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Level of physical activity and obesity among the adolescent school children in Bhaktapur: A cross-sectional pilot study

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Abstract

Background: Physical activity is crucial for overall health and well-being of an individual. As childhood obesity has emerged as a serious public health concern, physical activity is a proven tool for prevention and treatment of this type of obesity. As lifestyle and behavior pattern is formed at the adolescence age, it is essential that healthy lifestyle and good food habit should start at this age. Hence, we aimed to find the level of physical activity and obesity among the adolescent school children in this study.

Objectives: The objective of the study was to find the level of physical activity and obesity among the adolescent school children in a Bhaktapur school.

Method: This is a cross sectional pilot study conducted in October 2015 at a private school in Bhaktapur, Nepal. A total of 83 students studying in class eight, nine and ten were included in the study. A validated self-administered questionnaire was used, height and weight were measured and a BMI index for age percentile growth chart was used to interpret the Basal Metabolic Index of the participants.

Result: Out of the total 83 respondents, 31.3% of the respondents performed physical activity for at least 60 minutes a day for more than three days per week and 37.3% participants performed the same for less than three days per week. Twelve percent of the total participants were either overweight or obese.

Conclusion: The amount of physical activity in majority of the students is not adequate. Prevalence of overweight and obesity in adolescence is high. Sedentary life style, increasing trends of indoor game and consumption of junk food are responsible for increased prevalence of overweight and obesity in the adolescence.

Key words: Adolescent, Body mass index, Obesity, Physical activity

INTRODUCTION

Physical activity is defined as any bodily movement produced by skeletal muscles that require energy expenditure[1]. Those that are more physically active have lower levels of body fat than those who are less active. Regular physical activity in childhood and adolescence improves strength and endurance, helps build healthy bones and muscles, helps control weight, reduces anxiety and stress, increases self-esteem, and may improve blood pressure and cholesterol levels[2]. It is reported that age group between 5-17 should accumulate at least 60 minutes of moderate to vigorous intensity physical activity. Vigorous intensity activities should be incorporated, including those that strengthen muscle and bone at least three times per week[3]. A large proportion of children and adolescents do not meet recommended physical activity guidelines. Only one third of children and adolescents are estimated to be sufficiently physically active[4]. Physical activity and diet are the cornerstones of obesity prevention and management[5].

Obesity is excessive fat accumulation due to intake of high calorific diet and decreased level of physical activity. Childhood obesity is one of the emerging public health issues in the world. As the problem is increasing steadily and has grown worldwide, World Health Organization (WHO) has declared childhood obesity as "one of the most serious public health challenges of the 21st century"[6]. The number of overweight and obese children (aged zero to five years) increased globally from 32 million in 1990 to 42 million in 2013[7]. About 31 million of these children are

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found living in the developing countries[1]. If current trend continues, it is estimated that the number of overweight or obese children globally will increase to 70 million by 2025[7]. It is also found that the vast majority of overweight or obese children live in developing countries where the rate of increase has been more than 30% higher than that of developed countries[7].

Although, the prevalence is comparatively lower in Asia (4.9% in 2010), the number of afflicted children are greater[8]. In China, prevalence in children aged seven to nine years increased from 1-2 % in 1985 to 17 % among girls and 25 % among boys in 2000[9]. In the developed countries, children of low socio-economic status are more affected than their affluent counterparts[10]. The opposite is observed in the developing countries: children of the upper socio-economic strata are more likely than poor children to be obese[11, 12]. The overweight child is likely to become an overweight adult. Forty-three percent obese children persisted to be obese adult and twenty nine percent overweight as adult[13]. The risk of diabetes mellitus, coronary artery disease, atherosclerosis and gout is increased in those overweight as adolescents. Higher basal metabolic index (BMI) during childhood is associated with an increased risk of coronary heart diseases in adult[14].

The main objective of the research was to study the level of physical activity and prevalence of obesity among the adolescent school students of Bhaktapur, Nepal. The secondary objective was to access level of physical activity in terms of outdoor and indoor activities, dietary habit and BMI of the students. We plan to conduct further study on the basis of the findings of this pilot study.

