Original Article

Influence of Different Sociodemographic Factors on Body Mass Index - A Cross Sectional Survey from KEMU, Lahore

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Abstract

Background: Body mass index (BMI) is an important parameter of measurement of health status. Its significance is particularly high with relation to the medical students as they are the future health bearers of the nation. Therefore this study was conducted to explore the influence of different factors on the body mass index and give recommendations to improve the health status.

Subject and Methods: The height and weight of the students was measured and the data was collected on a structured questionnaire. The results were analyzed using SPSS 11.5, mean ± S.D, confidence interval (C.I), ANOVA and Chi-Square was applied for descriptive and inferential statistics. P-value ≤ 0.05 was considered significant.

Study Design: A cross – sectional study.

Place and Duration of Study: The study was conducted in the September 2010 in King Edward Medical University and was completed in 5 months.

Results: Study population consisted of 506 students, 252 (50%) male and 254 (50%) female students. 351 students (69.3%) had normal BMI, 98 (19.4%) underweight, 51 (10%) overweight and 6 (1%) obese. The prevalence of normal BMI was significantly higher in the male gender (p-value 0.000) students who consumed milk (p-value 0.000) children of housewife mothers (p-value 0001) and non-smoking students (P-value .000) and children of educated parents (p-value 0.041 for mothers and 0.000 for fathers) and good physical activity. No significant association was found between BMI and class, living in rural and urban areas, living in hostel or at home father's occupation, economic status and lifestyle.

Conclusion: About 30 percent of medical students are either underweight or overweight. Policies must be made to address the condition.

Key words: Body mass Index, Medical Students.

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Introduction

Body mass index (BMI) is an important health parameter that helps in determination of the well – being of an individual. Obesity is the fifth leading cause of death in the world[1] and is an important risk factor leading to diabetes and heart diseases.[2] Studies have shown that physicians can play a major role in improv-

ing this condition through nutrional counseling[3,4] but this only possible if the medical students who happen to be the future health bearers of the nation, take their responsibility and serve as role models.

BMI of an individual depends upon a number of factors. Different factors such as gender, demographic status, income, dietary factors, and lifestyle have been studied. A study was conducted on the sociodemographic indicators of BMI in 2006 in Nishtar Medical College[5] on 46 students and the influence of economic status, and sedentary life style was considered. Another study[6] was conducted in 2009 in King Edward Medical University, study population was 160 students but factors such as consumption of milk, parental education and occupation were not considered which are included in this study and also further detail about the nature of the games is added.

The aim of the study is to explore the association of demographic factors, dietary factors, physical activity and life style with the body mass index of medical students and hence provide suggestions to improve the present condition.

Objectives

To find out the association of different factors with BMI and make suggestions to improve the condition.

Methods and Materials

A cross – sectional study was conducted on 506 students of King Edward Medical University, 252 males and 254 females 5 months from September 2010 – Jan 2011. Approximately 50 male and female students were selected randomly from each class. After obtaining consent, their weight was measured on a weighing machine and height was measured by a measuring tape. The data obtained was used to calculate their BMI. Body Mass Index was calculated using standard method and the students were divided into four categories based on their BMI as classified by WHO.[7] Underweight > 18.5, normal 18.50 – 24.99, overweight 25 – 30, and obese above 30. A pretested structured questionnaire that had already been used for pilot study on 20 students prior to study to check these of respondents and usefulness of the data for analysis was administered to determine other parameters. The questionnaire included information regarding their demographic status, economic conditions, milk consumption, lifestyle and physical activity, etc. The results were analyzed using SPSS -11.5, mean ± S.D, confidence interval (C.I), ANOVA and Chi-Square was applied for descriptive and inferential statistics. P-value ≤ 0.05 was considered significant.

Results

A data of 506 students with mean age 20 ± 1.7 years was calculated using WHO criterion. Ninety eight (19.36%) were underweight, three hundred and fifty one (69.36%) had normal weight, fifty one (11%) overweight and six (1%) obese. Demographical data of all the students is given below in the tables. The data shows that BMI had significant association with gender. Although majority of both the genders (69.5%) had normal BMI but pre-obesity is higher in males (n = 41, 16%) while the trend of being underweight is considerable in females (n = 254, 31%). Among the total 98 underweight students 24 (24.9%) were from fourth year, 22 (22.5%) from second year, 19 (19.4%) were from first year and third year and 14 (14.2%) from final year. Nineteen (19.4%) of them were males and 79 (80.6%) were females. 85 (86.7%) of them lived in rural areas and 13(13.2%) lived in urban areas and 53 (54.1%) were hostelite and 45 (46%) were day-scholars.

