

# The Relationship between Eating Disorders and Stress among Medical Undergraduate: A Cross-Sectional Study

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## Abstract

**Introduction:** Eating disorders are compulsive behaviours that can consume a person's life to the point of becoming life threatening. Medical college can be a very stressful time and previous studies had found that stress could be a main factor leading to higher risk of eating disorder. We aimed to determine the association between stress and eating disorders among undergraduate medical students. **Methods:** A cross-sectional study was conducted among 320 respondents comprises of Year 3, 4 and 5 medical students in private medical college in Malaysia, assessed using self-administered questionnaires which consist of social demographic data, EAT-26 and Cohen Perceived Stress Scale. The response rate of this study was 77.4%. **Results:** With regards to EAT-26, 11.0% of medical students were at risk of developing eating disorder and from this students who have obese BMI status (25%) had 3.9 times more likely to develop eating disorder (95% CI: 1.4 - 10.9). There was significant association between those with unsatisfactory social relationship with friends and peers (OR 2.5, 95% CI 1.0 - 5.9; p value 0.035) and risk of developing eating disorders (OR 3.9, 95% CI 1.4 - 10.9; p value 0.007). For Cohen Perceived Stress Scale (CPSS), 75.5% of the respondents were having high stress level. There was no significant association between stress and the risk of eating disorders with OR 1.0, 95% CI: 0.6 - 1.7; p value 0.887. **Conclusion:** Majority of medical undergraduates were under stressed and there was a risky trend toward eating disorders in medical. However, based on our results it did not portray any significant association between stress and risk of developing eating disorders. Nevertheless, it should not be completely neglected. It is important to increase the awareness of medical undergraduates regarding eating disorders and its complications.

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## Keywords

Eating Disorders, Stress, Medical Undergraduates, Cross-Sectional

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### 1. Introduction

Eating disorders are abnormal eating habits that involve either insufficient or excessive food intake that tend to cause harm to an individual's physical and mental health. It is a psychological illness [1]. Eating disorders consist of anorexia nervosa, bulimia nervosa and binge eating disorder. Anorexia nervosa is an eating disorder that characterized by excessive weight loss, abnormal eating patterns and malnutrition. Bulimia nervosa on the other hand is compulsive over-eating followed by self-induced vomiting or laxative that is characterized by a pathological fear of gaining weight which leads to abuse eating habits and is often accompanied by guilt and depression. Binge-eating disorder is an eating disorder characterized by recurring episodes of binge eating without control mostly due to negative feelings about oneself but without any periods of compensatory behaviour such as self-induced vomiting, purging by laxatives, fasting, or prolonged exercise in between [2].

The rate of new cases of eating disorders developed had been increasing since 1950 [3]. In Malaysia, there were no concrete studies on the prevalence of eating disorders. However, it was estimated that approximately 1% of the population having anorexia nervosa and 3% having bulimia nervosa. Anorexia nervosa usually occurs in early adolescence while bulimia nervosa happens slightly later but still within the young adult age. Hence, eating disorders are said to be common among students [4]. Eating disorders are complex conditions that involve a combination of long-standing behavioural, emotional, psychological, interpersonal, and social factors [5]. Stress is one of the major influences on the students lifestyle and eating behaviours. Stress is defined as a state of mental or emotional strain or tension due to constant demanding situations [6]. Studies done found that university students experience a high level of stress especially those under their undergraduate university course [6]-[13]. The major cause of stress among the undergraduate university students are difficulties of integrating into the new environment, academic workload and time management [13].

There were evidences to support that stress not only affect an individual's health through direct physiological processes but also by changing behaviours which affect health such as change in diet patterns. Some studies showed that stressed individuals have higher tendency to consume food or snacks with high calorie and high fat [14] [15], which may results in weight gain and obesity [16]. There were also worldwide scientific acceptance of the relationship between psychological stress and eating behaviours [17]. However, the findings were varied. Individuals had found to have either reduced (hypophagia) or increased food intake (hyperphagia) to overcome stress [18] [19]. Other than the amount of food, the type of food eaten was affected by psychological stress. Snack type

foods, convenience or processed foods and sweet foods intake was found to increase among students undergoing stress; while healthy food such as vegetables tend to be neglected by the students [19] [20] [21]. Besides that, many unhealthy behaviours had been recognized to be related to high stress level such as alcohol drinking, smoking, lack of exercises, sleep disorders and bad eating habits [22]. The aim of our study was to determine the prevalence of eating disorders and association between social demographic characteristics, stress and eating disorders among undergraduate medical students in private medical institution.

