

Prevalence and risk factors of binge eating disorder among medical students: evidence from a cross-sectional study in Vietnam

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ABSTRACT

Binge eating disorder (BED) is a significant public health problem worldwide. This cross-sectional study aimed to determine the prevalence of BED and its association among 411 medical students at a medical university in northern Vietnam. Data were collected through face-to-face interviews using structured paper-based questionnaires in a classroom setting. The prevalence of BED symptoms among medical students was 9.5%. Among those with BED symptoms, 7.3% had moderate symptoms, and 2.2% had severe symptoms of BED. Multivariable logistic regression analysis showed that being female (AOR = 3.71; 95%CI: 1.48–9.34), being overweight/obese (AOR = 4.14; 95%CI: 1.39–12.32), and being depressed (AOR = 4.05; 95%CI: 1.97–8.33) were associated with an increased risk of BED. This is the first study to provide new insights into the prevalence of BED symptoms and contributing factors among Vietnamese medical students. The findings from this study may assist public health professionals in developing strategies to reduce the risks associated with BED.

Key words:

Binge eating disorder; medical students; Vietnam

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INTRODUCTION

Binge eating disorder (BED) was first included as a separate diagnosis under the eating disorder category in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) in 2013.¹ BED is also included in the International Classification of Diseases 11th Revision (ICD-11).² BED is characterized by recurrent episodes of binge eating, during which individuals consume relatively large amounts of food within a short time without attempting to compensate for weight gain. This behavior leads to significant distress.³ To meet the DSM-5 diagnostic criteria, these episodes must occur at least once a week for at least three months. They must be associated with distress related to binge eating.¹

The clinical and community-based studies conducted in North America, Australia, and Europe provide the current understanding of the epidemiology of BED.³ According to the World Health Organization's Psychiatric Survey study, which included adults from 14 countries across four continents, BED's prevalence was 1.4%.⁴ In 2018–2020, the estimated worldwide prevalence of BED was 0.6–1.8% among adult women and 0.3–0.7% among adult men.³ A study conducted among 878 students at a public university in Saudi Arabia reported a prevalence of 18.8% for BED, with a total of 165 participants testing positive for the disorder. Among these, 99 were female, and 66 were male.⁵ Another study by Shenoy SK et al., which involved 500 university students in South India, found a BED rate of 9.6%.⁶

A study from three public universities in Bangladesh found that male students were 2.28 times more likely to experience BED symptoms than their female counterparts. Older students, overweight/obese students, and students

reporting higher depressive symptoms had a higher risk of developing BED.⁷ Another study of 959 individuals aged 15–30 years in Bahrain found that higher BMI, dietary restriction, depression, and anxiety were associated with more frequent BED symptoms.⁸ Solly JE et al. conducted a study among students at the University of Minnesota, USA, which showed a relationship between BED and impulsivity and compulsivity.⁹

Individuals with BED experience a substantial burden of illness and a decline in their quality of life.³ Researchers in the United States have found that people with BED commonly struggle with health conditions such as obesity, hypertension (31%), other heart diseases (17%), arthritis (24%), increased cholesterol (27%), elevated triglycerides (15%), diabetes (14%), smoking (40%), sleep difficulties (29%), and overall poor health.³ BED is also associated with a significant disease burden and higher mortality rates.¹⁰ Despite the increased mortality risks, individuals with BED often struggle to access appropriate healthcare, and the proportion of patients who receive treatment is alarmingly low.³ In one study, out of 22,387 survey respondents, only 344 individuals (1.5%) met the BED criteria, and only 11 out of those 344 had received a formal diagnosis from a healthcare provider.¹¹

University students are considered vulnerable to BED development, primarily due to stressors such as academic pressure and significant life changes.¹² Students with moderate BED are more likely to experience impaired academic productivity and significant difficulties in carrying out daily activities.¹³ Serra R et al. researched first-year university students at the University of Leuven, Belgium, showing that students with BED had lower academic results during the school year and a higher failure rate in their first year of study than other students. Timely BED interventions

can prevent up to 3.9% of students from failing in their first year of study.¹⁴

Medical students often face high academic pressure, which can lead to stress and imbalances in their eating habits, contributing to the development of eating disorders. However, research on the prevalence of BED among medical students in Vietnam remains unconduted. Given this information, we conducted our study to describe the current situation and identify risk factors associated with BED among Hai Phong University of Medicine and Pharmacy medical students. This research aims to provide valuable insights that can assist schools, psychiatric experts, and policymakers to propose appropriate interventions.

