

Food Consumption Practice and Nutritional Status of Adolescent Girls from Urban areas of Pokhara, Nepal

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ABSTRACT

World Health Organization defined adolescent as the population of 10-19 years of age. Inadequate food consumption patterns during adolescence are linked not only with the occurrence of obesity in youth, but also with the subsequent risk of developing diseases such as cancer, obesity and cardiovascular disease in adulthood and later in life. This study aims to assess the food consumption practice and nutritional status among adolescent girls. Cross-sectional study design was used to determine the food consumption practice and nutritional status among adolescent girls. Simple random sampling method was used in this study. Interview schedule, Bathroom Scale and Stature meter were used to collect the data from adolescent girls. Anthropometric measurements of all participants were taken and the questionnaire was filled up. Data were entered in EPIDATA 3.1 and analyzed by using SPSS version 20. In this study, majority (63.1 per cent) of participants did not consume sufficient calorie. Mean \pm SD of calorie intake was 2009.97 \pm 342.366 Kcal. In same way, 27.4 per cent, 64.6 per cent, 8.0 per cent of the participants were underweight, normal and overweight respectively. Mean \pm SD of BMI was 20.46 \pm 2.99 kg/m². Underweight was high in private schools and overweight was high in Public schools. Family monthly income and religion were associated with calorie intake and fruits consumption per week was associated with nutritional status of participants. This study concluded that around two-third of participants consumed insufficient amount calorie. It has been found that majority of the participants did not consume sufficient amount of foods from different groups like: body building and protective food as per required. Participants who consumed fruits more than 4 days per week were 2.5 times more likely to be normal (OR 2.500; 95%CI 1.194-5.233; P=0.013). So, information should be given about the balanced diet to them.

Key words: Food consumption practice, Nutritional status, Adolescent girls, Urban areas

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INTRODUCTION

Adolescent is a transition from dependent childhood to independent and responsible adulthood. World Health Organization defined adolescent as the population of 10-19 years of age. Out of estimated 27 million populations in Nepal, 23% are adolescents. It is the cross road in life when choices and decisions made become crucial for the future of an individual. Adolescent learn and adopt new knowledge and practices more easily and generally these are long lasting with impact on next generation.¹

Adolescence is an important stage of physical growth and development in the lifespan and unique changes that occur in an individual during this period are accompanied by progressive

achievement of biological maturity. For females, this is the period for preparation for motherhood.² Malnutrition passes from generation to generation, because adolescent girls that enter into pregnancy with poor nutrition are more likely to give birth to low birth weight or intrauterine growth restricted babies who are more vulnerable to metabolic disorders later in life. So adolescence period is a unique opportunity to break a range of vicious cycles of structural problems that are passed from one generation to the next such as poverty, gender discrimination, violence, poor health, and nutrition.³

Inadequate food consumption patterns during childhood and adolescence are linked not only

the occurrence of obesity in youth, but also with the subsequent risk of developing diseases such as cancer, obesity and CVD in adulthood and later in life.⁴ This study was carried out to assess the food consumption practice and nutritional status among adolescent girls in Pokhara Sub-metropolitan.

METHODS

The study design was cross-sectional and study participants were the adolescent girls from secondary schools of grade 9th and 10th from Pokhara sub metropolitan city. The sample size was determined by assuming prevalence of undernourished adolescent girls is 68.52 per cent with an error of five per cent, 95 per cent confidence limit, and thus sample size was 540. All adolescent girls participated in this study were aged from twelve to eighteen years. The study was conducted from July to December 2016. Schools were selected using a simple random sampling technique which included all the girls from selected schools of class nine and ten. From the data available through District Education Office, there were altogether 19 public secondary schools and 103 private secondary schools in Pokhara sub-metropolitan city. In an average 20 girls were enrolled in one class of public school and 18 girls students enrolled in private school (Assumption made by taking the reference from Kaski Saichik Darpan-2069). Altogether 232 students were selected from public school and 308 students from private school. Based on proportion of private and public school, 6 public and 9 private secondary schools were selected by using lottery method but sample size completed from 4 public schools and 6 private schools.

Ethical clearance was obtained from the institutional review committee, Pokhara University. Formal permission from school Principal was taken and informed consent was taken from adolescent girls and their assent was taken from guardians before starting the interview. Face to face interview and body measurement was carried out. Enough time was provided to recall the information and to respond for question. Food consumption practice was measured by using weekly food consumption questionnaire and 24 hour dietary recall questions were used to measure daily energy intake.

The size of dishes used to measure the amount of food was of 250 ml, which was equivalent to a standard cup size. Through this reference, the amount of food was converted into a standard serving size, and the daily energy intake was calculated by Nutrition facts 0.9.5.0 version and food tables. The recommended energy requirement of adolescent girl is 2200 kcal/day. Those who met the requirement considered as sufficient calorie consumption while others were classified as insufficient calorie intake.

