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Fast Foods, Snacks and Non-Alcoholic Beverages Intake among School Children and Baseline Body Mass Index in an Urban Government School, Nepal

Vivechana Shakya[1], Susan Maharjan[2]

[1,2]Assistant Professor, Patan Academy of Health Sciences, School of Nursing and Midwifery (Lalitpur Nursing Campus), Lalitpur, Nepal

Corresponding Author: Vivechana Shakya

ABSTRACT

Introduction: Body Mass Index (BMI) is a screening tool that indicates whether a person is underweight, healthy weight or obesity. Fast foods are commercial, ready-to-eat meals with high fat, little fiber, and minimal vitamins or calcium. This study intended to identify baseline BMI and fast foods, snacks and non-alcoholic beverages intake and expenditure on those foods among school children in an urban government school.
Method: A cross-sectional study was conducted among 463 students, studying in grade 8-12 of Tri-Padma Vidyashram Secondary School during 21/02/2021 – 12/04/2021. Non probability convenience sampling and self developed structured questionnaire was used to collect data. SPSS 16 was used for analysis. BMI, frequency and amount of fast foods, snacks and non-alcoholic beverages consumption and their monthly expenditure on those foods were measured using descriptive statistics.
Results: The study shows that 382(82.5%) had normal BMI, 38(8.2%) overweight, 10(2.2%) obese, 28(6.0%) were in moderate malnutrition and 5(1.1%) were in severe malnutrition; therefore, the baseline BMI is ≥-2 to ≤ + 1 SD. 458(98.92%) respondents consume fast foods, snacks and non-alcoholic beverage. Instant noodles (chowmein and packaged chow-chow) are the highly consumed fast foods 412(89.95%), followed by panipuri 394(86.02%) and samosa 386(84.27%). 263(57.42%) students/participants frequently consume fast foods, snacks and non-alcoholic beverage. The mean expenditure on fast foods, snacks and non-alcoholic beverage (Mean ± SD) is Rs.2676.82 ± 1363.43.
Conclusion: Majority of the respondents have normal BMI. More than half respondents frequently consume fast foods, snacks and non-alcoholic beverage and expense much money though they study in government school.

Key Words: Body Mass Index (BMI), Fast foods, Non-alcoholic beverages, School children, Snacks

INTRODUCTION

Body Mass Index (BMI) is a screening tool that can indicate whether a person is underweight or if they have a healthy weight, excess weight or obesity. [1]

Fast foods are commercially available, ready-to-eat meals with a high fat content, little fiber, and minimal quantities of vitamins or calcium.[2] The high sugar and fat in fast food increase the risk for obesity, type 2 diabetes and heart disease, respiratory problem including asthma and shortness of breath. The fast foods high in sodium can elevate blood pressure. People who eat fast food and processed pastries are 51% more likely to develop depression. [3] 25% of children worldwide consume fast-food frequently or very frequently, and this increases to over 50% in adolescent. A study conducted among 72 900 children (17 countries) and 199 135 adolescents (36 countries) provided data that frequent and very frequent fast-food consumption was reported in 23% and 4% of children, and

39% and 13% of adolescents, respectively.[4] Another study done in Bhairahawa, Nepal showed that more than 60% students used to eat fast food.[5] Therefore, the aim of this study is to identify baseline BMI and fast foods, snacks and non-alcoholic beverages intake and expenditure on those foods among school children in an urban government school of Nepal.

METHODS

A cross-sectional study was conducted among 463 students, studying in grade 8-12 of Tri-Padma Vidyashram Secondary School, Lalitpur, Nepal. The data was collected during 2077/11/09 (21/02/2021)-2077/12/30 (12/04/2021). Non probability convenience sampling technique was used. The students who were willing and available at the time of data collection were enrolled in the study.

