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Dietary Patterns and Associated Factors among Adolescents in Pokhara Metropolitan, Nepal

Sarmila Baral[1], Shreejana Wagle[2], Tulsi Ram Bhandari[3]

[1]MPH student, School of Health and Allied Sciences, Pokhara University, Nepal
[2]Assistant Professor, School of Health and Allied Sciences, Pokhara University, Nepal
[3]Associate Professor, School of Health and Allied Sciences, Pokhara University, Nepal

Corresponding Author: Sarmila Baral

ABSTRACT

Introduction: Adolescence is a transitional phase of rapid physical growth, psychological development, and social changes. Sustainable healthy diet and healthy eating practices can address nutritional deficiencies and the risk of non-communicable diseases. This study assessed dietary patterns and their associated factors among school-going adolescents in Pokhara, Nepal.

Methods: A school-based cross-sectional study was conducted from November 2019 to April 2020 with a sample of 445 adolescents in Pokhara Metropolitan, Nepal. We applied systematic sampling and lottery methods to select wards of the Metropolitan and schools respectively. A self-administered questionnaire was used to collect information and performed principal component analysis (PCA) to identify the dietary patterns. We further used chi-square and logistic regression to assess the associated factors of dietary patterns.

Results: We identified three factors: healthy, junk, and traditional dietary patterns which explained 28.23% of the total variability of data. Healthy dietary pattern (50.33%) was associated with BMI (AOR=2.302, 95% CI=1.303-4.066), physically active days (AOR=2.302, 95% CI=1.303-4.066,) and fruit/vegetable plants at home (AOR=1.760, 95%CI=1.408-2.955). Junk food pattern (40.22%) was associated with gender (AOR=2.272, 95% CI=1.455-3.549), ever drink (AOR=2.626, 95%CI=1.216-5.672), screen-time (AOR=1.701, 95% CI=1.112-2.602), walking-time (AOR=1.636, 95%CI=1.035-2.588) and daily pocket-money (p=0.002). Gender (AOR=1.699, 95%CI=1.141-2.529) and midday meal-type (AOR=1.727, 95%CI=1.070-2.789) were associated with the traditional food pattern (57.33%).

Conclusions: Adolescents followed the healthy, junk and traditional dietary pattern. The dietary patterns we found to be associated with socio-economic, behavioural and environmental factors. School-based knowledge and practice level interventions would be the way out of the problems.

Keywords: *Adolescents; dietary patterns; food consumption; principal components analysis*

INTRODUCTION

Adolescence is a transitional phase between childhood and adulthood which is characterized by rapid physical growth, psychological development and social changes.[1] The dietary pattern gives information on overall nutritional behaviour rather than in a single component. A sustained healthy diet and healthy eating behaviour during adolescence have the potential to address nutritional deficiencies and prevent the risk of non-communicable diseases in adulthood. [2]

Behavioural, demographic, socio-economic and environmental factors can influence the dietary behaviour of the adolescents.[3] Nearly 28.5 (24%) million population are adolescents aged 10–19 years with an annual growth rate of 1.7 % in Nepal.[4]

In Nepal, very limited studies have been conducted about dietary patterns of adolescents. Adolescence is a crucial period

of life and it is important to assess their dietary patterns to maintain good nutritional status. This study assessed the dietary patterns and their associated factors among School-adolescents in Pokhara Metropolitan, Kaski, Nepal.

