Prevelance of Obesity in Indian Child: A National Scenario

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Abstract

Obesity in children is caused by an unhealthy diet, a lack of exercise, environmental factors, and genetics. It is a significant public health issue that is spreading around the world as an epidemic, and it is the most common metabolic syndrome in children. The prevalence rate of childhood obesity is rising rapidly because of the prevalent use of processed foods, junk foods, and other foods that, unfortunately, do not have any positive health effects on the bodies of children. The results of the previous studies show that the prevalence of obesity has tripled since 1975, with almost 41 million youngsters becoming overweight or obese in 2016. Additionally, the prevalence of overweight and obesity is being noted to be somewhere between 5.74 percent and 8.82 percent in school aged children in India. Parents, educators, and peers must all take responsibility for addressing this difficult problem. Although the government has developed policies and guidelines to combat the rapid rise in overweight and obesity through nutrition education programmes, only a limited number of these programmes have been implemented and should be expanded at the family, school, public, state, and local levels. Physical activities should be encouraged as well, because "**today's healthy child will grow up to be tomorrow's healthy adult."**

Keywords: Childhood obesity;Fast Foods; Implementation; Metabolic syndrome; Pocessed Foods

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Introduction

Child obesity become worldwide problem as it is root cause of several lifestyle disease which decrease quality of life. Developing countries are increasing their food resources which decrease food quality and increase ready to serve food. Several processed food high in fat and cholesterol which increase child weight and increase chances of obesity Children and teenagers who are obese suffer from a serious medical condition. It happens when one child's weight exceeds the typical range for his or her chronological age. Obesity/overweight is defined as "unhealthy fat buildup caused by improper or excess fat accumulation" (WHO, 2013). Obesity in children has become a big public health issue that is spreading globally as an epidemic, and it is the most prevalent metabolic complication in children. The number of overweight children has recently increased. Since 1975, the obesity rate has tripled worldwide, with 41 million children below the age of five being fat or overweight in 2016. In 2016, it was expected that over 340 million children and teenagers seen between age of 5 and 19 were overweight or obese (WHO). The trend toward urban expansion, industrialization, and better socioeconomic conditions has resulted in a greater number of overweight or obese children.

Childhood obesity in World and in India

One of the most significant public health issues the world is currently experiencing is childhood obesity. There are numerous low- and middle-income countries affected by the problem, including India. The rate of occurrence is increasing at a rapid pace. The prevalence rate of overweight and obesity in children and adolescents aged 5 to 19 has gradually climbed, rising from 4% in 1975 to approximately 18% in 2016. In 2016, 18% of girls and 19% of boys were overweight, making up the majority of both genders. In India, approximately 5.74 percent of school-age children are obese **(Rajan MAJ, Srinivasam R, and Thaddeus A, 2018),** because the majority of today's children are growing up in an obesogenic environment.

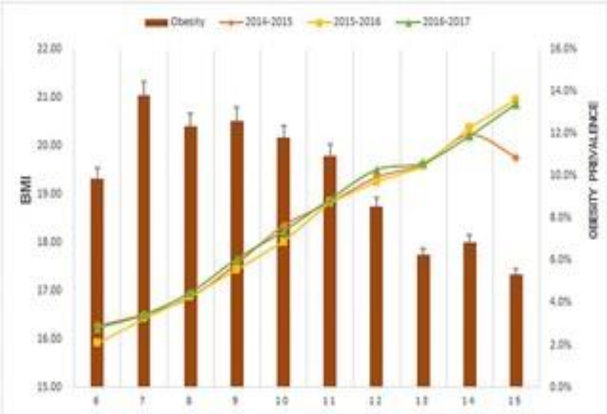


Image 1 :- Zhang X, Zhang F, Yang J, Yang W, Liu W, Gao L, et al. (2018) Prevalence of overweight and obesity among primary school-aged children in Jiangsu Province, China, 2014-2017. PLoS ONE 13(8): e0202681.

Table 1: The prevalence of obesity and overweight in India.

