

Prevalence of obesity in relation to television viewing and physical activity among Meitei adolescents of Manipur

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ABSTRACT:

The present study was conducted to evaluate overweight/obesity in relation to television viewing and physical activity. Cross-sectional data on 540 Meitei subjects (256 adolescent boys and 284 adolescent girls) aged between 14 and 19 years of age was collected following a house to house survey. The prevalence of overweight/obesity was evaluated by using z-scores BMI for age and sex recommended by WHO. The observed overall frequency of overweight/obesity among adolescent boys and girls was 6.6 per cent and 6.7 per cent, respectively. Subjects who watched television for more than three hours daily reported a higher frequency of overweight/obesity (adolescent boys 21.7% and adolescent girls 33.3%) as compared to those who watched TV for less than 3 hours per day (adolescent boys 2.0% and adolescent girls 2.1%). The study further indicated that the higher frequency of overweight/obesity among adolescent boys (30.2%) and adolescent girls (19.4%) was found among those who exercised below one hour daily as compared to those who exercised more than one hour (1.9% boys and 1.1% girls). The present study indicates that the prevalence of overweight/obesity was higher among adolescent boys and girls who spent more time on watching television and inactive physical activity. Inactive physical activity and prolonged television watching signify more sedentary lifestyles, which in turn, leads to unhealthy gains in body weight over time due to the accumulation of more unwanted fat depositions in the body and less opportunities to shed these.

Key words: Obesity, Television, Meitei, Adolescent, Manipur

INTRODUCTION

The prevalence of overweight/obesity among the children is increasing at an alarming rate in both developed and developing countries. About 43 million children worldwide under age five were overweight (WHO 2011). Differences in the predominant lifestyles influence overweight/obesity patterns. Much of the increase in overweight/obesity among children, adolescents and adults are related to inactivity with television viewing being one such factor to increase weight gain. Several studies have reported positive association between time spent on television with overweight and obesity (Koezuka et al. 2006; Schneider et al. 2008; Vicente-Rodriguez et al. 2008). A study by Shields (2006) reported that 35 per cent of adolescents who watch 30 or more hours of television per week are overweight and obese compare to 23 per cent of adolescents watching less than 10 hours of television per week. Similarly, study in Australia reported that watching television more than four hours a day are twice as likely to be overweight than subjects watching television less than one hour per day (Salmon et al. 2000). Increase television time is very closely associated with physical inactivity, which may contribute to increase weight status (Koezuka et al. 2006). A review published by Atlantis et al. (2006) found that higher amount of physical exercise may see a larger reduction in body fat. Many studies have reported an inverse relationship between physical activity and obesity among adulthood (Van Der Horst et al. 2007). Low levels of physical activity are associated with an increased risk of obesity (Erlichman et al. 2002). The obesogenic environments not only discourage physical activity but also encourage inactivity both occupationally and during leisure time (Hill and Peters 1998; Brownell 2002; Hill and Wyatt 2005). There has been a great decline in occupationally related activity since the turn of the twentieth century (Popkin et al. 2005).

Therefore, the present study is undertaken to examine the prevalence of overweight/obesity in relation with television viewing and physical activity among the adolescent Meitei boys and girls of Manipur.

MATERIALS AND METHODS

The present study was conducted among Meitei adolescent boys and girls residing in the urban areas of Lamphel subdivision under Imphal West District of Manipur. Imphal, the capital city of Manipur is the nodal functional centre where all the main important offices, institutions, hotels and markets are located. Meitei constitute the bulk of the population in Imphal Valley even though small numbers of Muslims (Meitei Pangals), Schedule Castes and Scheduled Tribes populations also reside there. In the past few years, Manipur has undergone