The study was approved from Institutional Review Committee (IRC), Patan Academy of Health Sciences. The IRC approval number is nrs2003191357. Self developed structured questionnaire containing two parts was used to collect data. Part I contains assessment of height (in centimeter) and weight (in kilograms) and identification of BMI. BMI was calculated by BMI Look-Up Table for Children and Adolescents. [6] Part II contains questionnaires related to socio demographic characteristics along with questions related to fast foods, snacks and non-alcoholic beverages. Frequency of consumption of fast foods, snacks and non-alcoholic beverages was assessed by scoring 1 for once a week (infrequent), score 2 for twice a week (frequent) and 3 for thrice a week (very frequent)[4]. Therefore, the total score of the 15 items was 45 and categorized into tertiles so that infrequent, frequent and very frequent consumption denotes in the range of (1-15), (16-30) and (31-45) respectively.

For the scoring of amount of fast food consumption, option a was given1 score (that is half packet {20-37 gm}, 1 number, 1 fistful {40 gm}, 1glass/200ml), 2 score was given to option b (that is 1 packet {40-75 gm}, 2 numbers, 2 fistful {80 gm}, 2 glasses/400ml), 3 score was given to option c (that is 1½ packet {60-112gm}, 3 numbers, 3 fistful {120gm}, 3 glasses/600ml) and 4 score was given to option d (that is 2 packets {80-150gm}, more than 3 fistfuls {120gm}, more than 3 numbers/glasses {600ml}), therefore, the score was 60 and was categorized into tertiles so that low, middle and high amount of consumption denotes in the range of (1-20), (21-40) and (41-60) respectively.

To assess the expenditure, price of each food item was calculated according to frequency and amount of consumption and calculated the total expenditure in a monthly basis.

The validity of the instrument was maintained by reviewing related literature and consulting with subject experts (community and pediatric speciality). Analog/Mechanical weight scale was used to measure weight and sewing tape was used to measure height. The accuracy of measuring tape and weighing scale was measured by checking with another measuring tape and weighing scale. Same tape and same weighing scale was used during data collection. The technique of measuring weight and height was based on WHO standard. [7]

Permission was obtained from principal of Tri-padma Vidyashram Secondary School. Parents of each respondent were informed and got permission by sending consent form to their home with the help of school health nurse and class teacher. Verbal informed consent was taken from each respondent. Privacy and confidentiality was maintained.

Prior to data collection, the weight and height of each student was measured and they were given a set of questionnaire with the record of weight and height. For the measurement of weight, weighing scale was used and measured the weight in kilograms. Height in centimeters was marked on wall in school with the help of a measuring tape. Both weight and height were

measured based on the WHO standard for measurement technique of height and weight of adolescent. [7]

The brief information on information sheet of fast foods, snacks and non-alcoholic beverages and instructions to fill up the questionnaire was given to the students and let them take the self - administered questionnaire to their home and asked them to return back after completely filling the questionnaire and made class representative to collect them and handed over to school health nurse. (Information on fast foods, snacks and non-alcoholic beverages was included here at the end after reference).

Statistical Analysis

Data were checked for completeness and accuracy then was coded and analysed using Statistical Package for the Social Science (SPSS) version 16. The data was analyzed according to socio demographic variables (age, sex, grade), level of BMI, habits of consuming fast foods, snacks and non-alcoholic beverages and monthly expenditure on fast foods, snacks and non-alcoholic beverages in terms of descriptive statistics (frequency, percentage).

RESULTS

The total questionnaire given to the respondents were 492. Among them, 7 were not returned and 22 were incompletely filled up, therefore, only 463 respondents were included in the study. Among 463 respondents, most of them 329(71.06%) belong to middle adolescence (15-17). 82(17.71%) belong to early adolescence (12-14) and 52(11.23%) belong to late adolescence (18-20). The mean age was 15.84 ± 1.44 years. 260(56.2%) were male and 203(43.8%) were female. 100 (21.6%), 125 (27.0%), 98 (21.2%) and 97 (21.0%) were in grade 8, 9, 10 and 11 respectively. 43 (9.3%) respondents were in grade 12.

