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Review Article

Relationship Between Childhood Obesity and Junk Foods

Yasmeen Jaan[1], Sonia Bassan[2]

[1]Post Graduate Student, SKIMS, Jammu and Kashmir, India.
[2]Nursing Tutor, Government Nursing College, Jammu and Kashmir, India.
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I N F O

Corresponding Author:
Yasmeen Jaan, SKIMS, Jammu and Kashmir, India.
E-mail Id:
yasmeenjaan120@gmail.com
Orcid Id:
https://orcid.org/0000-0003-2650-973x
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A B S T R A C T

Childhood obesity has reached epidemic levels in developed as well as in developing countries. Overweight and obesity in childhood are known to have significant impact on both physical and psychological health. The mechanism of obesity development is not fully understood and it is believed to be a disorder with multiple causes like environmental factors, lifestyle preferences, and cultural environment play an important roles in the rising incidence and prevalence of obesity worldwide. In general, overweight and obesity are assumed to be the results of an increase in calorie intake, dirty carbohydrates and fat intake. Childhood obesity can profoundly affect children's physical health, social, and emotional well-being, and self-esteem. It is also associated with poor academic performance and a lower quality of life experienced by the child. Many co-morbid conditions like metabolic, cardiovascular, orthopedic,neurological, hepatic, pulmonary, and renal disorders are also seen in association with childhood obesity.

Keywords: Childhood Obesity, Overweight, Consequences, Epidemiology,Lifestyle, Comorbid Conditions

Introduction

The world is undergoing a rapid epidemiological and nutritional transition characterized by persistent nutritional deficiencies, as evidenced by the prevalence of stunting, anemia, and iron and zinc deficiencies. Concomitantly, there is a progressive rise in the prevalence of obesity, diabetes and other nutrition related chronic diseases (NRCDs) like obesity, diabetes, cardiovascular disease, and some forms of cancer. Obesity has reached epidemic levels in developed countries. The highest prevalence rates of childhood obesity have been observed in developed countries; however, its prevalence is increasing in developing countries as well.[1] Females are more likely to be obese as compared to males, owing to inherent hormonal differences.[2]

It is emerging convincingly that the genesis of Type 2 Diabetes and Coronary Heart Disease begins in childhood, with childhood obesity serving as an important factor.[3] There has been a phenomenal rise in proportions of children having obesity in the last 4 decades, especially in the developed world. Studies emerging from different parts of India within last decade are also indicative of similar trend.[4,5,6,7,8,9] This view has been challenged over recent years and we presently consider these as different forms of the global malnutrition problem. This new conceptualization leads us to simultaneously address the root causes of nutritional deficiencies which in turn will contribute to the control of under nutrition and the prevention of obesity, diabetes, and other NRCDs. This summary provides a public health overview of selected key issues related to the prevention of obesity and chronic diseases with a life-course perspective of nutrition and child growth.

Childhood obesity is one of the most serious public health challenges of the 21st century. The problem is global and is steadily affecting many low and middle income countries,

particularly in urban settings. The prevalence has increased at an alarming rate. Globally in 2010, the number of overweight children under the age of five is estimated to be over 42 million. Close to 35 million of these are living in developing countries.

Definition of Childhood Obesity

Childhood obesity can be defined as an excess of body fat (BF). There is no consensus on a cut-off point for excess fatness of overweight or obesity in children and adolescents. A study by conducted by Williams et al. (1992), on 3,320 children in the age-group of 5–18 years classified children as fat if their percentage of body fat was at least 25% for males and 30% for females, respectively.[10] The Centre for Disease Control and Prevention defined overweight as at or above the 95th percentile of body mass index (BMI) for age and "at risk for overweight" as between 85th to 95th percentile of BMI for age.[11,12] European researchers classified overweight as at or above 85th percentile and obesity as at or above 95th percentile of BMI.[13]

An Indian research study has defined overweight and obesity as overweight (between ≥85th and <95th percentile) and obesity (≥95th percentile).[14] Another study has followed World Health Organization 2007 growth reference for defining overweight and obesity.[15]

In the clinical environment, techniques such as BMI, waist circumference, and skin-fold thickness have been used extensively. Although, these methods are less accurate than research methods, they are satisfactory to identify risk. While BMI seems appropriate for differentiating adults, it may not be as useful in children because of their changing body shape as they progress through normal growth. In addition, BMI fails to distinguish between fat and fat-free mass (muscle and bone) and may exaggerate obesity in large muscular children. Furthermore, maturation pattern differs between genders and different ethnic groups. Studies that used BMI to identify overweight and obese children based on percentage of body fat have found high specificity (95–100%), but low sensitivity (36–66%) for this system of classification.[16] While health consequences of obesity are related to excess fatness, the ideal method of classification should be based on direct measurement of fatness. Although methods such as densitometry can be used in research practice, they are not feasible for clinical settings.

