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Mode of conveyance effects body mass index of school girls of Punjab in India

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Abstract

Childhood obesity is becoming an equally challenging, yet under-recognized, problem in developing countries including India. The study aimed to assess mode of conveyance effects body mass index of school girls of Punjab in India. In the present study an attempt has been made to report the prevalence of obesity on the basis of body mass index among school girls of Punjab, total 6000 students were selected with stratified random sampling technique, ranging in age from 10-17 years. Height and weight were measured in all participants and the body mass index (BMI) of each individual was calculated with the bio electrical impedance machine scale of hbf-361. Body mass index classes (underweight, healthy weight, over weight & obese) on the basis of mode of conveyance (walking/bicycle & vehicle) were calculated according to the body mass index manual (IAP growth chart committee 2015). Statistically 't' test was applied to find out the difference between by walk/bicycle and by vehicle and further to find out the difference between various categories (underweight, healthy weight, over weight & obese) of body mass index chi square test was applied. The observations revealed that the overall mean value of walking/bicycle & vehicle was 16.71, 226.76 respectively. The body mass index by walk/bicycle were underweight, healthy weight, over weight & obese were 11.4%, 86.2%, 2.1% & .3% and by vehicle were .7%, 40.3%, 29.5% and 29.4% respectively. Overweight & obesity was more prevalent among those girl students who went to school by vehicle.

Keywords: Prevalence, obesity, body composition, bio electrical impedance machine, body mass index, mode of conveyance

Introduction

Engaging in regular physical activity is one of the best ways to improve general health. Physical activity has become the prime health indicator where it plays an essential role in enhancing physical fitness and health related behavior that could lower the risk of morbidity and mortality from diseases (Sundland *et al.*, 2008) [8]. Physical activity is key determinant of energy expenditure and thus fundamental to energy balance and weight control (WHO, 2010) [11]. (Kirkendall & Garrett, 1998) [5] aging results in a gradual loss of muscle function, and there are predictable age-related alterations in skeletal muscle function. The typical adult will lose muscle mass with age; the loss varies according to sex and the level of muscle activity. The bicycling does help build strong muscles, and having strong muscles helps build strong bones (U.S. Department of Health and Human Services, 2011) [10]. Kaur & Deol (2014) [4] compare the body composition variables of female employees of Punjabi University Patiala at different level of categories. The study revealed that selected variables that were body fat percent, basal metabolic rate and skeletal muscle have significant differences among teaching, non-teaching and class-d employees of Punjabi University Patiala. McCarthy *et al.* (2014) [6] Skeletal muscle is key to motor development and represents a major metabolic end organ that aids glycemic regulation, to create gender-specific reference curves for fat-free mass (FFM) and appendicular (limb) skeletal muscle mass (SMMa) in children and adolescents, to examine the muscle-to-fat ratio in relation to body mass index (BMI) for age and gender. The results of this study showed that muscle-to-fat ratio has the potential to provide a better index of future metabolic health. According to a survey, India is the third most obese country in the world. Obesity is further linked to a host of medical problems like high cholesterol, diabetes, joint pain, arthritis and heart diseases (Chowbey, 2016) [3]. More than 40 percent of the population in Punjab is overweight or obese.

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The survey pointed to the absence of physical activity among 75 percent as a reason for obesity, and said this may also be a contributing factor for high prevalence of hypertension (40 percent) in the state (Thakur, 2015) [9]. Punjabis are the most obese people in the country, Health Minister J P Nadda told the Rajya Sabha today, while men from Tripura and women from Meghalaya are the leanest. Men and women from Punjab followed by Kerala and Delhi are the most obese people with 22.2, 17.8 and 16.8 percent of men and 29.9, 28.1 and 26.4 per cent of women from respective states reporting a BMI of more than 25 (Naddu, 2016) [7].

Material and methods

Aim of the present study is to determine the prevalence of obesity in Punjab school girls by using API Growth chart standard. For this purpose total 6000 girl students were selected randomly as a sample and the age ranging from 10-17 years, among these 3222 commute to school by walk/bicycle whereas 2778 travel by vehicle). The data was obtained from various government and private schools of Punjab based on their literacy rate of families.

