

Factors Associated with Nutritional Status among Government School Adolescent Girls in Shuklaphanta Municipality, Kanchanpur, Nepal

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Abstract

Introduction: Due to the rapid growth in stature, muscle mass, and fat mass during this time, the risk of inadequate nutrition and other health problems is of major concern. Adolescent girls, mothers and children are particularly vulnerable because they are integral parts of the malnutrition cycle in order to overcome the vicious cycle of malnutrition, adolescent girl's nutrition is critical. Due to their rapid physical and mental development during this time. globally, adolescent undernutrition is a serious public health problem in both developed and developing countries, but is disproportionately keeping severe in developing countries, especially in Asia (32–65%). **Aim:** The study aimed to explore the nutritional status and factor associated among school going adolescent girls in Shuklaphanta municipality, Kanchanpur District, Nepal. **Materials and Methods:** The study was quantitative study and the study design was institutional based Cross-sectional Study Design. The study was conducted in government school of Shuklaphanta Municipality and the respondents were female students of selected school. Simple random sampling technique and self-administered questionnaire was used as study tool. For descriptive analysis percentage was reported and to find out the association between variables Chi-square test was applied. **Findings:** the majorities of the respondent age was 15 years, maximum numbers of the respondents were found to follow the hindu religions. Majority of adolescents were underweight that is 64.3% where, 32.0% were normal, 1.7% were overweight and 2% were obesity. There was significant association between Family type and BMI for age of government school adolescent girls with p-value of 0.004 which has strong level of association with Cramer's value of 0.188. **Conclusion:** in a nut shell the nutritional status of the adolescent girls in a shuklaphanta municipality was seems to be a matter concern.

Key words: Adolescent, Adolescent girls, Associated factors, Nutritional status, Adolescent Nepal

Introduction

Adolescent girls are the future mothers, making the girls towards the accessible towards the nutrition is the matter of concern. There are over 1.2 billion teenagers worldwide, or more than 18% of the world's population. About 600 million of them are women, and nearly 90% of them reside in developing nations¹. Adolescence is a time of rapid growth & development during which 15 to 25% of adult height is acquired, as well as up to 45% of skeletal growth². Due to the rapid growth in stature, muscle mass, & fat mass during this time, the risk of inadequate nutrition & other health problems is of major concern. Teenagers' health as adults would also be significantly impacted by this quick development spurt as a result of these significant nutritional problems³. Malnutrition in all of its forms, especially

undernutrition, which includes being underweight for age, too short for age (stunted), excessively thin compared to height (wasted), and functionally deficient in vitamins and minerals, is a worldwide problem, but it is particularly disastrous in poor national . Due to their rapid physical and mental development during this time, adolescents are particularly susceptible to malnutrition and its effects. Short stature, low lean body mass, and a lack of physical power are all symptoms of undernutrition, which begins at birth, continues through adolescence and adulthood, and can even run in families. Additionally, it can lessen resistance to infections and other incapacitating ailments that lower productivity.

Statement of problems: The world's current teenage cohort (10–19 y) is the largest in human history, 90% of whom live in low- and middle-income countries (LMIC) ⁴. In Sub-Saharan Africa, the prevalence of adolescent undernutrition is 15–58%, which is higher from other African countries⁵⁻⁷. Out of the estimated nearly 1.2 billion adolescents, 350 million live in South East Asia^{8, 9}. Adolescents in Nepal make up almost one-fourth of the population, and they face special physical, mental, and emotional challenges as they go through a period of gradual growth and development¹⁰. Malnutrition and anemia are major concerns for adolescent girls¹¹. According to the Global School Based Student Health Survey (GSHS) 2015, 6.7% of adolescent students were overweight (heavy for their height), 10.9% (male 13.8%, female 8.1%) were underweight, and 0.6% (male 0.8% and female 0.4%) of the school-age population were obese¹².

Rationale of the study: Adolescent girls' health and wellbeing must be safeguarded not only for their own sake but also so that healthy adolescent girls can give birth to healthy offspring. The teenage growth spurt increases the need for nutrients during puberty¹³.

