., Niederdeppe, J., & Barry, C.L. 2015. The role of parents in public views of strategies to address childhood obesity in the United States. *The Milbank quarterly*, 93 1, 73-111.
<https://doi.org/10.1111/1468-0009.12106>
- Zephier, E., Himes, J.H., & Story, M.D. 1999. Prevalence of overweight and obesity in American Indian school children and adolescents in the Aberdeen area: A population study. *International Journal of Obesity*, 23, S28-S30.
<https://doi.org/10.1038/sj/ijo/0800856>

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