Among total 351 students with normal BMI 68 (19.4%) were from first year, 73 (20.8%) from second year, 62 (17.6%) from third year, 76 (21.65%) from fourth year and 72 (20.5%) from final year. 187 (53.3%) were males and 164 (46.7%) females. 278 (79.2%) live in rural areas and 73(20.8%) in urban areas. 166 (47.3%) were hostelite and 184 (52.4%) day scholars.

Among the 51 (11%) overweight students 11 (21.5%), 9 (17.6%), 9 (17.6%), 7 (13.7%) and 15 (29.4%) students were each from first, second, third, fourth and final year respectively. 41 (80%) were males and 10 (20%) females. 41 (80%) were had rural and 10 (20%) had urban background, 27 (53%) students lived in hostel and 24 (47%) were day-scholar. Obesity was uncommon only 6 (1%) students were found obese in our study.

The following information was collected about the education of the parents which showed that the increase in education of the parents is significantly associated with maintenance of BMI (p-value for mother's education is 0.041 and that for father's education is 0.0000).

The occupation of the mother is significantly associated with BMI while father's occupation had no significant association. Majority of both the underweight and overweight students 73 (14.4%) and 34 (6.7%) respectively belonged to housewives.

Table 1: Demographic Data of All the Students.

		Underweight	Normal	Overweight	Obese	P-Value
Educational Year	First year	19	68	11	1	0.491
	Second year	22	73	9	3	
	Third year	19	62	9	0	
	Fourth year	24	76	7	2	
	Final year	14	72	15	0	
Gender	Male	19	187	41	5	0.000
	Female	79	164	10	1	
Residence	Rural	85	278	41	3	0.0962
	Urban	13	73	10	3	
Hostelite	Yes	53	166	27	3	0.924
	No	45	184	24	3	

Table 2: Parental Educations.

		Underweight	Normal	Overweight	Obese	p-value
Mothers Education	Housewife	73	261	34	2	0.001
	Doctor	14	40	6	2	
	Teacher	10	33	8	0	
	Engineer	1	7	2	0	
	Other	0	10	1	2	
Father's Education	Doctor	19	93	11	3	0.123
	Engineer	22	58	16	1	
	Businessman	20	77	9	1	
	Teacher	1	1	0	0	
	Govt. servant	17	25	5	0	
	Farmer	0	15	3	0	
	Other	10	49	3	1	

Table 3: Milk Consumption.

		Underweight	Normal	Overweight	Obese	P-value
Milk consumption	Yes	61 (27.11%)	140 (62.22)	21 (9.33%)	3 (1.33%)	0.000
	No	37 (46.83%)	10 (12.65%)	30 (37.97%)	2 (2.53%)	

The BMI did not have any significant relationship with the total parental income and pocket money of the respondents. The parental income of all the students

ranged between Rs. (7000 – 12000) and the pocket money ranged between RS (200 – 20,000).

The data about milk consumption revealed the following information. The data shows the consumption

Table 4: Physical Activity.

		Underweight	Normal	Overweight	Obese	P-value
Play Games	No (n = 219)	47	139	29	4	0.009
	Yes (n = 287)	51	212	22	2	
Exercise	Yes (n = 379)	74	259	43	3	0.542
	No (n = 127)	24	91	8	3	

Table 5: Smoking Behavior.

	Underweight	Normal	Overweight	Obese	P-value
Smokers	1	32	10	3	0.000
Non-Smokers	97	319	41	3	

Table 6: Lifestyle of Students.

		Mean	C.I	Min	Max	p-value
Studying hours	Under weight	4	3.83 – 4.71	0	13	0.159
	Normal weight	4	3.95 – 4.44	0	13	
	Over weight	5	3.97 – 5.35	1	13	
	Obese	6	1.64 – 10.41	2	12	
Working hours	Under weight	6	5.928 – 6.634	2.0	8	0.623
	Normal weight	6	6.270 – 6.637	1.0	13	
	Over weight	6	5.902 – 7.017	.0	12	
	Obese	7	7.028 – 7.269	7.0	7.2	
Sleeping hours	Under weight	7	6.768 – 7.651	2.0	14	0.658
	Normal weight	7	6.765 – 7.264	.0	16	
	Over weight	7	6.511 – 7.968	2.0	13	
	Obese	7	6.066 – 9.830	6.0	10	
TV watching hours	Under weight	1	1.10 – 1.65	0	6	0.088
	Normal weight	1	.92 – 1.17	0	8	
	Over weight	1	.89 – 1.78	0	6	
	Obese	1	.13 – 2.20	0	2	
Minutes of exercise	Under weight	15	7.84 – 19.43	0	120	0.000
	Normal weight	17	13.48 – 20.22	0	120	
	Over weight	12	4.01 – 18.67	0	120	
	Obese	70	-22.57 – 162.68	0	180	

