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A correlational study of BMI with food practice and physical activity among adolescents in Urban and Rural schools of east Sikkim

[1]Loreni Ovung, [2]Shashirani, Pangaambam and [3]Reshma Tamang

[1]M.Sc. Nursing, Sikkim Manipal College of Nursing, Sikkim Manipal Institute of Medical Sciences, Sikkim Manipal University, Sikkim, India
[2]Associate Professor, Sikkim Manipal College of Nursing, Sikkim Manipal Institute of Medical Sciences, Sikkim Manipal University, Sikkim, India
[3]Professor, Sikkim Manipal College of Nursing, Sikkim Manipal Institute of Medical Sciences, Sikkim Manipal University, Sikkim, India

Corresponding Author: Shashirani, Pangaambam

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Abstract

Background: The World Health Organization considers that poor nutrition is the single most important threat to the world's health (WHO, 2000). Low levels of physical activity, and unhealthy food habits are risk factors for under nutrition and over nutrition in children.

Purpose: The aim of this study was to assess, compare and find the association of BMI with food practice and physical activity among adolescents in urban and rural schools of east Sikkim.

Methods: A total of 276 adolescents from urban and rural school students comprise of the study population. 138 children were from urban and rural schools of East Sikkim. A simple random sampling technique was used. Data entry and statistical analysis was performed with the help of SPSS version 24.0. Height and weight were measured, and BMI was calculated.

Result: Findings show that most of the adolescents both in urban (79%) and rural (86.2%) were in normal weight. Similarly, findings also revealed that all the adolescents in urban schools 138 (100%) and rural schools 138 (100%) had acceptable food practices and majority were found moderately active in both the rural and urban schools. There was an association found in BMI and physical activity with their selected demographic variables. The study findings showed that there was statistically significance difference between the BMI, food practice and physical activity between the urban and rural school adolescents.

Conclusion: Furthermore, programs on improved dietary habits and programs to promote healthy body image could be incorporated to promote healthy body image to reduce their vulnerability towards distorted body image in later years

Keywords: Determine, stress, zumba, effectiveness, intervention

Introduction

Adolescence is defined as 10–19 years by World Health Organization (WHO). This is the key decennary in the life process of an individual with inferences on adult health, socio-economic well-being of a country and health of the future children. The nutritional issues in this age group have commonness with children and adults with some added dimensions of puberty, psychological changes, and growth spurt which are crucial for present, future and intergeneration health.

An adolescent is a period of rapid growth and maturation in human development. Independence is established during this period of life and adolescents make choices of their own.

According to the World Health Organization (WHO) poor nutrition is consider as the single most important threat to the world's health. Problems of underweight and overweight are caused by a chronic imbalance between energy intake and actual energy needs of the body [3].

Unhealthy food practice and poor activity amongst young people is a serious and unnoticed problem. The deregulations of energy consumption and expenditure related to inappropriate dietary habits and lack of exercises increase the prevalence of undernutrition and overnutrition. Body Mass Index (BMI) is a simple index of weight for height that is commonly used to classify underweight, overweight and obesity and same for both sexes [4].

Adolescents are the most important time of growth because at this age maximum growth occur in adolescents related not only to their mind but also physically as well. During this significant period dietary patterns have an important impact on lifetime nutritional status and their health. Adolescence is that period of life in which an adolescent learns healthy eating pattern which in future leads to healthy nutritional status of an adolescent. Adolescents are a period of increased vulnerability to obesity and malnutrition [7].

Obesity and malnutrition are the most preventable nutritional diseases of children and adolescents in many

developed and developing countries. Nowadays obesity and malnutrition are two main nutritional diseases prevalent in the country. The prevalence of this condition is occurring due to sedentary lifestyle and inadequate dietary habits. Today adolescents are mainly focused on the consumption of fast food and spend all the time with their laptops and phones due to advancement in technology. Due to advancement in technology, outdoor physical activity and play is reduced, and it leads to increased risk of development of obesity and malnutrition. The prevalence of teenage obesity, which has increased dramatically over the past here decades worldwide, is acknowledged as one of the most serious health challenges of the 21st century. Obesity results from a long-term energy imbalance, a combination of excess energy intake, low levels expenditure, and an active lifestyle.