## 2. Methodology

An analytical cross sectional study was done among medical undergraduate of private medical institution in Malaysia from month January to March 2016. The sample size of this study was 228, which was estimated by using where 95% confidence level ( $z = 1.96$ ),  $p$  was expected prevalence of proportion and  $d$  was desired width of the confidence level which was 5% in this study [23]. The prevalence of the previous study shows that 18.2% of participants were at risk of eating disorders. Universal sampling was done by distributing 340 questionnaires and 263 return the questionnaires. We excluded those who were absent on that day, who did not give consent to fill up the questionnaires and incomplete questionnaires.

We approached the respondents and collected data using self-administered questionnaire with three components. The questionnaire was adapted from an authorized website for stress and eating attitude tests [24] [25]. The first component of the questionnaire was on socio-demographic data; second component was regarding the Cohen Perceived Stress Test in which it includes 10 questions regarding feelings and thoughts of the individual during the past month and the third component of the questionnaire was about Eating Attitude Test (EAT-26) in which it was a screening measure to help the individuals to determine whether they might had an eating disorder that needs professional attention. Eating Attitude Test (EAT-26) consists of 3 different parts. Part A (6 questions) which was regarding the BMI, Part B (26 questions) and Part C (5 questions) which were regarding the eating behaviour.

We graded the questionnaire separately for Cohen Perceived Stress Test and EAT-26. For Cohen Perceived Stress Test, the score was from 0 to 4, in which 0 was given for “never” and 4 was given for “very often” except for questions number 4, 5, 7 and 8 which were vice versa. A total score of 0 to 12 was considered low stress level, a total score of 13 to 20 was average stress level and lastly total score of above 20 is considered high stress level. For Part A of EAT-26, we categorize each individual based on their BMI score. BMI score of  $\leq 18.5$  was considered thin, BMI score of 18.5 - 22.9 was considered normal, BMI score of 23 - 27.4 was considered as overweight and BMI score of  $>27.5$  was considered as obese. Part B of Eat-26, from question 1 to question 25, a score of 3, 2, 1, 0, 0, 0, allocated for always, usually, often, sometimes, rarely and never respectively. For question 26, it was vice versa. A total score of 0 to  $\leq 20$  is normal, if it was 21

and above, the individual is considered to have the risk of eating disorder. For Part C of EAT-26, it was graded based on any of the checked boxes.

Cohen Perceived Stress Scale (CPSS), and Eating Attitude Test (Eat-26) which was sub-divided into 3 parts. For (CPSS) based on the score obtain, we classified the data based on 3 groups as 1) Low; <13, 2) Average; 13 - 20 and 3) High; >20. We used *Microsoft Excel 2010* worksheet for data entry and *EpiInfo7™* for data analysis. We set the significance level at  $P < 0.05$  with a confidence interval of 95%. Descriptive statistics such as means, standard deviation, frequency and percentage was calculated. As for statistical analysis, Chi-square, Fisher exact and Odds ratio (OR) were calculated.

Approval from the Research Ethical Committee of Melaka Manipal Medical College is obtained before conducting our research. The nature of the study was explained to the students where their participation was solely voluntary and written consent was signed. The information collected was kept confidential for research purposes.

### 3. Results

A total 263 students participated in this study and response rate was 77.4%. **Table 1** shows socio-demographic characteristics of respondents. The mean age of the students who taken part in this study was 22.8 years (SD 1.1). 171 (65.0%) of the students were female and 108 (41.0%) of the students were Malays while 80 (34.4%) and 63 (23.9%) were Chinese and Indian respectively. Majority of them were single and only 1 (39.1%) were staying at hostel.

**Table 2** shows stress, BMI and eating disorder among students. For Cohen Perceived Stress Scale (CPSS), 109 (41.4%) of the respondents were categorized in high stress and 136 (51.7%) had average stress; merely 18 (6.8%) categorized as low risk. For BMI status of the population, we categories all data into 4 different subgroup, by means 1) underweight—22 (8.3%); 2) Normal—151 (57.4%); 3) Overweight—62 (23.5%) and 4) Obese—28 (10.6%). The mean value for BMI status was 22 with standard deviation of 3.8. As for EAT-26 status, 234 (88.9%) were categorized as “Normal”, and 29 (11.0%) in “Risky”.

**Table 3** shows the relationship between socio-demographic characteristics and risk of eating disorder categorized as risky and normal. There were no significant association between age, gender, race, marital status, residence, monthly allowance, student status and smoking and risk of developing eating disorder. However, students with unsatisfactory social relationship with friends and peers were significantly more likely at risk of having eating disorder (OR 2.5, 95% CI 1.0 - 5.9; p value 0.035).

**Table 4** shows the relationship between BMI, stress and risk of eating disorder. Regards to stress, there was no significant association between stress and risk of eating disorder among the students. However, students who had obese BMI status were significantly more likely to be at risk of eating disorder (OR 3.9, 95% CI 1.4 - 10.9; p value 0.007). There were no significant association between underweight, overweight and risk of eating disorder.

