

Behaviour Related to Overweight and Obesity Among Adolescents of Schools in Kathmandu

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ABSTRACT

Introduction: Overweight and obesity are major risk factors for non-communicable diseases. The prevalence of overweight and obesity is increasing and is influenced by urbanization and changes in lifestyles. Understanding adolescents' behaviour related to obesity in Kathmandu is pivotal. This study aimed to investigate behaviours associated with being overweight and obesity among school adolescents in Kathmandu.

Methods: A descriptive cross-sectional study was conducted among 665 adolescents in government secondary schools in Kathmandu using a one-stage cluster sampling technique. Data was collected using a structured, pretested, self-administered questionnaire. Ethical approval was obtained from the Ethical Review Board of the Nepal Health Research Council. Adolescents' behaviour related to diet, physical activities, sleep, and screen time was assessed. Data analysis was done using descriptive statistics, and a chi-square test was used to measure the association between behaviour status and selected variables.

Results: More than half (58.2%) were female with a mean age of 15 years, 47.4% were from a nuclear family, and 52.3% were studying in grade 10. Almost half (49.8%) exhibited fair behaviour, and only 2.1% showed good behaviour related to obesity. More than half (54.3%) had breakfast daily, and 27.1% consumed fast food daily. Nearly 30.0% reported never exercising, and among those who did exercise, 72.0% exercised less than 60 minutes per day. Screen time under two hours daily was reported by 73.2%. Significant association was found between behaviour status related to obesity and grade ($p=0.025$).

Conclusion: Very few adolescents have good behaviour, while most have fair behaviours that contribute to overweight and obesity. Health education promoting physical activity and a healthy lifestyle for adolescents is recommended to reduce the risk of adolescent obesity.

Keywords: Adolescents, behaviour, overweight, obesity

INTRODUCTION

Obesity and being overweight are emerging global health concerns among adolescents worldwide. Over 390 million children and adolescents aged 5–19 years were overweight in 2022, including 160 million with obesity.¹ It is anticipated that this trend will extend to over two billion people globally. It is also predicted that by 2035, with prevalence of obesity among children and

adolescents will increase sharply.² A higher proportion of overweight children is seen in developing countries, particularly in the Southeast Asia region, projected to have more than 45 million obese children and adolescents by 2030.^{3,4} In Nepal, the size of the adolescent population is 20.1%.^{5,6} With rapid urbanization, changes in social dynamics, lifestyles, and dietary patterns of Nepali children and adolescents have undergone significant changes, contributing to an increase in the prevalence

of overweight and obesity among them.^{7,8} Studies have reported that the prevalence of overweight and obesity among Nepali adolescents varies, with overall figures at 6.7% and 0.6%, respectively.⁹ Various school-based studies have reported that the prevalence of overweight/obesity ranges from 6.38% to 29.2%.^{7,8,10-15}

Adolescent overweight and obesity may persist into adulthood¹⁶ and these conditions are the major risk factors for non-communicable diseases (NCDs), which dominate mortality rates in Nepal, accounting for 66.0% of deaths.¹⁷ Factors contributing to obesity in adolescents include sedentary behaviour, inadequate physical activity, poor dietary habits, and high sugar consumption.^{7,10,11} Because of the foreseeable consequences of obesity, systematic investigation into the behaviours related to obesity among adolescents is essential.

METHODS

A descriptive cross-sectional study was conducted to assess adolescents' behaviours related to overweight in government secondary schools in Kathmandu District. The district consists of a metropolitan city and 10 municipalities, with a total of 60 secondary government schools (Source: Kathmandu District Education Office, 2020). The study included adolescent students studying in grades nine and ten from various schools. The sample size was calculated using the formula, $n = Z^2pq/d^2$ where n = required sample size, Z = statistic for a level of confidence (1.96 for 95.0% CI), p = assumed proportion of knowledge level of obesity = 50% i.e., 0.5, q = $1 - p = 1 - 0.5 = 0.5$, and d = margin of error, which is 5.0% i.e., 0.05. Thus, the calculated sample size was 385. Adding a 15.0% non-response rate and 1.5% design effects, the final sample size was 665.