Causes of Childhood Obesity

It is widely accepted that increase in obesity results from an imbalance between energy intake and expenditure, with an increase in positive energy balance being closely associated with the lifestyle adopted and the dietary intake preferences. However, there is increasing evidence indicating that an individual's genetic background is important in determining obesity risk. Research has made important contributions to our understanding of the factors associated with obesity. The ecological model, as described by Davison et al., suggests that child risk factors for obesity include dietary intake, physical activity, and sedentary behavior.[17] The impact of such risk factors is moderated by factors such as age, gender. Family characteristics parenting style, parents' lifestyles also play a role. Environmental factors such as school policies, demographics, and parents' work-related demands further influence eating and activity behaviours.

Genetics are one of the biggest factors examined as a cause of obesity. Some studies have found that BMI is 25–40% heritable.[18]However, genetic susceptibility often needs to be coupled with contributing environmental and behavioural factors in order to affect weight.[19] The genetic factor accounts for less than 5% of cases of childhood obesity.[18]Therefore, while genetics can play a role in the development of obesity, it is not the cause of the dramatic increase in childhood obesity.

Basal metabolic rate has also been studied as a possible cause of obesity. Basal metabolic rate, or metabolism, is the body's expenditure of energy for normal resting functions. Basal metabolic rate is accountable for 60% of total energy expenditure in sedentary adults. It has been hypothesized that obese individuals have lower basal metabolic rates. However, differences in basal metabolic rates are not likely to be responsible for the rising rates of obesity.[18]

Review of the literature investigates factors behind poor diet and offers numerous insights into how parental factors may impact on obesity in children.[20] They note that children learn by modelling parents' and peers' preferences, intake and willingness to try new foods. Availability of, and repeated exposure to, healthy foods is key to developing preferences and can overcome dislike of foods. Mealtime structure is important with evidence suggesting that families who eat together consume more healthy foods. Furthermore, eating out or watching TV while eating is associated with a higher intake of fat. Parental feeding style is also significant. The author's found that authoritative feeding (determining which foods are offered, allowing the child to choose, and providing rationale for healthy options) is associated with positive cognitions about healthy foods and healthier intake. Interestingly authoritarian restriction of "junk-food" is associated with increased desire for unhealthy food and higher weight.[21]

Government and social policies could also potentially promote healthy behaviour. Research indicates taste, followed by hunger and price, is the most important factor in adolescents snack choices.[22] Other studies demonstrate that adolescents associate junk food with pleasure, independence, and convenience, whereas

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liking healthy food is considered odd.[23] This suggests investment is required in changing meanings of food, and social perceptions of eating behaviour. As proposed by the National Taskforce on Obesity (2005), fiscal policies such as taxing unhealthy options, providing incentives for the distribution of inexpensive healthy food, and investing in convenient recreational facilities or the aesthetic quality of neighbourhoods can enhance healthy eating and physical activity.[24]

Dietary factors have been studied extensively for its possible contributions to the rising rates of obesity. The dietary factors that have been examined include fast food consumption, sugary beverages, snack foods, and portion sizes.

Fast food Consumption: Increased fast food consumption has been linked with obesity in the recent years. Many families, especially those with two parents working outside the home, opt for these places as they are often favoured by their children and are both convenient and inexpensive.[25] Foods served at fast food restaurants tend to contain a high number of calories with low nutritional values. A study conducted examined the eating habits of lean and overweight adolescents at fast food restaurants.[26]Researchers found that both groups consumed more calories eating fast food than they would typically in a home setting but the lean group compensated for the higher caloric intake by adjusting their caloric intake before or after the fast food meal in anticipation or compensation for the excess calories consumed during the fast food meal. Though many studies have shown weight gain with regular consumption of fast food, it is difficult to establish a causal relationship between fast food and obesity.

