

Relationship between Body Mass Index & Blood Group among MBBS Students of Government Medical College, Thrissur

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Abstract:

Introduction: Sedentary lifestyle, which is now more common among youngsters, especially college students, is associated with many diseases like obesity, cardiovascular diseases, diabetes, hypertension etc. This study deals with relationship between BMI and blood groups.

Objectives: To determine relationship between BMI and blood group.

Methods: This cross-sectional study was done among 171 first year MBBS students of Government Medical College, Thrissur, between 18-25 years, of who were willing to participate. Students were given a proforma to fill their name, age, sex, blood group and history of blood dyscrasias, recent bone marrow transplantation and physical disability. Height in centimeters and weight in kilograms were measured using standard scales. Blood groups were recorded from college identity card and physiology practical record. Data was coded in MS Excel and appropriate statistical analysis was done using SPSS software.

Results: Age of the study group was in the range between 18 to 25 with mean age 19.77 and standard deviation 1.31. Of the 171 study population, 99 were females and 72 males. 63.7% were normal weight, 19.3% underweight, 13.5% overweight and 3.5% obese. 45.1% were having O blood group, 32.2% B group, 16.9% A group and 5.8% AB group. 29.1% of students with B blood group and 13% of students with O blood group were found to have high BMI. The students with AB blood group had normal BMI and none of the students with A blood group were in the obese category.

Conclusion: Students with B blood group had significantly higher BMI.

Keywords: BMI; obesity; blood group.

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Introduction

The morbidity and mortality in the present world is increasing day by day. Studies show that causes for morbidity and mortality are multifactorial. Hence, identifying these risk factors in the population helps in prevention, early diagnosis and treatment.

Sedentary lifestyle, which is now more common among youngsters, especially college students, is associated with many diseases like obesity, cardiovascular diseases, diabetes, hypertension etc. In this study conducted among first year MBBS students of Government Medical College Thrissur, the relationship between BMI and blood group were dealt with. Due to industrialization and urbanization, the standards of living continue to rise in developing countries. This resulted in obesity and pose great threat to the health of the people. In developing countries like India, obesity is the most common malnutrition among younger

age group [1]. Obesity and related health complications had reached epidemic proportion in such countries [2]. A strong relationship has been found between mortality and BMI in Caucasians [3,4]. A similar association has been demonstrated among Asian populations [5,6]. Thirty three different blood group systems were identified by the International society of blood transfusion [7]. Most important among them is ABO system discovered by Karl Landsteiner in 19008. In 1940, Rh system was discovered by Weiner and Karl Landsteiner [9].

A, B, AB and O are the major blood groups of ABO system. The ABO system shows many relationship to paternity, fingerprinting, inheritance pattern, blood transfusion etc. In various genetic studies, it was found out to be a predictor of national suicide rate [9,10]. Blood group systems

show relationship with various diseases, which make researchers interested in this field. Researches have shown the relationship between blood groups and various diseases [11]. Several studies had investigated the probable relationship between blood group and obesity and have come out with conflicting results. In the view of these conflicting results, the present study is to assess the association between body mass index & blood group among MBBS students of Government Medical College, Thrissur. If there is a positive relation, it is important to identify and evaluate the susceptible population.

Objectives: To determine relationship between BMI and blood group.

Materials and Methods

Study Design: Cross-sectional study

Study Setting: Department of Physiology, Government Medical College, Thrissur.

Study Duration: One year.

Study Subjects: 1st year MBBS students of Government Medical College, Thrissur.

Inclusion Criteria:: Students between 18 and 25 years who were willing to participate in this study

Exclusion Criteria:

- Students with blood dyscrasias.
- Students who had recent history of bone marrow transplantation.