Other different tools were used such as UNICEF electronic weighing scale for measuring weight and stature meter for measuring height. Height and weight were measured in order to calculate BMI. The heights and weights of the participants were measured in a standing position without shoes on, whilst they looked straight ahead. The height and weight were measured in centimeters and kilograms respectively. The BMI was calculated using the following formula: weight/height^2 (kg/m²). BMI was categorized as underweight (<18.50), normal (18.50-24.99) and overweight (≥ 25.00).

Data were entered in Epidata software and analyzed by using SPSS 20 version software. Descriptive statistics (i.e., frequency, percentage, mean and standard deviation) were applied to calculate the nutritional status and food consumption practices. Associations between socio-demographic characteristics, food consumption practices and nutritional status were analyzed by using chi-square test.

RESULTS

Out of 540 participants, 57 % were from private schools and 43% were from public schools. Similarly, majority of the participants (69.8%) were of age less than 16 years followed by age group more than 16 years (30.2%). About three fourth of respondents (74.8%) were living in single family followed by one fourth joint family (25.2%). Majority of the participants (85.4%) were belonged from Hindu religion, (11.9%) were Buddhist and least from Muslim (0.7%) and Christian (2.0%).

Table 1: Socio-demographic characteristics among participants

Characteristics	Frequency	Percentage
School type		
Private	308	57.0
Public	232	43.0
Age in years		
Less than 16	377	69.8
More than 16	163	30.2
Mean=15.04, SD=0.95, Min=12, Max=18		
Family type		
Single	404	74.8
Joint	136	25.2
Religion		
Hindu	461	85.4
Buddhist	64	11.9
Muslim	4	0.7
Christian	11	2.0

Figure 1 shows that 27.4% of participants were underweight, 64.4% were normal and 8.0% were overweight.

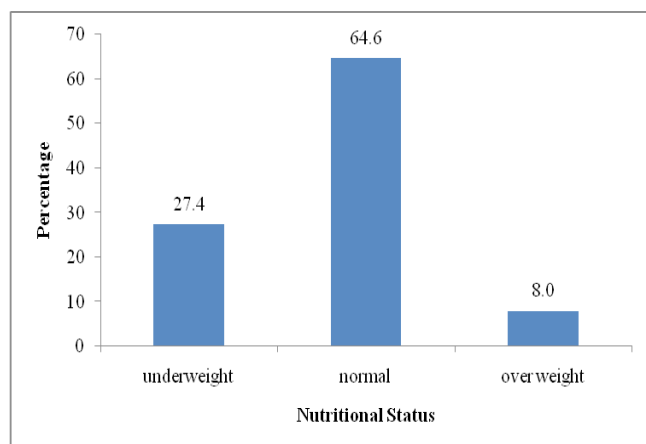


Figure 1: Nutritional status of the participants

Table 2 shows that information related to weekly food consumption. Out of 540 participants, majority (92.8%) of participants ate meat and least of them (7.2%) did not. Among students who ate meat, more than half (55.5%) ate meat equals and less than 2 days per week and (44.5%) ate more than 2 days per week. Mean± SD consumption of meat was 2.54±1.324 in last week. Similarly, more than half (59.3%) of participants did not eat fish and remaining were (40.7%) ate fish. Among them, three fourth (82.3%) ate fish once a week and remaining (17.7%) ate more than 2 days per week. Mean± SD was 1.25±0.721. Majority, i.e.

three fourth (84.4%) of participants ate egg and rest (15.5%) did not eat egg. Among them, (53.5%) of them ate egg equals and less than 2 days and 46.5 percent ate egg more than 2 days per week. Mean ± SD was 2.88±1.813. Similarly, majority (99.4%) of participants ate fruits and least (0.6%) did not eat fruits. Among (99.4%), more than half (58.5%) of participants ate equals and less than 4 days and (41.45%) ate more than 4 days per week. Mean ± SD was 4.24±1.955. Majority (96.1%) of participants ate vegetables and least (3.9%) of students did not eat vegetables. Among (96.1%), more than half (57.6%) ate equals and less than 5 days and (42.4%) ate more than 5 days per week. Mean ± SD was 4.81±1.953. Similarly, majority (89.8%) of participants ate milk and milk product and least (10.2%) of them did not. Among (89.8%), more than half (59.4%) ate more than 5 days and remaining (40.6%) ate equals and less than 5 days per week. Mean ± SD was 5.22±2.250.

