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Associated factors of binge eating disorder among adolescents and young adults

Faktor yang Berhubungan dengan Binge Eating Disorder pada Remaja dan Dewasa Awal

Dayan Hisni[1*], Siti Syamsiah[2], Lurdes Acorta Freitas[3], Rosmawaty Lubis[1]
[1]Program Studi Keperawatan, Universitas Nasional, Jakarta, Indonesia
[2]Program Studi Kebidanan, Universitas Nasional, Jakarta, Indonesia
[3]Department of Nursing, Instituto Superior Cristal, Dili, Timor Leste
*Email: dayanhisni@civitas.unas.ac.id

ABSTRACT

Background: *Binge eating disorder (BED) is a health problem among adolescents and young adults worldwide, including in Indonesia. Unfortunately, it lacks attention from health services. Characteristics of adolescents and young adults, dietary restrictions, and psychological problems contributed to BED. However, study on BED among those populations in Indonesia especially in Jakarta is still limited. If the issue of BED is not addressed immediately, Indonesia's Vision 2045 could be disrupted.*
Objective: *This study was to determine the prevalence and associated factors of BED among adolescents and young adults in Jakarta.*
Methods: *This was a cross-sectional study. A total 113 participants (aged 15-30 years) completed the questionnaires. A convenience sampling was performed to determine the participants. The Rosenberg Self-Esteem Scale, the Dietary Restrictions Questionnaire, the General Anxiety Disorder-7, the Patient Health Questionnaire-9, and the Binge Eating Scale were used to examine the variables. The continuity correction, Fisher's exact test, Pearson Chi-square, and logistic regression were performed to data analyses.*
Results: *Among all participants, 40.7% had BED symptoms. The study showed a significant association between gender (p=0.013), dietary restriction (p<0.001), anxiety (p=0.006), and depression (p=0.020) with BED. The logistic regression analysis presented that the gender (OR=7.854, p<0.001), anxiety (OR=7.107, p<0.001), depression (OR=4.137, p=0.013), and dietary restriction (OR=3.084, p=0.024) significantly affected BED among adolescents and young adults (aged 15-30 years).*
Conclusion: *The results of this study are expected to serve as preliminary data as a reference in developing interventions to prevent BED among adolescents and young adults in Indonesia.*

Keywords: *anxiety, BED, depression, dietary restriction, gender*

ABSTRAK

Latar Belakang: *Binge Eating Disorder* (BED) merupakan masalah kesehatan yang dialami oleh remaja dan dewasa muda di seluruh dunia, termasuk di Indonesia. Namun, masalah ini kurang mendapat perhatian dari layanan kesehatan. Karakteristik remaja dan dewasa muda, pembatasan pola makan, serta masalah psikologis turut berkontribusi terhadap terjadinya BED. Namun, penelitian mengenai BED pada kelompok populasi tersebut di Indonesia, khususnya di Jakarta, masih terbatas. Jika masalah BED tidak segera ditangani, Visi Indonesia Emas tahun 2045 terancam terganggu.
Tujuan: Penelitian ini bertujuan untuk mengetahui prevalensi dan faktor-faktor yang berhubungan dengan BED pada remaja dan dewasa muda di Jakarta
Metode: Penelitian ini menggunakan *cross-sectional study* dengan jumlah responden sebanyak 113 menggunakan metode *convenience sampling*. *The Rosenberg Self-Esteem Scale, the General Anxiety Disorder-7, the Dietary Restrictions Questionnaire,*

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the Patient Health Questionnaire-9, and the Binge Eating Scale adalah masing-masing alat ukur yang digunakan untuk variabel dalam penelitian ini. Uji statistic menggunakan *The continuity correction, Fisher's exact test, Pearson Chi-square, and logistic regression.*

Hasil: Terdapat 40,7% responden menunjukkan gejala BED. Ada hubungan yang signifikan antara jenis kelamin (p=0,013), pembatasan pola makan (p<0,001), kecemasan (p=0,006), dan depresi (p=0,020) dengan gejala BED. Analisis regresi logistik menunjukkan bahwa jenis kelamin (OR=7,854, p<0,001), kecemasan (OR=7,107, p<0,001), depresi (OR=4,137, p=0,013), dan pembatasan pola makan (OR=3,084, p=0,024) secara signifikan memengaruhi BED pada remaja dan dewasa muda (usia 15-30 tahun).