- Students having physical disabilities

Sample Size: Sample size was calculated as 146 according to the formula, $N = 4PQ/d^2$ Where, $P = 40.7$, $Q = 59.3$, $d = 8.14$ [From the study of Suman Dua, Monika Bhuker, Pankhuri Sharma, Meenal DhallSatwanti Kapoor in 2014] [1]

Sampling Technique: 171 1st year MBBS students, between 18 to 25 years of age were included. Study group comprises of 99 females and 72 males.

Methodology: The purpose of the study was explained to them and informed consent was taken. All ethical standards were strictly followed. The students were given a proforma to fill their name, age, sex, blood group, history of any blood dyscrasias, recent bone marrow transplantation and any physical disability. Height was measured in centimeters using the same Stadiometer. Weight in kilograms was measured using the same weighing machine to minimize any error.

BMI was calculated using the internationally accepted standard formula,

$BMI = \text{weight in kilograms} / (\text{height in meter})^2$ [2]

Results

The BMI and blood groups of MBBS students of Government Medical College, Thrissur of age group between 18-25 years were studied and analysis was done

Body Mass Index

Table 1: Distribution based on BMI Classification

BMI Classification	Frequency
Normal	109
Obese	6
Overweight	23
Underweight	33
Total	171

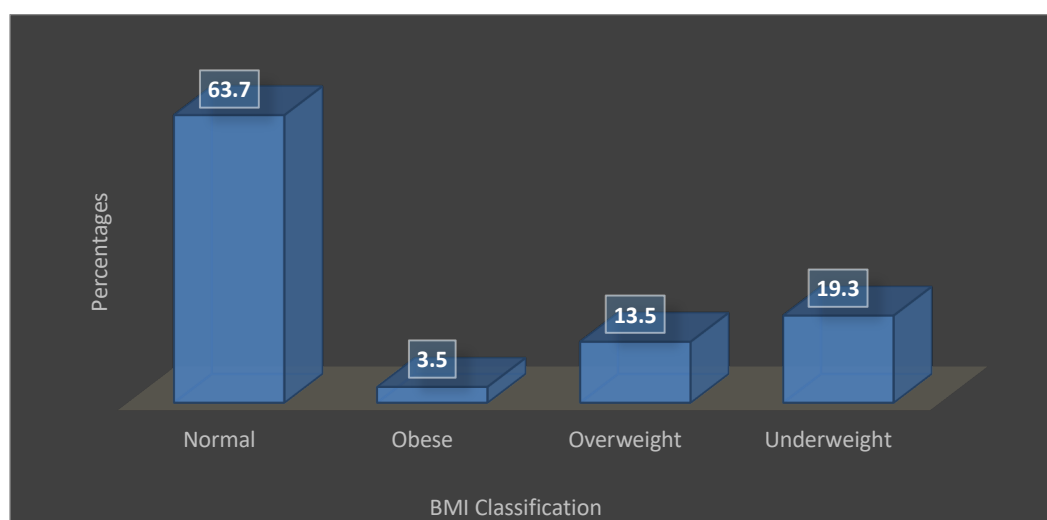
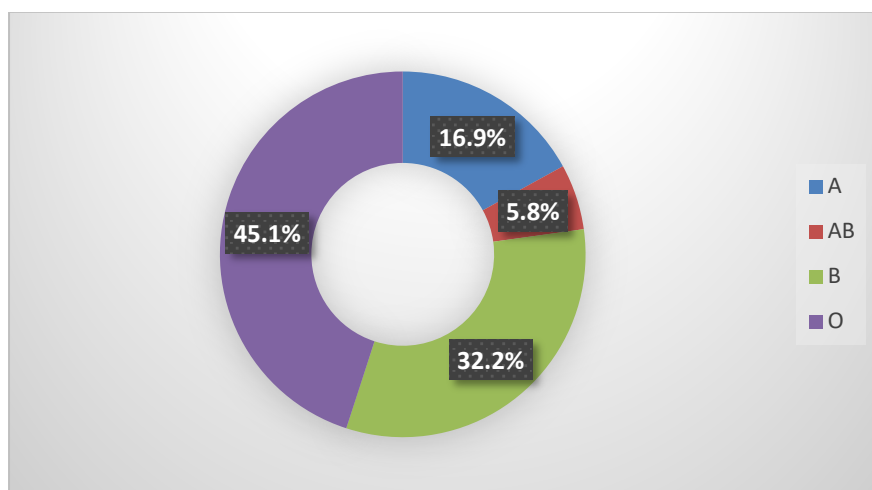