On the general nutritional status of adolescents in Nepal, there is relatively little information available. Despite the fact that it specifically collects nutrition-related data, the Nepal Demographic and Health Survey (NDHS) is a significant source of information on nutrition in the nation mothers and kids under 5 years old, According to the NDHS 2011, 18% of women are malnourished, and 29% of children under the age of five are underweight. 40% of children under the age of five have stunted growth. Similar to adults, 35% of women between the ages of 15 and 49 and 46% of children aged 6 to 59 months have anemia¹⁶.

Research Questions:

What are the factors that affects the nutritional status among school adolescent girls?

Objectives

General Objective

The general objective of the study id to assess the nutritional status and analyze the factors associated with nutritional status of school adolescent girls of Shuklaphanta Municipality, Kanchanpur Nepal

Specific Objectives

The specific objectives are:

- I. To describe the socio demographic characteristics of school adolescent girls;
- II. To assess the nutritional status which include BMI among school adolescent girls;
- III. To identify associated factors influencing nutritional status of school adolescent girls.

Study Method

The study method was quantitative since the study was analyzed based on quantitative data manipulation.

Study Design

A school based cross-sectional study was employed to assess the nutritional status and its associated factors among government school adolescents girls. Data was collected in a single shot with selected participant in a selected school. As a result, the study design was cross-sectional based on the frequency of data collection. According to the study objectives, it was carried out to analyzed the factors related with nutrition and nutritional status of adolescent girls.

3.3. Study Area

Shuklaphanta Municipality, Kanchanpur, Nepal will be the study area. Shuklaphanta is a Municipality, which is located in Kanchanpur district, Sudurpashchim Province of Nepal. Shuklaphanta has total 12 wards, which are scattered across 163 square kilometers of geographical area. According to 2011 Census conducted by Central Bureau of Statistics (CBS), Shuklaphanta Municipality had total population of 46,834

Study unit and sampling frame

The study population was individual school adolescent girls studying in grade 9 and 10 of government school in Shuklaphanta municipality was sample unit of the respective study area.

The municipality office provide the list of all secondary government schools operating within municipality, and each government school was contacted to find out the number of students of grade 9 and 10 adolescent girls.

Table 1: Sampling Frame

S.N	Ward number	Name of government school	Grade 9	Grade 10
1	1	Siddha Baijnath secondary school	54	69
2	1	Janjagriti secondary school	30	27
	2	There is no secondary school		
	3	There is no secondary school		
3	4	Kalika secondary school	22	31
4	4	Rastriyya secondary school	93	75
5	5	Sivshankar secondary school	24	42
6	6	Baijanath secondary school	36	51
7	7	Dharma Janata secondary school	93	71
8	7	Krishna secondary school	36	29
9	8	Siddhanath secondary school	24	38
10	9	Ashigram secondary school	21	16
11	10	Krishna secondary school	36	25
12	11	Saraswati secondary school	62	59
13	12	Shiva shakti secondary school	56	66
	Total		587	599
		Grand Total		1186

Study Duration

The study period was for six months starting from Baisakh to Asoj and the data collection was started from 1st week of Asadh and end on 1st week of Shrawan.

Sampling Unit

Individual school adolescent girl of class 9 and 10 of Shuklaphanta municipality were the sampling unit of the respective area.

Sample Size Calculation

The formula below were be used to determine the sample size.

$$n = z^2 * p * q / d^2$$

Where

, n= the desired sample size; z= the standard normal deviate at the required confidence level in this case 1.96

p= expected proportion of event

$$q = 1 - p$$

d = the level of accuracy of the statistics being measured = 0.05

Now, Calculating

Calculating formula for sample size $(n) = z^2 * p * q / d^2$

Underweight

Z= Standard normal variable at 95% confidence level, consider 1.96 Confidence Interval (CI) =95%

P = Expected proportion of events= 59%³⁴(proportion of the underweight in adolescent girls from Adolescent Nutrition Survey in Nepal, 2014) =0.59

$$q = 1 - p (1 - 0.59) = 0.41$$

d= Maximum allowable error i.e. 5. This is the expected half width of the confidence interval and is taken as 0.05 for this study.