Kesimpulan: Hasil penelitian ini diharapkan menjadi data awal dan sebagai acuan dalam mengembangkan intervensi untuk mencegah BED di kalangan remaja dan dewasa muda di Indonesia.

***Kata kunci**: BED, depresi, jenis kelamin, kecemasan, pembatasan diet*

INTRODUCTION

Eating disorders (EDs) are still a health problem globally. However, they have not received much attention from healthcare services, including in Indonesia. EDs are defined as a mental health issue characterized by excessive obsession with body weight, body shape, and foods.[1] A previous study reported that of 3148 students in ASEAN countries, 11.5% were EDs, with 7.4% of them in Indonesia.[2] One of the EDs that is commonly encountered is Binge Eating Disorder (BED). The prevalence of BED in Indonesia has not been clearly identified. However, recent studies reported that BED was often found in adolescents and young adults. [3,4]

BED is characterized by consuming large amounts of food in an uncontrolled manner, often within a short period, and usually less than 2 hours. [5] BED is closely linked to emotional dysregulation, which typically occurs in adolescents and young adults because they a phase of seeking self-identity, experience body image disturbance, psychological disorders such as depression and anxiety, dietary pattern problems, and making them vulnerable to emotional dysregulation. [6] Adolescents with emotional dysregulation are unable to control self-soothing. Consequently, they use eating behaviors as a means of emotional regulation.[7] Promptly addressing BED in adolescents and young adults can prevent the rapid development of chronic conditions. Therefore, it is necessary to investigate the factors associated with BED in adolescents and young adults.

Some studies have been done regarding the factors associated with BED. There were significantly associated between gender, occupation, BMI, smoking status, sosioeconomic status of parents, depression, anxiety, dietary restrictions, and sleep duration with BED among adolescents and young adults. [8,9] Women experience BED more frequently than men because it is linked to body dissatisfaction driven by societal beauty standards. This often triggers a cycle of extremely restrictive dieting. When the diet fails, emotional stress sets in, triggering an episode of BED, which is then followed by deep feelings of guilt, anxiety, and shame,[10] while dietary restriction is also significantly associated with BED because it causes two types of imbalances, they are biological and psychological. Dietary restriction stimulates the production of ghrelin, the hormone that triggers hunger, and suppresses leptin, the hormone that triggers satiety. The body interprets a strict diet as a crisis or a threat of starvation.[11] Furthermore. Approximately more than 50% of people with BED experience depression. BED can be triggered by depression as a self-soothing or emotional coping strategy and the physical

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consequences, and guilt that accompany a binge episode. General anxiety is also strongly associated with the occurrence of BED due to binge eating serves as an accessible, rapid way to dampen or escape the intolerable physiological and psychological distress caused by chronic anxiety.[12]

Other studies also reported that self-esteem, and body image were associated with BED among adolescents and young adults in Indonesia. Low self-esteem is both a major risk factor for developing binge eating habits and a frequent consequence of the disorder, creating a vicious cycle during the vulnerable adolescent years.[4,13] However, here were several factors whose results are inconsistent with existing studies, such as BMI, anxiety, and education reported did not significantly associated.[14] The association between adolescents and young adults characteristics and BED were also not reported in some studies that have been carried out in Indonesia. In fact, adolescents certainly vary in each region especially in Jakarta. These reflect that adolescents characteristics also contribute to the occurrence of BED.