MATERIALS AND METHODS

We conducted a school-based cross-sectional study from November 2019 to April 2020 among adolescent students enrolled in 9th and 10th grade in public and private schools of Pokhara, Nepal. The sample size was calculated by assuming the prevalence of healthy dietary patterns among adolescents in Nepal as 50% with 95% Confidence Interval and 5 % error of margin were used. $N= z^2pq/d^2$ formula was used. The required sample size was 384 but we included 445 students after finite population correction (total students in 9th and 10th classes in Pokhara Metropolitan=19,695) and 15% of non-response rate added. A total of 445 adolescents participated in this study. We chose Pokhara Metropolitan purposively which had a total of 33 wards. Out of 33 wards, one-third of wards were selected using a systematic random sampling method. From 11 wards, six private and five public schools were chosen using the lottery method. After deciding the wards and schools, the classes of each school were taken using a lottery and all students of the selected classes were involved in the study. After obtaining permission from the schools, we took informed consent from parents and assent consent from students before their participation. We ensured the privacy and confidentiality of each participant. The study proposal was reviewed and approved by the Ethical Review Board (ERB) of the Nepal Health Research Council (NHRC).

We measured the weight and height of the adolescents for assessing their nutritional status. Based on the body mass index (BMI), nutritional status was classified as underweight, normal, overweight and obese. The weekly food frequency questionnaire was assessed using 25 food items for a week. A self-administered weekly food frequency questionnaire was distributed to the participants and requested to fill in the classroom. The food items from the food frequency questionnaire consisted of 25 food items accordingly to the similarity of nutritional content. Data were entered in Epidata and transferred into the SPPS-22 version for analysis. We performed principal components analysis to identify the dietary patterns.

Before applying the PCA, the sample size was verified regarding its adequacy, since for the identification of dietary patterns it is recommended that the number of individuals should be equal to or greater than five for each food/food group of the FFQA. In this study, the weekly food frequency questionnaire consisted of 25 food items, so it would be necessary to have 260 individuals (1:10 items and sample size ratio), which was met by the sampling. The analysis of the Kaiser-Meyer-Olkin coefficient (KMO = 0.730) and Bartlett's test of sphericity (χ^2 (300) = 1418.204, $p < 0.01$) was also performed before the data were analysed by PCA followed by Varimax orthogonal rotation to identify dietary patterns. Then, the Eigenvalue of 1.4 was taken to extract factors to assess the exploratory factorial structure of the FFQA, factorial loads greater than 0.30 were considered. The number of factors to be extracted was defined according to the screen plot graph.

After the identification of factors, the dietary patterns were categorized into a dichotomous variable (0 and 1), using the yes (1) and no (0) categories for values above or below the median, respectively. The association between dietary patterns and independent factors was assessed by odds ratio (OR) estimated by logistic regression. For multivariate analysis, tested variables were those variables that showed association at < 0.05 in bivariate analysis.

RESULTS

A total of 445 adolescents were included in this study, 46.7 % were males and 53.3 % were females. In the case of ethnicity, about two-fifths (38.7%) of the participants were belonged to the upper caste which was followed by disadvantaged Janajati covering 20.7% while very few (2.2%) were from the disadvantaged Terai caste group. In the case of school type, about half (51.2%) of the participants were from private schools and the rest (48.8%) of participants were from public schools. Near half (48.5%) of participants reported that their mother completed basic education while very few (3.6%) of the participant's mothers completed bachelor's and above. Similarly, more than half (51.2%) of participants reported that their father completed secondary education. In the case of a parent's occupation, the majority (46.1%) of participant's mothers were homemakers and the majority (36 %) of participants' fathers were employed abroad. Out of 445 participants, only 301 responds to the monthly income of the family, and the mean income was found to be NRs. 66821 with a minimum of Nrs.2000 and a maximum of NRS.750, 000. The study showed that the majority (62.5%) of adolescent students had normal weight, followed by underweight with 29.9% and a few (7.6%) were overweight.

Table 1. Factors loading of food groups (rotated component matrix).