tremendous changes in terms of urbanization and socioeconomic development. Such a transition has, over the years, resulted in changes among Meitei population in terms of occupation, economy, food consumption, dietary intake, physical activity levels, and overall lifestyles. A cross sectional data on 540 subjects (256 adolescent boys and 284 adolescent girls) aged between 14 and 19 years was collected for the present study. The data was collected by following a survey of house to house visit. An anthropometric rod and a weighing scale to the nearest of 0.1 cm and 0.5 kg respectively was used to measure height and weight (Lohman et al. 1998). The prevalence of overweight/obesity was calculated based on z-scores BMI for age and sex (WHO 2007). According to this interpretation, BMI z-score $>+2SD$ is considered as obese, BMI z-score $>+1SD$, considered as overweight and BMI z-score $<-2SD$ considered as underweight. Information on lifestyles such as moderate physical activity and television viewing were collected from each subject. The data on moderate physical activity were divided into two categories: less than/equal to one hour and over one hour. The television watching time was classified into two groups, viz less than/equal to three hours, and more than three hours. The data were analysed using MS-excel (2007 version) and SPSS (16.0 version) for windows. The chi-square (χ^2), odds ratio (OR) and 95% confidence interval (95% CI) were calculated for each associated category.

RESULTS

The basic data on mean height, weight and BMI of the Meitei adolescent boys and girls are given in table 1.

Table-1: Basic data on height, weight and BMI of adolescent Meitei boys and girls of Manipur

Category	N	Mean height \pm SE (cm)	Mean weight \pm SE (kg)	Mean BMI \pm SE
Adolescent boys	256	161.32 \pm 0.45	53.85 \pm 0.41	20.67 \pm 0.12
Adolescent girls	284	151.57 \pm 0.29	47.86 \pm 0.29	20.83 \pm 0.11
Significance level		t=11.944, p<0.001	t=18.484, p<0.001	t=1.007, p>0.05

The mean height (161.32 \pm 0.45) among adolescent boys was found higher than adolescent girls (151.57 \pm 0.29). The difference was statistically significant (t=11.944; p<0.001). Similarly, mean weight among adolescent boys (53.85 \pm 0.41) was also higher than adolescent girls (47.86 \pm 0.29). The difference in the mean weight among adolescent boys and girls was statistically significant (t=18.484; p<0.001). However, the mean BMI value among adolescent boys (20.67 \pm 0.12) and adolescent girls (20.83 \pm 0.11) was more or less the same.

Table-2: Age wise prevalence of overweight/obesity among adolescent Meitei boys and girls

Adolescent boys				
Age	N	Underweight	Normal	Overweight/obese
14	40	-----	33(82.5%)	7(17.5%)
15	43	-----	38(88.4%)	5(11.6%)
16	40	1(2.5%)	38(95.0%)	1(2.5%)
17	42	-----	41(97.6%)	1(2.4%)
18	45	1(2.2%)	43(95.6%)	1(2.2%)
19	46	----	44(95.7%)	2(4.3%)
Adolescent girls				
14	45	1(2.2%)	37(82.2%)	7(15.6%)
15	47	-----	44(93.6%)	3(6.4%)
16	46	-----	43(93.5%)	3(6.5%)
17	46	-----	45(97.8%)	1(2.2%)
18	50	-----	48(96.0%)	2(4.0%)
19	50	-----	47(94.0%)	3(6.0%)

Age wise prevalence of overweight/obesity shows fluctuation in both adolescent boys and girls (table-2). The higher frequency of overweight/obesity among adolescent boys (17.5%) and adolescent girls (15.6%) was found in 14 years of age. Among adolescent boys, the frequency of overweight/obesity (11.6%) was also found higher in 15 years of age. From the age 16 years to 19 years, the frequency of overweight/obesity was ranged from 2 per cent to 4 per cent. Among adolescent girls, the frequency of overweight/obesity was ranged from 2 per cent to 6 per cent between 15 years to 19 years of age.

Table-3: Overall prevalence of overweight/obesity among adolescent Meitei boys and girls

Category	N	Underweight	Normal	Overweight/obese
Adolescent boys	256	2(0.8%)	237(92.6%)	17(6.6%)
Adolescent girls	284	1(0.4%)	264(93.0%)	19(6.7%)
$\chi^2=0.449, p>0.05$				

The overall prevalence of overweight/obesity in adolescent boys and adolescent girls are given in table 3. The overall prevalence of overweight/obesity was found the same among adolescent boys (6.6%) and adolescent girls (6.7%). Table-4 shows the prevalence of overweight/obesity in relation with television viewing. The table indicated that the higher prevalence of overweight/obesity (21.7%) was found among adolescent boys watching television over three hours a day. The frequency of overweight/obesity among adolescent boys who watched television below three hours was 2.0 per cent. The difference in the prevalence of overweight/obesity was statistically significant ($\chi^2=28.975; p<0.001$).