One-stage cluster sampling technique was adopted. A list of government secondary schools was obtained from the district education office. Schools were considered as clusters. Assuming 100 students from each school (considering an average of 50 students in each class), 5 schools were randomly selected to achieve the required sample size. The selected schools included one from Kathmandu metropolitan city, two from Budhanilkantha municipality, and two from Tokha municipality. There were 147 students from a school in Kathmandu metropolitan city, 297 students from schools in Budhanilkantha municipality, and 458 students from schools in Tokha municipality. Altogether, there were 912 students from all five selected schools. Complete enumeration was done to obtain samples from

the selected schools. Both male and female students, studying in grades nine and ten, who were present during the data collection period, were included in the study. A total of 702 students participated voluntarily, but only 682 students returned the complete questionnaires. The mostly blank questionnaire sets were excluded, and 665 were included for the final analysis.

A structured, self-administered questionnaire developed by the researchers themselves based on available literature was used to collect data. The instrument consisted of four parts: Part one included questionnaires related to the socio-demographic and personal information of the respondents, and Part two included questions related to behaviours to control overweight and obesity among adolescents, which were also multiple-choice questionnaires. It includes self-reported behaviours of adolescents related to dietary intake and eating patterns, choice of food, type of food intake, consumption of junk food, intake of beverages, and consumption of food/vegetables, sedentary behaviours watching TV or spending time with gadgets for more than two hours, and time spent on homework to control overweight and obesity. For each correct response, a score of one was given, and zero for wrong and "don't know" responses.

Questions about food items, children usually ate had the options of "often", "sometimes", "seldom", and "never". Answering "often" for healthy foods such as eggs, milk, rice, and vegetables were given a score of three, whereas "sometimes", "seldom" and "never" scored two, one and zero, respectively. In the case of unhealthy food items such as sweets, instant noodles, chips, scores of zero, one, two and three were given for "often", "sometimes", "seldom" and "never" respectively. Adolescents with positive or negative dietary and physical behaviours received one or zero score, respectively. Multiple choice questions with yes/no response options were given a score of one for healthy items such as water, fresh juice. Children who preferred sugar-sweetened carbonated drinks and packed juice received zero scores.

Adolescents who had done 60 minutes or more of moderate to vigorous intensity physical activity each day had obtained a score of one, and those who had done less than 60 minutes of exercise had obtained a score of zero. Similarly, adolescents who slept 8-10 hours per day had obtained a score of one, and those who slept less than eight hours and more than 10 hours per day obtained a score of zero. Screen time was also scored; the lowest score (i.e., 0) was for more than two hours per day and the highest score (i.e., 5) was for those who spent less than 30 minutes. A total of 14 questions were included in the scoring of the behaviours of adolescents.

The content adequacy of the instrument was ensured through an extensive literature review and by consultation with content experts (Pediatrician, Pediatric Nurse, Nutritionist) and other faculty members of the departments. Pretesting of the instrument was conducted with 10.0% (i.e., 66) of the sample size among adolescent students of a Government secondary school in Tokha Municipality. Cronbach’s alpha value was calculated based on the data obtained from the pretesting. The alpha value was 0.725 for the behaviour-related questionnaire. The research instrument was designed in English and then translated into Nepali. Back translation was done by the researchers and finalized by a bilingual expert.

Ethical approval was obtained from the Ethical Review Board (ERB) of Nepal Health Research Council (Ref. No. 2409). Written informed consent from each parent and assent from respondents were obtained in the case of minors. Anonymity of the respondents was maintained by not mentioning their names in the questionnaire and using code numbers. All the respondents participated voluntarily, and they were allowed to withdraw from participation in the study at any time during the data collection period. The approximate time to fill out the questionnaire was 15 minutes. Data were collected from September 28 to December 15, 2021. Administrative approval from the school was obtained, leading to a meeting with teachers and administrators to discuss the study's purpose and secure their cooperation. Data collection was facilitated by class teachers. The researchers manually compiled, edited, classified, and coded data after collecting it, then entered it into the Statistical Package for Social Sciences (SPSS) version 16.0. Data was rechecked and cleaned to minimize errors. Mean, standard deviation, and range were used for the analysis of socio-demographic information and behaviours of adolescents. Behaviour was categorized into three levels: poor (0.0% to 50.0%), fair (51.0% to 75.0%), and good (76.0% to 100.0%) to simplify the interpretation of results.¹⁸ The chi-square and Fisher’s exact test were used to measure the association of adolescents’ behaviour status regarding being overweight and obesity with selected variables.