**Table 1.** Socio-demographic characteristics among students (n = 263).

<b>Variables</b>	<b>Frequency (%)</b>
<b>Age</b>	
20 - 22	87 (33.0%)
23 - 25	170 (64.6%)
26 - 28	6 (2.2%)
Mean $\pm$ SD (Minimum-Maximum)	22.8 $\pm$ 1.1 (20 - 28)
<b>Gender</b>	
Male	92 (34.9%)
Female	171 (65.0%)
<b>Race</b>	
Malay	108 (41.0%)
Chinese	80 (34.4%)
Indian	63 (23.9%)
Others	12 (4.5%)
<b>Marital status</b>	
Single	204 (77.5%)
In a relationship	58 (22.0%)
Married	1 (0.3%)
<b>Residency</b>	
Hostel	103 (39.1%)
Non-hostel	160 (60.8%)
<b>Financial</b>	
Scholar	147 (55.8%)
Non-scholar	116 (44.1%)
<b>Monthly allowance</b>	
<RM500	20 (7.6%)
RM500 - RM999	196 (74.5%)
RM1000 - RM1499	35 (13.3%)
RM1500 - RM1999	7 (2.6%)
RM2000 - RM2499	4 (1.5%)
>RM2500	1 (0.3%)
Mean $\pm$ SD	711.8 $\pm$ 297.2
<b>Smoking habit</b>	
Yes	12 (4.5%)
No	251 (95.4%)
<b>Social relationship with friends and peers</b>	
Satisfy	218 (82.8%)
Not satisfy	45 (17.1%)

**Table 2.** Stress, BMI and Eating disorder among students (n = 263).

Variables	Frequency (%)
<b>Stress (CPSS status)</b>	
High	109 (41.4%)
Average	136 (51.7%)
Low	18 (6.8%)
<b>BMI status</b>	
Underweight	22 (8.3%)
Normal	151 (57.4%)
Overweight	62 (23.5%)
Obese	28 (10.6%)
<b>Eating disorder (EAT-26 status)</b>	
Normal	234 (88.9%)
Risky	29 (11.0%)

**Table 3.** The relationship between socio-demographic characteristics and risk of eating disorder.

Variables	Eating disorder		OR (95% CI)	P value
	Risky [N (%)]	Normal [N (%)]		
<b>Age</b>				
25 - 28	5 (55.5%)	4 (44.4%)	1 (ref)	
20 - 24	184 (72.4%)	70 (27.5%)	2.1 (0.5 - 8.1)	0.268
<b>Gender</b>				
Male	10 (10.8%)	82 (89.1%)	1 (ref)	
Female	19 (11.1%)	152 (88.8%)	1.0 (0.5 - 2.3)	0.953
<b>Race</b>				
Chinese	5 (6.2%)	75 (93.7%)	1 (ref)	
Indian	10 (15.8%)	53 (84.1%)	2.8 (0.9 - 8.8)	0.062
Malay	12 (11.1%)	96 (88.8%)	1.9 (0.6 - 5.6)	0.251
Others	2 (16.6%)	10 (83.3%)	3.9 (0.5 - 17.6)	0.226
<b>Marital status</b>				
In a relationship	41 (69.4%)	18 (30.5%)	1 (ref)	
Single	148 (72.5%)	56 (27.4%)	1.2 (0.6 - 2.2)	0.646
<b>Residence</b>				
Non-hostel	13 (8.1%)	147 (91.8%)	1 (ref)	
Hostel	16 (15.5%)	87 (84.4%)	2.1 (1.0 - 4.5)	0.061
<b>Monthly Allowance (RM)</b>				
<500	14 (70%)	6 (30%)	1 (ref)	
500 - 1000	139 (70.9%)	57 (29.0%)	1.0 (0.4 - 2.9)	0.931
>1000	(76.6%)	11 (23.4%)	1.4 (0.4 - 4.5)	0.57
<b>Student status</b>				
Scholar	13 (8.84%)	134 (91.16%)	1 (ref)	
Non scholar	16 (13.79%)	100 (86.21%)	1.6 (0.8 - 3.6)	0.203
<b>Smoking</b>				
No	27 (10.7%)	224 (89.2%)	1 (ref)	
Yes	2 (16.6%)	10 (83.3%)	1.7 (0.3 - 8.0)	0.628
<b>Relationship with friends</b>				
Satisfy	20 (9.1%)	198 (90.8%)	1 (ref)	
Not Satisfy	9 (20%)	36 (80%)	2.5 (1.04 - 5.9)	0.035

OR: Odds ratio; 95%CI: 95% confidence interval; ref: reference.