$$n = z^2 * p * q / d^2$$

$$\text{Sample size } (n) = 298 = 1.96^2 * 0.59 * 0.41 / 0.05^2$$

$$= 371.71 \sim 372$$

For finite population

$$N = 1186$$

$$n = n0 / (1 + (n0 - 1) / N)$$

$$= 372 / (1 + (372 - 1) / 1186)$$

$$= 284$$

Hence, from stunting, wasting, underweight and overweight the sample with maximum number was chosen for the study. Therefore Sample size (n) selected was = 284

Now,

Non Respondents

Using 5% of non response rate, the number of non respondent can be calculated the formula below:

$$\text{Number of non respondents} = 5\% * \text{sample size}$$

$$=0.05*284$$

$$=14.2$$

Adding 5% non respondents in sample size=sample size+5% * sample size

$$=284+14.2 =297$$

Data Collection Technique

The technique for data collection was structured questionnaire and anthropometric measurement. Firstly, students with inclusion criteria was participate, and inform consent was taken. Then all the required information was obtain through a structured questionnaire and anthropometric measurement.

A. Semi structure questionnaire was used for data collection on following variables;

1. Socio Demographic characteristics
2. Lifestyle related characteristics
3. Socio economic and cultural factors
4. Environmental factors
5. Anthropometric measurement

B. Standard instruments was used for anthropometric measurements, following techniques was used for anthropometric measurement:

Weight

The weight of respondents was measured twice after calibrating the weighing scale to zero and removing shoes and extra clothes. The weight was measured in kgs.

Height

Height of the respondents was measured using stature meter. Height of the subject was measured without shoes in cm and then converted to meter.

Body mass index

With the above obtained data following parameters was calculated as show in table below:

Nutritional Status	WHO criteria BMI cut-off	ASIAN criteria BMI cut-off
Underweight	<18.5	<18.5
Normal	18.5 - 24.9	18.5 - 22.9
Overweight	25 - 29.9	23 - 24.9
Pre-obese	-	25 - 29.9
Obese	≥ 30	≥ 30

Table 2: : Classification of BMI according to WHO criteria and “Asian

$$BMI= \text{Weight(kg)/Height(m}^2\text{)}$$

Normal	>0 SD
Overweight	>+1 SD
Obesity	>+2 SD
Thinness	<-2 SD

Table 3: Classification of BMI according to WHO BMI for age (5-19 years)

Pretesting

Pretesting was performed on 10% of the total sample size (n=297) in Rastriya secondary school which was the representative study population .

3.12. Validity and Reliability

Through the following procedures, the study's validity and reliability was assured during the proposal preparation, tool development, data collecting, and entry processes. Data was collected within 7-10 days minimize time bias error.

During tool and proposal development

- Before developing tools and proposal, a through literature review was conducted to ensure the validity and reliability.
- Reliability of the tools was insured by pretesting.
- Standard questionnaire, validated and modified in nepali vesion was used and again modified to English version.

During data collection

- Interview was taken in a suitable condition and environment.
- Field editing was done immediately for avoiding error.
- The instruments used for anthropometric measurement was calibrated after taking measurement from every five respondents where following steps was followed to maintain validity and reliability of instruments.

Weighing scale

- ✓ Weight was measured nearest kg using a weighing scale with a capacity of 180 kg.
- ✓ The weighing machine was checked regularly to ensure its accuracy using standard weight of 1 kg.
- ✓ To ensure the reliability, the weight of respondent was measured twice after calibrating it to zero and removing shoes and extra clothes.
- ✓ The weighing was calibrated after taking measurement from each of the five responders, so that the reliability of instrument was ensured.

Stature meter

- ✓ Height of the respondent was measured by using Stature meter of 200cm capacity.
- ✓ The responders was asked to stand without shoes on the horizontal platform for appropriateness measurement.

During data entry

- Data editing was completed on the same day of data collection by rechecking information before data entry to minimize the error.
- The data was entered in EPI-DATA in order to beyond the limit error to minimize within the limited errors, 10% of the entered data was randomly selected and manually checked and percentage of error was reported.

