Dynamics of junk food consumption with central and general obesity: a cross-sectional study among adolescent Tibetan girls in India

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Deterioration in health due to junk food consumption is a global concern, with adolescents at a greater risk. A cross-sectional study was conducted to understand the dynamics of junk food consumption with obesity in adolescent Tibetan girls (13–18 years; $N = 276$) of Himachal Pradesh, India. A pretested schedule and anthropometric measurements were used for data collection. Descriptive and bivariate analysis was done. The odds ratio was the determined. The study found that 45.28% of the girls consumed some form of junk food. Also, 25.4% and 16.3% were also centrally obese according to waist–hip ratio (WHR) and waist–height ratio (WHtR) respectively. Girls who consumed junk food were found to be at a greater risk (WHR: OR = 7.942, 95% confidence interval (CI) = 4.132–15.262; WHtR: OR = 3.652, 95% CI = 1.820–7.327 at $P < 0.001$) of developing abdominal obesity. Frequent consumption of junk food was found to be remarkably high (77.60%) among the studied population. It is of utmost importance to prioritize implementation programmes on healthy eating habits through various government and non-government agencies in order to improve health among adolescents.

Keywords: Adolescent girls, general and central obesity, healthy eating habits, junk food.

ADOLESCENT obesity has been increasing at an alarming rate worldwide, making it a global public health concern. Recently, 18.4% of adolescent females aged 10–19 years were reported to be overweight or obese[1]. Adolescent girls formed a more vulnerable group because of their increased nutritional needs for future reproductive processes and devalued social powers[2]. To combat this threat, the World Health Organization endorsed 'no increase in childhood overweight by 2025' as one of the six global nutrition targets in the 'Comprehensive Implementation Plan for Maternal, Infant and Young Child Nutrition'[3]. Several factors such as eating habits and disorders may have contributed to the obesity epidemic[4]. Junk food consumption has played a significant role in increasing global obesity rates[5]. Many researchers have reported strong positive associations between junk food consumption and weight gain during the transition from childhood to adulthood[6,7].

Junk food is defined as food that is easily available, usually inexpensive and has less nutrient value[8]. Due to its low cost and easy availability, households in developed and developing nations have been witnessing a shift from traditional diets towards junk food[9]. This shift is causing negative nutrition transitions, as such food contains more calories and salt, has a higher content of saturated fat and also less iron, calcium and dietary fibre[10]. Studies suggest that fast-food consumption is responsible for insulin resistance and type-2 diabetes[4,11], hypertension and dyslipidaemia[12]. Studies have also revealed that individuals who eat junk food once a week have a 20% increased risk for developing coronary heart disease and the risk increases with a greater consumption rate per week[6,13].

India has recorded a 4% increase in obesity, with the prevalence among women increasing to 24% (ref. 14) from 20.6% (ref. 15). It may be added that school-going children and adolescents are at a higher risk because of the easy access to and availability of junk food, which has been observed to affect weight gain positively. In this context, there are not many studies in India on adolescent girls in different ethnic groups, which relate obesity with the consumption of junk food. Therefore in this study, we examine the dynamics of junk food consumption with obesity.

Materials and methods

Study design

Data on 276 adolescent Tibetan girls (13–18 years) were collected from various schools of Kangra district, Himachal Pradesh, India, using stratified random sampling technique. Authorized informed consent was taken from the school management. Sample size of the studied population was calculated using the following formula[16]

$$N = \frac{z^2 \times p(1-p)}{a^2},$$

where N is the sample size, $P = 17.7\%$ (previous prevalence[17]), $z = 1.96$ (95% confidence level), and d is the

Table 1. Characteristics of junk food consumption among adolescent Tibetan girls in India

Characteristics	Response	Frequency (n)	Percentage
Junk food consumption during the previous 7 days (n = 276)	Yes	125	45.3
	No	151	54.7
Frequency of junk food consumption (days/week) (n = 125)*	Infrequently (1–3 days/week)	28	22.4
	Frequently (>3 days/week)	97	77.6
Reasons for junk food consumption (n = 125)*	Taste/pleasure	125	100
	Peer influence	63	50.4
	Convenience	89	71.2
	Affordability	12	9.6
Usual time of junk food consumption. (n = 125)*	Breakfast	28	22.4
	Lunch	45	36.0
	Dinner	19	15.2
	Snacks (afternoon/evening)	112	89.6

*Multiple responses.

relative precision of 5%. Taking 15% as non-response rate, a total sample size of 276 girls was chosen.