The underlying causes of obesity during the growing years are variable with multifactorial, non-modifiable and modifiable environmental factors involved and potentially further complicated by biological growth factors during the rapid period pubertal growth spurt [8].

A lot of studies found the prevalence of malnutrition was higher in the rural area compare to the urban area because of the socioeconomic status. This worrying condition has led to one of the objectives of this study to investigate the prevalence of malnutrition and obesity among the urban and rural children of Sikkim. These two settings will be compared because the environment in urban and rural areas is different, and it can affect the children's eating practices. Hence, the investigator felt the need to identify the correlation of BMI with food practice and physical activity among adolescents in urban and rural schools of East Sikkim.

Objectives

- Assess the BMI, food practice and physical activity among adolescents studying in selected urban and rural schools of East Sikkim
- Compare BMI, Food Practice and Physical activity among adolescents in urban and rural schools of East Sikkim
- Find association between BMI, food practice and physical activity among adolescents in selected urban and rural schools of East Sikkim

Methodology

Research approach: Quantitative approach was adopted

Research Design: Descriptive comparative design

Research Setting: Tadong Goverment Senior Secondary School (for urban setting) and Biraspati Parsai Government Senior Secondary School (for rural setting)

Population: Consists of adolescents going to urban and rural schools of East Sikkim

Sample size: 276 samples, 138 urban and 138 rural adolescents of Tadong government senior secondary school for urban school and Biraspati parsai government senior secondary school for rural school of East Sikkim

Sampling technique: Simple random sampling technique.

Sampling criteria

Inclusion criteria

- Students in the government schools in Sikkim state of class 9, 10 and 11.
- Students who will be willing to participate
- Students who will be present at the time of data collection

Exclusion criteria

- Students in the government schools in Sikkim state under class <9 and >11

Data collection tool and techniques

- Demographic Proforma
- Body Mass Index (BMI)
- Food Frequency Questionnaire (FFQ)
- Physical Activity Questionnaire for adolescent (PAQ-A)

Data collection procedure:

- Administrative approval was obtained from Principal, SMCON for the final study data collection.
- Formal permission was sought from the Education Department and HOD of the respective schools.
- The establishment of rapport and self –introduction with the participants was done to gain their co-operation, informed written consent was taken from the participant's parent and the data collection was done through interview technique.
- Data collection proceeded from 7th February 2022 to 12th March 2022 after the permission was granted.

Analysis and Interpretation

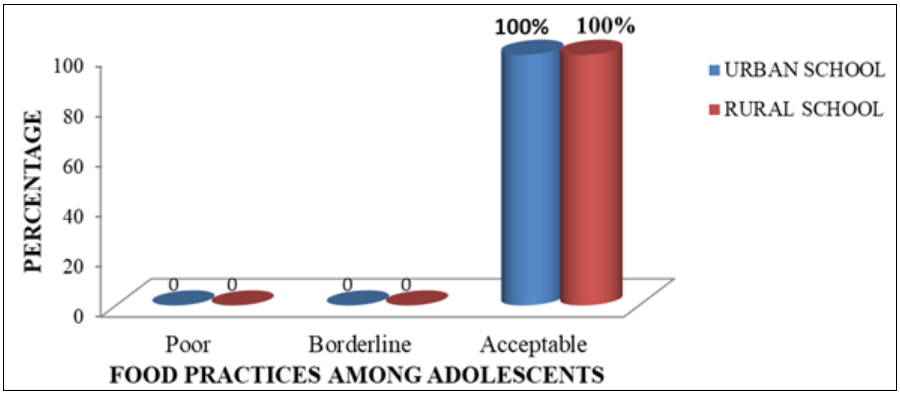

Fig 1: Distribution of food practices of among adolescents studying in selected urban and rural schools N=276

Table 1: Frequency and percentage distribution of adolescents studying in selected urban and rural schools. N=276