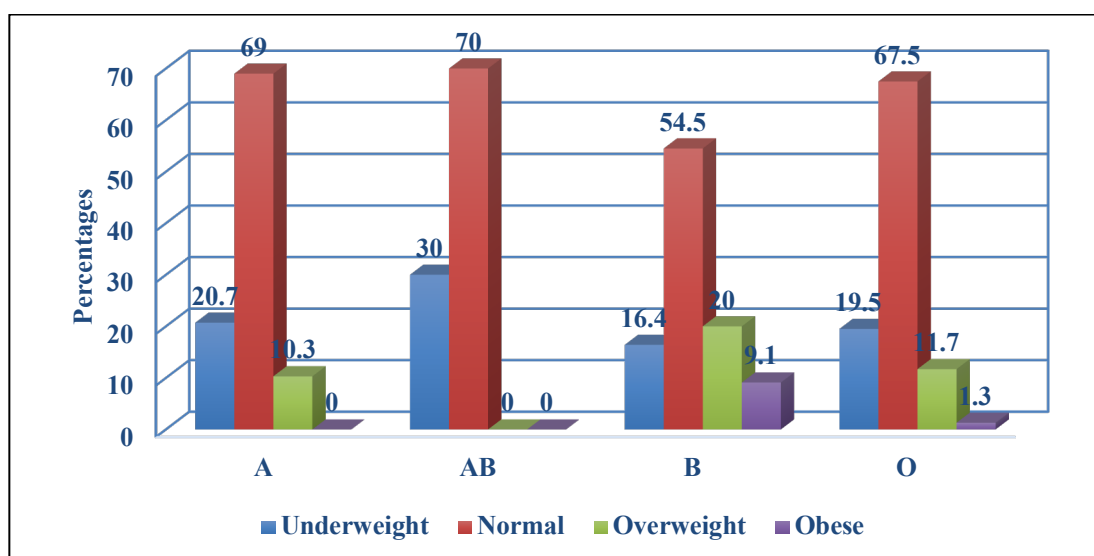
Figure 1: Distribution based on BMI Classification in Percentage

Blood Group**Table 2: Distribution based on Blood Group**

Blood Group	Frequency
A	29
AB	10
B	55
O	77
Total	171

**Figure 2: Distribution based on Blood Group in Percentage****Relationship between BMI and Blood Group****Table 3: Cross tabulation of BMI classification and Blood group**

BMI Classification	Blood group							
	A		AB		B		O	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Underweight	6	20.7	3	30.0	9	16.4	15	19.5
Normal	20	69.0	7	70.0	30	54.5	52	67.5
Overweight	3	10.3	0	0.0	11	20.0	9	11.7
Obese	0	0.0	0	0.0	5	9.1	1	1.3
Total	29	100.0	10	100.0	55	100.0	77	100.0

**Figure 3: BMI classification among different Blood groups**

In this study, 29.1% of students with B blood group and 13% of students with O blood group were having high BMI. None of the students with AB blood group were in high BMI category and none of the students with A blood group were in the obese category.

Table 4: Results of comparison of BMI among different Blood Groups

Blood group	BMI	
	Mean	SD
A	21.20	3.50
AB	19.98	2.13
B	22.94	4.62
O	21.55	3.20
F-value (P-value)	2.886* (0.037)	

* Significant at 0.01 level

One-way ANOVA was done for comparing BMI among people having different blood group. Pair wise comparison using Duncan Multiple Range Test reveals that significant difference exists only between AB and B group. B groups had significantly higher BMI compared to AB group.

