

Research Report

RISK OF EATING DISORDERS AND ITS ASSOCIATION WITH BODY IMAGE CONCERNS, DEPRESSION, ANXIETY AND STRESS AMONG MEDICAL STUDENTS IN A COLLEGE IN KERALA

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ABSTRACT

Background: Eating disorders are one of the most under-recognised psychiatric conditions which can lead to considerable morbidity. With their high workloads, academic pressure, and peer influence, medical students may be more likely to develop eating disorders. This study aimed to assess the prevalence of eating disorders among medical students in a college in Kerala. It was also planned to find its association with body shape concerns, depression, anxiety and stress. **Methods:** A cross-sectional study was conducted among 472 undergraduate medical students and interns at a medical college in Kerala. Socio-demographic proforma, Eating Attitudes Test-26 (EAT-26), Body Shape Questionnaire-8C (vBSQ-8C), Depression, Anxiety and Stress Scale-21(DASS-21) were administered after obtaining informed written consent. Statistical analysis was done using the chi-square test and Pearson correlation. **Results:** The prevalence of risk of eating disorders among medical students was 19.1%. Depression, anxiety and stress were significantly associated with the risk of eating disorders ($p=0.034$, $p=0.001$ and $p=0.001$, respectively). A positive correlation was found between the risk of eating disorders, body shape concerns and body mass index ($p=0.001$). **Conclusion:** A considerable risk of eating disorders was noted among medical students in Kerala. Body shape concerns and symptoms suggestive of depression, anxiety, and stress showed a significant association with the risk of eating disorders. Increased awareness and early identification can help institute timely interventions.

Keywords: Eating disorders, medical students, body shape concerns, depression, anxiety, stress

INTRODUCTION

Eating disorders(ED) are illnesses in which people experience noticeable disturbances in their eating behaviour.¹ These are characterised by excessive or inadequate intake of food. As per the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5), eating disorders are classified into anorexia nervosa, bulimia nervosa and binge eating disorder.² Historically, studies about eating disorders were less common in South Asia and India than in the West.³ But in the last decade, studies from Asian countries have reported high rates of eating attitude distortions.^{4,5} A

study conducted among 550 pre-university students in India reported a tendency to develop eating disorders in 31.09% of the participants.⁶ Yet another study involving 1600 students in the age group of 15-25 years in south India observed that 26.06% of the respondents were prone to develop eating disorders.⁷ The prevalence of eating disorders among medical students in India, as per studies, ranges from 13.68%-16.9%.^{7,8} In this modern era, the influence of media, which promotes the concept of 'size zero' body, has been found to be profound,

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thereby contributing to distortions in eating attitudes and body image concerns among youth in the Indian subcontinent.⁹

Medical students have high academic workloads, long working hours and many other factors that cause a tendency to develop unhealthy eating habits.¹⁰ The concept of westernised body image standards and fear of fatness superadded by peer pressure has influenced the eating attitudes of modern youth, making them vulnerable to eating disorders.^{11,12} Eating disorders are associated with depression in 45% of cases and anxiety in 65%.¹³ People who have body image dissatisfaction are likely to be affected by feelings of loneliness, low self-confidence and have more chances of developing an eating disorder.¹⁴ Eating disorder is often an under-recognised psychiatric disorder with significant comorbidities, which, if left untreated in medical students, would lead to considerable functional impairment. Psychiatric comorbidities like depression, substance use disorders, deliberate self-harm, and physical consequences, including cardiac and musculoskeletal complications, can lead to significant morbidity and mortality among medical students and poor work-related functioning and absenteeism. There is a paucity of Indian studies which have explored the prevalence of depression, anxiety and stress in individuals at risk of eating disorders.

This study aims to find the prevalence of risk of eating disorders and its association with body image concerns, depression, anxiety and stress among medical students in a college in Kerala. By identifying individuals who are at a high risk of developing eating disorders, who are also more prone to have comorbid depression, anxiety and high levels of stress, early interventions including pharmacological treatment and psychotherapy can be initiated.

MATERIALS AND METHODS

This was a cross-sectional study conducted in a medical college in Kerala from March to August 2019. Study participants included 400 MBBS students (total strength of each batch from the first year to final year being 100) and 100 students pursuing an internship in the institute during the study period. With reference to a study done by Ramaiah *et al.*⁸, which reported that 16.9% of medical students have a risk of eating disorders, we estimated that a sample size of 472 would be required, at a relative

precision of 20% with a 95% level of confidence interval. The study was done after obtaining clearance from the Institutional Ethics Committee.

