

Prevalence of Overweight, Obesity and Association with Junk Food Consumption and Physical Activity among Adolescent Girls in a Selected School of Chamarajanagar, Karnataka - A Cross-sectional Study

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Abstract

increasingly important public health concerns, with unhealthy dietary practices and inadequate physical activity contributing to risk. **Objectives:** To estimate the prevalence of obesity among adolescent girls and to determine the association of junk food consumption, physical activity and awareness regarding ill-health with obesity.

Methods: A cross-sectional study was conducted among adolescent girls aged 12–16 years in a selected school of Chamarajanagar, Karnataka, during May–July 2022.

From a known school population of 178, a sample of 130 girls was selected by simple random sampling. Data were collected using a pre-structured questionnaire and direct interview. Height and weight were measured using standard anthropometric procedures, and BMI was classified according to the WHO classification as reported in the study protocol. Chi-square test was used for qualitative associations, with $p < 0.05$ considered statistically significant.

Results: The mean age of participants was 14.08 ± 1.18 years. Most participants were from urban areas (59%)

and approximately half belonged to socioeconomic class II (49%). The prevalence of overweight was 26.3% and obesity was 19.2%. Junk food consumption was reported by 84.0% of girls with obesity compared with 61.9% of those without obesity ($p=0.035$). Physical activity was reported by 44.0% of girls with obesity compared with 71.4% of those without obesity ($p=0.009$). Awareness regarding ill-health was present in 52.0% of girls with obesity and 84.7% of those without obesity ($p=0.003$).

Conclusion: Overweight and obesity were common among adolescent girls in the study population. Junk food consumption, lower reported physical activity and poorer awareness regarding ill-health were significantly associated with obesity. School-based health education, healthier food environments and promotion of regular physical activity should be strengthened.

Keywords: Adolescent Girls, Obesity, Overweight, Junk Food, Physical Activity, School Health, India

Introduction

Adolescence is a critical stage of growth and development characterized by rapid physical, physiological and behavioral changes. Dietary habits, physical activity patterns and other lifestyle behaviours established during this period may persist into adulthood and substantially influence the future risk of non-communicable diseases.

Overweight and obesity during childhood and adolescence have therefore emerged as important public health concerns, particularly in low- and middle-income countries undergoing rapid nutritional and epidemiological transitions. Globally, more than 390 million children and adolescents aged 5–19 years were estimated to be overweight in 2022, including approximately 160 million living with obesity. The prevalence of overweight, including obesity, among 5–

19-year-olds increased from 8% in 1990 to 20% in 2022, while adolescent obesity increased approximately fourfold during the same period.^{1,2}

For children and adolescents, assessment of excess weight requires consideration of age and sex because body composition changes substantially during growth. The World Health Organization (WHO) recommends the 2007 BMI-for-age reference for individuals aged 5–19 years, with overweight defined as BMI-for-age $>+1$ standard deviation and obesity as $>+2$ standard deviations from the WHO reference median.^{3,5} Childhood and adolescent obesity is associated with an increased likelihood of obesity in adulthood and contributes to an earlier risk of type 2 diabetes, cardiovascular disease, musculoskeletal disorders and other chronic conditions.^{2,5}

India is experiencing a rapid nutrition transition characterized by increasing availability and consumption of energy-dense processed foods alongside changing patterns of physical activity. Indian studies have demonstrated considerable variation in the prevalence of overweight and obesity among school-going children and adolescents according to geographical location, socioeconomic status and lifestyle characteristics.⁶⁻⁸

A large study involving 5,664 Indian school children aged 12–18 years reported associations of overweight and obesity with socioeconomic status, dietary practices, junk-food consumption and physical activity.⁶ Systematic reviews have also demonstrated a substantial and increasing burden of childhood and adolescent obesity across different regions of India.^{7,8}

