

Food Habits and Nutritional Status of Adolescents in Malangwa Municipality, Sarlahi, Nepal: A Cross-sectional Study

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ARTICLE INFO

Article history:

Received: 17 January 2021

Revised: 27 April 2021

Accepted: 29 May 2021

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Citation:

Dhobi S, Giri M. Food Habits and Nutritional Status of Adolescents in Malangwa Municipality, Sarlahi, Nepal: A Cross-sectional Study J. Med. Sci. 2021;1(1):20-24

ABSTARCT

INTRODUCTION: Stunting and thinness are major nutritional problems affecting adolescents in the developing countries. This cross-sectional study was conducted to identify food consumption pattern, nutritional status and lifestyle pattern of adolescents studying in public schools of Malangwa municipality, Sarlahi, Nepal. **MATERIALS AND METHODS:** Analytical cross-sectional study was carried out among adolescents of public schools. A semi-structured questionnaire was developed and face to face interview method was used to collect information from three public schools of Malangwa municipality. Simple random sampling technique was applied. Food consumption pattern were reviewed by 24-hour recall method and 7-day food frequency questionnaire. **RESULTS:** The result indicated that protein rich food intake was very low (29%) among the adolescent's daily diet and 82% of the respondents took fruits and vegetables in daily diet. 40.1% respondents were found malnourished, out of which 37.5% were and 64.8% were boys while 35.2% were girls. Also, 2.5% were overweight, out of which 50.0% were girls and 50.0% were boys. **CONCLUSIONS:** Awareness on healthy eating of the adolescents needs to be created to uphold their nutritional status.

Keywords: Adolescent, food habit, nutritional status.

INTRODUCTION

Adolescents are nutritionally vulnerable due to their high requirements for growth, eating patterns and their susceptibility to environmental influences which is influenced by a rapid physical growth, psychological development and social changes [1].

Inadequate nutrition puts adolescent at high risk of chronic disease, although the detrimental effects appear after a long time [2]. However, most health programs overlook adolescents as they are generally considered a healthy population. Scientific literatures from the South-East Asia region suggests the high prevalence of stunting, thinness, micro nutrition deficiency like anemia and nutrition related problems such as Protein Energy Malnutrition, schistosomiasis and intestinal parasitosis [3-5]. 65% adolescents were

undernourished or underweight out of which 71% of male adolescents and 59% of female adolescents were undernourished as reported by Aryal KK [6]. In context of Nepal, especially at provincial level, there is limited data available on the nutrition status among adolescents. Therefore, this study was conducted to find out food habits and nutritional status of adolescents in public schools at Malangwa municipality.

MATERIALS AND METHODS

Study design and setting

A cross-sectional study was carried out in public schools of Malangwa Municipality from January 2020 to April 2020. Schools were selected randomly amongst schools located inside Malangwa municipality of Province 2, Nepal.

Participants, sampling and sample size

Sample size was calculated using the formula for descriptive cross-sectional study, and the calculated sample size was 242. Among the sample size (n=242), class eight, nine and ten students (around 81 from each of the schools) were selected for this study. Three public schools were selected by random sampling based on sample frame obtained from the district education office. Participants from class eight, nine and ten were included proportionally from the three schools. Adolescents aged between 10-19 years, studying in school were included. Physically and mentally ill children were excluded. Face to face interview was carried out to collect information with semi structured questionnaire. Body Mass index (BMI) was measured with wooden height measurement scale and the weight was measured with bathroom scale to assess the nutritional status of adolescents. Socio-demographic, lifestyle and food consumption related variables were included.

Pre-test was done in similar characteristics of school and modifications were done. An ethical approval was obtained from the Ethical Review Board, Department of Public Health, State University of Bangladesh, Dhaka. A permission for data collection was taken from the office of Malangwa Municipality, Malangwa, Nepal and from the respective schools. Informed written consent was taken and confidentiality was maintained.

Statistical consideration

The collected data was checked for completeness, was entered, and analysed using SPSS version 20. The results were interpreted in terms of frequency of response and percentage. Chi-square test was applied to find out the associated factors and p-value <0.05 was considered as statistically significant.

RESULTS

The background information of the respondents is presented in Table 1. The study consisted of adolescents aged 10 to 19 years. Out of 242 total adolescent's, majority (72.3%) were in the age group of 15 to 19 years and few (27.7%) were in the age group of 10 to 14 years. 52.5% of the respondents were girls, and majority (84.7%) were Hindus. Adolescents studying in eight, nine and ten class were 38%, 37.2% and 25.8% respectively.