	Component 1	Component 2	Component 3
Vitamin A-rich fruits	.630		
Other fruits	.566		
Fish	.529		-.364
milk products	.507		
animal milk	.490		.339
Organ meat	.470		
Flesh meat and poultry	.447		
Vitamin A-rich vegetables	.414		.342
Eggs	.382		
Chow-chow		.716	
street foods like chat pat		.670	
Sweets		.563	
fried foods		.562	
Biscuits, cookies		.512	
coke/Fanta/Pepsi	.457	.506	
Ice-cream, pastries, cake	.428	.460	
Dark green leafy vegetables			.463
Other vegetables			.412
Legumes			.412
Coffee/tea			.405
White roots and tubers			.385
Ghee, oil			.336
Cereals			.318

Extraction Method: Principal Components Analysis (PCA)
Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 5 iterations

Of the 25 food items, 23 were valid and had saturation values higher than 0.30. Foods with low correlation factorial loading (iodized salt and alcohol) were eliminated. Three dietary patterns were identified by PCA in this study and were labelled according to the characteristics of food groups. Three different dietary patterns are healthy, junk food and traditional dietary patterns and they together explained 28.226 % of the total variability of data. The Healthy pattern explained 14.112 % of total variability and represented consumption of fruits, milk and milk products, eggs, fish and meat products. Similarly, the Junk food pattern explained 7.437 % of the variability and represented by consumption of noodles, biscuits, deep-fried foods, street foods, chips, chocolates. Finally, The Traditional pattern explained 6.678 % of the variability and indicating high consumption of vegetables, tubers, coffee/tea, legumes, and ghee/oil (Table 1).

Table 2. Association between Socio-demographic variables and dietary patterns, bivariate analysis.

	Healthy food consumption			Junk food consumption			Traditional food consumption		
Variables	**Yes (%)**	**No (%)**	**χ^2(p value)**	**Yes (%)**	**No (%)**	**χ^2(p value)**	**Yes (%)**	**No (%)**	**χ^2(p value)**
Type of school									
Public	97(44.7)	120(55.3)	5.383(0.020)	103(47.5)	114(52.5)	9.235(0.002)	135(62.2)	82(37.8)	4.171(0.041)
Private	127(55.7)	101(44.3)		76(33.3)	152(66.7)		120(52.6)	108(47.4)	
Age									
15 and lower	127(50)	127(50)	0.027(0.870)	95(37.4)	159(62.6)	1.962(0.161)	137(53.9)	117(46.1)	2.741(0.098)
16 and higher	97(50.8)	94(49.2)		84(44)	107(56)		118(61.8)	73(38.2)	
Gender									
Male	114(54.8)	94(45.2)	3.122(0.077)	109(46)	128(54)	7.013(0.008)	148(62.4)	89(37.6)	5.483(0.019)
Female	110(46.4)	127(53.6)		70(33.7)	138(66.3)		107(51.4)	101(48.6)	
Ethnic Group									
Advantaged	143(55)	117(45)	5.439(0.020)	95(36.5)	165(63.5)	3.534(0.060)	148(56.9)	112(43.1)	0.037(0.848)
Disadvantaged	81(43.8)	104(56.2)	1	84(45.4)	101(54.6)		107(57.8)	78(42.2)	
Living with									
famil1y	200(52.2)	183(47.8)	3.896(0.048)	158(41.3)	225(58.7)	1.209(0.271)	224(58.5)	159(41.5)	1.570(0.210)
others	24(38.7)	38(61.3)		21(33.9)	41(66.1)		31(50)	31(50)	
Mother's education(n=443)									
Basic and lower	127(45.4)	153(54.6)	7.554(0.006)	108(38.6)	172(61.4)	0.820(0.365)	164(58.6)	116(41.4)	0.663(0.416)
Secondary or higher	96(58.9)	67(41.1)		70(42.9)	93(57.1)		89(54.6)	74(45.4)	
Family's monthly income(n=301)									
Low	50(46.3)	58(53.7)	7.029(0.030)	43(39.8)	65(60.2)	0.457(0.761)	66(61.1)	42(38.9)	2.446(0.294)
Medium	44(42.3)	60(57.7)		45(43.3)	59(56.7)		66(63.5)	38(36.5)	
High	54(60.7)	35(39.3)		34(38.2)	55(61.8)		47(52.8)	42(47.2)	

Table 3. Association between personal and behavioural factors with dietary patterns.