RESULTS

The study included 665 adolescent students from different secondary government schools in Kathmandu. Respondents’ status of behaviour related to being overweight and obesity was assessed using a self-reported questionnaire. The results presented personal information, behaviour status, and the association between behaviour status and selected variables.

Respondents’ Personal Information

Regarding the personal information of the respondents, more than half (52.5%) were above 16 years of age, with a mean age of 15 years. Many of the respondents (58.2%) were female. The largest group among them belonged to the disadvantaged Janajati (38.5%), and nearly half (47.4%) lived in nuclear families. Similarly, more than half (52.3%) were in grade 10, and a significant majority (93.7%) walked to school, with 85.4% reporting access to a playground at school (Table 1).

Table 1: Personal information of the respondents n=665

Personal Information	Number	Percent
Age		
Up to 15years	316	47.5
16years and above	349	52.5
Minimum= 12, Maximum= 19		
Mean age (±SD) (15.56 ± 1.23)		
Sex		
Male	278	41.8
Female	387	58.2
Ethnicity		
Disadvantaged Janajati	263	39.5
Upper-caste groups	216	32.5
Relatively advantaged Janajati	95	14.3
Dalit	56	8.4
Disadvantaged non-Dalit Terai	20	3.0
Religious minorities	15	2.3
Type of family		
Nuclear	315	47.4
Joint	311	46.8
Extended	39	5.9
Grade		
Class nine	317	47.7
Class ten	384	52.3
Going to school by		
Bus	42	6.3
Walking	623	93.7
Have playground in school		
Yes	568	85.4
Have a playground at home		
Yes	356	53.5

In terms of respondents’ behaviours regarding obesity, more than half (54.3%) reported eating breakfast daily, 27.1% had a daily consuming fast food daily, and 27.5% ate fruits and salads 4-6 times a week. Similarly, almost half (48.6%) and 48.1% had the habit of eating sweet dishes after a meal and eating while watching TV, respectively. Furthermore, 43.8% of the respondents reported never engaging in any exercise. Among the respondents, 38.3% played online games every day, and 35.6% reported never watching television (Table 2).

Table 2: Behaviours related to overweight and obesity among respondents

n=665

Statements	Everyday		4-6/week		1-3/week		Once/week		Never	
	N	%	N	%	N	%	N	%	N	%
Frequency of taking breakfast	361	54.3	72	10.8	64	9.6	15	2.3	153	23.1
Frequency of eating fast food	180	27.1	172	25.9	149	22.4	56	8.4	108	16.2
Eating fruits/salads	175	26.4	183	27.5	171	25.8	44	6.6	92	12.0
Additional sugars in tea/milk	182	27.4	47	7.1	260	39.1	47	7.1	129	19.5
Eating a sweet dish after meals	47	7.1	52	7.8	202	30.4	42	6.3	322	48.6
Eating while watching TV	107	16.1	105	15.8	108	16.2	26	3.9	319	48.1
Frequency of doing exercise	161	24.2	136	20.5	35	5.3	42	6.3	291	43.8
Playing online games	255	38.3	146	22.0	160	24.1	35	5.3	69	10.4
Frequency of watching TV	173	26.1	125	18.8	96	14.4	34	5.1	237	35.6

Among the respondents, only 21.4% and 21.1% of the respondents drink sweetened beverages and consume

fried food 2-3 times per week, respectively. Nine percent of respondents did not provide any response regarding drinking sweetened beverages (Table 3).