Major cities like Jakarta have complex adolescents and young adults health issues such as lifestyle demands, body image, and psychological pressure, which can eventually develop into BED. Currently, there were no studies on BED have been conducted in Jakarta, including its prevalence and associated factors. The existing study revealed that there was significantly associated between depression and BED among medical students in Jakarta. [15] In fact, there are many other factors that may contribute to the occurrence of BED among adolescents and young adults population in Jakarta that should be explored. In addition to mental health issues, another negative impact of BED on adolescents and young adults is their quality of life. A study in Spain indicated that people with BED experienced a decline in quality of life due to the psychological issues they face.[16] They are also at high risk for metabolic disorders such as obesity, type 2 diabetes, and heart disease.

The cognitive and behavioral model of binge eating was incorporated into this study as a modified theoretical framework.[17] According to social comparison theory, upward social comparison happens when a person compares themselves to those they consider to be superior, such as in terms of attractiveness or bodily size. A multi-level framework is created by integrating the Cognitive and Behavioral Model, Social Comparison Theory, and a biopsychosocial perspective. In this framework, comparative thoughts are triggered by the social environment, emotional and physical reactions are shaped by psychological processing, and the stress-response loop is moderated by biological systems.[18,19] Binge eating may become more likely as a result of someone responding to unfavorable social comparisons by severely restricting their food intake while becoming fixated on their appearance. Thin-ideal internalization, or the appreciation of a slender body, and personal relative deprivation, or the bitterness and fury brought on by negative societal comparisons.[20]

Previous studies in Indonesia have predominantly focused on EDs in general, while evidence specifically addressing BED among adolescents and young adults remains limited. In addition, studies simultaneously evaluating demographic characteristics, dietary restriction, self-esteem, anxiety, and depression as associated factors to develop BED using multivariable analysis are still scarce. Therefore, this study provides an integrated analysis of demographic, behavioral, and psychological factors to identify the associated factors with BED among adolescents and young adults in Jakarta. Furthermore, this study has several implications to public health area, such as developing early intervention and health promotion programs to adolescents and young adults, developing health care policies for adolescents and young adults at high risk for BED, emerging a media literacy program to help them filter out unrealistic visual content

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on social media, which often triggers BED, and establishing peer-support groups at the community and academic levels to reduce the social isolation of then experienced by people with BED.

METHODS

Study design

This cross-sectional study was conducted to identify the prevalence and associated factors of BED among adolescents and young adults (aged 15-30 years) in South Jakarta. An observational study that looks at data from a population at a certain point in time is called a cross-sectional study. It is widely used to describe demographic traits, understand health causes, and measure the frequency of health consequences. In a cross-sectional study, individuals are not monitored throughout time. They are usually inexpensive and easy to carry out. [21]

Data source and sampling procedure

This study was performed at community health center, South Jakarta, Indonesia, between May and July 2025. Participants were recruited using a convenience sampling method, and the study included aged between 15 and 30 years. This group was according to literature that BED commonly emerges in this range.[10] According to the Ministry of Health of the Republic of Indonesia, it falls within adolescents and young adults. [22] The minimum sample size required to find a connection between variables at a particular level of significance was determined using G*Power version 3.1.9.7. According to a prior study, the predictor of BED among Malaysians had an R^2 of 0.177.[23] Cohen's f^2 was determined to be 0.21 ($f^2 = R^2/1\text{-}R^2$). For a multiple regression with ten predictors, an alpha level of 0.05, and a statistical power of 0.88, the minimum sample size to detect a small effect was 87 participants, rounded up to 90 participants. To prevent dropout rate of the respondents, the sample size was increased by 25%.[24,25] Therefore, a total sample size in this study was 113 participants age 15-30 years. For those who under 18 years, participation in the study needs approval from their parents. Hormonal abnormalities, pregnant women, cortisone or orexigenic medication, declined consent, and those who had incomplete questionnaires were excluded.