Dietary behaviour is particularly relevant because adolescents increasingly have access to commercially prepared and ultra-processed foods that are often energy dense and high in sugar, salt and fat. Frequent

consumption of junk food and eating outside the home have been associated with excess weight in Indian school populations.^{6,9} At the same time, insufficient physical activity and increasing sedentary behaviour can contribute to a positive energy balance. Indian adolescent studies have identified physical inactivity and sedentary lifestyles as important behavioural determinants of obesity.^{10,11} The WHO recommends that children and adolescents undertake an average of at least 60 minutes of moderate-to-vigorous physical activity daily and limit sedentary behaviour.¹²

Schools provide an important setting for obesity prevention because they offer sustained access to adolescents and provide opportunities to influence nutrition, physical activity, health literacy and the surrounding food environment. Evidence from India indicates that school-based interventions incorporating physical activity, nutrition education and environmental modifications can improve lifestyle behaviours and adiposity-related outcomes.¹³ However, locally generated evidence from smaller urban and semi-urban school settings remains important for identifying context-specific behavioural risk factors.

In this context, the present study was undertaken among adolescent girls in a selected school of Chamarajanagar, Karnataka, to estimate the prevalence of overweight and obesity and to determine the association of junk-food consumption, physical activity and awareness regarding ill-health with obesity.

Objectives

1. To estimate the prevalence of obesity among adolescent girls.
2. To determine the association between junk food consumption and other factors with obesity among adolescent girls.

Materials and Methods

A school-based cross-sectional study was conducted among adolescent girls aged 12–16 years in a selected school of Chamarajanagar, Karnataka, over three months from May to July 2022. The study population comprised adolescent girls aged 12–16 years enrolled in the selected school. The school strength was 178. Using the stated formula $n = N/[1 + N(e)^2]$ with a 5% margin of error, the calculated sample size was 123; a total of 130 participants were included. Participants were selected using simple random sampling.

Data were collected using a pre-structured questionnaire through direct interview. Height and weight were measured using standard anthropometric procedures, and BMI was used to classify nutritional status according to the WHO BMI classification¹⁴. Data were entered in Microsoft Excel and analysed using SPSS version 20. The chi-square test was used to assess associations between categorical variables.

A p value <0.05 was considered statistically significant. Permission was obtained from the head of the school and assent was obtained from participating students. Institutional Ethical Committee approval was obtained before conducting the study.

Results

A total of 130 adolescent girls participated. The mean age was 14.08 ± 1.18 years.

The majority were from urban areas (59%), and 49% belonged to socioeconomic class II. The prevalence of overweight was 26.3%, while the prevalence of obesity was 19.2%.

Figure 1: Distribution of adolescent girls according to BMI classification (n=130)

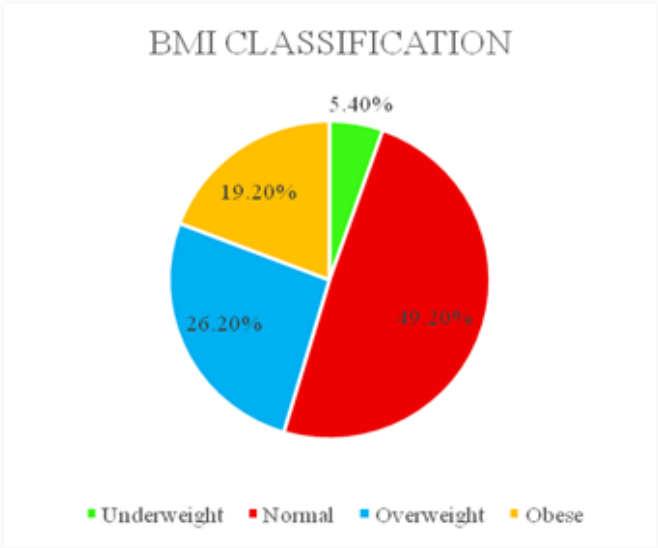


Table 1: Association of selected factors with obesity among adolescent girls (n=130).