Table 3: Respondents' food habits that induce overweight and obesity

n=665

Items	Never		Sometimes		1-2/week		2-3/week		>3/week	
	N	%	N	%	N	%	N	%	N	%
Drink sweetened beverages	69	10.4	130	19.5	234	35.2	142	21.4	90	13.5
Consume fried foods	54	8.1	132	19.8	227	34.1	140	21.1	112	17.0

Regarding the respondents' behaviour related to activities that induce or reduce overweight and obesity, the majority (80.0%) of the respondents did not eat in response to stress, while almost half (56.2%) performed physical exercises. Among them, the highest proportion (45.2%) of the respondents had done exercise for less than 60 minutes per day. Similarly, more than half of them (59.6%) had run as a form of exercise, followed by jogging (28.3%). The reason for not doing exercise was a lack of time (66.0%), and 80.4% did not respond to it (Table 4).

Table 4: Respondents' behaviours that induce overweight and obesity

n=665

Variables	Number	Percent
Eating in response to stress		
Yes	133	20.0
No	532	80.0
Doing physical exercise regularly		
Yes	374	56.2
No	291	43.8
Duration of exercise in a day (n=374)		
Less than 60 minutes	169	45.2
60 minutes	75	20.1
More than 60 minutes	21	5.6
Non-response	9	2.4

Variables	Number	Percent
Type of exercise (n=374) *		
Running	223	59.6
Jogging	106	28.3
Cycling	46	12.3
Dance	51	13.6
Playing games	83	22.2
PT in school	14	3.7
Non-response	88	23.5
Barriers for not doing exercise (n=291) *		
Lack of knowledge	50	17.2
Lack of time	192	66.0
Lack of space/ ground	98	33.7
Bad weather	48	16.5
Fear of dogs	42	14.4
Non-response	234	80.4

*Multiple responses

Table 5 illustrates the sleep behaviour and screen time spent among the respondents. More than half (51.7%) of the respondents slept 8-10 hours per day, which is normal for adolescents. Similarly, most of the respondents (73.2%) spent less than 2 hours per day on screens such as TV, mobile phones, laptops, etc.

Table 5: Sleep behaviour and screen time among the respondents n=665

Variables	Number	Percent
Sleep behaviour		
Less than 8 hours per day	308	46.3
8-10 hours per day	344	51.7
More than 10 hours	13	2.0
Screen Time		
< 2 hours per day	487	73.2
≥ 2 hours per day	178	26.8

Regarding behaviour related to overweight and obesity,

almost half (49.8%) had fair behaviour, while only a few (2.1%) had good behaviour (Table 6).

Table 6: Status of behaviour related to overweight and obesity among the respondents n=665

Behaviours	N	%	Minimum score	Maximum score	Mean	SD
Poor	320	48.1				
Fair	331	49.8	6	43	24.47	6.47
Good	14	2.1				

Table 7 indicates that there is a statistically significant association between behaviour status and grade (p = 0.025) of the respondents.

Table 7: Association between behaviours related to overweight and obesity and selected variables n=665

Variables	N	%	N	%	N	%		
Age	<15	125	39.6	185	58.5	6	1.9	0.320
	>15	160	45.8	174	49.9	15	4.3	
Gender	Male	112	40.3	155	55.8	11	4.0	0.372
	Female	173	44.7	204	52.7	10	2.6	
Ethnicity	Janajati	158	44.1	190	53.1	10	2.8	0.156 ^f
	Upper cast	80	37.0	128	39.3	8	3.7	
	Others**	47	51.6	41	45.1	3	3.3	
Family Type	Nuclear	129	41.0	173	54.9	13	4.1	0.304
	Joint	156	44.6	186	53.1	8	2.3	
Grade	Nine	140	44.2	173	54.6	4	1.3	0.025 ^f
	Ten	145	41.7	186	53.4	17	4.9	

f = Fisher's exact test

** others include Dalit, disadvantages non-Dalit Tarai, and religious minorities

DISCUSSION

This study assessed adolescents' behaviour related to obesity and being overweight in government secondary schools in Kathmandu. The findings of the study revealed that adolescents' health behaviour, in terms of lifestyle patterns, is risky for developing overweight and obesity. Fair behaviour was seen among nearly half of the respondents. It reflects a mixed lifestyle choice among respondents, such as dietary habits, sedentary habits, screen time, physical activities, and sleep patterns. Only a small proportion of respondents showed good behaviour related to being overweight and obese. This low proportion of good behaviour aligns with findings from a study in urban areas of Nepal, where modernization and sedentary lifestyles contribute to unhealthy behaviours.¹¹ Likewise,