Four hundred medical undergraduate students and 100 interns were invited to participate in the study. 472 subjects consented to participate in the study, and a self-administered questionnaire comprising the following study tools were administered:

1. **Socio-demographic and clinical proforma:** It contained relevant socio demographic (age, gender) and clinical (current weight, height) variables. BMI was calculated and categorised based on WHO classification for Asian population. (<18.5kg/m²- underweight, 18.5- 23kg/m²- normal, 23-27.5kg/m²- overweight, >27.5 kg/m²- obese)¹⁵
2. **Eating Attitudes Test (EAT-26):** EAT-26 was used to assess the subjects at risk of eating. The EAT-26 has 26 questions, with each item's response being rated as 0 to 3, ranging from never to always. If the net score was equal to or more than 20, the subject is considered to have a risk of eating disorders. This has been one of the most widely used scales in research worldwide with high reliability and validity.¹⁶
3. **Body Shape Questionnaire-8C (BSQ-8C) questionnaire:** This questionnaire evaluated body shape concerns. It is a shortened version of the originally developed Body Shape Questionnaire. Each item can be rated from 1 to 6, ranging from never to always. Studies have shown that BSQ-8C is a reliable and valid instrument across various cultural groups.¹⁷
4. **Depression, Anxiety and Stress Scale 21 [DASS-21]¹⁸:** to assess symptoms suggestive of depression, anxiety and stress. Each domain has seven items, and each item has scores from 0 to 3. Scores for depression, anxiety and stress were calculated by summing the scores for the relevant items and were analysed separately. This scale has been found to have adequate reliability and validity for use in the Indian population.¹⁹

Statistical details:

The prevalence of risk of eating disorders, symptoms suggestive of depression, anxiety and stress among medical students were estimated in percentages. To test the statistical significance of association between

categorical variables, chi-square test was utilised. To test the statistical significance of the correlation between continuous variables, Pearson correlation was applied. Analysis was done using SPSS software version 20.

RESULTS

Table.1 Distribution of EAT-26, BSQ-8C and DASS-21 scores among medical students in a college in Kerala

Variable	N (%)
EAT-26	
<20	382 (80.9%)
>20	90 (19.1%)
BSQ-8C	
No body shape concern (<19)	292 (61.9%)
Mild (19-25)	90 (19.1%)
Moderate (26-33)	47 (10.0%)
Severe (over 33)	43 (9.0%)
DASS-D	
No (0-9)	300 (63.6%)
Mild (10-13)	60 (12.7%)
Moderate (14-20)	72 (15.3%)
Severe (21-27)	40 (8.4%)
DASS-A	
No (0-7)	273 (57.8%)
Mild (8-9)	42 (8.9%)
Moderate (10-14)	100 (21.2%)
Severe (15-19)	57 (12.1%)
DASS-S	
No (0-14)	371 (78.6%)
Mild (15-18)	38 (8.1%)
Moderate (19-25)	46 (9.7%)
Severe (26-33)	17 (3.6%)

EAT-26 -Eating Attitudes Test, BSQ-8C-Body Shape Questionnaire-8C, DASS-Depression, Anxiety and Stress Scale

A total number of 472 participants were included in the study. 64% of the participants were females, and 36% were males. The mean age of the sample was 21 (± 1.671) years, and mean height was 1.63 (± 0.09) metres,

mean weight was 61.71 (± 12.28) kg and mean BMI was 23.08 (± 3.39) kg/m². 41.7% of the study subjects had BMI in the normal range, 8.1% were underweight, 23.9% were overweight, and 26.3% were obese as per the WHO Asian classification of BMI. In our study, the mean EAT-26 score for study participants was 10.48 (± 8.742), BSQ-8C score was 18.13 (± 9.15), DASS-D, DASS-A, and DASS-S scores were 8.13 (± 8.1), 7.04 (± 6.4) and 9.05 (± 7.96) respectively. Out of the total study subjects, 19.1% were found to be at risk of eating disorders with an EAT score >20. The prevalence of body shape concerns among participants was found to be as high as 38.1%. The prevalence of symptoms suggestive of depression was 36.4%, anxiety was 42.2%, and stress was 21.4% (Table 1).

Of the participants, eight reported having used laxatives for weight control in the last six months. 18.4% of the participants had self-reported behavioural binge eating in the past six months, and two participants had self-induced vomiting. One of them reported to have self-induced vomiting nine times during the worst week and another reported doing so, seven times during the worst week. One of the participants reported having been previously treated for an eating disorder in the past six months.