Year of Data Collection	Overweight Perc-entage	Obesity Perce-ntage	Overall Perc-entage	Area
2020	8 %	5 %	13%	**Chandimandir area.**
2015	7%	3%	10%	**Aurangabad**
2017	12%	2%	14%	**Nagpur**
2007	7.56%	3.10%	10.7%	**Kerala**
2019	10.8%	6.2%	NA	**Udupi**
2015	10.2%	6%	NA	**Surat**
2019	4%	2%	NA	**Kanpur**
2008	3.1%	1.2%	4.3%	**Central India**
2004	19.9%	5.75%	NA	**Pune**

Due to the growing consumption of packaged foods, ready meals, and other items that don't love children as much as children love them, childhood obesity is on the rise, as is a surge in the amount of time spent inactive as a result of tv, computer games, and the online, which are replacing extracurricular activities like sports and socializing with one another and altering family lives with growing wealth (**Singh and Sharma, 2005).**

Overweight and obesity are most prevalent in the 8–10 age group. It's also worth remembering that urban regions have a higher incidence than rural places. Obesity has been found to be more prevalent in children from Punjab, Delhi/NCR, Rajasthan, Uttar Pradesh, and Haryana (**Sidhu et al., 2006**).

According to the findings of **Arora and Patel**, the total number of overweight children was 8.8%, with males accounting for 7.8% and girls contributing for 10.2%. Although the overall obesity prevalence was 2.9 percent, boys made up 2.7 percent of the population and girls made up 3.2 percent.

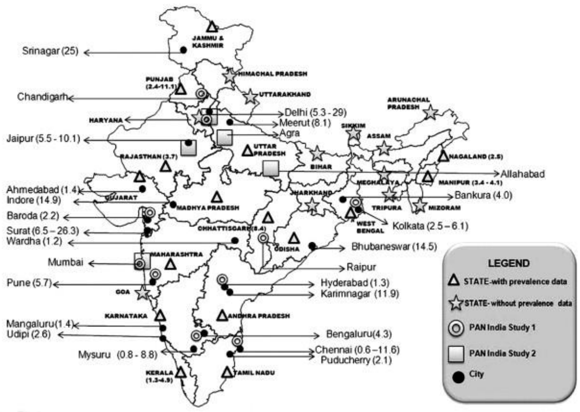


Image 2:- Map of India indicating prevalence (%) of childhood obesity in various States and cities. Values in parentheses are prevalence in percentages.

Why children are more affected?

Normally, infants and children respond to hunger and fullness cues to avoid consuming more calories than their actual requirements. However, the children are surrounded by plenty of things that can make it easy for them to eat junk food and harder for them to be active. Easy access to fast foods at home and at school, peer pressure, the stress of poor academic performance, etc. may result in a preference for junk food and fast foods over healthy home-cooked food by these children. Fast foods are rich in calories, sugar, and salt while being deficient in fiber, protein, vitamins, and minerals. Many fast foods are rich in trans fats, while cold drinks also contribute caffeine along with empty calories. Another ice cream topping is that foods high in processed sugar and fat content frequently come in large chunk sizes.

Nowadays, the eating behaviour of school-going children is more influenced by TV advertisements and free-bee schemes, due to which they eat more fast foods that are rich in saturated fat, refined carbohydrates, and added sugars like pizza, burgers, fried snacks, cold drinks, etc. It is generally established that dietary habits are developed throughout childhood and that adult eating habits are connected to those formed during infancy. Other elements in a kid's environment that cause obesity include the use of food as a bribe or to make a youngster feel more comfortable. These acquired habits can also result in binge eating.

Although dietary factors are not only responsible for this epidemic, genetic factors, along with environmental factors, are also susceptible. Not just in rich countries like the USA, but even in middle-income countries like India, fitness levels are declining and sedentary lifestyles are on the rise. Environmental factors also have an impact on changes in physical activity and dietary habits.

Diagram 1 : Childhood obesity: influencing factors

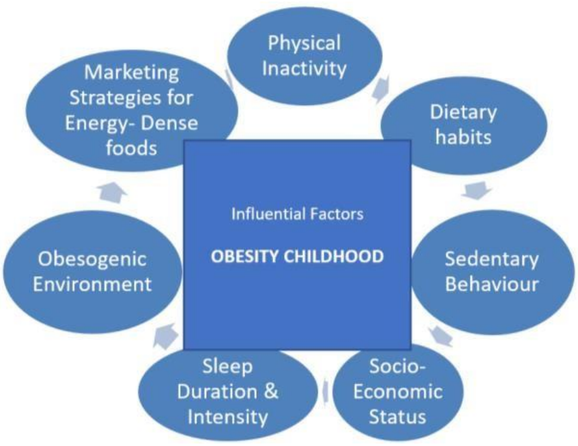
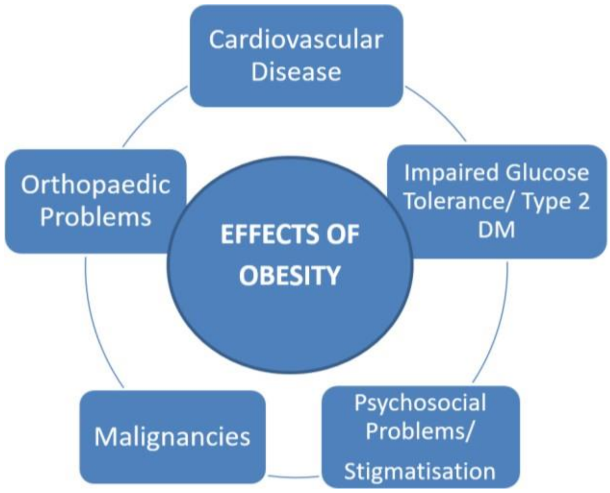