Variables	**Healthy food consumption**			**Junk food consumption**			**Traditional food consumption**		
	Yes	**No**	**χ^2(p value)**	**Yes**	**No**	**χ^2(p value)**	**Yes**	**No**	**χ^2(p value)**
Ever drink alcohol									
Yes	17(44.7)	21(55.3)	0.521(0.470)	23(60.5)	15(39.5)	7.122(0.00)	20(52.6)	18(47.4)	0.371(0.543)
No	207(50.9)	200(49.1)		156(38.3)	251(61.7)		235(57.7)	172(42.3)	
Sleeping time									
≤ 8 hr	167(48.7)	176(51.3)	1.628(0.202)	128(37.3)	215(62.7)	5.259(0.022)	200(58.3)	143(41.7)	0.619(0.432)
> 8 hr	57(55.9)	45(44.1)		51(50)	51(50)		55(53.9)	47(46.1)	
Holiday screen time									
< 3 hr	124(47.5)	137(52.5)	2.019(0.155)	90(34.5)	171(65.6)	8.655(0.003)	156(59.8)	105(40.2)	1.570(0.210)
≥ 3 hr	100(54.3)	84(45.7)		89(48.4)	95(51.6)		99(53.8)	85(46.2)	
Walking time									
<1 hr	80(45.5)	96(54.5)	2.776(0.096)	55(31.3)	121(68.8)	9.753(0.002)	90(51.5)	86(48.9)	4.526(0.033)
≥ 1 hr	144(53.5)	125(46.5)		124(46.1)	145(53.9)		165(61.3)	104(38.7)	
Physically active days									
0-4	137(45.7)	163(54.3)	8.033(0.005)	111(37)	189(63)	3.982(0.046)	167(55.7)	133(44.3)	1.008(0.315)
5-7	87(60)	58(40)		68(46.09)	77(53.1)		88(60.7)	57(39.3)	
Food Choice Factors									
Taste	146(47.1)	164(52.9)	4.292(0.038)	122(39.4)	188(60.6)	0.322(0.571)	177(57.1)	133(42.9)	0.018(0.894)
Nutritious	78(57.8)	57(42.2)		57(42.2)	78(57.8)		78(57.8)	57(42.2)	
BMI									
Underweight	81(60.9)	52(39.1)	9.351(0.009)	52(39.1)	81(60.9)	0.258(0.867)	82(61.7)	51(38.3)	3.788(0.150)
Normal	130(46.8)	148(53.2)		112(40.3)	166(59.7)		150(54)	128(46)	
Overweight	13(38.2)	21(61.8)		15(44.1)	19(55.9)		23(67.6)	11(32.4)	

This study showed that healthy food consumption (50.33%), junk food consumption (40.22%) and traditional food consumption (57.33%) among school-adolescents in Pokhara. Type of schools, ethnicity, living arrangements, mother's education and monthly family income was associated with healthy dietary patterns at p-value less than 0.05 in bivariate analysis. Similarly, school types and gender were significantly associated with the junk food pattern and traditional food pattern at a p-value less than 0.05 (Table 2).

Physically active days (p=0.005), food choice factors (p=0.038) and BMI (p=0.009) were associated with healthy food patterns in bivariate analysis. Similarly, Junk food patterns were associated with ever drink alcohol (p=0.00), holiday screen time (p=0.003), sleeping time (p=0.022) walking time (p=0.002) and physically active days (p=0.046). Traditional food pattern was associated with only walking time (p=0.033) in the bivariate analysis done by chi-square test (Table 3).

Table 4. Association between food environmental factors with dietary patterns.