Variables of the study

The independent variables were age, gender, BMI, smoking status, education, and sleep duration, self-esteem, dietary restriction, anxiety and depression symptoms, while dependent variable was BED. The researchers compiled respondent demographic data to measure age, gender, BMI, smoking status, education level, and sleep duration. Each respondent was asked to complete the form by selecting the appropriate answer from the options provided on the demographic data sheet. Answer options were provided in only two categories, except for BMI, which had four answer categories.

Self-esteem was measured by The Rosenberg Self-Esteem Scale (RSES). This is the most widely used psychological questionnaire worldwide for measuring a person's self-esteem or overall self-acceptance. In this study, the RSES used was the Indonesian version, which has undergone validity and realiability testing.[26] Dietary restriction was measured by using the Dietary Restriciton Questionnaire (DRQ). Although there was no Indonesian version of this questionnaire, the researchers used back translation method to get Indonesian version. Dietary restriction is defined as the goal of limiting food consumption to regulate body weight. Over the past three decades, the concept of dietary constraint has been proposed as a psychological factor that influences binge eating, overeating, and bulimia nervosa.[27] Anxiety and depression are defined as common and highly interconnected in individuals with BED. Binge episodes are frequently triggered by anxiety and depression, which also work as a means of self-soothing negative feelings and sustain a vicious cycle of shame and guilt.[28] These were

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measured by using the General Anxiety Disorder-7 (GAD-7) and the Patient Health Questionnaire-9 (PHQ-9), respectively, while BED is Binge Eating Disorder (BED) is an eating disorder in which sufferers frequently consume very large amounts of food and experience it difficult to resist the urge to eat. BED carries a high risk of leading to serious health conditions, such as obesity, diabetes, high blood pressure, and even heart disease. It was measured by using the Binge Eating Scale (BES).

Data collection

Collecting the data was performed sequentially. First, the research team contacted the head of the community health centre to explain regarding the study and to receive approval. Second, researchers continued to meet nurses who responsible at the adolescents unit at the community health centre to investigate the eligible participants. Third, the research assistants (RAs) met the participants for face-to-face interview to ensure the eligibility of the participants. All the RAs were trained related to the aims, content of the study, methods, and confidentiality. The in-person interviews lasted 30 minutes, and participants who accomplished all the questionnaires were given with a gift. The researchers used RAs in collecting the data to avoid the selection bias in determining the participants.

Measurement and instruments

The data collection was conducted using demographic data information, including age, gender, BMI, smoking status, education, and sleep duration. Meanwhile, self-esteem, dietary restriction, anxiety and depression symptoms, and BED were investigated by using self-report questionnaires. The RSES was used to measure the self-esteem of the participants. This tool comprised of 9 items with a 4-point Likert scale. Strongly agree receives a score of 4, agree receives a score of 3, disagree receives a score of 2, and strongly disagree receives a score of 1. The scale's total possible score falls between 0 and 36. Greater self-esteem is indicated by higher scores. The Cronbach alpha for the RSES is 0.87. The cut-off for this tool is 18.[26] Dietary restriction was measured by the DRQ. This tool consisted of 9 items, including 'I regulate the amount and type of food I eat,' 'I monitor my calories and portions,' 'I restrict my eating to lose/maintain my weight,' and others where each item consisted of 4 Likert scales namely never, sometimes, often, and always with a score of 1-4. The likelihood of restricted eating behavior increases with the score. This instrument has an 18 cut-off. Additionally, the scale's validity and reliability have been demonstrated. The internal consistency of the scale employed in this study was good (Cronbach's $\alpha = 0.81$). [27]

