

## ORIGINAL ARTICLE

# Effects of Diet and Physical Activity on BMI of Medical Students: Cross Sectional Study

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## ABSTRACT

**Background:** Most common method of measuring body fat of a person is through BMI. It is used to define obesity and overweight people across states, cities and, races.

**Aim:** To find the link between healthy nutrition and physical activity with BMI.

**Study Design:** Cross Sectional study.

**Methodology:** Data was collected using convenient sampling. A total of 60 students were selected of which 31 were students of 3rd year and 29 were of 4th year, ageing between 20-24 years. Accurate weight and height of each student were measured to calculate BMI. Cut off points according to WHO were used to define the prevalence of obesity and overweight. The volunteers were asked to answer a questionnaire comprising of 13 questions based upon typical day with regard to sleep, food, education. Data was evaluated by using SPSS version 24. The results were presented as counts (percentage), means and, standard deviation as appropriate.

**Results:** Findings indicated that 3rd year students had a little higher BMI. Most of them slept for less than 5 hours a day whereas almost all 4th year students were having ample amount of sleep. Eating habits of 3rd year MBBS was irregular as compared to 4th year MBBS students. Students of 4th year MBBS were having some kind of physical activity but 3rd year MBBS student had almost no physical activity.

**Practical Implication:** Present study highlighted few important factors that caused high BMI among medical students thus depicting an inverse relationship between BMI and physical activity. Hence, raised the importance of physical activity among medical students in our society.

**Conclusion:** It was concluded that irregular eating habits and lack of time for sleep and physical activity was the most frequently mentioned barriers to healthy eating habits and engaging in regular exercise. Thus routine should be made for regular physical activity in-order to reduce BMI and for improvement in quality of life.

**Keywords:** BMI, Physical Activity, Diet, Relationship, Students and Healthy Life.

## INTRODUCTION

Body Mass Index (BMI), formerly called the Quetelet index and, is a measure for indicating nutritional status in adults. BMI was invented by Belgian polymath Adolphe Quetelet in the 1896<sup>1</sup>.

It is the most common method of measuring body fat of a person is through BMI. It is used to define obesity and overweight people across states, cities and, races. BMI is calculated by dividing weight in kilograms (kg) by height in meters squared (m<sup>2</sup>). It is expressed as kg/m<sup>2</sup>. It is the most commonly used technique to measure fitness of a person<sup>2</sup>.

The National Institutes of Health (NIH) of the United States of America uses BMI as the standard metric to define which people are normal weight, overweight or obese. Underweight is a BMI of less than 18.5, Normal weight is a BMI of 18.5 to 24.9, Overweight is a BMI of 25 to 29.9 and Obese is a BMI of 30 or above<sup>3</sup>.

There has been a threefold increase in worldwide obesity since 1975. As of 2016 more than 1.9 billion adults of age 18 and above were overweight. 650 million out of these 1.9 billion adults were obese. It has become a fact that the being overweight or obese is more dangerous than being underweight<sup>4</sup>.

If the average country statistics are taken into consideration, over 30% of each, male and females are obese while 18.5% people of each gender are underweight<sup>5</sup>. According to World Health Organization (WHO), 19% of men and 26% of women in Pakistan are obese (Body Mass index (BMI) > 25) but only 1% of men and 4 % of men are obese using the standard criteria (BMI>30)<sup>6</sup>.

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There are obvious variations in the relative percentage of body fat at different BMIs in different races or populations. There are many governing factors such as the amount of physical activity and physiological factors<sup>7</sup>.

Exercise helps memory and thinking directly and indirectly as well. Exercise directly reduce inflammation, reduces insulin resistance, and stimulate the release of growth factors in the brain that affect the health of brain cells, angiogenesis, and increases the survival of new brain cells. Indirectly, exercise reduces stress and anxiety, and improves mood and sleep<sup>8</sup>.

In the modern society, decreased physical activity combined with poor eating habits are two major factors for the increased prevalence of overweight/obesity among humans<sup>9</sup>. BMI can help determine any health risks a person may face if it's outside of the healthy range.<sup>10</sup> High BMI levels increases the risk of diseases such cardiovascular diseases, stroke, high blood pressure, and Sleep Apnea<sup>11</sup>. Low BMI levels can lead to malnutrition, vitamin deficiencies, anemia and osteoporosis.<sup>12</sup> Present study highlighted few important factors that caused high BMI among medical students thus depicting an inverse relationship between BMI and physical activity. Hence, raised the importance of physical activity among medical students in our society.

The objective of the study was to find the link between healthy nutrition and physical activity with BMI.

## METHODOLOGY

It was a cross sectional study. Medical students who took part in the research were the students of 3rd and 4th year of HITEC IMS. It was made clear that participation was voluntary and students

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were informed that completing this study would have no individual effects. A total of 60 students were selected by using convenient sampling. There were 31 students from 3rd year and 29 from 4th year, ageing between 20-24 years.