Table no.1: Classifications of Body Mass Index, N = 463

Classifications	N	%
Severe malnutrition (<-3 SD)	5	1.1
Moderate malnutrition (≥-3 to <-2 SD)	28	6.0
Normal (≥-2 to ≤ + 1 SD)	382	82.5
Overweight (> +1 to ≤ + 2 SD)	38	8.2
Obese (>+ 2 SD)	10	2.2

Table 1 shows that majority of the respondents (82.5%) had ≥-2 to ≤ + 1 SD of BMI, therefore, it is the baseline of BMI.

Table no.2: Frequency of consumption of Fast foods, Snacks and Non-alcoholic beverages, N= 458

Items	Once a week n(%)	Twice a week n(%)	Thrice or more a week n(%)
Samosa (n=386)	186(48.18%)	166(43.0%)	34(8.8%)
Donut (n=372)	148(39.78%)	159(42.74%)	65(17.47%)
Aaluchop (n=353)	181(51.27%)	145(41.07%)	27(7.64%)
Fried noodles (Chowmein) (n=412)	179(43.44%)	181(43.93%)	52(12.62%)
Fried potato/French fries (n=329)	154(46.80%)	143(43.46%)	32(9.72%)
Potato chips (n=355)	161(45.35%)	157(44.22%)	37(10.42%)
Packaged noodles (chow-chow) (n=412)	99(24.02%)	225(54.61%)	88(21.35%)
Packaged cheese ball (n=248)	135(54.43%)	98(39.51%)	15(6.04%)
Pakauda (n=351)	176(50.14%)	139(39.60%)	36(10.25%)
Bhujiya/dalmoth (n=312)	149(47.75%)	128(41.02%)	35(11.21%)
Panipuri (n=394)	137(34.77%)	159(40.35%)	98(24.87%)
Ice cream (n=360)	260(72.22%)	83(23.05%)	17(4.72%)
Packed powder juice (n=187)	128(68.44%)	44(23.52%)	15(8.02%)
Soft drinks (n=378)	241(63.75%)	113(29.89%)	24(6.34%)
Milk tea (n=335)	93(27.76%)	97(28.95%)	145(43.28%)

Table 2 shows that 458(98.92%) respondents only consume fast foods, snacks and non-alcoholic beverages. Regarding frequency of consumption, 162(35.4%) respondents infrequently (1-15) consume, 263(57.4%) frequently (16-30) and 33(7.2%) very frequently (31-45) consume fast foods, snacks and non-alcoholic beverage.

Table no.3: Amount of consumption of Fast foods and Snacks at a time, N= 458

Items	One at a time n(%)	Two at a time n(%)	Three at a time n(%)	More than three at a time n(%)
Samosa (n=386)	183(47.40%)	180(46.63%)	23(5.95%)	-
Donut (n=372)	270(72.58%)	87(23.38%)	13(3.49%)	2(0.53%)
Aaluchop (n=353)	113(32.01%)	163(46.17%)	72(20.39%)	5(1.41%)
	Half plate at a time	One plate at a time	One and half plate at a time	Two plates at a time
Fried noodles (Chowmein) (n=412)	195(47.33%)	209(50.72%)	7(1.69%)	1(0.24%)
French fries/Fried potato (n=329)	192(58.35%)	126(38.29%)	11(3.34%)	-
	Half packet at a time (20-37gm)	One packet at a time (40-75gm)	One and half packet at a time (60-112gm)	Two packets at a time (80-150gm)
Potato chips (n=355)	110(30.98%)	225(63.38%)	17(4.78%)	3(0.84%)
Packaged noodles (chow-chow) (n=412)	56(13.59%)	341(82.76%)	14(3.39%)	1(0.24%)
Packaged cheese ball (n=248)	61(24.59%)	175(70.56%)	10(4.03%)	2(0.80%)
	Four pieces at a time	Five pieces at a time	Six pieces at a time	More than six pieces at a time
Pakauda (n = 351)	270(76.92%)	48(13.67%)	33(9.40%)	-
	One fistful at a time (40gm)	Two fistful at a time (80gm)	Three fistful at a time (120 gm)	More than three fistful at a time (160gm)
Bhujiya/dalmoth (n = 312)	211(67.62%)	63(20.19%)	21(6.73%)	17(5.44%)
	One plate(8 nos.) at a time	Two plates (16 nos.) at a time	Three plates (24 nos.) at a time	More than three plates (32 nos.) at a time
Panipuri (n=394)	316(68.3%)	51(11.0%)	18(3.9%)	9 (1.9%)
	One cone/number at a time	Two cones/numbers at a time	Three cones/numbers at a time	More than three cones/numbers at a time
Ice-cream (n=360)	315(87.5%)	40(11.11%)	2(0.55%)	3(0.83%)