almost similar findings were reported in a study of urban schools in India, where 86.2% and 13.8% of adolescents practiced unhealthy and healthy lifestyles, respectively.¹⁹ Several studies conducted in different settings in Nepal have reported varied prevalence of overweight and obesity among adolescents, often linked to behaviour and lifestyle patterns. For example, a study conducted in Nagarjun municipality reported a 6.38% prevalence of overweight, with risk factors including lack of physical activity and consumption of high-calorie, sugar-rich foods.⁷ In this study, more than half (54.3%) took their breakfast daily, which is a good behaviour to prevent overweight and obesity. This aligns with a meta-analysis of 40 studies involving over 320,000 adolescents, which reported that those who skipped breakfast had a 59.0% higher prevalence of overweight or obesity compared to those who ate breakfast regularly.²⁰ In contrast, skipping breakfast was linked to increased odds of overweight or obesity.²¹ Similarly, this study found that 27.1% have

been eating fast food daily, which aligns with results from Southeast Asia, where the fast food consumption rate was 17.7% (2.3–33.2%)²² and lower than the findings of the study in Chitwan, where 42.3% of adolescents consumed junk food twice a day.²³ The study also found that only 26.4% and 27.5% ate fruits and salads daily and 4–6 times a week, respectively. Likewise, almost half (48.6%) had a habit of eating sweet dishes after meals.

In this study, only 21.4% and 21.1% of the respondents drink sweetened beverages and consume fried food 2–3 times per week, respectively. Nine percent of respondents did not provide any response on drinking sweetened beverages, which is lower than the study conducted in Nagarjun Municipality, Kathmandu, where the percentage of adolescents consuming sugary foods and beverages was 84.50%.⁷ The high consumption of sugary foods, beverages, and fried foods among adolescents is a public health concern due to its association with overweight/obesity and non-communicable diseases in Nepal.²⁴

Exercise is a key component for weight control. We found that 43.8% of the respondents had never done any exercise, and the highest proportion (45.2%) of the respondents had done exercise for less than 60 minutes, with only 20.1% having done 60 minutes of exercise per day. Running is the most common form of exercise. This indicates a low prevalence of meeting exercise guidelines for adolescents, which recommend at least 60 minutes of moderate to vigorous activity daily.²⁵ In this study, lack of time is identified as a restriction on physical exercise. This indicates the need for health education to encourage individuals of the importance of making time for exercise.

This study also found that most respondents (73.2%) reported spending less than 2 hours per day on screens. Overweight and obesity are related to the amount of time spent in front of a TV set or a personal computer.^{26,27} Our study showed that 51.7% of children have a sleep time of more than 8 hours per day. Poor sleep quality and deprivation promote weight gain by altering appetite hormones, increasing intake, and reducing activity.²⁸ One interesting finding we observed in this study is that there is a significant difference in behaviour status related to overweight and obesity between students in grades nine and ten, even though they are of the same age group and only a year apart in school. This difference may be attributed to the influence of school education and peers.

CONCLUSION

In conclusion, almost half of the adolescents have fair behaviour regarding obesity, while very few have good

behaviour towards preventing obesity. Furthermore, more than half of the respondents perform physical exercise regularly. There is a statistically significant association between the status of behaviour that prevents obesity and the grade of adolescents. It is recommended to implement a focused education program to promote physical activities and healthy lifestyles to prevent obesity among them.

IMPLICATIONS OF THE STUDY

This study provides baseline data regarding behaviours towards overweight and obesity among school-going adolescents in Kathmandu, which is valuable to understand the status of behaviour related to overweight and obesity, and to develop a focused education program to prevent obesity among school adolescents. This data is also useful for future researchers.

LIMITATION OF THE STUDY

This study was conducted only in government schools in Kathmandu district, which limits generalizability. Data were collected using a self-reported questionnaire, which may lead to response bias.

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CONFLICT OF INTEREST

None

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