Similarly, among adolescent girls, the frequency of overweight/obesity (33.3%) was found higher among those who watched television over three hours than those who watched television below three hours (2.1%). The difference was statistically significant ($\chi^2=56.137$; $p<0.001$).

Table-4 Prevalence of overweight/obesity among adolescent Meitei boys and girls in relation with television hour

Adolescent boys				
Television hour	N	Underweight	Normal	Overweight/obese
≤3 hrs.	196	2(1.0%)	190(97.0%)	4(2.0%)
>3hrs.	60	0(0.0%)	47(78.3%)	13(21.7%)
$\chi^2=28.975$, $p<0.001$				
Adolescent girls				
≤3 hrs.	242	1(0.4%)	236(97.5%)	5(2.1%)
>3hrs.	42	0(0.0%)	28(66.7%)	14(33.3%)
$\chi^2=56.137$, $p<0.001$				

Table-5 shows the prevalence of overweight/obesity in relation with physical activity. Among adolescent boys, the frequency of overweight/obesity (30.2%) was recorded higher in those who exercised below one hour daily. Overweight/obesity (1.9%) was observed among adolescent boys who exercised over one hour. The difference was significant at $\chi^2=46.624$; $p<0.001$. The table further showed that overweight/obesity (19.4%) was higher among adolescent girls who exercised below one hour than those who exercised over one hour (1.1%). The difference was statistically significant ($\chi^2=8.820$; $p<0.05$).

Table-5: Prevalence of overweight/obesity among adolescent Meitei boys and girls in relation with physical activity

Adolescent boys				
Physical activity	N	Underweight	Normal	Overweight/obese
≤1hr.	43	0(0.0%)	30(69.8%)	13(30.2%)
>1hr.	213	2(0.9%)	207(97.2%)	4(1.9%)
$\chi^2=46.624$, $p<0.001$				
Adolescent girls				
≤1 hr.	192	0(0.0%)	174(90.6%)	18(19.4%)
>1hr.	92	1(1.1%)	90(97.8%)	1(1.1%)
$\chi^2=8.820$, $p<0.05$				

Table-6 shows the risk of overweight/obesity in both the sexes in relation to television viewing. The frequency of overweight/obesity (≤ 3 hrs. as reference value) was higher among adolescent boys watching television over three hours (OR: 13.277; 95%CI: 4.141-42.571). Similarly, the risk of overweight/obesity (≤ 3 hrs. as reference value) was higher among adolescent girls watching television over three hours (OR: 23.700; 95%CI: 7.939-70.749).

Table-6: Risk of overweight/obesity among adolescent Meitei boys and girls in relation with television hour

Adolescent boys				
Television hour	Total N (%)	Overweight/Obese (%)	OR (95% ci)	P-value
≤ 3 hrs.	196(76.6%)	4(2.0%)	1	
> 3 hrs.	60(23.4%)	13(21.7%)	13.277(4.141-42.571)	0.001
Adolescent girls				
≤ 3 hrs.	242 (85.2%)	5(2.1%)	1	
> 3 hrs.	42(14.8%)	14(33.3%)	23.700(7.939-70.749)	0.001

The risk of overweight/obesity among adolescent boys and girls in relation to physical activity is given in table-7. The odd ratios revealed that the risk of overweight/obesity (OR: 0.044; 95% CI: 0.014-0.144) was significantly ($p < 0.001$) lower among adolescent boys who exercised over one hour (≤ 1 hr. as reference value). Similarly, among the adolescent girls, the risk of overweight/obesity (OR: 0.106; 95%CI: 0.014-0.808) was significantly ($p < 0.05$) lower in those who exercised over one hour (≤ 1 hr. as reference value).