of milk was greater among the underweight than in the overweight. BMI was found to have a significant association with playing games (p-value = 0.009) while exercising regularly did not show to have any association with the BMI. 219 (43.2%) students did not play games while the 287 (56.71%) played games. Among the 287 students who played games 97 (19.16%) played indoor, 107 (21.1%) played outdoor and 83 (16.4%) played both indoor and outdoor games. Playing outdoor games was significantly associated with BMI (p-value 0.041).

The smoking is significantly associated with the BMI, smoking was prevalent in both the underweight and overweight individuals. According to the data reported by the students lifestyle did not have any significant impact on BMI, but the level of exercise had a significant relation (p-value 0.000). Among the underweight students the mean studying hours are 4 ± 2.18, mean working hours are 6 ± 1.76, mean sleeping hours are 7 ± 2.2, and TV watching time is 1 ± 1, 3 hours. There was no difference in the values among the normal individuals. In overweight students the mean studying hours are 6 ± 2.4, working hours 7 ± 1.76, sleeping hours 7 ± 2.2 and TV watching 1 hour ± 1.58. Exercise duration was 15 ± 28 minutes in underweight, 17 ± 32 minutes in normal, 12 ± 26 minutes in overweight and 70 ± 88 minutes in obese.

Discussion

In the present study BMI was classified among 506 subjects, 98 were underweight (19.34%), 351 were normal (69.36%) and 51 were overweight (11%) and 6 were obese (1%). So, majority were within normal range of BMI and overweight were fewer in number than the underweight. But the condition is alarming as one third of the students (30%) had some form of malnutrition, being either underweight or overweight. Moreover although majority (69.5%) of the students fell in the normal range, the trend of obesity is greater in males and being underweight is greater in males.

This study concludes that BMI is positively related to the demographic factors including male sex, while it has no significant relation with parental income, living in rural or urban areas, being hostelite or not. Also no variation in the character of BMI was observed in the five classes at the Medical University. Another study in Norway[8] showed that being males was positively associated with being overweight. Our study is consistent with this study. However the results regarding living in rural and urban areas are different from a study carried out by Kukulu et al[10] in Turkey that showed that obesity is more prevalent in metropolitan than in non metropolitan areas.

In our study we found that life style including average duration of sleeping, studying, watching TV, and working did not differ significantly among the four groups of students. While Vik F N et al[9] found that obesity was positively associated with high TV / computer time. Similarly there is difference in the results of both the studies regarding smoking. Smoking is a significant factor in our study while an insignificant factor in their study.

Low physical activity played a determining role in the prevalence of weight imbalance among the students. This is inconsistent with the Malaysian study[11] probably this is because of the small study sample of the former but is consistent with the studies carried out in Pakistan[6] and other international Universities.[12] Thus physical activity is an important factor that plays a pivotal role and will help in improvement of weight imbalance.

The study sample in our study was 506 students. It was the largest among the other researches that were carried out in Pakistan. Other studies that were carried out in Pakistan had a sample size of 46[5] and 160,[6] thus the results of this study are more reliable than the previous ones. A study carried out in Malaysia on medical students had a study sample of 240 students.[11] Another carried out in Europe by Spanos et al[8] on university students in which the study sample was 160 students. Thus the study is one of the large studies carried out by now.

Conclusion

Thirty percent of the students in the medical school are suffering from some kind of weight imbalance. The students should receive adequate counseling about the healthy behavior and hazards of malnutrition, and the gap between knowledge and practice should be bridged to have a healthy nation.

Recommendations

It is recommended that greater attention should be paid to the content of the syllabus in M.B.B.S and importance of maintaining normal weight should be addressed seriously. Awareness should be created among the students through seminars and workshops. All the students should improve their exercise habits and adopt healthy lifestyles. Further research should be carried out on influence of mental status and weight problems.

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