The anxiety symptoms were evaluated by using the GAD-7. It was a self-report tool with 7 questions to evaluate symptoms of generalized anxiety disorder. A prior study that validated the GAD-7 among Indonesians showed good internal validity and reliability, with a validity coefficient ranging from 0.648 to 0.800 and a Cronbach's alpha score of 0.86. The seven items have a total score between 0 and 21. Anxiety symptoms are more severe when the GAD-7 score is higher. The cut-off is 11.[29] The internal consistency of the GAD-7 employed in this study was 0.80, indicating strong reliability. While, the depression symptoms were assessed with the PHQ-9. With a Cronbach's alpha of 0.88, the PHQ-9 has shown validity and reliability in a range of Indonesian communities and was used to assess depressive symptoms. The 9 items on the PHQ-9 were rated on a scale of 0 to 3, with a rating of 0 denoting "not at all" and a rating of 3 denoting "almost every day." The total score ranges from 0 to 27. A higher PHQ-9 indicates more severe depressive symptoms.[30] The cut-off is 14. The internal consistency reliability in this study, as measured by Cronbach's alpha, was 0.79.

BED was measured by the BES, each of the 12 items in this questionnaire has 4 Likert scales—never, sometimes, often, and always—with a score ranging from 1 to 4.

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The likelihood of binge eating disorder increases with a higher score. The cut-off for this instrument is 24. Additionally, the scale's validity and reliability have been demonstrated.[13] The internal consistency of the scale employed in this study was good (Cronbach's α = 0.76).

Ethical considerations

This study was approved by the institutional review board of the Faculty of Health Sciences at Universitas Nasional; the clearance number is 039/e-KEPK/FIKES/IV/2025. The RAs gave each participant a clear explanation of the study's objectives, possible risks, and possible advantages. Before any data was gathered, the RAs also explained the procedures, the expected time commitment, and the intended use of the data. More time was devoted to answering any questions participants may have had and encouraging them to express any concerns or uncertainties. The RAs also used clear language and follow-up questions to make sure participants understood every aspect of the study before obtaining written informed permission. The participants were also told that they might decline to take part in the study at any time without incurring any fees.

Data analysis

The Statistical package for the Social Sciences (SPSS) program version 29 was used for analyses. Categorical variables were presented as frequency and percentage. The dependent variable was the BED, categorized as yes vs. no. Data analysis included univariate, bivariate, and multivariate. Univariate analysis was used to describe the frequency distribution of each variable. The bivariate tests was used to investigate the relationship between two categorical variables. In this study, the continutity correction was performed on a 2x2 contingency table with no expected frequencies less than 5. While Fisher's exact test was used when there were cells with expected frequencies less than 5 in a 2x2 contingency tables. Meanwhile, the Pearson chi-square test was used if the expected count in at least 80% of the cells was 5 or more, and no cell had an expected count of 0 in a 2x2, 3x3, or larger contingency table.

Multivariate analysis was conducted using binary logistic regression because the dependent variable BED in this study was categorized as "No" and "Yes". This test was to assess the simultaneous relationship between independent variables and categorical dependent variable (backward stepwise method). Variables included in the multivariate test were those with a p-value < 0,25 in the bivariate analysis. The odds ratio (OR) with a 95% confidence interval (CI) were reported. Assumption tests were conducted prior to the logistic regression analysis such as 1) the dependent variable in this study was categorical, namely "Yes BED" and "No BED," as shown in Table 1; 2) conducted the bivariate tests, such as the continuity correction, Fisher's exact test, and Pearson chi-sqaure, as shown in Table 2; 3) conducted a multicollinearity test, which yielded a VIF < 10, and 4) performed the goodness-of-fit to ensure that the model is fit. All results of these assumption tests met the requirements for conducting a logistic regression analysis.

RESULT

Table 1 reports the characteristics of the participants. There were 113 participants who completed the study, the prevalence of BED was 46 participants (40.7%), and 50 of them were females (52.2%). The majority of participants have no experience with smoking (91.2%). Regarding education levels, 82 participants (72.6%) graduated before university or college, and the duration of sleep was less than 7 hours per day (52.2%). Sixty-four participants were overweight (56.6%), and they have a high self-esteem in their daily life. Sixty-one participants were not following dietary restrictions and majority of participants have no psychological disorders, such as anxiety and depression.

