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Original Research Article

A Cross-Sectional Study to Determine the Relationship between BMI and Anxiety Levels Based on Gender among Medical Students

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Abstract

Aim: The aim of the present study was to examine the relationship between BMI, gender, and anxiety levels.

Methods: A cross-sectional study was carried out Department of Medicine, JLNMCH, Bhagalpur, Bihar, India for one year. In this study, 200 non-smoking, healthy medical students were included.

Results: Our study found significant differences in BMI and anxiety scores between male and female participants. Men had an average BMI of 22.62 with a standard deviation of 3.16, while women had a lower average BMI of 20.02 with a standard deviation of 2.96, which was statistically significant (P-value < 0.0001). In terms of anxiety, men had an average score of 11.65±4.16, whereas women had a higher average score of 15.83±7.26. This difference was also statistically significant (P- value = 0.0007). The study investigated the correlation between BMI and anxiety scores. For male participants, the correlation coefficient (r) was -0.156 with a P-value of 0.314, indicating no significant relationship. Similarly, for female participants, the correlation coefficient was -0.108 with a P-value of 0.424, also showing no significant relationship. However, when considering the overall sample of 200 participants, the correlation coefficient was -0.236 with a P-value of 0.018. This result indicates a statistically significant negative correlation between BMI and anxiety scores across the entire sample.

Conclusion: MBBS students exhibit a range of anxiety levels, ranging from low to severe. To alleviate this worry, it is advisable to implement various measures such as counseling and stress management approaches right from the beginning of the curriculum.

Keywords: Body Mass Index (BMI); Anxiety; gender

Introduction

In the past decades, obesity has become a serious threat to public health worldwide.1-3 Obesity, commonly defined [1-4] by a Body Mass Index (BMI) above 30 (height/kg2), is caused by a combination of a high-level intake of energy-dense food and a low level of physical activity. This leads to an energy imbalance between calorie intake and calories burned, which in turn leads to weight gain.[5] According to the World Health Organization (WHO), the global prevalence of obesity has nearly tripled since 1975. [5] Nowadays 13% of the worldwide adult population meet the criteria of obesity. The prevalence rates of obesity in western societies are even more alarming and vary from 10–23% in Europe to 22–25% in the United States. [6-8] Next to that, 39% of the worldwide population is overweight (BMI 25–29.9). [8]

Previous research has indicated that having an unhealthy BMI (e.g. obesity and overweight) has a negative influence on quality of life. [9] Moreover, itis associated with various chronic physical diseases such as cardiovascular disease, various types of cancer, type 2 diabetes mellitus and sleep apnea. [3,10,11] Next to that, there is strong evidence for an association between unfavorable BMI and mental disorders, especially in depression and anxiety. [12-16] A recent meta-analysis gave convincing evidence for a U-shaped association, meaning that underweight is also associated with depression. [17] There are various explanations for the mechanisms underlying the relation between BMI and mental disorders. Both psychological as well as biological factors seem to have an influence on the association. [15,16,18,19]

The aim of the present study was to examine the relationship between BMI, gender, and anxiety levels.

Materials and Methods

A cross-sectional study was carried out Department of Medicine, JLNMCH, Bhagalpur, Bihar, India for

one year. In this study, 200 non-smoking, healthy medical students were included.

Inclusion Criteria:

Healthy male and female undergraduate MBBS students between the age group of 18-25 years were included.

Exclusion Criteria:

The study excluded MBBS students who had a history of prolonged use of medicine for acute or chronic illnesses, a history of hypertension, those who had consumed tea or coffee or had a substantial breakfast, and those who had exercised within 30 minutes of blood pressure measurement.

Study Procedure:

The participants' demographic data encompassed age, gender, sleep duration, family history of hypertension, presence of other medical conditions, smoking behavior, alcohol intake, level of physical activity, and medication usage. We assessed the subjects' weight, and height using the weighing scale and stadiometer tools. We measured the participants' weight when they were barefoot and wearing lightweight clothing. We measured the participants' height with a stadiometer while they were barefoot, their heels, hips, shoulders, and head in a neutral position. We computed the BMI by dividing the weight in kilograms by the square of the body height in meters (kg/m2). The Health Ministry and diabetes foundation of India established a body type categorization in 2015 to categorize the body mass index (BMI) of students. Anxiety levels were evaluated via the Hamilton anxiety scale. [20]

The scale is commonly employed to assess anxiety symptoms at the first stage and has 14 items. Each item is evaluated using a scale ranging from 0 to 4, where 0 indicates the absence of the item and 4 indicates its severity. The final item assesses behavior. The sum of the scores for each individual was recorded as the anxiety score. To maintain anonymity, participants were instructed to refrain from including their names on the questionnaire. The participants were instructed to complete the anxiety questionnaire without being informed about the interpretation of the scoring system. There was no evidence of past chronic disease or psychological disorders.

Statistical Analysis: The collected data was organized into a table using Microsoft Excel 2019. Subsequently, the data was transferred to GraphPad version 8.4.3 for further statistical analysis. Mean and Standard Deviation were computed, and an unpaired t-test and Pearson's correlation were employed for comparison. A difference was deemed significant if the p-value was less than 0.05 and highly significant if the p-value was less than 0.001. Analysed data led to valid conclusions.