Factor	Obesity Present n (%)	Obesity Absent n (%)	p value
Junk food consumption			
Yes	21 (84.0%)	65 (61.9%)	0.035*
No	4 (16.0%)	40 (38.1%)	
Physical activity			
Yes	11 (44.0%)	75 (71.4%)	0.009*
No	14 (56.0%)	30 (28.6%)	
Awareness about ill-health			
Yes	13 (52.0%)	89 (84.7%)	0.003*
No	12 (48.0%)	16 (15.3%)	

*Chi-square test; statistically significant at p<0.05.

Junk food consumption was significantly associated with obesity. Among girls classified as obese, 84.0% reported consuming junk food compared with 61.9% among those without obesity (p=0.035). Physical activity was significantly associated with obesity; only 44.0% of girls with obesity reported physical activity compared with 71.4% of girls without obesity (p=0.009). Awareness regarding ill-health was also significantly associated

with obesity, being reported by 52.0% of girls with obesity and 84.7% of girls without obesity (p=0.003).

Discussion

The present study found a prevalence of 26.3% overweight and 19.2% obesity among adolescent girls. The burden observed in this school population is notable and supports the need for early prevention during adolescence. In a study from Western Maharashtra among 207 school children aged 11–16 years, obesity was reported in 8.7% and overweight in 12.1%. Junk food consumption more than once a week was reported by 77.3% of participants.³ The higher obesity prevalence in the present study may partly reflect the inclusion of girls only, local dietary patterns, socioeconomic characteristics and methodological differences.

A study among school-going adolescents in Surat examined dietary and lifestyle factors in a larger sample and highlighted the contribution of changing lifestyle patterns to adolescent obesity.⁵ Evidence from Indian adolescent populations also indicates that dietary behaviour and sedentary or inactive lifestyles are relevant behavioural determinants.⁴ The present study similarly identified junk food consumption and lower reported physical activity as factors significantly associated with obesity.

The association between junk food consumption and obesity in this study is biologically plausible because frequent intake of energy-dense foods may increase total energy intake and displace healthier food choices. The finding that only 44% of girls with obesity reported physical activity, compared with 71.4% of those without obesity, further supports the importance of promoting active lifestyles in schools.

An important finding was the significant association between awareness regarding ill-health and obesity.

Awareness was lower among girls with obesity. This suggests that knowledge and health communication may be relevant components of prevention, although the cross-sectional design does not establish whether lower awareness preceded obesity or resulted from it. Importantly, knowledge alone may not translate into healthier practices; school food environments, family practices, peer influences and opportunities for physical activity also shape behaviour.

School-based prevention is therefore likely to be most effective when it combines health education with supportive environments: healthier food choices, reduction in availability of energy-dense snacks, regular physical education, opportunities for recreational activity and engagement of parents and teachers. WHO has recently emphasized whole-school approaches to healthy food environments as part of childhood obesity prevention.⁶

Strengths

Anthropometric measurements were obtained directly rather than relying solely on self-reported weight and height.

The study focused specifically on adolescent girls, a population in which gender-specific evidence is useful for school health planning.

The study assessed modifiable behavioural factors relevant to school-based prevention.

Limitations

The study was conducted in a single selected school with a relatively small sample, limiting generalizability. Only selected dietary, behavioral and awareness-related factors were assessed; other potential determinants of adolescent obesity, such as genetic, familial, environmental and other lifestyle factors, were not evaluated

Conclusion

The prevalence of overweight and obesity among adolescent girls were high in the present study. Junk food consumption and physical inactivity were significant factors associated with obesity among adolescent girls. Though the students were aware of hazards of ill health, their attitude & practices were not satisfactory.

Hence behavior change and communication must be imparted at school levels among adolescent girls to prevent obesity

Recommendations

Strengthen school-based nutrition education, regular physical activity, and healthier food environments to prevent adolescent overweight and obesity. Engage parents, teachers and peers in behaviour-change communication and undertake periodic BMI screening with appropriate counseling and referral for at-risk students.

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