Variables	Healthy food consumption			Junk food consumption			Traditional food consumption		
	Yes	No	χ^2(p-value)	Yes	No	χ^2(p-value)	Yes	No	χ^2(p-value)
Availability of fruit/vegetable plants at home									
Yes	126 (58.1)	91 (41.9)	10.117 (0.001)	92 (42.4)	125 (57.6)	0.831 (0.362)	135 (62.2)	82 (37.8)	4.171 (0.041)
No	98 (43)	130 (57)		87 (38.2)	141 (61.8)		120 (52.6)	108 (47.4)	
Availability of canteen									
Yes	208 (50.5)	204 (49.5)	0.049 (0.825)	172 (41.7)	240 (58.3)	5.359 (0.02)	239 (58)	173 (42)	1.133 (0.287)
No	16 (48.5)	17 (51.5)		7 (21.2)	26 (78.8)		16 (48.5)	17 (51.5)	
Midday meal									
Canteen	170 (50.1)	169 (49.9)	0.020 (0.886)	148 (43.7)	191 (56.3)	7.351 (0.025)	207 (61.1)	132 (38.9)	8.217 (0.004)
Homemade	54 (50.9)	52 (49.1)		8 (34.8)	15 (65.2)		48 (45.3)	58 (54.7)	
Daily pocket money									
<50	39 (41.5)	55 (58.5)	6.014 (0.049)	23(24.5)	71 (75.5)	12.323 (0.002)	46 (48.9)	48 (51.1)	3.839 (0.147)
50	127 (50.2)	126 (49.8)		113 (44.7)	140 (55.3)		155 (61.3)	98 (38.7)	
>50	58 (59.2)	40 (40.8)		43 (43.9)	55 (56.1)		52 (53.1)	46 (46.9)	

Healthy food pattern was associated with the availability of fruit/vegetables at home (p=0.001) and daily pocket money (p=0.049) in bivariate analysis. Availability of canteen (p=0.02), midday meal type (p=0.025) and daily pocket money (p=0.002) were associated with Junk food pattern. Similarly, the traditional food pattern was associated with the availability of fruit/vegetables at home (p=0.041) and midday meal type (p=0.004) in a bivariate analysis done by chi-square test (Table 4).

Table 5. Association between explanatory variables with healthy food pattern.

Variables	UOR		AOR	
	OR	95% CI	OR	95% CI
Type of school				
Private	1.556	1.070-2.261	1.519	0.759-3.041
Public	1		1	
Ethnicity				
Advantaged	1.569	1.074-2.294	1.235	0.712-2.145
Disadvantaged	1		1	
Living arrangements				
With family	1.730	0.999-2.996	1.948	0.970-3.912
Others	1		1	
Physically active days				
5 to 7 days	1.785	1.193-2.669	2.302	1.303-4.066
0 to 4 days	1		1	
BMI				
Underweight	2.516	1.160-5.459	3.458	1.029-11.619
Normal	1.419	0.683-2.946	1.839	0.575-5.883
Overweight	1		1	
Food choice factors				
Nutritious	1.537	1.022-2.311	1.544	0.842-2.832
Cheap, taste	1		1	
Fruit /vegetable trees at home				
Yes	1.837	1.261-2.675	1.760	1.048-2.955
No	1		1	

The type of school, ethnicity, living arrangements, mother's education, and father's education, family's monthly income, means to come to school, physically active days, BMI, food choice factor, fruit plant trees at home and average daily pocket money were associated with the healthy dietary pattern. Similarly, physically active days, BMI and fruit plant trees at home were associated with the healthy dietary pattern at a p-value less than 0.05. Variables that showed association with

dietary patterns were adjusted for multivariate analysis in Regression. Multivariate analysis shows adolescents physically active for 5 to 7 days were 2.3 times (AOR=2.302, 95%CI=1.303-4.066) more likely to have a healthy dietary pattern as compared to adolescents who were less than 4 days physically active. Similarly, underweight adolescents were 3.4 times (AOR=3.458, 95% CI=1.029-11.619) more likely to have healthy dietary patterns in reference to overweight adolescents (Table 5)

Table 6. Association between explanatory variables with junk food pattern and traditional pattern.