Table 1 | Background information of the respondents

Characteristics	Number (%)
Age	
10 -14 years	67 (27.7)
15 -19 years	175 (72.3)
Mean \pm SD	15.42 \pm 1.309 years
Gender	
Girls	127 (52.5)
Boys	115 (47.5)
Religion	
Hindu	205 (84.9)
Muslim	35 (14.5)
Christian	02 (0.8)
Education status	
Grade 8	92 (38.0)
Grade 9	90 (37.2)
Grade 10	60 (25.8)
Type of Family	
Nuclear Family	179 (74.0)
Joint Family	63 (23.0)
Occupation of fathers	
Farmer	107 (44.2)
Foreign Employee	36 (14.9)
Government service	18 (7.4)
Private job	30 (12.4)
Others	51 (21.1)
Occupation of Mothers	
House wife	219 (90.5)
Farmer	13 (6.2)
Private job	04 (1.7)
Government service	02 (0.8)
Others	04 (1.7)
Annual family income	
Up to 100000	65 (26.9)
100001 to 250000	100 (41.3)
250001 to 500000	60 (24.8)
500001 to 750000	06 (2.5)
More than 750000	11 (4.5)
Mean \pm SD	262870 \pm 216980 Rupees

About three fourth (74%) of the respondents belonged to nuclear family.

Table 2 | Life style information of the respondents

Life style information	Number (%)
Habits of the Physical Exercise	
Yes	227 (93.8)
No	15 (6.2)
Smoking habit of boy respondents	
Yes	05 (4.3)
No	110 (95.7)
Tobacco chewing habit among boys	
Yes	03 (2.6)
No	112 (97.4)
Alcohol consumption among boys	
Yes	06 (5.2)
No	109 (94.8)
Use of internet	
Yes	98 (40.5)
No	144 (59.5)

Less than half (44.2%) of the respondent fathers were farmer and 90.5% of the respondent mothers were housewives. About 41.3% of the respondents annual family income was NRS 100001 to 250000 with mean annual family income of 262870±216980 Nepali Rupees.

Life style information of the respondents is depicted in Table 2. The study found that 93.8% respondents were involved in physical exercise. 40.5% respondents used internet. 4.3% of the boys had smoking habit while 2.6% boys had tobacco chewing habit and 5.2% boys consumed alcohol.

Table 4 | Food consumption during last 24 hours

Food Groups	Frequency (%)
Grains	242 (100)
Milk and milk Products	169 (69.8)
Vitamin A rich fruits and vegetables	227 (93.8)
Other fruits and Vegetables	199 (82.2)
Meat, Egg, Fish	71 (29.30)
Legumes or Nuts	92 (38.0)
Oils and Fats	235 (97.1)

The food consumption pattern of the respondents is shown in Table 3, 4 and 5. Table 3 shows that, 98.8% of the respondents took meal two times per day whereas 62.4% of respondents took snacks one time per day. Table 4 shows food consumed by the adolescents in the last 24 hours preceding the survey. All respondents (100%) consumed regular food items like grain like rice, wheat, bread etc. More than 90% of the respondents consumed vitamin A rich fruits and vegetables, oils and fats whereas more than 80% of them consumed others fruits and vegetables.

Table 3 | Food consumption pattern among respondents

Food consumption pattern	Number (%)
Number of meals eaten per days	
2 times	239 (98.8)
3 times	03 (1.2)
Mean ± SD	2.01 ± 0.11
Number of snacks eaten per day	
1 time	151 (62.4)
2 times	87 (36.0)
3 times	04 (1.7)
Mean ± SD	1.39 ± 0.52

Nearly 70% of them had consumed milk and milk product and around one third (29.3%) of them consumed meat, egg, fish and legumes or nuts.

Usual dietary pattern, expressed by consumption frequency per week, of the respondents are shown in Table 5. A substantial proportion of the adolescents did not take milk (12.0%), meat (43.0%) while 38.8% took large fish and 55.0% took meat at least 1 to 3 times in a week. A considerable proportion of adolescents did not take eggs (43.4%) and dark green and leafy vegetables (4.5%); while 51.7% took eggs and 65.3% took dark green and leafy vegetables at least 1 to 3 times in a week. Likewise, 17.8% did not

Table 5 | Weekly food consumption pattern among respondents by food frequency

Foods items	Food consumption/week (%)		
	Never	1- 3 days	≥ 4 days
Rice (Bhat)	0.0	00	100.0
Wheat (Roti)	8.3	34.3	57.4
Bhuja or chiura	22.7	66.5	10.7
Sugar	13.2	41.7	45.0
Potato	0.8	14.0	85.1
Bread	31.4	51.2	17.4
Yellow vegetables	17.8	59.9	22.3
Leafy vegetables	4.5	65.3	30.2
Pulses or nuts	46.7	42.1	11.2
Any Fruits	23.1	70.2	6.6
Milk & milk products	12.0	45.9	42.1
Egg	43.4	51.7	5.0
Small fish	74.8	22.7	2.5
Large fish	59.9	38.8	1.2
Meat	43.0	55.0	2.1
Liver	78.9	21.1	0.0

consume yellow vegetables which are a major source of pro-vitamin A. Over 78.9% did not take liver at all in the week; liver is rich source of iron and preformed vitamin A.