Anthropometric measurements

Anthropometric measurements like stature, weight, waist circumference and hip circumference were taken according to the standards and protocols of the International Society for the Advancement of Kinanthropometry[18].

Assessment of obesity

The cut-off points recommended by Indian Academy of Pediatrics (IAP)[19] for girls were used to analyse the general obesity in terms of body mass index (BMI)[19]. Similarly, for central obesity, waist–hip ratio (WHR)[20] and waist–height ratio (WHtR)[21] cut-offs were used.

Determination of junk food consumption

A pretested schedule was used to determine the consumption of junk food, which included questions like type and frequency of junk food consumption as well as time and reason for the same.

Statistical analysis

Statistical analysis was done using SPSS version 20.0 and MS-Excel. The binary logistic regression analysis was performed to estimate the odds ratio (OR) and 95% confidence interval (CI), to study the association between junk food consumption and obesity (central and general). A P value < 0.01 was considered statistically significant.

Results

Among adolescent girls across the age group, total junk food consumption on a weekly basis was reported by 45.3% of the participants ($N = 125$). The frequency of consumption (>3 days/week) was also high, being 77.6%. Among the various reasons behind the consumption of junk food, taste (100%) and convenience (71.2%) were found to be the most common, and junk food was generally consumed in the evening or in the afternoon (89.6%) (Table 1).

Among the different types of junk food, salty snacks (96.8%) and fried food (92.8%) were highly popular among the study participants (Figure 1). Food items such as fried packed snacks, momos, french fries, noodles, burger, pizza, samosa, packaged juices, cold drinks, chocolates were most commonly consumed junk food.

Figure 2 illustrates the prevalence of general and central obesity. It can be seen that central obesity is higher than general obesity.

The association of junk food consumption with obesity predictors among adolescent girls showed that those consuming junk food exhibited eight times greater odds (95% CI = 4.132–15.262; $P < 0.001$) of being centrally obese with WHR and 3.7 times greater odds (95% CI = 1.820–7.327; $P < 0.001$) with WHtR than those not consuming junk food (Table 2). No significant association between junk food consumption and general obesity was found in the studied population.

Discussion

The prevalence of adolescent obesity in Asia has increased several fold in recent years along with associated diseases such as cardiovascular disease, hypertension, hyperlipidaemia, type-2 diabetes and certain cancers[11,12,22,23]. In the present study, we determine the relationship between junk food consumption and central and general obesity among school-going adolescents Tibetan girls. The prevalence of junk food consumption in the present study taken over a week was found to be 45.28%. This is less than that reported in a study conducted on adolescents in Nepal, showing a 60.3% prevalence in the consumption of junk

Table 2. Binary logistic regression analysis of junk food consumption with obesity predictors

Variables	WHR		WHtR		BMI		
Junk food consumption	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Total
Yes	56 (44.8)	69 (55.2)	32 (25.6)	93 (74.4)	35 (28.0)	90 (72.0)	125
No	14 (9.3)	137 (90.7)	13 (8.6)	138 (91.4)	30 (19.9)	121 (80.1)	151
Total	70	206	45	231	65	211	276
OR (CI)	7.942* (4.132–15.262)		3.652* (1.820–7.327)		1.568 (0.897–2.742)		

*$P < 0.001$; BMI, Body mass index; WHR, Waist–hip ratio; WHtR, Waist–height ratio; OR, Odds ratio; CI, Class intervals.
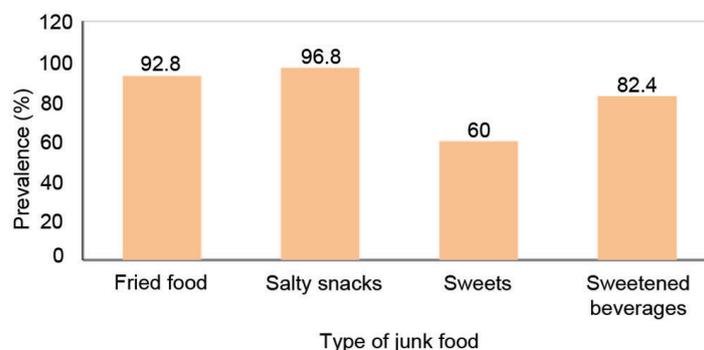