**Physical measurements:** Accurate weight and height of each student were measured to calculate BMI. BMI is determined by using following formula:  $BMI = \frac{Weight(Kg)}{Height^2(Meters)}$

Students were selected and sampling was done using the Convenience Sampling Technique.<sup>13</sup> Weight and height were measured using weight and height measurement instrument. Cut off points according to WHO<sup>14</sup> were used to define the prevalence of obesity and overweight.

**Questionnaire:** The volunteers were asked to answer a questionnaire comprising of 13 questions based upon typical day with regard to sleep, food, education. The questionnaire had 3 portions and took 5 minutes to answer: 1) General questions about their age, gender, education, residence and height; 2) Questions about dietary habits; 3) Questions about their sleep pattern and exercise routine.

The questions relating to dietary habits asked about the eating schedule, fat consumption, carbohydrate and protein intake and, dietary supplement intake. Finally, the questions relating to sleep pattern and exercise routine asked about frequency of exercise, effect of exercise on concentration and sleep. Questionnaire was prepared on Microsoft Word. The "Fat and Jolly" hypothesis<sup>15</sup> proposed that obesity has a negative relationship with depressive symptom.

**Statistical analysis:** Data was evaluated by using SPSS version 24. The results were presented as counts (percentage), means and, standard deviation as appropriate.

**RESULTS**

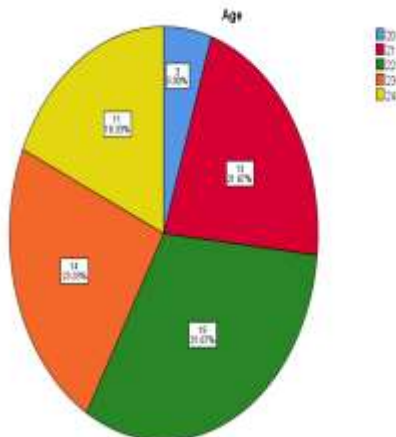
Parameters like age, height, weight and BMI were presented in form of mean±SD as shown in table-1.

Table-1: General Profile

	n	Variables	Age	Height(cm)	Weight(kg)	BMI
3 <sup>rd</sup> Year	31	Mean	22	173	70	24.1
		SD	1	9	11	3.5
4 <sup>th</sup> Year	29	Mean	23	175	73	23.4
		SD	1	7	11	3.3
Total	60	Mean	22.38	174.00	71.37	23.740
		SD	1.209	8.093	10.786	3.3560

Age distribution among participants was presented as frequency and percentage (figure-1). Age ranged from 20 to 24 years.

Figure-1: Pie chart depicting age (years) among students



Regarding consumption of meals in a day; 17(28.3%) ate twice a day, 38(63.3%) ate thrice a day, 5(8.3%) ate more than three times a day. Regarding eating schedule; 18(30%) ate irregularly,

14(23.3%) ate moderately regularly, 28(46.7%) ate regularly. Regarding fat consumption in a week; 14(23.3%) had taken meals with high fat content, 15(25%) had a meal low in fats, 31(51.7%) had meals with moderate levels of fat. Regarding Carbohydrate consumption in a week; 10(16.7%) had meals high in carbohydrate, 12(20%) had meals low in carbohydrate, 38(63.3%) had meals with moderate levels of carbohydrate in it. Regarding protein consumption in a week; 17(28.3%) have taken meals high in protein content, 14(23.3%) have taken meals low in protein content, 29(48.3%) had meals with moderate protein levels. Regarding consumption of dietary supplements; 14(23.3%) took dietary supplements, 41(68.3%) took no dietary supplements, 5(8.3%) have taken supplements in moderate amounts. Regarding exercise in a week; 23(38.3%) exercise 1-2 days in a week, 18(30%) exercise 3-5 days in a week, 19(31.7%) do not exercise. Regarding duration of exercise in a day; 33(55%) exercise 1-2 hours daily, 7(11.7%) exercise 3-4 hours daily, 20(33.3%) do not exercise. Regarding effect of exercise on concentration; 25(41%) exercise had no effect on concentration, 35(58.3%) exercise had effects on concentration. Regarding duration of sleep in a day; 37(61.7%) sleep 5-8 hours in a day, 9(15%) sleep less than 5 hours a day, 14(23.3%) sleep more than 8 hours a day. Regarding effect of exercise on sleep; 17(28.3%) exercise has no effect on sleep, 43(71.7%) exercise affects sleep. Regarding influence of weight on emotions; 27(45%) were insensitive to change in weight over emotions, 33(55%) did feel the effects on their emotions. Regarding effects of studies on eating habits; 13(21.7%) studies do not affect eating habits, 47(78.3%) studies affects eating habits (table-2).