Diagram 2: Childhood obesity: Effects



Adlakha et al. report research on increased physical exercise in a low- or middle-income country, focusing on Chennai, India, in which increasing demand for automobiles has reduced daily commuting. Because of a lack of facilities such as safe pavements, bike parks, and safe parks, increased urbanization and digitalization provide fewer recreational opportunities through healthy play.

Parent-child interaction has also affected dietary behaviour as children spend more time at school or are busy with their academics, and parents also have a lack of time to interact as both mother and father are busy with their jobs.

Consequences

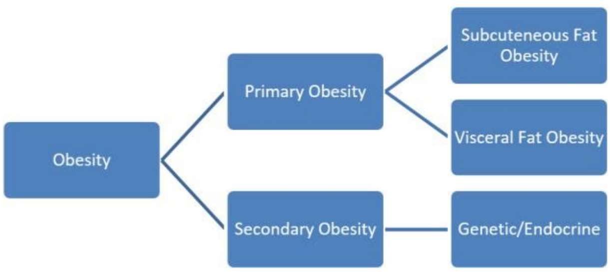
Junk food can be enticing to children, and they may be ignorant of the complications associated with their eating habits. On the other hand, consuming fatty junk food on a daily basis may be addicting for youngsters, leading to difficulties including obesity, chronic sickness, reduced self-confidence, and even depressed mood, as well as impairing their academic and extracurricular performance. Preventing obesity in children is critical not only for preventing chronic disease in childhood but also for preventing chronic disease in adulthood.

According to **Sahoo K et al.,** obesity in childhood can harm a child's overall fitness, socioemotional well-being, and personality. It's also connected to a child's reduced quality of life and poor educational performance.

Medical consequences- Obesity during childhood has been associated with numerous medical conditions. NAFLD, sleep disorders, Type 2 diabetes, respiratory disease, hepatic steatosis, cardiac disease, hyperlipidemia, gallstones, hyperglycaemia, metabolic syndrome, skin disorders, menstruation abnormalities, poor balance, and orthopaedic issues are among these conditions (**Niehoff et al., 2009).** Pre-hypertension and high blood pressure are also more common in children who are overweight or obese. (**Yadav PKS et al.**)

Social and emotional repercussions - In contrast to being linked to a number of physical disorders, childhood and teenage obesity has a significant impact on their psychological and emotional well-being. "Among the major stigmatised and least socially approved childhood conditions is being overweight, according to some." (**Schwimmer JB, Burwinkle TM, and Varni JW).** Because of their weight, individuals who've been overweight or obese are commonly taunted and/or harassed. They are also confronted with a plethora of additional issues, including unfavourable attitudes, discrimination, and stigmatisation.

Diagram 3: Classification of Obesity



The social effects of obesity may lead to chronic weight control challenges. Overweight youngsters prefer to go to safe locations, such as their homes, to avoid harsh remarks and attitudes while seeking food for enjoyment. In addition, compared to their classmates who are of a healthy weight, obese children have few friends, which decreases social engagement and increases time spent on inactive activities. As previously said, physical exercise often causes more anxiety among overweight children, as they find it difficult to compete with their peers and experience shortness of breath. Gaining weight is an unavoidable consequence of the extra calories ingested beyond the number of calories burned **(American Academy of Pediatrics, 2014).**

Academic consequences- Additionally, it has been shown that obesity has a negative impact on young people's academic ability. Based on one study, overweight and obese children face 40% greater problems than their normal-weight classmates in reporting having academic difficulties (**Schwimmer JB et al., 2003).** Obese children are more likely to miss class regularly, particularly if they have serious health problems such as diabetes or breathing problems, which can affect academic achievement.