Table 3 shows that 209(50.72%) respondents consume one plate of fried noodles (chowmein) at a time, 195(47.33%) consume half plate at a time, 7(1.69%) consume one and half plate at a time and 1(0.24%) consume two plates at a time.

Table no.4: Amount of consumption of Non-alcoholic beverages at a time,N = 458

Items	One glass/200ml at a time	Two glasses/400 ml at a time	Three glasses/600 ml at a time	More than three glasses/600 ml at a time
Powder juice (n=187)	142(75.93%)	34(18.18%)	9(4.81%)	2(1.06%)
Soft drinks (n=378)	254(67.19%)	97(25.66%)	16(4.23%)	11(2.91%)
	One cup at a time	Two cups at a time	Three cups at a time	More than three cups at a time
Milk tea (n=335)	292(87.16%)	29(8.6%)	13(3.88%)	1(0.29%)

Table 4 shows that among 378 respondents, 254(67.19%) consume one glass/200 ml at a time, 97(25.66%) consume two glasses/400 ml at a time, 16(4.23%) consume three glasses/600 ml at a time and 11(2.91%) consume more than three glasses/600 ml at a time.

Among 458(98.92%) respondents who consume fast food, snacks and non alcoholic beverages, 332(72.5%) consume low amount (score 1-20), 125(27.3%) consume middle (21-40) and 1(0.2%) consume high amount (41-60).

Table 5 shows that the minimum expenditure per month is Rs.140 and the maximum expenditure is Rs.7576. The Mean ± SD is Rs.2676.82 ± 1363.43.

Table no.5: Monthly expenditure on Fast foods, Snacks and Non alcoholic beverages, N=458

Expenditure	N	%
Rs.140-1000	33	7.2
Rs.1001-2000	125	27.3
Rs.2001-3000	145	31.7
Rs.3001-4000	86	18.8
Rs.4001-5000	37	8.1
>Rs.5000	32	7.0

DISCUSSION

In the present study, 382(82.5%) respondents have normal BMI. 28(6.0%) were moderately malnourished and 5(1.1%) were severely malnourished. 38(8.2%) were overweight and 10 (2.2%) were obese. while the study conducted by Mohammadbeigi showed that 65.4% had normal BMI, 23.2% had under weight and 11.4% had over weight.[8] Similarly, Sherpa et al in their

study report 65.1% were in normal category of BMI, followed by 27.1% in underweight,5.7% in overweight, and 1.6% were in obese. [9] Contradictory to this finding, a study conducted by Poudel shows that majority (50.5%) of the adolescents were having BMI less than normal and were considered underweight and 47.3% having normal BMI. [10] In this study almost all respondents 458(98.92%) consume Nepali meal (Bhaat, Daal, Tarkari) two times a day and 5(1.08%) consume once Bhaat, Daal, Tarkari and roti tarkari the other. Therefore, most of the respondents have normal BMI though they consume fast foods and non-alcoholic beverages. The study finding also shows that the baseline of BMI is ≥-2 to ≤ + 1 SD as majority of respondents belong to this category.