Figure 1. Junk food consumption pattern among adolescent Tibetan girls in India.
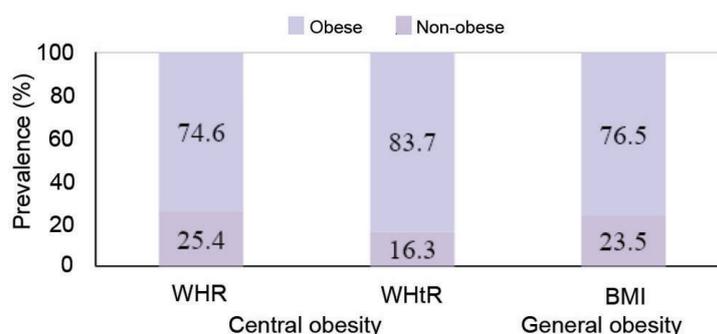

Figure 2. Prevalence of obesity among adolescent Tibetan girls in India. Obesity cutoff: WHR $\geq$ 0.80; WHtR $\geq$ 0.50 and BMI $\geq$ 85‰.

food[8]. Also, 25.4% and 16.3% of girls were found to be centrally obese according to WHR and WHtR respectively. Girls who consumed junk food exhibited 8 and 3.7 times greater risk of developing central obesity with WHR and WHtR respectively.

Globally, junk food has almost replaced traditional home-cooked meals as it is available in ready-to-eat canned form and can be preserved for a long time, unlike tradition-ally cooked foods[24]. Also, more girls (77.60%) were fre-quently consuming junk food in a week. The most popular junk food was salty snacks (96.8%) and fried foods (92.8%), followed by sweetened beverages (82.40%). Ado-lescents spend most of their time outside for tuition and other school activities resulting in meal-time constraints, making fast food an ideal snack.

The consumption of junk food has increased in develo-ped countries and a similar trend is being reported in de-veloping countries[12]. Thus, eating out has emerged as a new trend that was earlier more prevalent among the rich. Also, the fast-paced urban lifestyle requires quick solutions for everything, including meals[25]. Accompanying chang-es in lifestyle, aggressive marketing by food outlets has led to the popularity of fast food in small towns, making its success inevitable[26]. In the present study, convenience (100%) and taste (71.20%) of fast food, followed by peer influence (50.40%), have been reported as the main rea-sons for its consumption. This finding is consistent with those of the previous studies[7,27,28]. Several studies have reported associated factors such as advertisement, mar-keting and fast service with the increasing obesity trends[29,30].

A majority (89.60%) of the adolescent girls were found to consume junk food during their snack time, which is in accordance with previous studies[27,31,32]. A study has reported

a positive association between sedentary behaviour and fast food consumption[33]. In addition, technological advancements in several Asian countries have shifted the leisure time of adolescents from outdoor games to watching television. Studies have found that television viewing has a significant relationship with unhealthy dietary habits among older children and adolescents, which includes consumption of junk food and sweetened beverages, less fruits and vegetables[34–36]. Researchers have reported that modernization and a sedentary lifestyle have increased the harmful consequences of fast food consumption, viz. gaining unhealthy and excessive weight[10].

The present study revealed that the overall prevalence of general obesity was 23.5% among adolescent Tibetan girls. In 2015, a total of 107.7 million children were obese[37]. Data from Lebanon (32.2%)[38] and the United States (52%)[39] show a higher prevalence of obesity compared to that observed in the present study. However, a lower prevalence has been reported in Greece (19.2%)[40], Iran (6.4%)[41] and Peru (8%)[42] compared with the present findings.

A similar prevalence of central obesity (16.7%) was reported among 1500 Egyptian adolescents by WHtR[43]. A study conducted in Saudi Arabia revealed that children who consumed chocolates, sweets, fast food and soft drinks had an increased risk of being obese[44]. Watching television while eating and fast-food consumption was associated with increased waist circumference. Consumption of soft drinks was associated with high WHR. Also, increased central obesity was found to be associated with the consumption of chocolates and sweets[44].

In the present study, adolescent girls who consumed junk food were found to be at a greater risk of developing abdominal obesity. No such significant association was found between BMI and junk food consumption.

Conclusion

Frequent consumption of junk food was remarkably high among the studied population. Junk food consumption was found to be a risk factor for central obesity. A combined effort should be made from school/college authorities and parents to impart adequate knowledge to school-going adolescents on the harmful consequences of junk food consumption. It is also desirable to prioritize implementation programmes on healthy eating habits through various government and non-government agencies in order to improve health among adolescents.

Conflict of interest: The authors declare no conflict of interest.

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