Junk food consumption					**Traditional food consumption**				
Variables	**UOR**		**AOR**		**Variables**	**UOR**		**AOR**	
	OR	**95% CI**	**OR**	**95% CI**		**OR**	**95% CI**	**OR**	**95% CI**
School type					**School type**				
Public	1.807	1.232-2.651	1.532	0.976-2.405	Public	1.482	1.015-2.162	1.108	0.730-1.680
Private	1		1		Private	1		1	
Gender					**Gender**				
Female	1.679	1.143-2.466	2.272	1.455-3.549	Female	1.570	1.075-2.291	1.699	1.141-2.529
Male	1		1		Male	1		1	
Ever drink alcohol					**Walking time**				
Yes	2.467	1.249-4.872	2.626	1.216-5.672	≥1 hr	1.516	1.032-2.226	1.247	0.816-1.904
No	1		1		<1hr	1		1	
Holiday screen time					**Fruit plant at home**				
< 3 hr	1		1		Yes	1.482	1.015-2.162	1.450	0.978-2.151
≥ 3hr	1.780	1.210-2.618	1.701	1.112-2.602	No	1		1	
Walking time in a day					**Midday meal**				
< 1 hr	1		1		canteen made	1.895	1.220-2.943	1.727	1.070-2.789
≥ 1 hr	1.881	1.263-2.803	1.636	1.035-2.588	homemade and others	1		1	
Availability of canteen									
Yes	2.662	1.130-6.273	2.068	0.760-5.630					
No	1		1						
Average daily pocket money									
< 50		0.05	1	0.002					
50	2.492	1.464-4.240	2.608	1.476-4.609					
> 50	2.413	1.303-4.472	2.995	1.491 -6.01					

Concerning males, the odds of consuming junk food were 2.2 times among females (AOR=2.272, 95%CI=1.455-3.549). Similarly, with reference to never drinker adolescents, ever drinker adolescents were 2.6 times more likely (AOR=2.626, 95%CI=1.216-5.672) to consume junk foods. Similarly, adolescents who spend more than 3 hrs. in screen activity were 1.7 times (AOR=1.701, 95%CI= 1.112-2.602) more likely to consume junk foods as compared to adolescents spending less than 3 hr in screen activity. Adolescents who walk more than 1 hr were 1.6 times more likely (AOR=1.636, 95% CI= 1.035-2.588) to consume junk food as compared to adolescent walk less than 1 hr a day. Finally, daily pocket money with Nrs.50 were 2.6 times (AOR=2.608, 95% CI= 1.476-4.609) and more than NRS 50 was near about 3 times (AOR=2.995, 95% CI= 1.491-6.014) more likely to consume junk food as compared to adolescents with pocket money of less than Nrs. 50. Gender and midday meal-type showed significant association (p value<0.05) with Traditional food patterns. t (p value< 0.05) in multivariate analysis. Female adolescents were 1.6 times (AOR=1.699, 95%CI=1.141-2.629) more likely to have traditional food patterns as a reference to male. Similarly, Adolescents eating midday meals from the canteen were 1.7 times (AOR=1.727, 95%CI=1.070-2.789) more likely to have traditional food patterns as compared to homemade and other types of midday meal eater (Table 6).

DISCUSSION

This study reported three dietary patterns among adolescents in Pokhara. The three dietary patterns resulting from PCA explained the 28.226 % of the total variability of data. The identified dietary patterns were healthy, junk food patterns, and traditional food patterns. In this study,

healthy dietary patterns are characterized by consumption of fruits, milk and milk products, eggs, fish and meat products, Junk food represented by consumption of noodles, biscuits, deep-fried foods, street foods, chips, and chocolates. Traditional food pattern consisting of typical Nepalese foods including high consumption of cereals, vegetables, tubers, coffee/tea, legumes, and ghee/oils.