Regarding frequency of consumption, in the present study, 5(1.08%) didnot consume, 162(35.37%) respondents infrequently consume, 263(57.42%) frequently and 33(7.2%) very frequently consume fast foods, snacks and non-alcoholic beverage while Majabadi et al in their study reported 4.8% never consume, 28.6% rarely consume, 38% sometimes consume and 28.6% often consume fast food.[11]

This study shows that 412(89.95%) respondents consume instant noodles (chowmein and packaged chow chow). Among them, 225(54.61%) consume packaged noodles (chow chow) and 181(43.93%) consume fried noodles (chowmein) twice a week. Similarly, 394(86.02%) consume panipuri, 378(82.53%) consume soft drink, 372(81.22%) consume donut while a study done by Sapkota and Neupane showed that all respondents (100%) consumed noodles, 97.2% consumed panipuri, 93.0% donut, 65.5% ice-cream and cold drinks. [12] Likewise, Mohammadbeigi et al in their study showed that 26.3% consume soft drinks every week, 29.4% consume chips and 23.2% consume ice cream every week.[8] By the findings of the studies it shows that fried noodles (chowmein), packaged noodles (chow chow) and panipuri are the mostly consumed fast foods by adolescents.

In this study, the maximum expenditure on fast foods, snacks and non-alcoholic beverage is Rs.7576 and minimum expenditure is Rs.140. The mean ± SD with expenditure is Rs.2676.82 ± 1363.43 while Shukla et al in their study showed that the mean expenditure was 127.38 ± 102.45 INR (medium 97; Range 0 – 530). [13] In present study, 33(7.2%) respondents spend Rs.140 - 1000. Most of the respondents 145(31.7%) spend Rs.2001-3000 and 32(7.0%) respondents spend >Rs.5000 per month. In contrast, the study carried out by Meena and Varma showed that 40.68% respondents' spends Rs. 200 or less money per month on fast food/snacks. Around 22.75% respondents spend Rs. 200-500 money per month and 11.03% respondents spend Rs.1000 & above money per month on food/snacks. [14] The finding of this study shows that though they study in government school, they expense much money in fast foods, snacks and non alcoholic beverages. In the context of Nepal, families who cannot afford to send their children to private schools, government schools are only their options. It shows that people are expensing more in fast foods, snacks and non alcoholic beverages than education.

CONCLUSIONS

Majority of the respondents have normal BMI, few were overweight and moderately malnourished. More than half of the respondents frequently consume fast foods, snacks and non-alcoholic beverage. Chowmein and packaged chow-chow are equally consumed by most of the respondents, followed by panipuri, samosa, and donut respectively. More than three fourth of the respondents consume soft drink as beverage. More than two third of respondents consume low amount of fast foods, snacks and non-alcoholic beverage. The study shows that they expense much money in fast foods, snacks and non

alcoholic beverages though they study in government school.

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Information Sheet

Information on Fast Foods, Snacks and non-alcoholic beverages

Potato Chips: The chips made of potato and contains high amount of sodium, fat and artificial preservatives either available in package or without package

Packaged instant noodles (Chow-chow): Pile of dried instant noodles and flavouring in sachet (e.g, Rara, Wai wai, Maggie, 2 PM, Ramba, Aha etc.)

Packaged Cheese ball: Readymade cheese ball available in the packet with additives salt, color and flavor

Bhujiya/Dalmoth: Readymade spicy and salty processed food products mixed of small pieces of namkeen, grains like grams, pulses etc

Panipuri: A round, hollow puri filled with potato, onion or chickpeas and a mixture of flavored water containing imli pani, chili, salt, chaat masala etc.

Fried potato/French fries: Potatoes cut into pieces and fried with oil.

Ice-cream: All types of ice-cream that contains high amount of calories and sugar.

Packed powder juice: Readymade juice available in the package added with sugar, flavor and preservatives. (E.g, Tang, Rasna, Foster clark etc)

Soft drinks: Drinks containing sugar or artificial sweeteners like Coke, Pepsi, Fanta, Sprite

Chowmein: Plain/strained stir-fried noodles with little vegetables

Samosa: A fried or baked pasty with a savoury filling such as spiced potatoes, onions, peas etc

Donut: Small ring-shaped cake of sweetened dough fried in deep oil

Aaluchop: A deeply fried potato cutlet made with mashed potatoes mixed with chopped onion and spices (chilli, cumin and turmeric powder), then dip in a besan/gram flour batter

Pakauda: Crisp fried snack made of chopped onion dipped in a batter from gram flour

Milk tea: Tea added with water, milk and sugar

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