

Tackling Adolescent Obesity: A Multi-Dimensional Approach to Intervention

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Abstract

Adolescent obesity represents an escalating public health burden with multifactorial etiology encompassing behavioral, environmental, psychosocial, and physiological determinants. Recent epidemiological trends indicate that the prevalence of obesity among adolescents has surpassed that of undernutrition in numerous regions globally. This narrative review delineates a multidimensional approach to addressing adolescent obesity, emphasizing health promotion, early prevention, and policy-level interventions. Governmental initiatives such as the Fit India Movement, FSSAI's nutritional guidelines, and CBSE's school-based wellness programs aim to foster physical activity and nutritional literacy. The influence of urbanization, impulsive food purchasing behavior, food marketing strategies, and increased accessibility to energy-dense, nutrient-poor foods are critically examined. Moreover, psychosocial comorbidities—particularly depression, anxiety, low self-esteem, body dissatisfaction, and binge-eating disorders—are highly prevalent among obese adolescents, necessitating integrated mental health interventions. The role of Cognitive Behavioral Therapy and structured psychological counselling is explored as a therapeutic adjunct. Physical inactivity, prolonged screen time, and lack of access to recreational infrastructure contribute significantly to the obesogenic milieu. Technological tools, including health applications and screen-time monitors, are proposed as potential enablers of behavior modification. The review advocates for age- and sex-specific intervention strategies, incorporation of mindful eating practices, parental involvement, and community-level participation. Emphasis is placed on longitudinal evaluation, feedback mechanisms, and tailored interventions based on urban-rural disparities and socioeconomic stratification. A multidisciplinary, context-sensitive, and evidence-based framework is essential to mitigate the trajectory of adolescent obesity and its associated long-term cardiometabolic sequelae.

Keywords: Adolescent obesity; Preventive health services; Nutritional behaviour; Physical inactivity; Cognitive Behavioral Therapy

Introduction

Obesity, also infamously called as '*silent-pandemic*' has slowly started gaining more popularity for its rapid presence- now a matter of concern among the youth too! As the worldwide Body Mass Index (BMI) [1] trends show an increase in many countries, research conducted shows that in 2022, obesity in school-aged children and adolescents was more prevalent than thinness with a posterior probability of at least 0.80 among girls in 133 countries (67%) and boys in 125 countries (63%) [2]. Adolescent obesity has become a burden as over 390 million children and adolescents aged 5-19 years were overweight in 2022, including 160 million who were living with obesity [3]. Adolescent obesity prevention will help in preventing conditions having obesity as a risk factor such as Non-insulin dependent diabetes mellitus, hypertension, obstructive sleep apnoea, PCOD in women [4]. The National Family Health Survey (NFHS-5) (2019-21), states that 6.4% of women and 4% of men, aged 15-49 years are obese [5]. As many researches reveal a positive prevalence challenges understanding preventive strategies, and dimensions affecting the individuals as well as influencing their lifestyle is necessary [6-8]. Adolescent and child obesity has different dimensions of preventive approach and should not be treated the same as adult obesity. This review aims at exploring five data-driven, and quality improvement initiatives related to adolescent obesity.

Preventive strategies

With obesity being a risk-factor as well as a benign condition, it also remains one of the modifiable and preventive conditions. Preventive strategies have been mostly non-medical measures implemented at home or at schools by the state and national government.

Government plans	Strategies	Expected outcome on adolescent obesity
FIT INDIA MOVEMENT [9]	Fit India grading for schools by providing funds for equipment	Creating fitness through traditional games and sports and exercise
NITI AYOJ prevention of maternal, childhood, and adolescent obesity [10]	A convention held to emphasise on prevalence and factors influencing adolescent obesity	Advocation of integration of dietary and physical activity, supportive environment and mass communication
Food Safety and Standards Authority of India (FSSAI) [11]	Safe and nutritious food guidelines	Tells us nutritive values of food for better diet modification.
Eat Right [12]	Encourages collaboration among healthcare administration, other sectors	Eat Right mission participation ensures that children know about safe, traditional as well as local cuisine and knowledge about nutritional value of food.
Central Board of Secondary Education [13]	Health and well-being education on various topics	Nutrition is the key element of all Student well-being programmes which educate children about hygiene, food, and physical activity.

While many government programmes focus on healthy eating and moderate exercise, the majority of such missions focus more on undernutrition than Obesity. More focus is needed for better strategies to convince and counsel adolescents to focus on diets appropriate for their age as many such adolescents tend to follow adult recommendation calorie charts/ influencers. Tiffin restriction of snacks, and textbook advice are not enough for inculcation as mandatory physical exercises are not followed in many schools. Other measures common for all genders and ages in adolescents.