Table 2: Distribution food consumption among participants

Characteristics	Frequency	Percentage
Meat consumption (n=540)		
Yes	501	92.8
No	39	7.2
Meat consumption per week (n=501)		
≤ 2 days	278	55.5
> 2 days	223	44.5
Mean=2.54, SD=1.324, Min=1, Max=7		
Fish consumption (n=540)		
Yes	220	40.7
No	320	59.3
Fish consumption per week (n=220)		
Once a week	181	82.3
More than 2	39	17.7
Mean=1.25, SD=0.721, Min=1, Max=7		
Egg consumption (n=540)		
Yes	456	84.4
No	84	15.5
Egg consumption per week (n=456)		
≤ 2 days	244	53.5
> 2 days	212	46.5
Mean=2.88, SD=1.813, Min=1, Max=7		

Fruits consumption (n=540)		
Yes	537	99.4
No	3	0.6
Fruits consumption per week (n=537)		
≤ 4	314	58.5
> 4	223	41.5
Mean=4.24, SD=1.955, Min=1, Max=7		
Vegetables consumption (n=540)		
Yes	519	96.1
No	21	3.9
Vegetables consumption per week (n=519)		
≤ 5	299	57.6
> 5	220	42.4
Mean=4.81, SD=1.953, Min=0, Max=7		
Milk and milk product consumption (n=540)		
Yes	485	89.8
No	55	10.2
Milk and milk product consumption per week (n=485)		
≤ 5	197	40.6
> 5	288	59.4
Mean=5.22, SD=2.250, Min=1, Max=7		

Table 3 shows that more than one third of the participants consumed sufficient calorie in their daily food intake whereas less than two third did not consume sufficient calorie in their daily food intake.

Table 3: Calorie consumption among participants in per day

Calorie intake	Frequency	Percentage
Not sufficient	341	63.1
Sufficient	199	36.9
Mean=2009.97 kcal, SD=342.36, Min=1205, Max=5977		

Table 4 shows that monthly income and religion were significantly associated with calorie intake. Parents whose monthly income was less than 50,000 were 1.82 times more likely to take not sufficient amount of calorie (OR 1.828; 95%CI 1.135-2.944; P=0.012). Likewise, participants who were Hindu were 1.90 times more likely to take not sufficient calorie (OR 1.903; 95%CI 1.104-3.279; P=0.019). In this study, socio-demographic factors like; Age, Family type, Father Education and Mother Education were not found to be associated with calorie intake.

Table 4: Association of socio demographic factors with calorie intake

Factors	Not sufficient	Sufficient	χ^2	p value	OR	95%CI
Age in years			2.458	0.117	0.733	(0.497-1.082)
Less than 16	230(61.0%)	147(39.0%)				
More than 16	111(68.1%)	52(31.9%)				
Family type			1.006	0.316	1.226	(0.823-1.826)
Single	260(64.4%)	144(35.6%)				
Joint	81(59.6%)	55(40.4%)				
Father education			3.378	0.066	1.503	(0.972-2.326)
Primary	85(70.2%)	36(29.8%)				
Secondary and above	256(61.1%)	163(38.9%)				
Mother education			0.913	0.339	1.19	(0.833-1.699)
Primary	148(65.5%)	78(34.5%)				
Secondary and above	193(61.5%)	121(38.5%)				
Monthly income of family			6.239	0.012*	1.828	(1.135-2.944)
Less than 50000	202(67.1%)	99(32.9%)				
More than 50000	48(52.7%)	43(47.3%)				
Religion			5.476	0.019*	1.903	(1.104-3.279)
Hindu	218(66.3%)	111(33.7%)				
Non-hindu	32(50.8%)	31(49.2%)				

Table 5 shows out of 540 participants more than one fourth were underweight, two third were normal and least of them were overweight. The mean \pm SD of BMI was 20.46 \pm 2.99 kg/m².

Table 5: Nutritional status of participants

Nutritional status	Frequency	Percentage
Underweight	148	27.4
Normal	349	64.6
Overweight	43	8.0
BMI: (Mean=20.4606 kg/m ² , SD=2.99451)		

Fruits consumption per week was found to be significantly associated with nutritional status. Participants who consumed fruits more than 4 days per week were 2.5 times more likely to be normal(OR 2.500; 95%CI 1.194-5.233; P=0.013). However Meat consumption per week, Egg consumption per week, Fish consumption per week, Vegetable consumption per week and Milk and milk product consumption per week has no association with nutritional status (Table 6).