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Table 1. Participants Characteristics (n=113)

Variables	n (%)
Age (years)	
15-22	69 (61.1)
23-30	44 (38.9)
Gender	
Male	54 (47.8)
Female	59 (52.2)
Smoking status	
No	103(91.2)
Yes	10 (8.8)
Education	
Elementary to senior high school	82 (72.6)
University/college	31 (27.4)
Sleep duration (hours/day)	
< 7	59 (52.2)
≥ 7	54 (47.8)
BMI	
Underweight	9 (8.0)
Normal	28 (24.8)
Overweight	64 (56.6)
Obese	12 (10.6)
Self-esteem	
Low	45 (39.8)
High	68 (60.2)
Dietary restriction	
No	61 (54.0)
Yes	52 (46.0)
Anxiety symptoms	
No	63 (55.8)
Yes	50 (44.2)
Depression symptoms	
No	81 (71.7)
Yes	32 (28.3)
BED	
No	67 (59.3)
Yes	46 (40.7)

Table 2 shows a comprehensive overview of demographic characteristics in relationship with the BED. The results revealed that there were significantly relationship between gender, dietary restriction, anxiety symptoms, and depression symptoms with BED among adolescents ($p<0.05$). Furthermore, female participants were more likely to experience BED compared to male participants. It was recorded that 52.5% of female respondents in this study have BED and were undergoing dietary restriction. Related to psychological disorders, it appeared that 56% of participants with BED experienced with anxiety symptoms, and 59.4% have depression symptoms.

Table 2. The association between independent variables and BED (n=113)

Characteristics	Binge eating disorder				Total		*p**
	No		Yes				
	n	%	n	%	n	%	
Age (years)							0.180*
15-22	37	53.6	32	46.4	69	100	
23-30	30	68.2	14	31.8	44	100	
Gender							0.013*

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Characteristics	Binge eating disorder				Total		p*
	No		Yes				
	n	%	n	%	n	%	
Male	39	72.2	15	27.8	54	100	
Female	28	47.5	31	52.5	59	100	
Smoking status							0.738**
No	62	60.2	41	39.8	103	100	
Yes	5	50.0	5	50.0	10	100	
Education levels							1.000*
Senior high school	49	59.8	33	40.2	82	100	
University/college	18	58.1	13	41.9	31	100	
Sleep duration							1.000*
(hours/day)	35	59.3	24	40.7	59	100	
< 7	32	59.3	22	40.7	54	100	
≥ 7							
BMI							0.272***
Underweight	4	44.4	5	55.6	9	100	
Normal	14	50.0	14	50.0	28	100	
Overweight	43	67.2	21	32.8	64	100	
Obese	6	50.0	6	50.0	12	100	
Self-esteem							0.270*
Low	30	66.7	15	33.3	45	100	
High	37	54.4	31	45.6	68	100	
Dietary restriction							0.001*
No	45	73.8	16	26.2	61	100	
Yes	22	42.3	30	57.7	52	100	
Anxiety symptoms							0.006*
No	45	71.4	18	28.6	63	100	
Yes	22	44.0	28	56.0	50	100	
Depression symptoms							0.020*
No	54	66.7	27	33.3	81	100	
Yes	13	40.6	19	59.4	32	100	

*Continuity Correction; **Fisher's Exact Test; ***Pearson Chi-Square

According table 3. The steps for the variables included in logistic regression analysis were: 1) the researchers conducted a bivariate test (table 2). If the results of the test yielded a p-value < 0.25, then the variables could be included in the logistic regression analysis; 2) performed a logistic regression analysis, variables with a p-value > 0.25 were excluded. However, the variables were not excluded all at once but rather in stages, starting with the variable having the highest p-value; and 3) after the variable with the highest p-value was excluded, then compared the OR before and after that variable was removed. If the resulting OR difference was < 10%, the variable could be excluded from the analysis.