Data Management and Analysis

Data Management

The tools used was handled properly, calibrated and was managed as the data collection was conducted by self. Collected data was cleaned and edited on the of data collection. If some questions were left unanswered, then the provided information was recalled. If the information cannot be recalled, then the data was recollected from the same respondent. After completing the data collection, questionnaires was counted whether it is according to sample size or not. Epi Data software was used for data entry. To minimize the error within the limit, selected data was manually rechecking during data collection.

Data Analysis

Entered data was exported from Epi Data software to SPSS (22 version) for further analysis. Necessary transformation of data was done and data was interpreted using tables representation. Based on the objective of the study the data was analyzed by using the descriptive statistics. Categorical variable were described using numbers and percentages. Frequency distribution and cross tabulation between dependent and independent variable was used to describe the basic background and respondent characteristics. Chi square test was performed to find association between variables.

Table 4: Data analysis plan

Variables	Measurement	Univariate
Nutritional status	Ordinal	Mean
Age	Discreate	Mean/Median
Marital status	Nominal	Percentage
Educational status	Ordinal	Percentage
Religion	Nominal	Percentage
Ethnicity	Nominal	Percentage
Source of income	Nominal	Percentage
Physical activity	Ordinal	Percentage
Occupation	Nominal	Percentage
Wealth Quantile	Ordinal	Percentage
Water resources	Ordinal	Percentage
Water consumption	Ordinal	Percentage
Handwashing	Ordinal	Percentage
Sanitation	Ordinal	Percentage
Knowledge	Ordinal	Percentage

Ethical Considerations

- Permission was taken from CiST college.
- Permission was taken from school administration.
- Approval was taken from IRC-CiST.
- Verbal consent was taken from each respondent written accent was taken from parents of the respondent.
- No respondent was forced to answer the questions.
- Purpose and objectives of the study was explained to all the respondents.
- All information was kept confidential i.e. respondent's privacy was highly maintained and respected.
- Counseling and appropriate suggestion to respondents about their Nutritional Status was provided.
- Immediately refer the respondents if identify any bad consequences of the Nutritional Status.

- Approval for the study was obtained from the Ethical Review Board of the NHRC (ERB).

Findings

Socio-demographic related characteristics

The following table show the socio-demographic information information which includes age, religion, marital status, family size and type, father education, mother education, father and mother occupation.

Among the total sample of 297, highest number of adolescent girls belong to median age 15 and above that is 55.9%, lowest number of adolescent girls belong to the median age less than 15 that is 44.1%.

Maximum number of respondent were disadvantaged janajatis with 32.0%. Almost every respondent were following Hindu religion that is 94.3%. Maximum adolescent girls was unmarried with 96%. Most of the respondents lived in joint family with 61.6% and lowest number of respondent lived in Extended family that is 7%. About half of the adolescent girls were living in the family median six and above that is 59.9%. Maximum number of adolescent girls were studying in class 9 that is 59.6%. Maximum number of respondents father education were Lower secondary with 31.6%, where about one third of respondents mother are illiterate that is 34.7%. Agriculture were the highest occupation of respondents father and mother with 45.5% and 58.2%.

Table 5: Sociodemographic characteristics (n=297)

Variable	Number (n)	Percentage(%)
Age of adolescent		
less than 15	131	44.1
15 and above	166	55.9
Religion		
Hindu	280	94.3
Islam	1	.3
Christian	16	5.4
Ethnicity		
Dalit	45	15.2
Disadvantaged janajatis	95	32.0
Disadvantaged non dalit terai caste	6	2.0
Religious minorities	28	9.4
Relatively advantaged janajatis	5	1.7
Upper caste group	118	39.7
Marital status		
Married	11	3.7
Unmarried	285	96.0

Widower	1	.3
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Family type

Nuclear	112	37.7
Joint	183	61.6
Extended	2	.7

Number of Family members

Less than 6	119	40.1
6 and above	178	59.9
Less than 6	119	40.1

Studying class

Class 9	177	59.6
Class 10	120	40.4

Father education

Illiterate	40	13.5
Informal education	8	2.7
Less than primary education	17	5.7
Primary level	38	12.8
Lower secondary	94	31.6
Secondary	78	26.3
Higher secondary and above	22	7.4

Mother education

Illiterate	103	34.7
Informal education	21	7.1
Less than primary education	19	6.4
Primary level	34	11.4
Lower secondary	74	24.9
Secondary	36	12.1
higher secondary and above	10	3.4

Occupation of father

Government job	26	8.8
NGO/private	10	3.4
Agriculture	135	45.5
Business	30	10.1
Foreign employee	76	25.6
Daily labor	20	6.7

Occupation of mother

Housewife	7	2.4
Government job	4	1.3
Agriculture	173	58.2
Ngo/private	16	5.4
Daily labor	82	27.6
Business	15	5.1

Nutrition related characteristics

The following table show the information related to the Anthropometric related information of government school adolescent girls which includes BMI for age.