Depression, as measured by DASS-D scores, was significantly associated with higher EAT-26 scores ($p=0.034$). A higher number of individuals with EAT > 20 were noted to have moderate (31.1%) and severe anxiety symptoms (18.9%). The association between anxiety scores on DASS-A and risk of eating disorder on EAT-26 was statistically significant. ($p=0.001$). Stress scores on DASS-S also showed a significant association with the risk of eating disorders ($p=0.001$). (Table 2)

A weak positive correlation was observed between the risk of eating disorders and body shape concerns ($r=0.211$, $p=0.001$). A significant moderate positive correlation was noted between the risk of eating disorders and BMI, which means that the higher the BMI, the greater the risk of eating disorders. ($r= 0.482$, $p=0.001$) (Table 3).

DISCUSSION

This study estimated the prevalence of eating disorders among medical students in a college in the state of Kerala and found its association with body shape

concerns, depression, anxiety, and stress symptoms. In our current study, among 472 study subjects, the mean

age was 21 years, mean BMI was 23.08 kg/m², mean height was 1.63

Table 2: Factors associated with eating disorders among the study subjects.

Variable	Category	EAT- 26		Chi-square	p-value
		<20	>20		
BSQ- 8C	No	268 (70.2%)	24 (26.7%)	86.13	0.001
	Mild	68 (17.8%)	22 (24.4%)		
	Moderate	30 (7.8%)	17 (18.9%)		
	Severe	16 (4.2%)	27 (30%)		
DASS-D	No	253 (66.2%)	47 (52.2%)	8.691	0.034
	Mild	43 (11.3%)	17 (18.9%)		
	Moderate	58 (15.2%)	14 (15.6%)		
	Severe	28 (7.3%)	12 (13.31%)		
DASS-A	No	238 (62.3%)	35 (38.9%)	16.96	0.001
	Mild	32 (8.4%)	10 (11.1%)		
	Moderate	72 (18.8%)	28 (31.1%)		
	Severe	40 (10.5%)	17 (18.9%)		
DASS-S	No	314 (82.2%)	57 (63.3%)	15.96	0.001
	Mild	27 (7.1%)	11 (12.2%)		
	Moderate	30 (7.8%)	16 (17.8%)		
	Severe	11 (2.9%)	6 (6.7%)		

EAT-26 -Eating Attitudes Test, BSQ-8C-Body Shape Questionnaire-8C, DASS-Depression, Anxiety and Stress Scale

years, mean BMI was 23.08 kg/m², mean height was 1.63 metre and mean weight was 61.71 kg. In a study done by Ramaiah et al., among medical students of a rural teaching hospital in Karnataka, the mean age was found to be 21 ± 4.50 years, mean height was 1.64 ± 0.11 metre, mean weight was 58.5 ± 12.0 kg and mean BMI was 21.58 ± 4.49 kg/m².⁸ As compared to this study, in which mean BMI comes under the normal range of WHO classification, the mean BMI in our study was noted to fall under the overweight category. This can be attributed to the fact that this study was conducted in a medical college in an urban locale with easy availability and more chances of increased consumption of junk calorie-dense food items.²⁰

Out of the total study subjects, 19.1% were found to risk eating disorders with an EAT score >20. In studies done among medical students by Ramaiah et al. and Nivedita et al., the prevalence of eating disorders was 16.9% and 13.68%, respectively.^{7,8} The prevalence of risk of eating disorders among medical students in Kerala, according to this study, was higher than those reported from other parts of South India. This points to the need to assign more importance to assess the risk of eating disorders in medical students in Kerala, a psychological aspect that has not received due attention.

Among our study subjects, 36.4% had symptoms suggestive of depression, 42.8% had anxiety symptoms, and 21.4% had symptoms suggestive of stress. In a study

done by Taneja et al. in Delhi among medical students, 32.1% of study subjects had depressive symptoms, 40.1% had anxiety symptoms, and 43.8% had stress.¹⁰ Students may not be able to cope with the intense stress of medical education, long working hours, constant exposure to death and suffering with limited time available to spend for hobbies and physical activities. These may act as factors that predispose medical students to develop significant stress, anxiety and depressive symptoms.