Results

Table 1: The comparison between male and female students with respect to BMI and anxiety scores

Gender	BMI (Mean±SD)	Anxiety Score (Mean±SD)	p-value
Male (n=98)	22.62±3.16	11.66±4.16	<0.0001
Female (n=102)	20.02±2.96	15.83±7.26	0.0007

Our study found significant differences in BMI and anxiety scores between male and female participants. Men had an average BMI of 22.62 with a standard deviation of 3.16, while women had a lower average BMI of 20.02 with a standard deviation of 2.96, which was statistically significant (P-value < 0.0001). In terms of anxiety, men had an average score of 11.65±4.16, whereas women had a higher average score of 15.83±7.26. This difference was also statistically significant (P- value = 0.0007).

Table 2: The correlation coefficient between BMI and anxiety scores

Gender	r-value	p-value
Male (n=98)	-0.156	0.314
Female (n=102)	-0.108	0.424
Overall (n=200)	-0.236	0.018

The study investigated the correlation between BMI and anxiety scores. For male participants, the correlation coefficient (r) was -0.156 with a P-value of 0.314, indicating no significant relationship. Similarly, for female participants, the correlation coefficient was -0.108 with a P-value of 0.424, also showing no significant relationship. However, when considering the overall sample of 200 participants, the correlation coefficient was -0.236 with a P-value of 0.018. This result indicates a statistically significant negative correlation between BMI and anxiety scores across the entire sample.

Discussion

Anxiety is a state that involves both physiological and psychological aspects, including cognitive, physical, emotional, and behavioral components. [21] Anxiety is a pervasive condition characterized

by feelings of unease, anxiety, fear, apprehension, and excessive worrying. The body's reaction to a perceived danger or threat, whether actual or imagined, is a physiological response initiated by an individual's thoughts, beliefs, and emotions. These illnesses impact our emotions and behaviors, and they can present genuine physiological signs. [22] Stress, despair, and anxiety can lead to increased rates of absenteeism and diminished self-assurance among individuals. [23] Anxiety is a prevalent issue among college students. Students are overwhelmed by the stress of adapting to a new environment, being far away from home, and the expectation to excel academically. These students may encounter numerous psychiatric issues, with the most prevalent being anxiety disorder. Anxiety disorders typically encompass disruptions in emotion, cognition, behavior, and physiological functioning. These conditions manifest as adjustment disorders with anxious symptoms, including test or performance anxiety, and social phobia, and in certain cases, they can progress to more severe forms such as depression and panic disorders. [24]

Our study found significant differences in BMI and anxiety scores between male and female participants. Men had an average BMI of 22.62 with a standard deviation of 3.16, while women had a lower average BMI of 20.02 with a standard deviation of 2.96, which was statistically significant (P-value < 0.0001). In terms of anxiety, men had an average score of 11.65±4.16, whereas women had a higher average score of 15.83±7.26. This difference was also statistically significant (P- value = 0.0007). Multiple research studies have specifically examined the mental well-being of young medical students, as medical school is recognized as a period of substantial psychological strain for aspiring doctors. [25] Certain elements of training can inadvertently have adverse impacts on the mental and emotional well-being of medical students. [26] Several studies have documented a significant occurrence of psychiatric illnesses, including anxiety and depression, among medical students. [27,28]

The study investigated the correlation between BMI and anxiety scores. For male participants, the correlation coefficient (r) was -0.156 with a P-value of 0.314, indicating no significant relationship. Similarly, for female participants, the correlation coefficient was -0.108 with a P-value of 0.424, also showing no significant relationship. However, when considering the overall sample of 200 participants, the correlation coefficient was -0.236 with a P-value of 0.018. This result indicates a statistically significant negative correlation between BMI and anxiety scores across the entire sample. The rate at which knowledge is acquired in a medical college is more rapid than any previous experience the student has encountered. [29] A study revealed that female students had higher levels of melancholy, anxiety, and phobias in comparison to their male counterparts. [30] Female students had higher levels of psychological symptoms, as measured by various indicators, in comparison to their male counterparts. The higher prevalence of mental anguish among females may be attributed to the environment and social support they encounter in most cultures, which is influenced by their gender. [31]

Engaging in academic endeavors significantly impacts the mental abilities of all students, with medical students being particularly susceptible to experiencing anxiety and sadness at higher rates compared to their non-medical counterparts. [32] The domain of mental health concerns among medical students is often overlooked. Medical students who are in good health are more likely to become physicians who are also in good health. These physicians can then serve as role models and advocate for healthy lifestyles among their patients. Stress that originates during the student phase has the potential to persist into one's future life. [33] According to reports, medical students exhibit a hesitancy to seek necessary assistance for mental health issues and perceive it as a sign of weakness. This matter requires attention and it is important to motivate students to seek assistance while also ensuring the availability of sufficient resources. It is important to address the initial indications of anxiety symptoms in medical students. [34]

Conclusion

MBBS students exhibit a range of anxiety levels, ranging from low to severe. To alleviate this worry, it is advisable to implement various measures such as counseling and stress management approaches right from the beginning of the curriculum.

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