Among 297 government school adolescent girls, Majority of adolescents were underweight that is 64.3% where, 32.0% were normal, 1.7% were overweight and 2% were obesity.

Table 6: Anthropometric measurements (n=297)

Variable	Number (n)	Percentage (%)
BMI for age of respondent		
Under weight	191	64.3
Normal	95	32.0
Over weight	5	1.7
Obesity	6	2.0

Food habits related characteristics

The following tables shows the information related to the Environmental related status of government school adolescent girls

Maximum number of respondents had rice as a main diet at home that is 86.2%. Majority of respondents were nonvegeterain that is 78.8%. Most of the respondents were consume meat once a months with 27.6%. Almost all respondents were consume vegetables that is 99.0%. where maximum number of respondents were consume vegetables more than 3 days a week that is 75.1%. Almost every respondent were consume fruits that is 99.0%.Where half of the respondents were consume fruits once a week that is 57.6%.Most of the respondents consume milk that is 83.8%. where 30.6% of respondents were consume milk once a week that is 30.6%. Maximum number of respondents consume egg that is 86.9%.Majority of respondents consume egg once a week that is 53.5%.Majority of the respondent consume fish that is 69.7%, where maximum respondents consume fish once a week that is 45.5%.Almost all respondents consume lentils beans that is 98.0%.where 43.4% respondents consume lentils/beans more than 3 days a week. Most of the respondents consume sugar chocolates sweet drinks more than 3 days a week that is 30.3%.Majority of respondents school were not providing mid day meal that is 63.3. Almost all respondents consume junk food that is 95.3%. Half of respondents school were allowed junk food that is 58.2% .Majority of the respondents had meal median less than 4that is 99.7%. Maximum of the respondents were not skipping meal in a week that is 70.4% ,still 29.6% respondents skip their meal in a week. Majority of the respondents skip breakfast that is 55%.Majority of the respondents had dinner with whole family members that is 67.2%.Almost all respondents had provided pocket money that is 94.6%

Table 7: Food habits (n=297)

Variable	Number (n)	Percentage (%)
Main diet at home		
Rice	256	86.2
Buckwheat	30	10.1
Wheat	11	3.7
Vegeterain or non-vegeterain		
Non-vegetarian	234	78.8
Vegetarian	63	21.2
Often do you eat meat (n=297)		
Daily		4.4
once a week		17.8
twice a week		17.5
once a month		27.6
twice a month		12.1
Consume vegetables		
Yes		99.0
No		1.0
Days consume vegetables in week		

(n=297)

once a week	10.1
less than 3 days a week	14.8
more than 3 days a week	75.1

Consume fruits ?

Yes	99.0
No	1.0

Days do you consume fruits in week (n=297)

Once a week	171	57.6
Less than 3 days a week	65	21.9
More than 3 days a week	61	20.5

Consume milk ?

Yes	249	83.8
No	48	16.2

Consume milk in a week (n=297)

Once a week	91	30.6
Less than 3 days a week	47	15.8
More than 3 days a week	111	37.4

Consume egg ?

Yes	258	86.9
No	39	13.1

Consume egg in a week (n=297)

once a week	159	53.5
less than 3 days a week	55	18.5
more than 3 days a week	44	14.8

Consume fish ?

Yes	207	69.7
No	90	30.3

Consume fish in a week (n=297)

once a week	135	45.5
less than 3 days a week	57	19.2
more than 3 days a week	15	5.1

Consume lentils beans ?