Demographic variables	Urban school		Rural school	
	f	%	f	%
1. Sex				
Male	84	60.9	68	49.3
Female	54	39.1	70	50.7
2. Age in years				
13-14 years	41	29.7	40	29
15-16 years	89	64.5	90	65.2
17-19 years	8	5.8	8	5.8
3. Religion				
Hinduism	62	44.9	107	77.6
Christianity	27	19.6	8	5.8
Buddhism	34	24.6	18	13
Others	15	10.9	5	2.6
4. Whom do you live with				
Parents	121	87.7	131	94.9
Grandparents	8	5.8	3	2.2
Relatives	9	6.5	4	2.9
5. Highest education level of parents				
None	17	12.3	7	5.1
Primary	41	29.7	41	29.7
Secondary	61	44.2	63	45.7
University	13	9.4	14	10.1
Others	6	4.4	13	9.4
6. Occupation of father				
Professional	19	13.8	14	10.1
Skilled worker	69	50	71	51.4
Unskilled worker	33	23.9	26	18.8
Unemployed	17	12.3	27	19.6
7. Occupation of mother				
Professional	13	9.4	7	5.1
Skilled worker	35	25.4	30	21.7
Unskilled worker	39	28.2	23	16.7
Unemployed	51	37	78	56.5
8. Mode of transport				
Bicycle	4	2.9	2	1.4
Public transport	20	14.5	14	10.2
Walking	71	51.4	76	55.1
Parents car	43	31.2	46	33.3

Table 2: Distribution of BMI among adolescents studying in selected urban and rural schools N=276

BMI	Urban school		Rural school	
	F	%	f	%
Underweight	4	2.9	9	6.5
Normal weight	109	79	119	86.2
Overweight	20	14.5	7	5.1
Obese	5	3.6	3	2.2

Figure 1. depicts that all the adolescent in urban schools 138(100%) and rural schools 138(100%) had acceptable food practices.

Table 3: Distribution of physical activity among adolescents studying in selected urban and rural schools N=276

Physical activity	Urban school		Rural school	
	F	%	f	%
Lightly active	0	0	0	0
Moderately active	111	80.4	119	86.2
Very active	27	19.6	19	13.8

Table 4: Description of comparison of BMI among adolescents studying in selected urban and rural schools N=276

Comparison BMI	Mean	SD	Mean D	t value	Df	p value
Urban school	20.29	3.218	1.19	3.329	274	0.001*
Rural school	19.10	2.712				

*p<0.05 level of significance NS-Not significant

Table 5 illustrates that adolescents studying in urban schools had mean BMI score of 20.29±3.218 and in rural schools was 19.10±2.712 with mean difference of 1.19 with t=3.329 at df=274 was statistically significant at $p<0.05$ level. Result revealed that there is statistically difference in BMI among adolescents studying in urban and rural schools.

Table 5: Distribution of comparison of food practices among adolescents studying in selected urban and rural schools N=276

Comparison Food practices	Mean	SD	Mean D	t value	Df	p value
Urban school	85.43	8.489	2.80	2.657	274	0.008*
Rural school	82.63	8.996				

*$p<0.05$ level of significance
NS-Not significant

Table 6 illustrates that there was 85.43±8.489 and in rural schools was 82.63±8.996 with mean difference of 2.80 with t=2.657 at df=274 was statistically significant at $p<0.05$ level. Result revealed that there is statistically difference in food practices among adolescents studying in urban and rural schools.

Table 6: Distribution of comparison of physical activity among adolescents studying in selected urban and rural schools N=276

Comparison Physical activity	Mean	SD	Mean D	t value	Df	p value
Urban school	27.58	5.576	1.59	2.639	274	0.009*
Rural school	25.99	4.388				

*$p<0.05$ level of significance
NS-Not significant

Table 4.7 illustrates that adolescents studying in urban schools had mean score of physical activity was 27.58±5.576 and in rural schools was 25.99±4.388 with mean difference of 1.59 with t=2.639 at df=274 was statistically significant at $p<0.05$ level. Result revealed that there is statistically difference in physical activity among adolescents studying in urban and rural schools.