There were two steps, step 0 and step 1, to achieve the final model. Step 0 included age, gender, dietary restrictions, anxiety and depression symptoms. The result of step 0 showed that age was excluded because it has the largest p-value. Then, the researchers reran the analysis without including age in step 1. The result showed that all independent variables in step 1 were statistically significant (p<0.05). To determine whether the model in step 1 was fit, the goodness-of-fit was conducted. The result showed p=0.262; it was greater than the p-value > 0.05. It can be explained that the model in step 1 was fit. To assess the absence of multicollinearity, all VIF values in this study were below 10, ranging from 1.05 to 1.19. It showed that there was no multicollinearity among the independent variables in this study. Based on these results, it can be concluded that the model in step 1 is fit and final. Variables included in the final model were gender, anxiety

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symptoms, depression symptoms, and dietary restrictions. It can be explained that those variables had the most substantial relationship to the occurencelt of BED among adolescents and young adults, as shown by the significance value of p <0.001; <0.001; 0.013; and 0.024, respectively. In addition, the Negelkerke R^2 value is 0.396, which means that the variablity of the BED can be explained is 39.6%, while variables outside the study explain the remaining 60.4%.

Table 3. Step by step of logistic regression analysis of BED in Jakarta (n=113)

Step	Independent Variables	B	S.E	Wald	p-value	OR	95% CI	
							Lower	Upper
0	Age	-1.010	0.557	3.287	0.070	0.364	0.122	1.085
	Gender	2.080	0.578	12.939	<0.001	8.007	2.577	24.874
	Dietary restriction	1.502	0.569	6.957	0.008	4.489	1.471	13.702
	Anxiety symptoms	1.991	0.581	11.737	<0.001	7.321	2.344	22.866
	Depression symptoms	1.145	0.596	3.693	0.055	3.142	0.977	10.098

Step	Independent Variables	B	S.E	Wald	p-value	OR	95% CI	
							Lower	Upper
1	Gender	2.061	0.553	13.911	<0.001	7.854	2.659	23.199
	Dietary restriction	1.126	0.500	5.076	0.024	3.084	1.158	8.213
	Anxiety symptoms	1.961	0.558	12.349	<0.001	7.107	2.381	21.219
	Depression symptoms	1.420	0.571	6.174	0.013	4.137	1.350	12.678

-2 Loglikelihood= 113.482, Cox&Snell R^2= 0.293, Negelkerke R^2= 0.396
Goodnes-of-fit= 0.262
*p < 0.05 Multiple logistic regression (backward method)

DISCUSSION

Gender with BED

The result showed that there was relationship between gender and BED among adolescents and young adults. Females are more frequent compared to males. In this study, females are more likely to pay attention regarding their appearance because they want to look more attractive and become the center of attention for the opposite gender. Thus, occasionally they engage in extreme food restriction, which lead to the development of BED. This study was supported by a previous study reported that females are more likely to have BED rather than male.[4,13] In this study, females commonly have eating styles, food preferences, and activity of brain regarding negative body perception. Furthermore, females indicated sex steroid hormones, such as progesterone, estradiol, and testosterone, can be connected to gender and have a considerable impact on the likelihood of eating disorders in both males and females over the course of their life. Three perspectives—social, cognitive, and neurophysiological—have been used to analyze gender differences in BED. Gonadal steroid hormones have been linked to BED, according to neurophysiological research.[31]

Psychological disorders with BED

BED among adolescents and young adults also influenced by psychological factors, such as anxiety and depression. These findings are consistent with the biopsychosocial framework. When they are faced with stressors, whether they originate from internal

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causes like self-doubt or external variables like social demands or life issues, adolescents on a regulated diet are less likely to experience diminished self-control.