In our study, the Mean EAT-26 score was 10.48 ± 8.742 , and the BSQ-8C score was 18.13 ± 9.15 . As per the study

Table 3. Relationship between variables using Pearson's correlation (n=472) Significant at $\alpha=0.05$

Variable correlation	Pearson correlation	p-value (2 tailed)
<u>EAT-26</u>		
With BMI	0.211	0.001**
With BSQ -8C	0.482	0.001**
With Age	0.026	0.578
With DASS-D	0.199	0.001**
With DASS-A	0.246	0.001**
With DASS-S	0.246	0.001**
<u>BSQ-8C</u>		
With BMI	0.501	0.001**
With Age	0.077	0.093
With DASS-D	0.244	0.001**
With DASS-A	0.281	0.001**
With DASS-S	0.323	0.001**

EAT-26 -Eating Attitudes Test, BSQ-8C-Body Shape Questionnaire-8C, DASS-Depression, Anxiety and Stress Scale

done by Ramaiah et al. among medical students in Karnataka, the Mean EAT-26 score was 10.58. BSQ score using the original version was 58.4 ± 28.5 .⁸ The disparity in mean BSQ was due to the usage of shortened version (scores from shortened version can be converted approximately to scores obtained from the

long version by multiplying with a corrective factor of 34/8.¹⁷ On employing the corrective factor, mean BSQ score of our study subjects was found to be 77.1 ± 38.9 . In a study done in USA using BSQ-8C among medical students, mean score for males was 17.6 ± 9.58 and for females was 21.8 ± 11.43 .²¹ The observations from this study were similar to our study as in both studies BSQ-8C was used and study subjects were medical students. This might be because maintaining a thin physique has become the priority in the younger generation across the globe, rather than being physically and mentally healthy. Medical students also tend to have levels of perfectionism, a trait that is often associated with restricting types of eating disorders.²²

In the current study, a significant positive correlation was noted between EAT-26 scores and BSQ-8C scores, which means that the higher the level of body shape concerns, the greater the risk of developing an eating disorder. A study by Brechan et al. observed that body shape concerns positively affected the risk of restrained eating and compensatory behaviours.²³ This can be explained by 'Allocentric lock theory', which states that the risk of eating disorders is associated with an impairment in the individual's ability to update the allocentric representation of their body (what the body is believed to look like- e.g., my body is overweight/fat) stored in long term memory with the egocentric experience of body shape, driven by real-time somatoperceptions (representation of the present state of the body from tactile stimuli and other sensory inputs).²⁴

A positive correlation was found between EAT-26 scores and BMI among our study subjects, implying that the higher the BMI, the greater the risk of developing eating disorders. A study conducted among 398 students in a Bangladeshi university reported that students with overweight or obese BMI had a higher risk of developing eating disorders ($p < 0.001$).²⁵ Atypical eating behaviours including dieting, bingeing and skipping meals are commonly seen in individuals with higher BMI. Fan et al. conducted a study including 3544 adolescents in China and reported that higher BMI was significantly associated with increased eating disorders. It was postulated that individuals with higher BMI were more likely to have concerns about weight control, which increased the likelihood of engaging in unhealthy weight control behaviours and ultimately led to a

greater risk of eating disorders.²⁶

We found a significant positive correlation between the risk of eating disorders and depression, anxiety, and stress levels. A study conducted among 1865 Greek students noted that higher scores of depression, anxiety and stress were associated with a greater risk of developing eating disorders ($p < 0.0001$).²⁷ The Dual-pathway model hypothesises that shared risk factors can lead to the co-occurrence of disordered eating behaviours and depressive symptoms. Negative affective states can increase the tendency to resort to binge eating as a source of comfort and as a strategy to distract the mind from emotional distress. On the contrary, calorie restriction, as well as repeated failures related to transient dietary restrictions seen in individuals at risk of eating disorders, can lead to negative emotional states.²⁸ Studies on the underlying neurobiology of eating disorders as well as depression and anxiety implicate a common pathway of serotonergic and dopaminergic dysfunction which regulates the rewarding aspects of food, affective regulation, satiety and impulse control.²⁹

Our study had certain limitations. Since the study included students from a single medical college in an urban area, the findings cannot be generalised. Also, as the study utilised self-reported questionnaires, there is a higher chance of reporting bias. This being a cross-sectional study, a causal relationship could not be established between the study variables.

CONCLUSION

Our study shows that one-fifth of the study population comprising medical students had a risk of eating disorders. These individuals were found to have higher levels of depression, anxiety and stress. This points to the need for increased awareness among the medical community to ensure that students with risk of eating disorders are identified early, and appropriate intervention is instituted.

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Conflict of interest:

None declared.

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