Age does not show a significant association with any dietary pattern in our study. But in a study done in Germany higher age was associated with traditional dietary pattern among boys. [5]

In this study, gender was found to be associated with the junk food pattern. Females were more likely to consume junk foods as compared to males. This may be due to the salty and sweet taste liked by females.

This study showed that underweight adolescents were more likely (AOR=3.458, 95%CI= 1.029-11.619) to consume healthy foods as compared to overweight complementary to the study of Brazil, which revealed, overweight adolescents, were less likely to consume food of the ''healthy'' pattern (OR = 0.56, 95% CI = 0.35 to0.91).[6]

This study showed adolescents from the upper caste were more likely to consume healthy foods as compared to disadvantaged adolescents. This result is consistent with the study of the USA.[7]

In this study, adolescents whose parents completed a secondary and higher level of education were more likely to consume healthy foods. Similar findings were reported from the study of USA [7], Norway [8], Australia[9], and Mozambique [10]. Women, wives and mothers likely tend to have a stronger influence on the family's health-related behaviours by providing meals, spending more time in the household and organizing the household. Additionally, adolescents living with the family were more likely to consume healthy foods as compared to living with others whereas a similar study of the USA showed, adolescents living with both parents had a healthy dietary pattern than living with single parents [7]. This may be due to socio-cultural differences between Nepal and the USA.

Conversely, with increasing hours of screen time, a higher adherence to less healthy dietary patterns i.e. junk food pattern, similar to the association was previously observed in a study from Germany [5], Perth, Western Australia [9] and Greece[11]. This could be attributed first to the fact that it is common for people and especially for adolescents to eat sweets, salty snacks and drink soft drinks while they are watching television, mobile and, second, to the food advertisements to which they are exposed during the viewing for a long time. Daily pocket-money was associated with junk food patterns in this study. Adolescents, who go to schools with higher pocket money can purchase sweets, snacks and soft drinks. Similar findings were observed from the study of Ghana[12]. Thus, it is important to make the food environment of schools healthier to influence healthy choices.

In this study, adolescents eating midday meals from the canteen were following the traditional pattern. This could be due to traditional foods are most common in canteen too. This study showed the different dietary patterns of school-going adolescents and associated factors with them. This study would be the first published study that identified different dietary patterns using Principal Component Analysis in Pokhara Nepal. This study may not properly represent the dietary patterns of all adolescents who do not go to school. Weekly food frequency is completely based on the recalling memory of adolescent students.

CONCLUSIONS

This study identified three dietary patterns among adolescents in Pokhara, namely healthy, junk food, and traditional dietary pattern. Three dietary patterns together explained 28.226% of the dietary

intake of adolescents. The healthy dietary pattern, which explained 14.112% of the variance and was represented by vitamin A-rich fruits, other fruits, fish, milk products, milk, meat, vitamin A-rich vegetables and eggs. The junk food pattern explained 7.437% of the variance, was characterized by intake of chow-chow, street foods, sweets, deep-fried foods, biscuit/cookies, ice-cream-pastries. The third pattern, the traditional pattern explained 6.678% of the variance was characterized by consumption of dark green leafy vegetables, other vegetables, legumes, coffee/tea, tubers, ghee/oil and cereals. BMI, physically active days and fruit/ vegetable plants at home were associated with the Healthy Dietary pattern. Similarly, gender ever drinks alcohol, holiday screen time, walking time, and daily pocket money was associated with the Junk food pattern. Gender and midday meal-type were associated with the traditional food pattern. From this study we can conclude regular intake of healthy foods should be prompted and junk food consumption should be minimized. Hence, school-based knowledge and practice level intervention programs would be the way out of the problems.

Conflict of Interest: None.

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