METHODS

A cross sectional pilot study was conducted among the adolescent school students aged 12 -17 years of Supreme Academy at Thimi, Bhaktapur in October 2015. The school was randomly selected and permission from the principal was taken. All the students of grade eight, nine and ten present on the day of data collection were included in the study. Prior to the data collection, students were informed about objectives of the study, their voluntary participation, anonymity and confidentiality of information. A verbal consent was taken from the participants. A pretested questionnaire was used for data collection on level of physical activity and obesity status of the students. Height and weight were measured using stadiometer and weighing machine respectively. The BMI for age percentile growth chart of Centre for Disease Control (CDC) was used to interpret the BMI of the participants. The analysis was performed using Statistical Package for Social Sciences (SPSS) version 20. Mean, standard deviation and percentage were computed. Ethical clearance was taken from the Institutional Review Committee of Kathmandu Medical College.

RESULTS

Out of 95 students, 83 students who were present on the day of data collection participated in the study (Response rate 100%). Among them 61.4% were boys and 38.6% were girls (Table 1). Among them, 32 (38.6%) were from grade 8, 23 (27.7%) from grade 9 and 28 (33.7%) from grade 10. The age of participants ranged from 12 to 17 years. One third of the respondents were aged 15 and 16 years. The mean age of the total study subject was 14.88 years with standard deviation (SD) of 1.12 years. Table 2 shows consumption of different food stuff by the respondents per week. Out of total respondents, 12% were either overweight or obese, 22% were underweight and 66% had normal BMI. Table 3 shows relationship between different variables with BMI status. On asking whether they have been taught about benefits of physical exercise at school, 68.7% students responded positive, 9.6% said not taught and 21.7% students did not recall. On asking about outdoor physical activity, only 9.6% of the respondents did skipping for less than two hours per week. Similarly, 56.6% respondents walked for less than two hours per week, 4.8% walked for three to six hours per week and 38.5% did not walk at all.

Table 1: Age and sex distribution of the respondents

Age (in years)	Sex				Total	
	Male		Female			
	Number	Percent	Number	Percent		
12	0	0.0	1	1.2	1	1.2
13	2	2.4	9	10.8	11	13.3
14	9	10.8	7	8.4	16	19.3
15	18	21.7	8	9.6	26	31.3
16	21	25.3	6	7.2	27	32.5
17	1	1.2	1	1.2	2	2.4
Total	**51**	**61.4**	**32**	**38.6**	**83**	**100.0**

Table 2: Consumption of different food stuffs per week

Food habits (Per week)	Eating junk food		Fruit		Vegetable		Carbonated soft drink	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
No	18	21.7	18	21.7	11	13.3	28	33.7
Yes	65	78.3	65	78.3	72	67.7	55	66.3
1-2	48	73.8	44	67.7	54	75.0	38	69.1
3-4	14	21.5	15	23.1	15	20.8	13	23.6
>5	3	4.6	6	9.2	3	4.2	4	7.3
Total	**65**	**100.0**	**65**	**100.0**	**72**	**100.0**	**55**	**100.0**

Table 3: Distribution of physical activity parameters with BMI status

	Underweight		Healthy weight		Overweight/obese		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Play in playing ground								
Yes	33	75.0	2	4.5	9	20.5	44	100.0
No	22	56.4	8	20.5	9	23.1	39	100.0
Vehicles								
Bicycle	11	52.4	4	19.1	6	28.5	21	100.0
Motorbike	30	69.8	5	11.6	8	18.6	43	100.0
Car	4	80.0	1	20.0	0	0.0	5	100.0
Taught the benefit of physical activity								
Yes	5	62.5	3	37.5	0	0.0	8	100.0
No	50	66.7	7	9.3	18	24.0	75	100.0
Physically active for at least 60min/day								
Yes	9	15.8	43	75.4	5	8.8	57	100.0
No	9	34.6	12	46.2	5	19.2	26	100.0

Table 4: Distribution of various indoor activities according to BMI status

Activity	Underweight		Healthy weight		Overweight/obese		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Watching TV								
No	1	50	1	50	0	0.0	2	100.0
Yes	17	21.0	54	66.7	10	13.3	81	100.0
Use of computer for homework								
No	6	28.6	13	61.9	2	9.5	21	100.0
Yes	12	19.4	42	67.7	8	12.9	62	100.0
Use of computer for fun								
No	3	20.0	10	66.7	2	13.7	15	100.0
Yes	15	22.1	45	66.2	8	11.7	68	100.0
Video/ mobile games								
No	0	0.0	7	87.5	1	12.5	8	100.0
Yes	18	24.0	48	64.0	9	12.0	75	100.0
Reading (per week)								
<2hrs	7	12.7	43	78.2	5	9.1	55	100.0
3-6hrs	10	40.0	11	44.0	4	16.0	25	100.0
>7hrs	1	33.3	1	33.3	1	33.3)	3	100.0
Sitting and chatting								
No	3	27.3	6	54.5	2	18.2	11	100.0
Yes	15	20.8	49	68.1	8	11.1	72	100.0
Play musical instrument/ hobbies								
No	3	18.8	12	75.0	1	6.2	16	100.0
yes	15	22.4	43	64.2	9	13.4	67	100.0