Discussion

It is the need of the hour to effectively understand and identify risk factors leading to morbidity and mortality and to formulate interventional strategies. In the past, number of studies were undertaken to understand the relationship between obesity, blood group and rate of morbidity. Most of these studies had conflicting results. After thorough research into these studies, it has come into the foray that a fresh perspective is required to reach the goal.

An in-depth assessment of the various parameters consisting of body mass index and blood group of a sample demographic within Government Medical College, Thrissur will be undertaken. If any of the pre-existing parameters reflects a pattern, it will provide us the wherewithal to expand the studies to include diagnosis, treatment and above all prevention.

The present study was conducted among 171 1st year MBBS students of Government Medical College, Thrissur. Compared to other professional students, MBBS students are more liable to be more stressed as the course demands more time for learning and patient care. Therefore, the risk factors of ill health are likely to have a greater impact on them compared to general population of similar age group. The objective of the present study was to analyze the relationship between body mass index, blood pressure and blood group among the 1st year MBBS students of Government Medical College, Thrissur. The results were compared with other related studies.

Body Mass Index: In the present study, 63.7% were observed to have normal BMI, 19.3% underweight, 13.5% over weight and 3.5% obese. Overweight and obese population were less compared to underweight population. Similar

results were obtained in a cross-sectional study conducted by Jawed S, Zia S and Tariq S [12] in comparable age group in which 47.6% were having normal BMI, 21.4% underweight, 17.2% obese and 13.8% overweight. Another study in 23,320 blood donors, conducted by Tulika C, Ashish G13, concluded that 70% of the sample were in normal BMI, 4.3% in underweight, 4.9% in overweight and 20.8% in obese categories. It revealed that high BMI was more prevalent than underweight in the study population. In all these studies, majority of the study population had normal BMI.

Blood Group: In a cross-sectional study conducted by Jawed S, Zia S and Tariq S [12], blood group distribution was B:44.8%, O:29.7%, A:18.6%, AB:6.9%. Majority of the study population had B blood group. Among our study subjects, blood group distribution was O:45.1%, B:32.2%, A:16.9%, AB:5.8%. In the study conducted by Singh S et al [14], blood group distribution was O:39%, B:37%, A:17%, AB:7%. In the current study and study conducted 54 by Singh S et al [14], the common blood group was O in study population of second and third studies. The least common blood type was AB in all the three study population.

Relationship between BMI and Blood Group: 9.1% and 20% of students in the present study with B blood group were obese and overweight respectively. Among O blood group students, 1.3% and 11.7% were obese and overweight respectively. 10.3% of students with A blood group were overweight and none had obesity. None of the students with AB blood group were in obese or in overweight category. Students with B blood group have significantly higher BMI compared to AB blood group students. Similar results were noted in a retrospective study carried among 23,320 blood donors [13]. In that study, obesity was highest in B blood group and least in AB blood group individuals. In both these studies, participants with B blood group were more susceptible to obesity. So, the students with B blood group have to take extra care and adopt proper diet and engage in

regular exercise to reduce further risk of becoming obese and developing complications of obesity.

Conclusion

Analysis had revealed, significant relationship between these parameters among the study subjects.

We have to take extra care and adopt proper diet and engage in regular exercise to reduce further risk of becoming obese and developing complications of obesity

B.M.I.: 3.5% of the study subjects were obese, 13.5% overweight, 19.3% underweight and 63.7% were having normal BMI. Majority of the students were having normal BMI.

Blood Group: 45.1% of students had O blood group, 32.2% B blood group, 16.9% A blood group and 5.8% AB blood group. Majority of the students were having B blood group.

Relationship between B.M.I and Blood Group:

Students with B blood group had significantly higher BMI. None of the students with AB blood group had high BMI (Obese and overweight) and none of the students with A blood group was in the obese category.

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