Yes	291	98.0
No	6	2.0

Consume lentils beans in a week (n=297)

Once a week	103	34.7
Less than 3 days a week	61	20.5
More than 3 days a week	129	43.4

Consume sugar chocolates sweet drinks

Less than 3 days a week	113	38.0
More than 3 days a week	90	30.3
Once a week	88	29.6

School provides mid day meal

No	188	63.3
Yes	109	36.7

Consume junk food ?

Yes	283	95.3
No	14	4.7

If yes how often

Daily (n=279)	109	36.7
Once a week	65	21.9
Twice a week	105	35.4
Once a month	15	5.1
Twice a month	3	1.0

Opinion regarding junk food (n=279)

Lacks of nutrients	26	8.8
Good for health	12	4.0
Bad for health	180	60.6
Prefer for taste	79	26.6

Allowed junk food in school

Yes	173	58.2
No	124	41.8

Meal do you eat per day

less than 4	296	99.7
more than 4	1	.3

Skipping meal in a week ?

Yes	88	29.6
No	209	70.4

Skipping pattern (n=297)

Breakfast	55	18.5
Lunch	14	4.7
day snacks	12	4.0
Dinner	10	3.4

Reason for skipping meal (n=297)

Due to food deficient	27	9.1
For weight loss	39	13.1
For attractive body	23	7.7

**Dinner with family members
(n=297)**

Alone	9	2.9%
Whole family	209	67.2%
Mother father	54	17.4%
Brother sister	39	12.5%

Provided pocket money

Yes	281	94.6
No	16	5.4

Association between different variables

Association between the Nutritional status which included the BMI for age and socio-demographic, Environmental, Lifestyle, Food habits related characteristics was analyzed using Chi-Square test where degree or level of strength of association was analyzed through Cramer's V.

Association between different variables and BMI for age

Association between BMI for age and Socio-Demographic characteristics

The following table shows the association between the Socio-Demographic factor and BMI for age of government school adolescent girls. There was significant association between Family type and BMI for age of government school adolescent girls with p-value of 0.004 which has strong level of association with Cramer's value of 0.188. However, there was no association between BMI for age and the age, ethnicity, religion, father and mother education and father and mother occupation of government

school adolescent girls.

Variables	BMI for Age			Chisquare	p-value	Phi/cramer's V
Ethnicity of respondent						
Disadvantage janajati	55 (57.9)	33 (34.7)	7 (7.4)	5.857	0.053	As
Other than disadvantage janajati	136 (67.3)	62 (30.7)	4 (2.0)			
Family type						
Joint family	105 (57.4)	71 (38.8)	7 (3.8)	10.853	0.004	0.188
Other than joint family	86 (75.4)	24 (32.0)	4 (3.5)			

sociation between BMI for age and Environmental related characteristics

The following table shows the association between the Socio-Demographic factor and BMI for age of government school adolescent girls. Where, there was a significant association between treat water for drinking and BMI for age of school adolescent girls with p-value of 0.024 which has strong level of association with Cramer’s value of 0.159. However there was no significant association between BMI for age and source of drinking water, Handwashing, toilet at home and type of latrine of government school adolescent girls.

Variable	BMI for age			Chi-square	p-value	Phi/ cramer’s V
Treat water for drinking						
Yes	110 (71.4)	38 (24.7)	6 (3.9)	7.467	0.024	0.159
No	81 (57.0)	56 (39.4)	5 (3.5)			

Association between BMI for age and Food Habits related characteristics

The following table shows the association between the Socio-Demographic factor and BMI for age of government school adolescent girls. Where, there was a significant association between Consume sugar, chocolate, sweetened drink and BMI for age of school adolescent girls with p-value of 0.020 which has very strong level of association with Cramer’s value of

0.45. However there was no significant association between BMI for age and vegeterain or nonvegeterain , consume vegetable, consume fruits, consume milk or milk products, consume junk food, allowed junk food in school and skipping pattern of meal .

Variable	BMI for Age			Chisquare	p-value	Phi/cramer's V
Consume sugar ,chocolate, sweetened drink						
Yes	173 (62.5)	93 (33.6)	11 (4.0)	7.865	0.020	0.45
No	18 (90.0)	2 (10.0)	0			
School provided food						
Yes	79 (72.5)	26 (23.9)	4 (3.7)	5.479	0.065	
No	122 (59.6)	69 (36.7)	7 (3.7)			

DISCUSSION

This chapter deals with the discussion of the major findings of the study and proving the basic support to the results of the study simultaneously correlated the major finding with the preexisting findings.