Table 5: Distribution of various outdoor activities according to BMI status

Activity (Hour per week)	Underweight		Healthy weight		Overweight/obese		Total	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Skipping								
No	16	21.3	49	65.3	10	13.3	75	100.0
Yes	2	25.0	6	75.0	0	0.0	8	8 (100.0
Walking								
No	10	32.3	20	62.5	2	6.2	32	100.0
Yes	8	15.7	35	68.6	8	15.7	51	100.0
Stretching exercise								
No	13	26.5	30	61.3	6	12.2	49	100.0
Yes	5	14.7	25	73.5	4	11.8	34	100.0
Muscle strengthening exercise								
No	14	26.0	33	61.1	7	12.9	54	100.0
Yes	4	13.8	22	75.9	3	10.3	29	100.0
Bicycling								
No	4	12.5	23	71.9	5	15.6	32	100.0
Yes	14	27.5	32	62.7	5	9.8	51	100.0
Jogging								
No	7	21.2	21	63.6	5	15.2	33	100.0
Yes	11	22.0	34	68.0	5	10.0	50	100.0
Swimming								
No	14	23.0	39	64.0	8	13.0	61	100.0
Yes	4	18.2	16	72.7	2	9.1	22	100.0
Football/ basketball/ cricket/tennis								
No	5	22.7	11	50.0	6	27.3	22	100.0
Yes	13	21.3	44	72.1	4	6.6	61	100.0

Table 4 shows distribution of various indoor activity levels with BMI status and table 5 shows distribution of various outdoor activity levels with BMI status.

DISCUSSION

Our study focused on the level of physical activity and obesity among the students from grades eight, nine and ten from a school. The study site, school where we conducted this study is situated in Bhaktapur District, where most of the people are still dependent on traditional agriculture as their major occupation and most of them are still not capable of living a sedentary lifestyle. But with changing global scenario people have started to adopt a sedentary life, and consumption of junk foods, which ultimately results to obesity[15].

The present study revealed that 12% of study subjects were overweight/obese, 22% were underweight and 66% had a normal BMI. This result signifies that obesity is prevalent among the students. It might be due to lack of adequate physical activity and the dietary habit, as they are most important factor for the management of obesity[5]. Although prevalence of the obesity is comparatively lower in Asia (4.9% in 2010) as compared to other part of the world[9], the prevalence of obesity is likely to increase in few years if proper attention is not paid in maintaining healthy lifestyle and sound dietary habit. School-based data demonstrates an obesity range of 5.6% to 24% for the children and adolescents in India[16-18].

In a study done by Raut et al, the prevalence of overweight and obesity were 3.1% and 0.6% respectively[19]. Similarly, prevalence of overweight and obesity in a study done in Belgaum city in India were 12% and 3.3% respectively among the adolescent school children[20]. A study conducted amongst school children in Dhaka aged between 3 to 18 years of age found 17.9% obese and 23.6% overweight children and adolescents[21]. Children these days spend more time indoors involved in increased screen time like TV, computer, video games and cell phones. This may be one of the major causes leading to a child being physically inactive and finally leading to obesity and its consequences.

A study done by Dietz WH showed an association between obesity in the childhood and high prevalence of blood pressure, diabetes, respiratory disease, orthopedic

and psychosocial disorders[22]. Cardiovascular diseases and diabetes are two chronic diseases which are rapidly increasing globally with no exception in Nepal as well[23].

There are few limitations of the study. One of the major limitations of the study was the number of students and schools included in the study and sample size is small. Due to the small sample size result may not be generalized. As this was a pilot study, we decided to perform study among the students of a single school in Bhaktapur District.

CONCLUSION

The amount of physical activity in majority of the students is not adequate. The prevalence of overweight and obesity in adolescence is observed to be high. The findings suggest that sedentary lifestyle, increasing trends of indoor game and consumption of junk food are responsible for increased prevalence of overweight/obesity in the adolescents. As a result of conducting this research, we propose that school can be the place from where adolescents can get knowledge about the benefits of physical exercise. It is recommended to pursue further research in larger population of adolescent school children in Nepal.

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