Variable and criterion measures

Body mass index

Each subject was made to stand bare foot on bio electrical impedance machine with scale HBF-361. The subject’s height, age, and gender were manually saved in the machine. System automatically calculates the actual values of Body Mass Index and displayed the same machine. If the test performed systematically then it was saved otherwise test was repeated again.

Statistical Consideration

SPSS was utilized for interpretation of the data. The results were analyzed statistically by applying ‘t’ test. Further to see the differences among various categories of body mass index chi square test was applied. In all the examinations, the 5 Percent critical ($p < 0.05$) was used to indicate statistical significance.

Results

Different types of descriptive statistic such as mean and standard deviation was computed to describe each variable statistically. The level of significance was set at .05. Its results have been depicted in the following tables.

Table 1: Significant mean differences of body mass index between mode of conveyance (walking/bicycle and vehicle)

Group	N	Mean	Standard deviation	Mean Diff	Std. Error Mean	Std. Error Diff	‘t’
Walking/Bicycle	3222	16.71	2.26	-6.05	.03	.09	-66.21*
Vehicle	2778	22.76	4.57		.08		

Tabulated ‘t’ value (1.960) at .05 level of significance, df=5998

Table - 1 depicts that the mean values of walking and vehicle used as mode of conveyance by school girls is 16.71 & 22.76 whereas the SD is 2.26 & 4.57 respectively for body mass index. The calculated t-value for walking/bicycle and vehicle

for school girls is -66.21*, which is more than the tabulated t-value (1.960) at .05 levels. So, it implies that there is significant difference of body mass index on basis of mode of conveyance used by school girls.

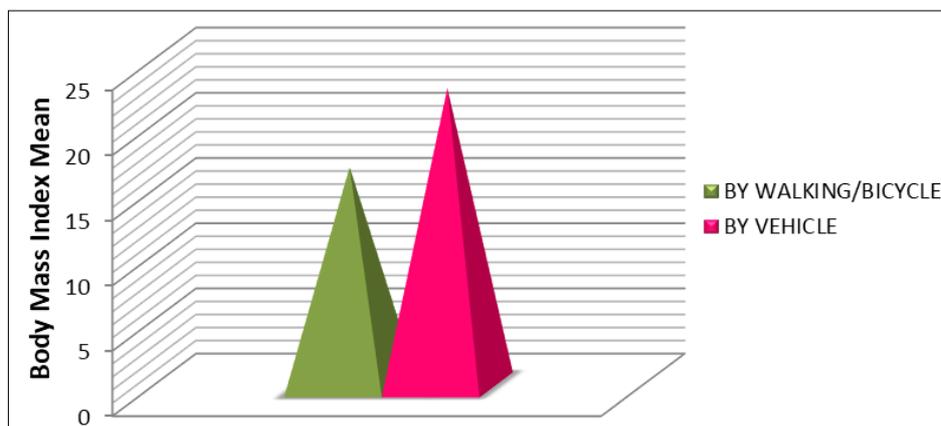


Fig 1: Mean Scores of Body Mass Index between Mode of Conveyance (Walking/Bicycle And Vehicle)

Table 2: Crosstabulation among Body Mass Index Categories of Mode of Conveyance (Walking/Bicycle & Vehicle)

Group		Body Mass Index Categories				Total
		*Under Weight	*Healthy Weight	*Over Weight	*Obese	
Walking/BI Cycle	Count	367	2776	68	11	3222
	Expected Count	207.8	2092.2	476.9	445.2	3222.0
	% of Total	11.4%	86.2%	2.1%	.3%	100.0%
Vehicle	Count	20	1120	820	818	2778
	Expected Count	179.2	1803.8	411.1	383.8	2778.0
	% of Total	.7%	40.3%	29.5%	29.4%	100.0%
Total	Count	387	3896	888	829	6000
	Expected Count	387.0	3896.0	888.0	829.0	6000.0
	% of Total	6.4%	64.9%	14.8%	13.8%	100.0%

*IAP Growth chart Committee 2015.