METHODS

Study Design and Participants

A cross-sectional study was conducted among medical students at Hai Phong University of Medicine and Pharmacy, a medical university in northern Vietnam. The study included general medical students from first to sixth year who voluntarily agreed to participate. The study excluded students who were pregnant or breastfeeding, those with a history of chronic diseases that impact diet (such as diabetes mellitus, hypertension, and dyslipidemia), and students who were absent during the data collection period.

Sample Size and Sampling Method

The sample size was calculated based on the formula for the estimated sample size for a proportion: $N = Z^2 (1 - P) / d^2$. Z = the level of confidence (for a level of confidence of 95%, $Z = 1.96$); P = proportion of participants having BED symptoms, $P = 0.5$ (because there is no prior study in Vietnam); d = the margin of error, $d = 0.05$; N (minimum sample size) = 384 participants. We expected 10% of survey questionnaires to have missing data ($N = 43$). The expected rate of students

refusing to participate was 62.7% ($N = 645$).¹⁵ Consequently, the total target sample size was 1,072 participants.

We employed the cluster sampling method to select the participants. During the 2023–2024 academic year, Hai Phong University of Medicine and Pharmacy comprised six grade levels, ranging from the 1st to the 6th year, with each class consisting of approximately 60 students. We randomly selected three classes per grade, resulting in 18 sampled classes. Invitations were extended to 1,080 students, and the refusal rate was approximately 61.9%. Ultimately, we received 411 responses between January 16, 2024, and February 27, 2024.

The data collection process involved direct interviews conducted in the classroom setting, utilizing structured questionnaires prepared explicitly by the researchers. Each interview lasted 15–20 minutes, during which the investigator read out each question and the participants selected their responses accordingly.

Instrument

Dependent variable: We use the binge eating disorder (BED) scale to assess the binge eating behavior of participants. In 1982, Gormally et al. developed the BED scale with a sensitivity of 85% and a specificity of 20%. We translated this questionnaire into Vietnamese (the local language). Before the official survey, we tested the questionnaire on a random sample of people to ensure the understandability and clarity of the questions. The BED scale consists of 16 questions that assess behavioral characteristics, emotional responses, guilt, and shame related to binge eating. Each question is scored from 0 to 3. The total score on the BED scale ranges from 0 to 46. The BED symptoms are divided into three levels: 0–17 indicate no BED symptoms, 18–26 indicate moderate BED symptoms, and >26 indicate severe BED symptoms.¹⁶

Independent variables: Age (year), gender (male, female), height (cm), weight (kg), grade level, and living status. Self-reported weight and height were collected to calculate the Body Mass Index (BMI); participants were considered overweight or obese if their BMI was $\geq 25 \text{ kg/m}^2$.

We utilized the Patient Health Questionnaire 9 (PHQ-9) to assess the depression symptoms of participants. The PHQ-9 scale has demonstrated validity and reliability in various populations within the Vietnam setting, with a Cronbach's alpha of 0.745.¹⁷ The PHQ-9 scale comprises nine questions, each rated on a scale from 0 to 3. A rating of 0 indicates "not at all," while a rating of 3 represents "almost every day." The total score on the PHQ-9 can range from 0 to 27, with higher scores indicating a greater severity of depressive symptoms. A score of 10 or higher on the PHQ-9 indicates depressive symptoms, while a score below 10 suggests no signs of depressive symptoms.