Nutritional Status	Number (%)	Mean \pm SD
Under weight (<18.5)	91 (37.6)	
Normal (18.5 - 24.9)	145 (59.9)	19.42 \pm 2.5
Over weight (\geq 25.0)	06 (2.5)	

Nutritional status	Male	Female	p-value
Underweight	59 (64.8%)	32 (35.2%)	<0.001
Normal weight	53 (36.6%)	92 (63.4%)	
Overweight	03 (50.0%)	03 (50.0%)	

The anthropometrics information of the respondents is presented in Table 6. Table 6 demonstrates that about 40.1% of the adolescents were malnourished out of which 37.6% were under weight and 2.5% were overweight. The mean BMI was 19.42 \pm 2.5. Table 7 shows the association of nutritional status with gender where 64.8% males and 35.2% females were found to be underweight. Among the overweight, both sexes were equal as 50.0%. The study shows nutritional status is significantly associated with gender ($p < 0.001$).

DISCUSSION

The present study highlights the mean age of the respondents as 15.42 \pm 1.30 years. Zaman et al. found the mean age (years) of adolescents as 14.3 \pm 1.52 which is similar to our results [7]. In this study 72.3% of the respondents belonged to late adolescence (15- 19 years), while 27.7% belonged to early adolescence (10- 14 years) age group. Islam et al. reported 55.7% belonged to late adolescence (15- 19 years) and 44.3% belonged to early adolescence (10- 14 years) age group which is almost parallel to our results [8]. This study reports 52.5% of the respondents as females and 47.5% as males. Similar results were attained by Aryal et al. [6]. This might be due to the mandatory school age of the respondents for the high school study in Nepal is 14-16 years. In the current study, 38.0%, 37.2%, 25.8% studied in grade eight, nine and ten respectively. This was inconsistent with study done by Sarkar et al. [9]. This finding might be due to the fact that Grade eight students might not be absent in the class with respect to grade nine and ten. The other possibility might be due to the right to education that may have ensured more children being enrolled in schools of Nepal. Majority (84.7%) of the respondents in this study were Hindus, 14.5% were Muslims and 0.8% were Christians

which was similar to the findings of Kotecha et al. [10]. The prospective might be due to the fact that among two main religious groups, Hindu population and religion is greater comparative to Muslims and Christians. In the present study majority respondents (74.0%) belonged to nuclear family and 26.0% respondents belonged to joint family which is almost parallel to the findings of Shukla et al. [11]. This might be due to the decreasing trend of concept of joint family from Nepalese society whereas nuclear family has started gaining preference in urban areas with increased independence in Nepal. The present study reveals the average annual family income around NRS 2,60,000. Most of the respondents had habit of physical exercise among which only 57.7% respondents practiced regularly. Similarly, results accounted by Zaman et al. where 58.23% respondents did regular physical exercise [7]. This suggests that children of adolescent's age are exercising, active in sports, gyms and physical activity regularly which has many benefits for body and brain of human body. This study found that 4.3% of the male respondents had habit of smoking and 5.2% of the respondents consumed alcohol. Similarly, Aryal et al. found that 3.2% of the respondents had smoking habits and 3.4% consumed alcohol [6]. The possibility is that they might not be familiar with the fact that smoking and alcohol drinking during adolescence have both immediate and long-term health consequences including addiction to nicotine, reduced lung function and impaired lung growth and asthma, likelihood of experimenting with other drugs which are associated with detrimental psychological, social and physical effects, such as dropping out of high school without graduating. Majority (above 80%) of the respondent's consumed rice, vitamin A rich fruits and vegetables, other fruits and vegetables, oils and fat but only one third of them consumed meat, fish, egg, pulses or nuts and around two third of them consumed milk among adolescents of this study which is almost parallel in the study conducted by Rath et al. [12]. This might be due to the natural food habit of Nepalese people. This study reported that protein rich food or body building foods like pulses or nuts, milk and milk product, egg, small fish, large fish, meat were avoided by 46.7%, 12.0%, 43.0%, 74.8%, 59.9%, 43.0% respectively, and protective foods like yellow vegetables, dark green and leafy vegetables, fruits, liver avoided by 17.8%,

4.5%, 23.1, 79.0% respectively, the avoided rate was lower for body building food but liver avoided rate was too much high. The prevalence of malnourished is 40.1% among them 37.6% were underweight and 2.5% were overweight in this study which was alike with the results obtained by Hossen et al. and Jayatissa et al. [13, 14]. This suggests that malnutrition is still very much prevalent in Nepal mainly among young children and adolescents. There was no significant ($p > 0.05$) association between physical exercise and annual family income with nutritional status but the study found that gender had strongly significant ($p < 0.05$) association with nutritional status of adolescents.

CONCLUSIONS

This study concludes that around one third of the adolescents were found under weight and few adolescents were overweight. The adolescents were found taking fruits and vegetables daily but protein rich food intake was very low in the daily diet. The gender of the respondents was significantly associated with nutritional status of adolescents. Awareness programs on dietary habits and healthy eating of the adolescents needs to be created to uphold the nutritional status in community settings.

ADDITIONAL INFORMATION AND DECLARATIONS

Acknowledgements: The authors would like to thank all individuals who rendered help and participated during the study period.

Funding: Self

Competing interest: The authors declare no competing interests.

Author Contributions: Concept and design: SD; statistical analysis: SD and MG; writing of the manuscript: SD, and MG; revision and editing the manuscript: SD and MG. All authors read and agreed with the contents of the final manuscript.

Data Availability: Data will be available upon request to corresponding authors after valid reason.

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