Table-2: Questionnaire and Response of students

Variable	Response	Frequency	%age
1. How many meals do you consume in a day?	2	17	28.3
	3	38	63.3
	More	5	8.3
2. Would you describe your eating schedule as?	Irregular	18	30.0
	Moderately irregular	14	23.3
	Regular	28	46.7
3. How much fat do you think you consume in a week?	High	14	23.3
	Low	15	25.0
	Moderate	31	51.7
4. How much carbohydrate do you think you consume in a week?	High	10	16.7
	Low	12	20.0
	Moderate	38	63.3
5. How much protein do you think you consume in a week?	High	17	28.3
	Low	14	23.3
	Moderate	29	48.3
6. Do you consume any dietary supplements?	Moderate	5	8.3
	No	41	68.3
	Yes	14	23.3
7. How often do you exercise in a week?	1-2 days	23	38.3
	3-5 days	18	30.0
	No exercise	19	31.7
8. How much time do you exercise?	1-2 hours	33	55.0
	3-4 hours	7	11.7
	No exercise	20	33.3
9. Does exercise effect your concentration?	No	25	41.7
	Yes	35	58.3
10. How many hours do you sleep?	5-8	37	61.7
	Less than 5	9	15.0
	More than 8	14	23.3
11. Does exercise makes you sleep well?	No	17	28.3
	Yes	43	71.7
12. Does your weight increase or decrease your emotions?	No	27	45.0
	Yes	33	55.0
13. Does studies effect your eating habits?	No	13	21.7
	Yes	47	78.3

**DISCUSSION**

This was a cross sectional descriptive study, where we assessed BMI in medical students and their correlation with food consumption and physical activity. Although our study was done on a small scale, we found interesting results for BMI, food consumption and physical activity. Medical profession is a challenging and stressful one and so it affects the day to day routine, which includes choice of food also. This is probably the

first study which has reported such a correlation among medical students in Pakistan. Our study found that 34.05% students were overweight and obese (with BMI of more than 25). The result of this research paper showed little disparity in indices of 3rd year MBBS and 4th year MBBS students, where 3rd year students have a little higher BMI. This can be explained partly due to lack of physical activity by 3rd year students because of ongoing professional examination. They have very little time left after their studies to do proper physical activity.

The Sleep Pattern of 3<sup>rd</sup> year MBBS students showed that most of them slept for less than 5 hours a day. Almost all 4<sup>th</sup> year Students were having ample amount of sleep. Earlier studies showed higher risk of weight gain and thus a higher BMI in people who slept for short duration of time<sup>7</sup> but newer researches show no relation of this sort.<sup>9</sup> The different results can be due to different number of participants involved in the research. The research is more accurate if the number of participants are in greater number.

Students of 3<sup>rd</sup> Year MBBS had more consumption of meals in a day as compared to 4<sup>th</sup> year MBBS students probably due to their ongoing Professional Exams. Also, the eating habit of 3<sup>rd</sup> year MBBS was irregular as compared to 4<sup>th</sup> year MBBS students. Due to this disturbed eating habit, 3<sup>rd</sup> year MBBS students had more weight than 4<sup>th</sup> year MBBS students.

Another study indicated a positive association between fast food intake and BMI in both cross-sectional and longitudinal analyses among young adults<sup>16</sup>. One previous study concluded that seventy percent of medical students did not care about gaining weight, did not exercise to reduce excess weight, did not even care about the caloric or nutritional content of foods, and lived a sedentary life. The clinical term students (years 4 to 6) preferred all-bran bread, while the preclinical term students (years 1 to 3) had a habit of salt overuse. More clinical students than preclinical ones restricted eating when they realized weight gain. Depressive students usually ate a snack at night, skipped meals, and consumed high-calorie food. Positive eating habits and general healthy behaviors in non-depressive students were more frequent, while the opposite was typical for those who were in depression<sup>17</sup>. Our results were in line with above mentioned studies.

Students of 4<sup>th</sup> year MBBS were having some kind of physical activity but 3<sup>rd</sup> year MBBS student were busy attending their professional examination during the period study was being conducted. BMI and Physical activity are inversely proportional to each other. It is a fact that more calories are burnt to generate heat and energy from stored fat.

## CONCLUSION

It was concluded that irregular eating habits and lack of time for sleep and physical activity was the most frequently mentioned barriers to healthy eating habits and engaging in regular exercise. Thus routine should be made for regular physical activity in-order to reduce BMI and for improvement in quality of life.

**Limitations:** This study was limited to responses by males only because female students were not willing because we had no female colleagues in our research batch. Our research was limited to a small group of people and results cannot be applied on a national level but incidences on the whole are increasing globally. Participants in this study were young people and results cannot be

applied to a different age group.

**Contribution of authors:** **MRH& SS:** Conception and design of work, **SSS & AA:** Collecting and analyzing the data, **SAM & AA:** Drafting the manuscript, **MF & SAA:** Collecting and analyzing the data, **TS & SNH:** Drafting the manuscript

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