We employed the Pittsburgh Sleep Quality Index (PSQI) scale to assess signs of sleep quality disorders. This scale is widely used in research and clinical settings and has been translated into multiple languages. The PSQI scale was validated among the Vietnamese population with a Cronbach's alpha coefficient of 0.789, indicating good internal consistency.¹⁸ The PSQI scale consists of 19 questions divided into seven components, each with equivalent scores. These components include subjective sleep quality (1 question), sleep latency (2 questions), sleep duration (1 question), habitual sleep efficiency (3 questions), sleep disturbances (9 questions), use of sleep medications (1 question), and daytime dysfunction (2 questions). Each item on the scale is rated on a scale of 0 to 3. The total PSQI score ranges from 0 to 21 points, with a higher score indicating poorer sleep quality. A PSQI score of 5 or less suggests good sleep

quality, while a score above 5 indicates poor sleep quality.¹⁹

Statistical Analysis

The data were entered using EpiData software version 3.1 (EpiData Association, Odense, Denmark). All analyses were performed using Statistical Package for the Social Sciences (SPSS version 27.0, SPSS Inc., Chicago, IL, USA). Categorical variables were represented as frequencies and percentages (%), while continuous variables were expressed as the mean, standard deviation (SD), maximum, and minimum values. The Chi-squared and Fisher's exact tests assessed differences in BED symptom proportion and associated factors. Univariate and multivariate logistic regression analyses were conducted to calculate odds ratios (ORs) and their corresponding 95% confidence intervals (CIs) to examine associations between BED symptoms and potential factors. Variables with a p -value < 0.2 in the univariate analysis were included in the multivariate analysis. Statistical significance was defined as a p -value < 0.05 .

Ethics Statement

The research protocol was approved by the Scientific Council of Hai Phong University of Medicine and Pharmacy (Ref 206/QĐ-YDHP). We provided all participants with a comprehensive explanation of the research objectives and their roles prior to their involvement in the study. We treated all information collected from participants as confidential.

RESULTS

The distribution of BED symptoms according to the general information of the participants is presented in Table 1. The proportion of participants exhibiting

symptoms of BED was 9.5%. The age group of 23 and above exhibited the highest rate of BED symptoms, with a percentage of 11.5%. Females have a higher rate of BED symptoms compared to males, with percentages of 12.6% and 4.6%, respectively. Fourth-year students exhibit the highest rate of BED symptoms at 16.3%

among the different grade levels, while second-year students exhibit the lowest rate at 6.0%. Furthermore, the rate of BED symptoms was higher among participants who were overweight/obese (20%), depressed (20.6%), and experienced poor sleep quality (12.3%) than in other groups.

Table 1. Distribution of BED based on the characteristics of the participants (N, %)

Variables	Total	Binge Eating Disorders	
		Yes	No
Age (in years)			
19 – 20	128 (31.1)	9 (7.0)	119 (93.0)
21 – 22	75 (18.3)	6 (8.0)	69 (92.0)
23 and higher	208 (50.6)	24 (11.5)	184 (88.5)
Mean $\pm$ SD	21.47 $\pm$ 1.55	21.62 $\pm$ 1.46	21.45 $\pm$ 1.56
Gender			
Male	152 (37.0)	7 (4.6)	145 (95.4)
Female	259 (63.0)	32 (12.4)	227 (87.6)
Grade level			
Year 1	57 (13.9)	4 (7.0)	53 (93.0)
Year 2	83 (20.2)	5 (6.0)	78 (94.0)
Year 3	68 (16.5)	6 (8.8)	62 (91.2)
Year 4	98 (23.8)	16 (16.3)	82 (83.7)
Year 5	73 (17.8)	5 (6.8)	68 (93.2)
Year 6	32 (7.8)	3 (9.4)	29 (90.6)
Living status			
Living alone	150 (36.5)	12 (8.0)	138 (92.0)
Living with friends	206 (50.1)	22 (10.7)	184 (89.3)
Living with family or relatives	55 (13.4)	5 (9.1)	50 (90.9)
Overweight/Obesity			
No	381 (92.7)	33 (8.7)	348 (91.3)
Yes	30 (7.3)	6 (20.0)	24 (80.0)
Depressive symptom (PHQ-9)			
No	304 (74.0)	17 (5.6)	287 (94.4)
Yes	107 (36.0)	22 (20.6)	85 (79.4)
Sleep quality (PSQI)			
Good	183 (44.5)	11 (6.0)	172 (94.0)
Poor	228 (55.5)	28 (12.3)	200 (87.7)
Overall (N, %)	411 (100)	39 (9.5)	372 (90.5)