Sugary Beverages

A study examining children aged 9–14 from 1996–1998, found that consumption of sugary beverages increased BMI by small amounts over the years.[18] Sugary drinks are another factor that has been examined as a potential contributing factor to obesity. Sugary drinks are often thought of as being limited to soda, but juice and other sweetened beverages fall into this category.Many studies have examined the link between sugary drink consumption and weight and it has been continually found to be a contributing factor to being overweight.[18]Sugary drinks are less filling than food and can be consumed quicker, which results in a higher caloric intake.[19]

Snack Foods

Snack foods include foods such as chips, baked goods, and candies. Many studies have been conducted to examine whether these foods have contributed to the increase in childhood obesity. While snacking has been shown to increase overall caloric intake, no studies have been able to find a link between snacking and overweight.[18]

Portion Size

Portion sizes have increased drastically in the past decade. Consuming large portions, in addition to frequent snacking on highly caloric foods, contribute to an excessive caloric intake. This energy imbalance can cause weight gain, and consequently obesity.[18]

Activity Level

One of the factors that is most significantly linked to obesity is a sedentary lifestyle. Each additional hour of television per day increased the prevalence of obesity by 2%.[18] Television watching among young children and adolescents has increased dramatically in recent years.[18,27] The increased amount of time spent in sedentary behaviours has decreased the amount of time spent in physical activity. Research which indicates the number of hours children spend watching TV correlates with their consumption of the most advertised goods, including sweetened cereals, sweets, sweetened beverages, and salty snacks.[22]

Environmental Factors

While extensive television viewing and the use of other electronic media has contributed to the sedentary lifestyles, other environmental factors have reduced the opportunities for physical activity. Opportunities to be physically active and safe environments to be active in have decreased in the recent years. The majority of children in the past walked or rode their bike to school. A study conducted in 2002 found that 53% of parents drove their children to school.[18] Of these parents, 66% said they drove their children to school since their homes were too far away from the school. Other reasons parents gave for driving their children to school included no safe walking route, fear of child predators, and out of convenience for the child.[18] Children who live in unsafe areas or who do not have access to safe, well-lit walking routes have fewer opportunities to be physically active.[18]

Socio-cultural Factors

Socio-cultural factors have also been found to influence the development of obesity. Our society tends to use food as a reward, as a means to control others, and as part of socializing.[28]These uses of food can encourage the development of unhealthy relationships with food, thereby increasing the risk of developing obesity.

Family Factors

Family factors have also been associated with the increase of cases of obesity. The types of food available in the house and the food preferences of family members can influence the foods that children eat. In addition, family mealtimes can influence the type of food consumed and the amount thereof. Lastly, family habits, whether they are sedentary or physically active, influence the child.[28] Studies have

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shown that having an overweight mother and living in a single parent household are associated with overweight and childhood obesity.[29]

Psychological Factors

Depression and Anxiety

A recent review concluded that the majority of studies find a prospective relationship between eating disturbances and depression.[30]However, this relationship is not unidirectional; depression may be both a cause and a consequence of obesity.[31]Additionally, in a clinical sample of obese adolescents, a higher life-time prevalence of anxiety disorders was reported compared to non-obese controls.[32]Although some studies demonstrate no significant relationship between increased BMI and increased anxiety symptoms.[33] Thus, the relationship between obesity and anxiety may not be unidirectional and is certainly not conclusive.

Self-esteem

Research findings comparing overweight/obese children with normal-weight children in regards to self-esteem have been mixed.[34] Some studies have found that obese children have lower self-esteem while others do not.[35,36,37] There is some consensus in the literature that the global approach to self-esteem measurement with children who are overweight/obese is misleading as the physical and social domains of self-esteem seem to be where these children are most vulnerable.[38]

Body Dissatisfaction

Research has consistently found that body satisfaction is higher in males than females at all ages.[39]Gender differences may reflect the westernized cultural ideals of beauty in that thinness is the only culturally defined ideal for females, while males are encouraged to be both lean and muscular. Thus, there is a linear relationship between body dissatisfaction and increasing BMI for girls; while for boys a U-shaped relationship suggests that boys with BMIs at the low and high extremes experience high levels of body dissatisfaction.[40,41]