It is evident from the table - 2 that total of 6000 school girls were taken as a subject which analysed the various mode of conveyance (walking/bicycle & vehicle) of body mass index in particular activity is under weight (6.4%), healthy weight (64.9%), over weight (14.8%) & obese (13.8%) respectively. The total no. of 3222 subjects were taken as subjects which are coming to school by walking/bicycle and

their body mass index category of underweight (11.4%), healthy weight (86.2%), over weight (2.1%) & obesity (.3%). Whereas in the case of girls which are coming to school by vehicle total 2778 school girls were taken and their body mass index category of underweight (.7%), healthy weight (40.3%), over weight (29.5%) & obesity (29.4%).

Table 3: Chi-square tests of body mass index categories of mode of conveyance (walking/bicycle & vehicle)

	χ^2 Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2418.00 ^a	3	.000
Likelihood Ratio	2856.00	3	.000
Linear-by-Linear Association	2175.00	1	.000
N of Valid Cases	6000		

a. 0 cells (.0%) have been expected to count less than 5. The minimum expected count is 179.18
Tabulated χ^2 value is (124.34) at .05 level of significance.

Table - 3 displayed test of body mass index which was computed on 6000 subjects between mode of conveyance (walking/bicycle & vehicle) of school girls. A chi square test was performed to determine the prevalence of underweight, healthy weight, overweight and obesity indicated a significant difference, $\chi^2= 2418.00^a$, $p = .000$ which is less than $p>0.05$. It

means the test results indicate that there is significant difference among various categories of body mass index on basis of mode of conveyance (walking/bicycle & vehicle). As clear from table - 2 which shows that even among those using vehicle as means to reach school having overweight & obese and vice versa.

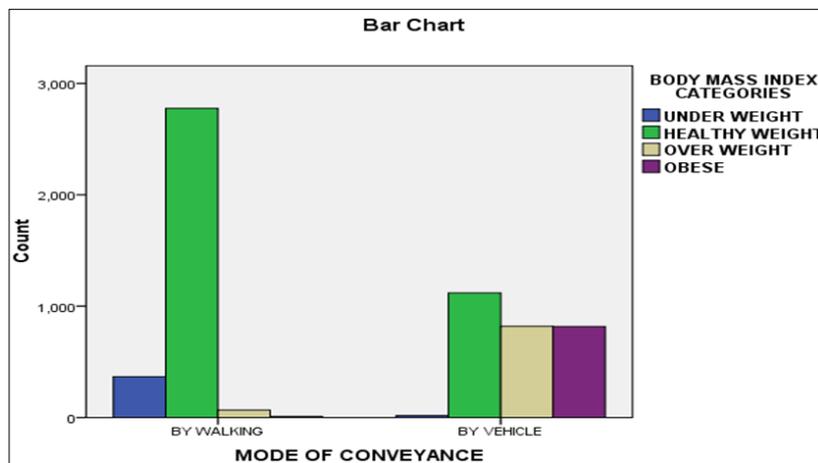


Fig 2: Body mass index categories of mode of conveyance (walking/bicycle & vehicle)

Discussion

While comparing the various categories of mode of conveyance it has been observed that the overweight or obesity was greater in those students who come to school by vehicle as compare to students who came by walking/bicycle. Also the underweight & healthy weight was found higher in those girls who came to school by walking/bicycle to their matching part. As per different reviews it is proved that an aerobic activity can dilute more carbohydrate and fat from our body, so researcher find that the girls who use motor vehicle as mode of conveyance are more bulky comparative to the girls who come to school by walking/bicycle. The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories burn. Globally, there has been an increased intake of energy-dense foods that are high in fat, salt and sugars and a decrease in physical activity due to the increasingly sedentary nature of many forms of work, changing modes of transportation, and increasing urbanization. These findings are similar to Kotian *et al.* (2010) [1] and Laxmaiah *et al.* (2007) [2]. Results of this study also similar with results of (WHO 2003) [12] poor dietary habits combined with decreased physical activity have led to an increase in over weight and obesity among affluent children.

Conclusion

It was detected from the study that the school girls who came to school by walking were having body mass index as compare to those school girls who came to school by vehicle. Therefore study establishes that the mode of conveyance effects the obesity in Punjab.

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