Although there are number of studies conducted in nutritional status of adolescent girls, this is the first study to be conducted among government school adolescent girls in Nepal with the aim of assessing the nutritional status and factor associated among school going adolescent girls through BMI for age.

The research study shows the prevalence of underweight, overweight and obesity among government school adolescent to be 64.3%, 1.7% and 2.0% respectively. Where as the Adolescent Nutritional Survey in Nepal, 2014 study findings reveal that 71% (95% CI: 61.2-79.1) of male (95% CI: 61.2-79.1) adolescents and 59% (95% CI: 48.2-68.5) of female (95% CI: 48.2-68.5) adolescents were under weight¹⁴.

To begin with the socio demographic status of the respondents as in the prior 39.7% percentages of the respondents were from the upper class groups, 32 percentages from the terai dalit and 15.2 percentages from the dalit. As by of this data we can say that even the back warded and marginalized people are also showing the enthusiasm towards a education which seems to a positive factor.

Likewise, study conducted among adolescent girls in india, shows that half of the adolescent girls, 49.76% living in the urban slums were underweight³⁵. The prevalence of underweight is higher among government school adolescent girls, than Adolescent Nutritional Survey in Nepal and research conducted in india. The possible reason for this difference in prevalence could be a difference in socioeconomic status and study setting.

The study shows that there is strong level of significant association between family type and BMI of adolescent girls, where the prevalence of underweight among joint family was 57.4% compared to other than joint family adolescent girls with 86% and joint family adolescent girls had percentage (71%) normal BMI than other than joint family adolescent girls. This might be due to more adolescent girls had join family.

Regarding the food habit consumption patterns and BMI my findings shows that 60.3 percentages of the vegetarian's respondents were under weight and 65.4 percentages of the non-vegetarians were underweight. This seems to be spurious association but the fact was in my study out of 297 respondents only 63 respondents were vegetarians and remaining others were non vegetarians.

The BMI of the respondents shows that 64.3 percentages of the respondents were underweight that is weight for height below 18.5, normal 32 percentages overweight 1.7 and obesity 2 percentages respectively. The study conducted by Poudel S and et.al in 2017 in Lalaitpur district of Bagamati Province shows that 31.8 Percentages of the respondents were underweight. This shows that Shuklaphanta Municipality is twice lower in the adolescent underweight¹⁵.

The consumption of the chocolates, sweets and other sweeten substances shows the significant association that is 0.02 p-value with the BMI. This reveals that consumptions of the sweet substances like chocolates, sweeten carbonated and non-carbonated drinks consists of the digestion inhibitors substances like caffeine's, tannin which inhibits the digestions of the food substances a result there is a maladjustment in the metabolism of the food and leads to the malnutrition.

Conclusion

The research was conducted among 297 government school adolescent girls in selected government school of Shuklaphanta municipality, where the aim of the study was to assess nutritional status and factors associated with nutritional status through the anthropometric measurements (BMI for age). The anthropometric results shows that, the prevalence of underweight among was more than the prevalence of overweight/obesity among government school adolescent girls. In the study respondents had high risk of underweight.

The study showed no association between BMI for age and different variables like Age, Religious, Ethnicity, Education status of father and mother, Occupation of father and mother, Vegetarian nonvegetarian, junk food consumption. Likewise, there was significant association between BMI for age of adolescent girls and different variables. Where majority of adolescent girls who were in joint family were evident underweight in BMI for age. Similarly, majority of adolescent girls who do not treat water for drinking had prevalence of the underweight. These result suggest that there is an increasing need of stakeholders to identify, promote, and implant policy interventions that simultaneously address mainly underweight and also overweight and obesity in government school adolescent girls.

Recommendation

Improvement of nutritional status of government school adolescent girls of Shuklaphanta Municipality of Kanchanpur district is very crucial since more than half of the respondents in the research were underweight. So based on the study.

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Even though we had applied for the fund in numerous organization but we didn't get the fund from any sources.

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