Eating Disorder Symptoms

Traits associated with eating disorders appear to be common in adolescent obese populations, particularly for girls.[42]A number of studies have shown higher prevalence of eating-related pathology (i.e. Anorexia, Bulimia Nervosa, and impulse regulation) in obese children/youth.[43,44]

Emotional Problems

In one of the few studies to investigate the psychological impact of being overweight/obese in children, a review of 10 published studies over a 10-year period (1995-2005) with sample sizes greater than 50 revealed that all participants reported some level of psychosocial impact as a result of their weight status.[45] Being younger, female, and with an increased perceived lack of control over eating seemed to heighten the psychosocial consequences.

Consequences of Childhood Obesity

Childhood obesity can profoundly affect children's physical health, social, and emotional well-being, and self-esteem. It is also associated with poor academic performance and a lower quality of life experienced by the child. These potential consequences are further examined in the following sections.

Medical Consequences

Childhood obesity has been linked to numerous medical conditions. These conditions include, but are not limited to, fatty liver disease, sleep apnoea, Type 2 diabetes, asthma, hepatic steatosis (fatty liver disease), cardiovascular disease, high cholesterol, cholelithiasis (gallstones), glucose intolerance and insulin resistance, skin conditions, menstrual abnormalities, impaired balance, and orthopedic problems.[25,46]Until recently, many of the above health conditions had only been found in adults; now they are extremely prevalent in obese children. Although most of the physical health conditions associated with childhood obesity are preventable and can disappear when a child or adolescent reaches a healthy weight, some continue to have negative consequences throughout adulthood.[46] In the worst cases, some of these health conditions can even result in death. Below, three of the more common health problems associated with childhood obesity are discussed, diabetes, sleep apnoea, and cardiovascular disease.

Socio-Emotional Consequences

In addition to being implicated in numerous medical concerns, childhood obesity affects children's and adolescent's social and emotional health. Obesity has been described as being "one of the most stigmatizing and least socially acceptable conditions in childhood."[38] Overweight and obese children are often teased and/or bullied for their weight. They also face numerous other hardships including negative stereotypes, discrimination, and social marginalization.[46] Discrimination against obese individuals has been found in children as young as 2 years old.[28]Obese children are often excluded from activities, particularly competitive activities that require physical activity. It is often difficult for overweight children to participate in physical activities as they tend to be slower than their peers and contend with shortness of breath.[25] These negative social problems contribute to low self-esteem, low self-confidence, and a negative body image in children and can also affect academic performance.[46] All of the above-mentioned negative effects of overweight and obesity can be devastating to children and adolescents.

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The social consequences of obesity may contribute to continuing difficulty in weight management. Overweight children tend to protect themselves from negative comments and attitudes by retreating to safe places, such as their homes, where they may seek food as a comfort. In addition, children who are overweight tend to have fewer friends than normal weight children, which results in less social interaction and play, and more time spent in sedentary activities.[25]As aforementioned, physical activity is often more difficult for overweight and obese children as they tend to get shortness of breath and often have a hard time keeping up with their peers. This in turn inevitably results in weight gain, as the amount of calories consumed exceeds the amount of energy burned.[25]

Academic Consequences

Childhood obesity has also been found to negatively affect school performance. A research study concluded that overweight and obese children were four times more likely to report having problems at school than their normal weight peers.[38] They are also more likely to miss school more frequently, especially those with chronic health conditions such as diabetes and asthma, which can also affect academic performance.

Conclusion

The growing issue of childhood obesity can be slowed, if society focuses on the causes. There are many components that play into childhood obesity, some being more crucial than others. A combined diet and physical activity intervention conducted in the community with a school component is more effective at preventing obesity or overweight. Moreover, if parents enforce a healthier lifestyle at home, many obesity problems could be avoided. What children learn at home about eating healthy, exercising and making the right nutritional choices will eventually spill over into other aspects of their life.This will have the biggest influence on the choices kids make when selecting foods to consume at school and fast-food restaurants and choosing to be active.Focusing on these causes may, over time,decrease childhood obesity and lead to a healthier society as a whole.

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