Table 7: Distribution of association between BMI among adolescents studying in selected urban school with their selected demographic variables N=138

Demographic variables	BMI				χ^2 Value	df	p value
	Under weight	Normal weight	Over weight	Obese			
Sex							
Male	4	66	11	3	2.867	3	0.413^{NS}
Female	0	43	9	2			
Age in years							
13-14 years	1	31	7	2	3.578	6	0.734^{NS}
15-16 years	2	72	12	3			
17-19 years	1	6	1	0			
Religion							
Hinduism	3	45	13	1	10.06	9	0.345^{NS}
Christianity	0	24	2	1			
Buddhism	1	27	3	3			
Others	0	13	2	0			
Whom do you live with							
Parents	4	96	16	5	2.399	6	0.880^{NS}
Grandparents	0	6	2	0			
Relatives	0	7	2	0			
Highest educational level							
None	1	11	5	0	13.29	12	0.348^{NS}
Primary	1	33	5	2			
Secondary	0	50	8	3			
University	1	10	2	0			
Others	1	5	0	0			
Occupation of father							
Professional	1	16	2	0	6.666	9	0.672^{NS}
Skilled worker	1	52	13	3			
Unskilled worker	2	26	3	2			
Unemployed	0	15	2	0			
Occupation of mother							
Professional	1	8	3	1	4.799	9	0.851^{NS}
Skilled worker	1	30	3	1			
Unskilled worker	1	30	6	2			
Unemployed	1	41	8	1			
Mode of transport							
Bicycle	0	4	0	0	3.527	9	0.940^{NS}
Public transport	1	16	3	0			
Walking	1	57	10	3			
Parents car	2	32	7	2			

*$p<0.05$ level of significance
NS-Not significant

Table 8: Distribution of association between BMI among adolescents studying in selected rural school with their selected demographic variables N=138

Demographic variables	BMI				χ^2 Value	df	p value
	Under weight	Normal weight	Over weight	Obese			
Sex							
Male	6	58	2	2	2.666	3	0.446^{NS}
Female	3	61	5	1			
Age in years							
13-14 years	3	35	1	1	2.373	6	0.882^{NS}
15-16 years	6	76	6	2			
17-19 years	0	8	0	0			
Religion							
Hinduism	9	93	3	2	13.02	9	0.161^{NS}
Christianity	0	6	2	0			
Buddhism	0	15	2	1			
Others	0	5	0	0			
Whom do you live with							
Parents	7	114	7	3	6.415	6	0.378^{NS}
Grandparents	1	2	0	0			
Relatives	1	3	0	0			
Highest educational level							
None	2	4	1	0	15.41	12	0.219^{NS}
Primary	4	34	3	0			
Secondary	3	55	2	3			
University	0	13	1	0			
Others	0	13	0	0			
Occupation of father							
Professional	0	14	0	0	10.43	9	0.316^{NS}
Skilled worker	7	58	4	2			
Unskilled worker	0	26	0	0			
Unemployed	2	21	3	1			
Occupation of mother							
Professional	0	7	0	0	5.199	9	0.817^{NS}
Skilled worker	1	26	2	1			
Unskilled worker	1	22	0	0			
Unemployed	7	64	5	2			
Mode of transport							
Bicycle	0	2	0	0	19.75	9	0.016*
Public transport	3	10	0	1			
Walking	4	68	3	1			
Parents car	2	39	4	1			

*p<0.05 level of significance NS-Not significant

Table 9: Distribution of association between physical activity among adolescents studying in selected urban school with their selected demographic variables N=138

Demographic variables	Physical activity		χ^2 value	df	p value
	Moderately active	Very active			
Sex					
Male	64	20	2.457	1	0.117^{NS}
Female	47	7			
Age in years					
13-14 years	34	7	1.809	2	0.405^{NS}
15-16 years	72	17			
17-19 years	5	3			
Religion					
Hinduism	53	9	13.12	3	0.004*
Christianity	24	3			
Buddhism	27	7			
Others	7	8			
Whom do you live with					
Parents	97	24	0.564	2	0.754^{NS}
Grandparents	6	2			
Relatives	8	1			
Highest educational level					
None	12	5	3.014	4	0.556^{NS}
Primary	33	8			
Secondary	52	9			
University	9	4			