**Table 4.** The relationship between BMI, stress and risk of eating disorder.

Variables	Eating disorder		OR (95% CI)	P value
	Risky [N (%)]	Normal [N (%)]		
<b>BMI status</b>				
Normal	12 (7.9%)	139 (92.1%)	1 (ref)	
Underweight	2 (9.1%)	20 (90.9%)	1.2 (0.2 - 5.6)	0.854
Overweight	8 (12.9%)	54 (87.1%)	1.7 (0.7 - 4.4)	0.260
Obese	7 (25%)	21 (75%)	3.9 (1.4 - 10.9)	0.007
<b>Stress</b>				
Average and Low	81 (73.3%)	31 (27.6%)	1(ref)	
High	108 (71.5%)	43 (28.4%)	1.0 (0.6 - 1.7)	0.887

OR: Odds ratio; 95% CI: 95% confidence interval; ref: reference.

#### 4. Discussion

The objective of our study was to determine the prevalence of eating disorders and association between socio-demographic characteristics, stress and eating disorders among undergraduate medical students in private medical institution. A total of 109 (41.4%) of students were in the high level stress group, where else 136 (58.5%) of students were below the average group and 18 (6.8%) students were in low level stress group. We found that 29 (11.0%) students fall under the risky group of developing eating disorder and the remaining 234 (88.9%) of students were in the normal categories that were at a low risk. In a study conducted among 435 medical students in Karachi using the same EAT-26, 22.75% individuals were found to be at high-risk of eating disorders [26]. Another study done among university student in Bangladesh, using the EAT-26, 37.6% of the students were classified as being at risk for an eating disorder [27].

The association between stress and the risk of eating disorders were our main concern. Among those undergraduate students, 71.5% were under high stress level and 72.3% were under average and low stress level. We found that there were no significant association between stress and the risk of eating disorders. However, a study was conducted among undergraduate students in Kuwait to see the association between stress and the risk of eating disorders. According to this study, stressed students being strongly associated with unhealthy food selection that leads to risk of eating disorders [28]. This study did not coincide with our study because there can be difference in the study load and examination pattern between our study population and their study population. There was also a study done stating that chronic stress was strongly associated to development of risk of eating disorder where 25% - 75% of anorectic patients were found to suffer from chronic stress [29]. This can be explained by another study conducted in US to assess eating disorders among stressful medical students and showed that 15% of the female medical students had history of eating disorders [30].

This study depicted that there was a significant association between obesity and risk of eating disorder. According to previous studies, there was an association between obesity and binge eating which was a type of eating disorder [31]. This was also supported by another article stating that the risk of binge eating disorder increases with increasing obesity. Prevalence estimates (mostly from the USA) suggest BED affects 2% - 5% of obese community samples [32]. In terms of social relationship with friends and peers, based on our study there was significant association with the risk of eating disorders. This is supported by a study conducted in Japan suggesting that the activity of orbito-frontal cortex which was associated with social relationship with friends and peers has significant association with the risk of eating disorders [33]. This was also supported by previous study which states that poor social relationship with friend and peers were common among eating disordered populations [34].

Other than that, there were no significant association found between other variables (social demographic factors) and risk of eating disorder in our study. However, a study in 2006 which was conducted by University of North Carolina Department of Psychiatry, showed that smoking had been reported to be used for weight control in eating disorders [35]. This did not coincide with our study, most probably due to small number students among our study population that smoked. Regarding marital status, a study was done to understand the clinical impact of marital status on the psychopathology and symptoms of eating disorder. According to this study, eating disorder patient who lives with a partner were those who presented with greater eating symptoms and psychopathology [36]. This too did not coincide with our studies as majority of our study population were single in status.

Virtually, our project contained few inevitable limitations. The participants were asked to recall the frequency of having particular feelings and thoughts like feeling upset, stressed, nervous and angry while handling the problems in the past month. Since the feelings and thoughts were very subjective manner, they may perceive of having stressed or upset “often” and “sometimes” differently. This may apparently added up into information bias gained pertaining to the study. History of alcohol consumption by the participants; which can be part of the risk factors towards this study was not asked in the questionnaire. The nature of cross-sectional study also restricts the incidence rate to be calculated and causal relationship between the variables to be interpreted in parallel.

## 5. Conclusion

It was a matter of concern to know the association between stress and risk of having eating disorder especially among medical undergraduates. However, only obesity and social insecurity portrays positive association. Nevertheless, the other variables which based on this study prove insignificant in correlation should not be completely neglected. It was an utmost importance that the students were aware of the complication of having eating disorder, since its rate of development of new cases indicates an increment since half century ago. As a



medical institution, this was an opportunity to introduce an eating disorder education as part of the curricular syllabus to reduce this pronounced incident in the society. Lastly, the institute administration can execute a counselling session or a talk on stress management as a primary affair towards the students to reduce the stress level among them and hence can enhance the performance quality in this professional discipline. Hopefully, these suggested measures can be implemented to the society to improve the eating disorder status.

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