- Daily exercise for minimum 30-45 minutes.
- Limiting outside food.
- Limiting sedentary activities.
- Engaging in activities that reduce stress.
- Eat all meals adequately and avoid intermittent snacking.

- Learning how to cook food.
- Learning portion control and setting up timings to eat food to avoid untimely meals.

Discussion

Food- mindful eating or impulsive purchase?

Whether it is drinking street-side food after school, or gifting a packet of chips and soda to kids, or constantly eating food with friends at college, globalisation and food delivery apps have brought every food at the door and fingertips, especially in urban areas. One such study depicts statistics of food purchase trends in India across retail stores which states that behaviour towards purchasing food depends on presentation, educational status of parents as well as visit frequency [14]. Other studies showing purchase trends in urban areas depicts a marked increase towards sugary, salty, and edible oils whereas in rural areas study also shows inclination towards buying packed and processed foods along with local shop food available [15].

Socio-demographic status of parents and their eating habits have an effect on preferences of diet among adolescents [16]. In India, most children grow up with unique eating practices at home based on religious occasions, staple diets, cooking style. Mindful eating has contributed to lowering stress eating, depression among diet conscious individuals. Mindful eating is a concept that focuses on acknowledging feelings, emotions, bodily sensations and paying close attention to what one buys, eats, and prepares [17].

Another big influence is food marketing. Food advertising themes, animation, and customisable portion options, people involved in brand advertising, influencer advertising, are some big factors to consider in adolescent obesity. Studies conducted in various countries show that television advertising roughly counts about more than 100 ads per adolescent as well as exposure of food advertisements on social media like facebook, instagram, and other platforms show an increase in desire to eat junk foods and frequent eating depending upon distribution of such eating places [18-20]. Repeated exposure, constant and creative advertising also lead to loyalty towards certain brands among adolescents [21]. More such research should be conducted in India considering age, sex, frequency of purchase, and consumption of certain types of food. Many advertisements focus conveniently on certain nutritional values depending upon the product, however there are other products who advertise food stuffs that exceed the value of claimed nutritional values and do not mention the claimed ingredient example: absence of mentioning whole grains in ingredients list while claiming to have whole grains. Foods such as soups contained excessive sodium while beverages contained excessive sugar [22]. Therefore it is extremely necessary to promote healthy eating habits, teaching, checking for nutrition labels, and avoiding excess junk food intake among adolescents. Food portion has been strongly linked to the BMI of children [23]. Eating large portions of food has been linked with obesity and vice-versa and reduction in size leads to decrease in BMI if followed for a long time [24-27]. Effective strategies need to be developed that are suitable for appropriate age and sex among Indian children without compromising on required calorie intake and variety. Initiatives need to be undertaken to increase availability of healthy foods in underserved areas. Dietary fads should be controlled and realistic solutions and healthy alternatives should be advised in place of unhealthy ones. All diet plans should adhere to dietary preference (vegetarian/ mixed/ lactose intolerance/allergies).

Physical activity

Physical activity trials conducted among school children proved that children who are physically more active also tend to have normal BMIs and inactivity is associated with weight gain [28]. A study showing daily physical activity intervention including aerobic exercises and strength training 1 hour for 5 days a week showed significant reduction in BMI of the students [28]. Exercise should always be recommended according to the child's age, sex. Special close attention should be given to his/her co-morbid status. Children suffering from obesity due to cancer with physical exercise showed decrease in weight when implemented in maintenance phase of chemotherapy. Assistance of psychosocial counselling has also proven effective [29].

Starting with a 30 minute walk to moderate and high intensity cardiovascular as well as other strength training exercises are one of the best measures for weight control. Schools and the environment around the young help them to play outside. Indian schools offer mandatory physical exercises every day under Fit India movement, however, not all schools follow the same [9]. Many schools

do not have equipment or proper staff appointed for the same and in coastal areas, where school grounds are closed during the entire monsoon season, consistent physical activity is impossible. It is observed in many areas although unnoticed and not always recorded that physical fitness classes last almost 30 minutes and in monsoon, outdoor play is discouraged due to mud staining, cold, hindrances in field games, and indoor activity being reduced results in decreased physical activity. Lot of barriers hinder the physical activity of adolescents. Many Indian parents believe that physical activity or sports are unnecessary and don't allow their kids to play after school which results in home confinement and sitting around digital gadgets. In many homes, it is stereotypically seen that outdoor activity is considered as a distraction and waste of time, which results in children sitting at home surrounding themselves with gadgets for entertainment. In urban areas and few rural areas, many open areas are being converted to open gyms with small equipment. Safe playgrounds are unfortunately not accessible for everyone which also results in children being confined to home. Children usually don't play on designated playgrounds due to lack of space and equipment, and hence play in open areas which may not be safe for the desired game. Even the newly built parks run down quickly and don't have well-functioning toys or proper maintenance. Hence, proper maintenance and monitoring as well as building more such areas is important for all to access and prevent overcrowding.