Fat Cell Theory

The process by which subcutaneous tissues develop is known as adipogenesis, or the ability of preadipocytes to proliferate and transform into mature adipocytes. As obesity progresses, the volume of adipose tissue rises as a result of a persistently favorable energy balance.

White adipose tissue (WAT) and brown adipose tissue (BAT) are the 2 types of adipose tissue found in animals. These two types differ from one another in terms of physiology, distribution, gene function, and function. As the main source of energy, WAT secretes a number of hormones and cytokines that regulate metabolism and insulin sensitivity (**Mathieu P et al., 2010**). The balance between WAT, which acts as the body's primary energy store, and BAT, which focuses in energy expenditure with different levels of thermogenesis through the mitochondrial uncoupling protein 1, is also important for the development of obesity (UCP-1). Furthermore, BAT may impact glycemic control and metabolism (**Yang X. et al., 2003**) as well as alter susceptibility to obesity (**Almind K. et al., 2007).**

In contrast to caloric restriction, physical activity in a dose that is suitable to every person's fitness level is an obvious indicator for the prevention of obesity. Caloric deduction lengthens life expectancy, reduces the chances of developing insulin resistance, cardiovascular, degenerative, and some types of cancer, and prolongs life (**Redman L. M., Ravussin E., 2008**).

Aside from caloric restriction, there is evidence that total energy management for several months, including a rise in energy expenditure, is efficient in reducing subcutaneous tissues. Abdominal fat, which has the highest lipases when compared to the rest of adipose tissue, accounts for the majority of this reduction (**López-Lluch G., et al., 2006**). Additionally, those in peak physical form have greater lipid metabolism than inactive people do (Seidell, **J. C.,**

1991). The lipid profile is another factor that improves physical activity in obese patients. For starters, it raises HDL levels, lowering the low-density lipoprotein proportion and cardiovascular health **(Varady K. A. 2011).** Furthermore, exercise changes LDL and HDL particle density, resulting in a lipid profile that is less susceptible to thrombosis than the short LDL and HDL particles seen in obese people. Furthermore, regular exercise raises insulin sensitivity, which reduces triglyceride levels in individuals with high baseline levels. Exercise also boosts oxidative capacity, which encourages the aerobic glycolysis of fatty acids and carbohydrates and leads to very advantageous peripheral adaptations. Physical exercise thereby restores normal metabolic function and lowers morbidity and death from these sources **(Lamarche B., Despres J.-P., Moorjani S., et al., 1993).**

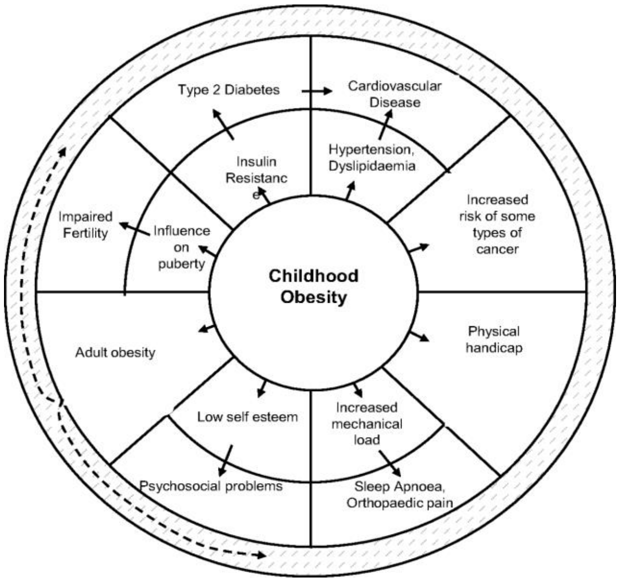
Table 2: BMI Grading and Interpretation

Classification	WHO General Classification of BMI	Asia-Pacific Classification of BMI
Underweight	<18.5	<18.5
Normal range	18.5-24.9	18.5-22.9
Overweight	25-29.9	23-24.9
Obesity Class I/Grade 1	30.0-34.9	25-30
Obesity Class II/Grade 2	35-39.9	≥30
Obesity Class III	>40	---

Health risk of childhood obesity:

In recent years, there has been an increase in childhood obesity. Obesity and overweight in children and adolescents are on the rise in India, affecting people from all socioeconomic backgrounds. It is because the majority of today's children are growing up in an obesogenic environment, which increases our chances of becoming overweight. A few of these factors are social or intellectual in nature, such as advertising exposure for unhealthy foods; an increased number of chain restaurants in a community also relates to a greater number of children at risk for obesity.