Others	5	1			
Occupation of father					
Professional	15	4	0.130	3	0.988^{NS}
Skilled worker	55	14			
Unskilled worker	27	6			
Unemployed	14	3			
Occupation of mother					
Professional	8	5	3.506	3	0.320^{NS}
Skilled worker	28	7			
Unskilled worker	33	6			
Unemployed	42	9			
Mode of transport					
Bicycle	4	0	7.206	3	0.066^{NS}
Public transport	17	3			
Walking	61	10			
Parents car	29	14			

*p<0.05 level of significance NS-Non significant

Table 10: Distribution of association between physical activity among adolescents studying in selected rural school with their selected demographic variables N=138

Demographic variables	Physical activity		χ^2 value	df	p value
	Moderately Active	Very active			
Sex					
Male	53	15	7.761	1	0.005*
Female	66	4			
Age in years					
13-14 years	34	6	0.076	2	0.963^{NS}
15-16 years	78	12			
17-19 years	7	1			
Religion					
Hinduism	90	17	2.588	3	0.460^{NS}
Christianity	8	0			
Buddhism	16	2			
Others	5	0			
Whom do you live with					
Parents	113	18	0.904	2	0.636^{NS}
Grandparents	3	0			
Relatives	3	1			
Highest educational level					
None	7	0	1.470	4	0.832^{NS}
Primary	36	5			
Secondary	53	10			
University	12	2			
Others	11	2			
Occupation of father					
Professional	12	2	3.553	3	0.314^{NS}
Skilled worker	58	13			
Unskilled worker	25	1			
Unemployed	24	3			
Occupation of mother					
Professional	6	1	4.078	3	0.253^{NS}
Skilled worker	23	7			
Unskilled worker	19	4			
Unemployed	71	7			
Mode of transport					
Bicycle	1	0	2.039	3	0.729^{NS}
Public transport	13	1			
Walking	63	13			
Parents car	41	5			

*p<0.05 level of significance
NS-Not significant

Discussion

In the present study, the majority of the school adolescents in urban school i.e. 109(79%) were in normal weight, 20(14.5%) were in overweight, 5(3.6%) were obese and 4(2.9%) were underweight whereas among the adolescents in rural school majority 119(86.2%) were in normal weight, 9(6.5%) were in underweight, 7(5.1%) were in overweight and 3(2.2%) were obese. The present study is consistent

with the findings of the study conducted by Farrukh Mujud[21] that among the adolescents in urban school the students 64% were in normal weight, 18% were in overweight, 9% were obese and 9% were underweight whereas among the adolescents in rural school 80% were in normal weight, 10% were in underweight, 6% were in over weight and 4% were obese.

In the present study, it shows that all the adolescents in urban schools 138(100%) and rural schools 138(100%) had acceptable food practices. The present study is consistent with the findings of the study conducted by Neha Rathi *et al*. (2017) [22] that the Indian adolescents reported poor food consumption patterns, and these findings highlight the need to design effective nutrition promotion strategies to encourage healthy eating in adolescence and targeting food supply and availability

In the present study, it shows that physical activity among adolescents in urban schools, the majority i.e. 111(80.4%) were moderately active and 27(19.6%) were very active. Among adolescents in rural schools, the majority i.e. 119(86.2%) were moderately active and 19(13.8%) were very active. The present study is consistent with the findings of the study conducted by Omar Ibn Ibrahim Abuzaid[23] that Physical activity levels among urban students were significantly higher than rural students. However, more than 50% of rural students and 40% of urban students did not engage in any physical activity in this study

Conclusion

The major findings of the study were that most of the children from both the urban and rural schools were normal for their BMI, food habits and physical activity. But for further adoption of healthy lifestyles, participation in physical education classes should be made compulsories for all the students. Furthermore, programs on improved dietary habits and programs to promote healthy body image could be incorporated to promote healthy body image to reduce their vulnerability towards distorted body image in later years.

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Author's Contribution

Not available

Conflict of Interest

Not available

Financial Support

Not available

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