Table 2 presents the BED, PHQ-9, and PSQI levels among respondents. The average BED, PHQ-9, and PSQI scores were 8.34 ± 6.63 , 7.28 ± 4.70 , and 6.06 ± 2.57 , respectively. The proportion of respondents with moderate and severe BED

symptoms was 7.3% and 2.2%, respectively. The rates of moderate, moderately severe, and severe depression were 18%, 6.6%, and 1.5%, respectively. Additionally, 55.5% of the respondents reported experiencing poor sleep quality.

Table 2. The level of BED, PHQ-9, and PSQI of the participants

Variables	N	%
Binge Eating Disorder (BED)		
Normal (0 – 17)	372	90.5
Moderate (18 – 26)	30	7.3
Severe (27 – 46)	9	2.2
Mean $\pm$ SD (Min – Max)	8.34 $\pm$ 6.63 (0 – 43)	
Patient Health Questionnaire-9 (PHQ-9)		
None – Minimal (0 – 4)	121	29.4
Mild (5 – 9)	183	44.5
Moderate (10 – 14)	74	18.0
Moderately severe (15 – 19)	27	6.6
Severe (20 – 29)	6	1.5
Mean $\pm$ SD (Min – Max)	7.28 $\pm$ 4.70 (0 – 27)	
Pittsburgh Sleep Quality Index (PSQI)		
Poor (6 – 21)	228	55.5
Good (0 – 5)	183	44.5
Mean $\pm$ SD (Min – Max)	6.06 $\pm$ 2.57 (0 – 14)	

The analysis results of factors associated with BED are presented in Table 3. The multivariable logistic regression analysis revealed that factors were statistically significantly associated with

BED, including being female (AOR = 3.71; 95%CI: 1.48–9.34), being overweight/obese (AOR = 4.14; 95%CI: 1.39–12.32), and being depressed (AOR = 4.05; 95%CI: 1.97–8.33).

Table 3. BED symptoms and associated factors: Univariate and multivariate logistic regression analyses (N, %)

Factors	Univariate	Multivariate
	OR (95%CI)	AOR (95%CI)
Gender		
Male	1	1
Female	2.92* (1.26 – 6.79)	3.71** (1.48 – 9.34)
Overweight/Obesity		
No	1	1
Yes	2.64* (1.01 – 6.91)	4.14* (1.39 – 12.32)
Depressive symptom		
No	1	1
Yes	4.37*** (2.22 – 8.60)	4.05*** (1.97 – 8.33)
Sleep quality		
Good	1	1
Poor	2.19* (1.06 – 4.53)	1.35 (0.61 – 2.95)

Abbreviation: OR: Odds Ratio, AOR: Adjusted Odds Ratio, CI: Confidence Interval

Notes: Bolded numbers are significant at $p < 0.05$ (* <0.05 , ** <0.01 , *** <0.001)

DISCUSSION

This cross-sectional study aimed to examine the prevalence of BED symptoms and identify associated factors among Vietnamese medical students. The findings revealed that approximately 10% of medical students in our sample exhibited symptoms of BED. Moreover, female students, those who were overweight or obese, and those experiencing depression were found to be at a higher risk of developing BED symptoms. These study results emphasize the significance of implementing comprehensive interventions that consider factors such as gender, weight status, and depression to effectively address the prevalence of BED among university students.