Image 3: Consequences of Obesity 2346



The surrounding area has an influence on eating habits in the food supply region, as the availability of nutritious fast-food joints is a key study topic. Food deserts are defined as locations with limited availability of fresh fruits, veggies, and other nutritious foods, which are more common in lower-income or ethnic minority groups. **(Congdon P, 2019).**

There are two primary reasons for focusing on childhood obesity. Children who are overweight are more prone than children in the healthy range to grow up to be obese, and once they are fatty, it is more difficult for these people to lose weight. Children and adolescent obesity are associated with earlier menarche and menstrual irregularity in girls, impaired glucose tolerance, and a higher incidence of syndrome X in teenage people and adult obesity. These changes have been linked to cardiovascular disease.

Many studies show that a high-carbohydrate and fat-rich diet, coupled with increased access to junk food, increases the risk. Consumption of low-calorie, fiber-rich, and high-calcium foods, on the other hand, has been linked to a lower risk of obesity.

Obesity prevention strategies for children:

A primary focus in public health is the prevention of childhood obesity, which can have a significant impact on controlling obesity as it reduces the chances of acute and chronic diseases, improves general health, and helps in development and well-being. Evidence indicates that many programmes have been developed to overcome this disease, but many of them have remained school-based and their effects have been limited **(Weihrauch-Bluher S et al., 2018).** So, to have a good impact on the wellbeing of children, programmes should not only focus on behaviour-oriented prevention but also emphasise family-based, community-based, physical activity-based, governmental-based, and environment–based interventions.

Educating the general public on healthy nutrition (, nutraceutical **(Kumar V *et al.*,2021)**, bioactive compounds**(Kumar S *et al*.,2022)** , alternative good food sources and spreading information about health issues It is being implemented strategies such as neighboring public areas and parks for children and teenagers, free access to water sources in daycare and schools, and legally mandated quality assurance for food stalls in kindergarten and schools. To combat childhood obesity, the federal or state governments should order all food establishments to display precise calorie labels, mention calories on menus, restrict advertisements of unhealthy foods, and promote healthy food preparation among parents (Karnik, S., & Kanekar, A.).

Nutrition education and quality food **(Kohli D *et al.*, 2019)** is a combination of learning tactics and environmental support that promotes people's adoption of healthy eating patterns and other dietary and nutrition-related behaviours on their own volition.

The likelihood of a fat kid becoming an obese adult increase with age. Several studies have found a link between paediatric and adolescent obesity and adult obesity. Almost half of all obese adults were obese as children (**Biro FM & Wein M**). Obesity can thus be avoided only if children are properly monitored from a young age with good food care like good gut health with probiotic drinks and dietary sources **(Singh S *et al.*, 2022)**. It is critical to understand in children the importance of healthy feeding habits and physical activity from an early age. To encourage healthy eating, they should increase their intake of fresh fruits, vegetables, pulses, legumes, whole grains, and nuts. Involve them in at least 20 minutes of regular physical activity each day and limit their calorie intake from trans fats and simple carbs (WHO, 2019). And this can only be accomplished if the entire family works together to make healthy behavioural changes. Because a healthy lifestyle and good eating practices with recent technologybased nutraceutical **(RAUTELA I *et al.*, 2021)** is beneficial for everybody, even if weight reduction is not the primary goal for children. Several advance food laboratory and industries are working on incorporation of good bioactive**(Kumar, S *et al.*, 2022)** ingredients in conventional food products to increase food nutritional quality.

Furthermore, **Pandita et al.** promote nutritional objectives and recent **technology (Verma P *et al*.,2022)** to monitor health status is important to assess and health parameter in early status. The children prefer different variety and nutrition, such as the "different-coloured diet":

- Low-calorie green foods that may be enjoyed without limitation
- White foods contain a modest number of calories and should be taken in moderation.
- High-calorie foods should be avoided or taken in small amounts.

Conclusion

Obesity can be controlled and tackled only if a balanced and sensitive approach is adopted. Parents, teachers, peer groups, and the community must take responsibility for addressing this issue by organising healthy food carnivals, spreading healthy messages, educating people, and encouraging them to live healthy lifestyles. As well, emphasis should be placed on physical activities, as **"today's healthy child will grow up to be tomorrow's healthy adult."**

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