Mental health: Obesity and emotional well-being

Mental health, due to its sensitive nature is a tough topic of discussion. The real prevalence of mental health disorders is never understood due to fear, stigma, bullying, and lack of confidence. In addition to risking physical health, psychosocial problems like depression, anxiety, low self-esteem, body image issues, eating disorders, as obese children are more likely to get bullied. In a study, the prevalence of psychosocial disorders was found in 44.2% of obese individuals compared to 13.8% non-obese individuals [30]. Common psychiatric disorders such as depression, anxiety were found in obese adolescents [31, 32]. Almost 40% of children with obesity are likely to have mental disorders, 51% being anxiety related, 48.1% eating disorder, 83.2% neurodevelopmental disorders and 45.1% being obsessive compulsive related disorders [33]. Attention-Deficit/Hyperactivity Disorder (ADHD) was also reported in some students [34]. A study conducted in The U.S.A showed a stronger connection of ADHD among adolescents with higher BMI [34]. Binge-eating had also been observed in many adolescents, especially girls who were dissatisfied with their bodies. A study conducted shows that in younger adolescent girls who were dissatisfied with their body appearance had frequent episodes of binge eating. For girls who were satisfied with their bodies, 9.5% of them developed binge eating [35, 36].

Psychological counselling and psychiatric interventions have proven to be the best form of medical care for obese adolescents. Confidentiality ensures participation of more individuals. Cognitive behavioural therapy was found to be largely effective among obese individuals [37-39]. Counselling a child is important but it is equally important to counsel the parents as well. Misconceptions must be cleared and adolescents who are continuing any other therapy or previous failed Cognitive Behavioural therapy or pharmacological therapy should be assessed for Diagnostic and Statistical Manual of Mental Disorders (DSM) diagnostic guidelines [40]. Screening of the child must be imperative if changes in mood or changed recent eating pattern is observed. Child's reaction to certain foods, sudden avulsion, and sudden change in eating practices must be observed. Fostering healthy parent-child conversations, healthy friendships, healthy talks and avoiding negative talks help the child to feel better in the surroundings. Positive reinforcement can help the child to develop a new perspective. Emphasising on body appreciation, encouraging internal motivation and appreciating and rewarding small achievements are a way of inculcating gratitude and hard work through positive reinforcement.

Technology: paving effective measures to track health habits

It is a known and proven fact that increased screen time leading to sedentary action leads to obesity if there is no physical activity and other ocular problems. An analysis conducted showed that 36.6% adolescents have obesity with screen time greater than 4 hours, and 27.5% in adolescents watching 1 hour. More prevalence was seen in males and people with poor sleep [41-43]. While this is true, many social media apps and platforms can be used to track and use it in a good way to reduce obesity as limiting screen time alone cannot help. YouTube sessions on exercise, app lockers, setting screen time goals, various apps in local and English language to help you work out from home helps to put the screen to a good use. Screen time goals for apps can be set using settings in the phone. A UNICEF video captures three ways of managing screen time for teenagers, aiming at parents to foster healthy screen-watching habits.

Using mobile, and other devices to supplement other tasks instead of replacing them is a great way to develop a healthy relationship with gadgets [44]. Using technology helps to eliminate distance and problems with respect to gym training and can be done from the comfort of home. Using screen time to watch and connect with people who went through similar struggles helps to gain confidence and building an online community can help to overcome loneliness felt when watching the screen all alone. Setting up screen widgets to positive reminders could act like a boosting message.

Conclusion

Adolescent obesity is a complex, multifaceted condition with significant implications for long-term physical and psychosocial health. Effective prevention and management require a synergistic approach incorporating nutritional education, structured physical activity, mental health support, and behavior modification strategies. While national initiatives like the Fit India Movement and dietary regulations by FSSAI have laid a foundational framework, there remains a critical need for policy reforms that prioritize obesity-specific strategies rather than focusing predominantly on undernutrition.

This review highlights the necessity for individualized, age-appropriate interventions that are sensitive to gender, sociocultural background, and comorbid conditions. Mindful eating practices, parental education, and reinforcement of positive body image are essential components of a sustainable obesity prevention strategy. Moreover, digital tools and telehealth platforms can be leveraged to overcome barriers related to accessibility, awareness, and adherence.

Future directions must include longitudinal monitoring of school-based interventions, integration of mental health services in adolescent wellness programs, and comprehensive research into the socioeconomic determinants of obesity. A coordinated, multidisciplinary effort involving healthcare professionals, educators, parents, policymakers, and community stakeholders is imperative to arrest the growing epidemic of adolescent obesity and mitigate its associated metabolic and psychosocial complications.

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