Our findings indicate that the prevalence of BED symptoms in our study sample was 9.5%. This finding aligns with that of the research conducted by Shenoy S et al. on South Indian university students.⁶ However, the prevalence of BED symptoms is lower than that observed in the study by Abdulla ZARA et al. conducted among Bahraini youth and young adults⁸ and the study by Jung JY on adolescent girls in Korea.²⁰ Conversely, it is higher than that observed in the research conducted by Adhikari A et al. among medical students in Nepal²¹ and Solly JE et al. in the United States.⁹ The reported rates of BED may be significantly influenced by differences in study populations, including age, gender distribution, and the assessment tools utilized.

The study findings indicate that females were more likely to exhibit symptoms of BED compared to males. Specifically, the multivariate logistic regression analysis revealed that females were 3.71 times more likely to have BED than males. This result was consistent with a previous study.²² The differential risk of eating disorders between genders can be attributed to sex steroid hormones such as testosterone, estradiol, and progesterone,

which significantly influence the risk of eating disorders in males and females throughout their lifespan.²³

This study found a statistically significant association between being overweight/obese and BED symptoms. Overweight/obese individuals were found to be 4.14 times more likely to exhibit BED symptoms compared to non-overweight/obese individuals. These findings align with those of previous research that has identified obesity as a potential risk factor for BED.^{7,8} The relationship between obesity and eating disorders may have a bidirectional effect, meaning that obesity can be both a consequence and a contributor to BED.²⁴ Binge eating may lead to long-term consequences, such as obesity, while BED itself can also impact body weight and size.²⁵

Our study indicates that individuals with depressive symptoms were more likely to exhibit symptoms of BED compared to those without depressive symptoms. These results are consistent with previous research studies.^{8,9} This association may be partially explained by the influence of the consequences of BED, which has been found to impact and predict depression.²⁶ Alternatively, this association may be the result of a reciprocal relationship between depression and binge eating, where one factor may serve as either a cause or consequence of the other.²³ The interplay between depression and BED is complex, and further research is needed to gain a more comprehensive understanding of its nature.

STRENGTHS AND LIMITATIONS

This study represents the first investigation in Vietnam examining the prevalence of BED symptoms. Consequently, these findings provide initial data regarding BED symptoms and establish a foundation for future research. The study employed standardized

assessment tools, such as the PHQ-9 for depression and the PSQI for sleep quality, demonstrating reliability and validity in the Vietnamese context. Nonetheless, the study does have certain limitations. Firstly, the BED questionnaire used in this study has yet to be explicitly standardized for Vietnam. Additionally, the questionnaire relies on self-reporting rather than clinical diagnosis, possibly introducing bias into the results. Secondly, the study sample was limited to medical students, thus limiting the generalizability of the findings to students in other fields or different age groups. Lastly, this study is cross-sectional, preventing the establishment of a cause-and-effect relationship between BED and the associated factors.

CONCLUSION

Our study indicates that approximately 1 in 10 medical students exhibits symptoms of BED, and these symptoms are significantly associated with being female, overweight/obese, and depressed. These results highlight the need for intervention strategies to promote healthy eating habits and maintain a healthy weight among medical students. Moreover, it emphasizes the importance of providing comprehensive mental health services to university students. Additionally, conducting longitudinal follow-up studies would be beneficial in establishing a causal relationship between the identified factors and BED symptoms.

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CONFLICT OF INTEREST

The authors declare no conflict of interest in this study.

AUTHOR CONTRIBUTIONS

Conceptualization: Cap Minh D. Data collection: Tran Duc D, Nguyen Thi H, Nguyen Thi Thu H, Hoang Thi H, Truong Dieu L, Dang Tuan T, Doan Bao A, Le Ngoc T. Formal analysis: Cap Minh D. Methodology: Cap Minh D, Dang Van C. Writing - original draft: Cap Minh D, Dang Van C. Writing - review & editing: Cap Minh D, Dang Van C.

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