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Original Research Article

Body mass index and blood pressure indices – an epidemiologic measure for obesity in medical students

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Abstract: World health organization (WHO) has declared obesity as a disease of pandemic significance. Bodymass index (BMI) is the most useful epidemiological measure of obesity which is promulgated by WHO. The present study designed to assess the correlation between Body mass index and blood pressure indices in medical students. This study includes 500(Male 272 and female 228) M.B.B.S students, aged between 17-22 years. Study group divided in to four group's i.e. normal weight, underweight, over weight and obese group. Results showing statistically highly significant raise of weight, SBP, DBP, MAP, RAP, BMI and PP ($p<0.001$) and no significant difference in age, height and heart rate ($p>0.001$) between normal eight, overweight, under weight and obese groups. The prevalence of being overweight and obese among undergraduate medical students is a matter of serious concern. This provide some insights to support and to encourage physical activity during adolescence and also for attempts aimed at modifying the food habits.
Keywords: Body mass index (BMI), Obesity, Systolic blood pressure, Diastolic blood pressure.

INTRODUCTION

The standards of living drastically changing globally due to industrialization and urbanization which is leading to various complication i.e. obesity, stress, cardiac and neurological complications. Obesity is the most prevalent form of malnutrition both in adults and children. Body mass index (BMI) or Quetelet index is the most recommended tool for determining relative obesity both epidemiologically and clinically (WHO, 2014). BMI usually means body shape based on an individual's mass and height.

Obesity is evolving a serious public health issue in India and contributes to 26 million deaths per year globally. Obesity and hypertension is the leading factors to develop cardiovascular, cardio metabolic diseases and their association increased dramatically in the past 2-3 decades. In young adults various physiological changes takes place besides physical, mental growth and development, which leads a tendency to become overweight. The prevalence of obesity is 7 to 9% in India [1].

BMI is an appropriate and most recommended parameter to define obesity in adults [2,3]. So, the present study is an endeavor to study the relationship between BMI and Blood pressure among medical students

MATERIALS AND METHODS

The present study was conducted in Department of Physiology, Alluri sitaramaraju Academy of Medical Sciences, Eluru during July 2015 to January 2017. The study contains 500(Male 272 and female 228) MBBS students. Asymptomatic, healthy subjects between 17-22 years age group were included and hypertensive, diabetes other complications were excluded from the study. A written consent was obtained from each of the participants after explaining the purpose. On the basis of BMI, students were divided in to four group's i.e. normal weight, underweight, over weight and obese group. Data form was prepared to record information about gender, blood pressure, height, weight and BMI, heart rate, Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Pulse Pressure (PP), Mean Arterial Pressure (MAP), Rate Pressure Product (RPP) of the participants. Mean and standard deviation were

used to summarize the height, weight, BMI and BP of the participants. Karl Pearson's correlation coefficient was used to analyze the relationship between BMI and BP parameters.

RESULTS

The present study conducted to assess the relationship between body mass index and blood pressure indices. A total 500 Medical student aged between 17 to 22 years was included. According to BMI, 230 students were under normal weight, 132 students were under over weight, 70 students were under weight and 68 students were under obese.

Table 1. Mean and Standard deviation of parameters in all groups.

Parameters	Normal weight (n=230)		Over weight (n=132)		Under weight (n=70)		Obese (n=68)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	19.42	0.48	19.51	0.47	19.45	0.48	19.51	0.52
Height	1.58	0.04	1.60	0.04	1.60	0.05	1.58	0.05
Weight	56.7	6.34	68.78	5.11	45.13	2.86	62.07	9.54
BMI	21.24	1.72	26.98	1.53	18.61	0.94	24.88	4.12
Heart rate	72.58	3.22	75.13	3.78	73.23	3.27	75. 08	3.65
SBP	113.62	3.28	128.35	3.54	94.73	3.98	120.14	9.43
DBP	72.56	2.38	85.10	2.33	67.98	2.75	79.50	76.98
PP	30.16	1.68	44.42	2.76	25.31	3.64	43.74	4.66
MAP	88.92	3.14	99.48	2.54	76.88	2.22	94.16	8.94
RPP	85.06	5.22	95.48	8.22	66.64	4.48	91.93	10.95

Table 2.Karl Pearson's correlation coefficient between BMI and blood pressure indices.

Parameters	Karl Pearson's correlation coefficient (r)			
	Normal weight	Over weight	Under weight	Obese
BMI and SBI	0.4000	0.7124	0.6982	0.4914
BMI and DBP	0.4822	0.7602	0.3178	0.4988
BMI and PP	0.1220	0.1765	0.5740	0.1496
BMI and MAP	0.4830	0.7688	0.5654	0.5645
BMI and RDP	0.1180	0.3754	0.5762	0.0004

DISCUSSION

Obesity and overweight in adolescence and early adults is the global problem especially very common in developing countries like India and associated with increased risk of disease morbidity and mortality [4, 5, 6]. According to the reports 7% in India are obese [7].

The results of present study showing highly significant difference between weight, SBP, DBP, BMI, RAP, MAP and PP in normal weight and obese group and no significant difference between height, age and heart rate. In comparison between normal and overweight group there is a highly significant difference between weight, SBP,DBP, MAP, RAP, BMI and PP and no significance between height, age and heart rate. In normal weight and overweight groups, there is a highly significant difference between weight, SBP,DBP, MAP, RAP, BMI and PP and no significant difference between height, age and heart rate. The comparison between obese & overweight groups, obese & underweight groups and overweight& underweight groups were shown highly significance in weight, SBP, DBP, MAP, RAP, BMI and PP ($p<0.001$)and no significance in age, height and heart rate ($p>0.001$).

Jiang et al, in his study stated that SBP and DBP were positively related to BMI sand their association is more in males than females and found positive correlation between BMI and hyper dynamic circulation i.e. increased PP[8,9].In the present study, BMI and blood pressure (SBP& DBP) were statistically correlated which is similar to the studies of Nan aware et al. and Joan et al. who reported on children and adolescents. Present study also correlating with findings of Mungreiphy et al. on Tangkhul Naga tribal males of northeast India[10,11,12].Bose et al. reported that BMI had a strong impact on SBP, but its impact on DBP and mean arterial pressure (MAP) were weak[13].

CONCLUSION

Overweight and obesity are a major health hazard all over the world and are becoming a major health threat among both the sexes in all age groups. The results showing statistically highly significant raise of weight, SBP, DBP, MAP, RAP, BMI and PP ($p<0.001$) and no significant difference in age, height and heart rate ($p>0.001$) between normal eight, overweight, under weight and obese groups. The results of present study provide some insights to support to encourage physical activity during adolescence and also for attempts aimed at modifying the food habits. The role of physical activity, participation in games and sports are to be emphasized in adolescence. Promotion of better food, life style practices and regulated TV viewing could go a long way in preventing development of obesity and overweight.

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