Table-7: Risk of overweight/obesity among adolescent Meitei boys and girls in relation with physical activity

Adolescent boys				
Physical activity	Total N (%)	Overweight/Obese(%)	OR (95% ci)	P-value
≤ 1 hr.	43 (16.8%)	13(30.2%)	1	
> 1 hr.	213(83.2%)	4(1.9%)	0.044(0.014-0.144)	0.001
Adolescent girls				
≤ 1 hr.	192 (67.6%)	18(19.4%)	1	
> 1 hr.	92(32.4%)	1(1.1%)	0.106(0.014-0.808)	0.05

DISCUSSION

Obesity is increasing rapidly in many developing countries as well as within poor neighbourhoods of developed countries (WHO 2003). Even in places like India and Africa, which are usually associated with under nutrition, the prevalence of obesity is increasing (Brewis 2011). Rapid increase in obesity reflects the speediness of socio-economic development, nutrition transition, urbanization and modernization (Sobal and Stunkard 1989; Brownell 2002; Popkin 2004). Adding to these factors are motorized transport, dependence on television for leisure, and inactive physical activity culminating in relatively sedentary lifestyles (Hill and Peters 1998; Bell et al. 2002; Erlichman et al. 2002). Taken together, these trends explain, at a broad level, the increasing number of people now being overweight and obesity worldwide.

The age wise prevalence of overweight/obesity shows fluctuation in both adolescent boys and girls in the present study. However, the higher prevalence of overweight/obesity is found in the lower age group in both adolescent boys and girls. The overall prevalence of overweight/obesity is found the same in adolescent boys and adolescent girls. The prevalence of overweight/obesity among adolescent boys and girls of the present study is smaller as compared with that of the other studies. The prevalence of overweight/obesity among Delhi adolescent boys and girls was 25.0 percent and 19.1 percent respectively (Gupta et al. 2013). Another study by Singh et al. (2006) in Delhi reported the prevalence of overweight/obesity among adolescent boys (18.6%) and girls (16.5%). Kotian et al. (2010) reported the prevalence of overweight/obesity among Karnataka adolescent boys (14.5%) and girls (14.8%). A study by Goyal et al. (2011) reported the prevalence of overweight/obesity among boys (21.8%) and girls (19.7%) in Gujarat. The wide difference in the prevalence of overweight/obesity could be due to the different age group, sample size, study area and difference in criteria being used to defined overweight and obesity (Kotian et al. 2010). More importantly, a prominent explanatory reason might be the profound difference in socio-economic conditions and lifestyles.

The present study shows the higher prevalence of overweight/obesity in association with more time spent in watching television and inactive physical activity in both adolescent boys and girls. Less physical activity and time spent in watching television are thought to be important factors underlying the increasing prevalence of overweight/obesity observed in many populations around the world (Vincente-Rodriguez et al. 2008). Several studies have reported positive association between the prevalence of overweight/obesity with television viewing time among adolescents (Lajunen et al. 2007; Lutfiyya et al. 2007). Present study has

shown similar results to those of the other studies. Watching television has been hypothesized to result in increasing body weight by displacing more physically active leisure interests thereby decreasing total energy expenditure (Robinson 2001). It seems reasonable that sedentary behaviours engaged with television time takes the place of physical activities, and therefore contribute to the development of overweight and obesity.

The negative association between the prevalence of overweight/obesity and physical activity in both the sexes in the present study is consistent with other findings (Atlantis et al. 2006). Inactive physical activity may lead to more sedentary lifestyles and finally unhealthy weight gains due to the accumulation of more fat in the body. The prevailing political situation, built environment, kidnapping, neighbourhood crimes etc. are of particular interest among the study population. These situations could lead to a relative decrease in physical activity by restricting children to the confines of the home environment. The increasing land use for development, traffic density, restricted sport grounds and parks provide restrictions of physical activity promoting behaviour (Blake and Macinko 2008). Therefore, such a restriction could lead to more sedentary lifestyles, which in turn, may lead to the development of obesity in due course of time.

In conclusion, the present study highlights the prevalence of overweight/obesity among adolescent Meitei boys and girls in Manipur. Increasing problems of overweight/obesity shows significant association with inactive physical activity and time engage in television watching. Childhood and adolescence obesity is related to an increased adult morbidity and mortality by leading to a variety of conditions such as diabetes mellitus, hypertension, psychological disorders and social problems (Sorof and Daniels 2002, Strauss 2002). Therefore, it is important for society to aware and monitor overweight and obesity in children and adolescents to prevent from the consequences of its associated health problems.

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