Table 6: Association of weekly food consumption with nutritional status

Characteristics	Malnutrition	Normal	χ^2	P value	OR	95%CI
Fruits per week			6.236	0.013*	2.5	(1.194-5.233)
≤ 4 days	33(14.3%)	198(85.7%)				
> 4 days	43(11.0%)	348(89.0%)				
Meat per week			1.894	0.169	1.609	(0.814-3.182)
≤ 2 days	27(13.4%)	175(86.6%)				
> 2 days	14(8.8%)	146(91.2%)				
Egg per week			0.051	0.822	0.918	(0.438-1.927)
≤ 2 days	15(9.3%)	147(90.7%)				
> 2 days	16(10.0%)	144(90.0%)				
Fish per week			0.108	0.742#	1.289	(0.273-6.085)
Once a week	13(9.7%)	121(90.3%)				
more than 2	2(7.7 %)	24(92.3%)				
Veg. per week			0.287	0.592	1.199	(0.617-2.328)
≤ 5 days	25(11.7%)	189(88.3%)				
> 5 days	16(9.9%)	145(90.1%)				
Milk and milk product per week			2.621	0.105	1.781	(0.879-3.608)
≤ 5 days	20(13.0%)	134(87.0%)				
> 5 days	15(7.7%)	179(92.3%)				

* Statistically significant χ^2 based p-value from bivariate analysis, # p-value from likelihood ratio

DISCUSSION

The recommended energy requirement of adolescent girl is 2200 kcal/day. The assessment of food intake by adolescent girls of class 9 and 10 attending public and private schools of Pokhara city showed that, only 36.9 per cent of adolescent girls consumed sufficient amount of calorie whereas majority 63.1 per cent did not consume sufficient calorie as per RDA. The frequency of food intake for less than 4 times in a day was 81.1 per cent and more than 4 times in a day was 18.9 per cent. In this study, based on weekly food intake, a substantial proportion of girls did not consume fish (59.3%) and egg (15.5%). In comparison with them larger portions consumed meat (92.8%), fruits (99.4%), vegetables (96.1%) and milk and milk products (89.8%). A study conducted on Dhaka city also showed that based on usual pattern of food intake, a substantial proportion of girls did not consume egg (26%), milk (35%), and dark green leafy vegetable (20%). In comparison larger proportion consumed meat (50%), fish (65%) a least four times a week. Similarly, for intake of energy and protein, only 9 per cent and 17 per cent of girls respectively met RDA.⁵ Which might be due to difference in study area and participants wealth index. Similarly, another study conducted in Europe also showed that adolescents eat half of the recommended amount of fruit and vegetables and less than two-thirds of the recommended amount of milk (and milk products), but consume much more meat (and meat products), fats and sweets than recommended.⁴ Likewise, a study conducted in Barcelona, Spain showed that the prevalence of adolescents following food recommendations is low.⁶

This study revealed that, 27.4 per cent of participants were underweight, 64.4 per cent were normal and 8.0 per cent were overweight. The mean BMI was 20.46kg/m². A study conducted among adolescent school girls in Adwa Town, North Ethiopia also showed that the overall prevalence of thinness among adolescent school girls was 21.4 per cent.³ Similarly, other studies showed that 36 per cent of girls were underweight, 47 per cent were of normal weight and 17 per cent were overweight for their height.⁷ Likewise, the study conducted in Tunisian adolescents showed

prevalence of underweight, overweight and obesity was 1.3 per cent, 20.7 per cent and 4.4 per cent respectively among girls.⁸ A study conducted in rural area of Wardha district also showed that 53.8 per cent of the adolescents were thin, 44 per cent were normal and 2.2 per cent were overweight. The mean body mass index (BMI) for girls was 15.54.⁹ These variation in results may be due to the variability of sample size.

This study indicated that monthly income and religion were found to be associated with the dietary intake of adolescent girls of class 9 and 10 ($p < 0.05$). Both the factors monthly income and religion were found to be significantly differs with the nutritional status of adolescent girls ($p < 0.05$). No association was observed in calorie intake and nutritional status. A study conducted in Germany to determine the association between parental socio-economic position and health among adolescents also showed association of parental socio-economic position and their educational level with consumption of less energy, dense food more fruits and vegetable and more favorable overall dietary behavior.¹⁰ This study showed the association between fruits consumption per week with the nutritional status of adolescent girls. Similarly, no association was observed between socio-demographic factors and nutritional status among adolescent girls. A study conducted in West Bengal also showed no significant association between socio-demographic factors and nutritional status among adolescent girls.¹¹ Likewise, study conducted among adolescent in Ethiopia showed that age of the adolescents, educational status are associated with underweight; and place of residence, household size, household income, educational status, employment status are associated with stunted. The findings reflect socio-demographic characteristics are associated with underweight and stunting.¹²

CONCLUSION

This study concluded that around two-third of participants were consumed insufficient amount calorie. It has been found that majority of the participants did not consume sufficient amount of foods from different groups like: body building and protective food as they required. Participants

who consumed fruits more than 4 days per week were 2.5 times more likely to be normal (OR 2.500; 95%CI 1.194-5.233; P=0.013). More than one fourth of the participants were underweight, more than half of the participants were normal and least (8%) of them were overweight. Mean±SD of BMI was 20.46±2.99 kg/m². There was not significantly association between calorie intake and nutritional status of the participants. However, fruits consumption per week (p=0.013) is significantly associated with the nutritional status of participants. So, information should be given about the balanced diet to them.

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