Various studies focusing on anxiety theory report that there is a significant association between anxiety and BED. People with anxiety undergo binge episodes and unconsciously use them as a means to cope with their anxiety, which could be linked to their increased hunger when they are nervous. This coping strategy has actually been shown to be associated with a decrease in anxiety. According to reports, the second most prevalent psychological comorbidity among BED patients is anxiety disorders.[10,32] According to the study, persons who experience anxiety commonly overeat and unintentionally utilize it as a coping method since they are more hungry during stressful situations. It has been demonstrated that this coping mechanism is linked to a reduction in anxiety.[33] On the other hand, a recent Indonesian study found no connection between eating problems and anxiety. Nevertheless, BED was not particularly examined in the study. [34] There is relatively little research on anxiety and BED. However, this study made it clear that the most prevalent psychological comorbidity among BED sufferers is anxiety. In order to determine the severity of BED, screening for psychological impairment should be done.

Depression symptoms and BED also correlated significantly in this study. Among other particular mood disorders, such as major depression is the most prevalent comorbidity with BED. The pathophysiological significance of depression in BED is generally poorly understood. However, a recent concept suggests that the dopaminergic pathway plays a crucial role in impulsive or compulsive food consumption theory and its regulation by the brain reward system (mesocorticolimbic circuit). It is believed that another neuropathway involving the neurotransmitter serotonin (5-hydroxytryotamine [5-HT]) is essential to the development of BED among adolescents.[35] The current result is also consistent with an earlier Bahrain study that found depression to be the most significant psychological factor influencing BED in individuals between the ages of 15 and 30.[10] However, a study carried out in Turkey revealed that among medical students, there was no discernible difference between those with and without BED and depressive symptoms.[36] Before undertaking health education to prevent BED, particularly among the adolescents and young adult population, screening for depression and anxiety is necessary because the study's findings indicated that psychological issues were the decisive factors that contributed to BED. Additionally, the psychological factors ought to be a measure of the future BED intervention's effectiveness.

In this study, depression among adolescent in Jakarta is influenced by a combination of psychological variables, peer conflicts, and less harmonious familial circumstances. Adolescents' mental vulnerability is increased by the competitive urban environment, bullying, social media exposure, and lack of safe venues for conversation. These phenomena will have an impact on EDs especially BED among adolescents. Thus, future studies should be examined these variables on the depression among adolescents and young adults with BED.

Dietary restrictions with BED

In this study, dietary restriction reported significantly relationship with BED among adolescents and young adults. This statement similars to another study explained that adolescents who exert self-control over their eating habits will monitor their food intake and attempt to combat physiological processes like hunger and satiety.[37] Dietary restriction defined as constraints on what someone can eat, influenced by health (allergies, diseases like celiac or diabetes), religious or cultural convictions (kosher, halal, vegetarianism), or personal choices (veganism, gluten-free). They entail leaving

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out particular foods, substances, or entire food groupings, necessitating careful label reading and meal preparation for wellbeing and inclusivity.[38]

In order to maintain their weight and diet, most participants in this study frequently skipped breakfast and engaged in portion management and dieting. It is also not uncommon for them to watch their calorie and intake. However, the investigation revealed that when it comes to its application, people prefer to pay more attention to their desired outcomes than to whether the diet is suitable. This can lead to a state of deprivation, which can trigger binge eating as a method to compensate for the perceived lack of food.

Associated factors of BED among adolescents and young adults

According to the results of this study revealed that gender, anxiety, depression, and dietary restrictions among adolescents significantly associated with BED. These findings reflect that it is not only psychological issues that influence the occurrence of BED in adolescents, but extreme dieting issues to achieve an attractive appearance also affect the development of BED in adolescents, particularly female adolescents and young adults. The city of Jakarta, being a metropolitan city and a fashion trend center for adolescents and young adults, is also one of the reasons these populations develop BED. These supported by the result of this study showed that female adolescents are more likely to have BED than male adolescents. Furthermore, the study reported that gender had the highest OR among the other variables, at 7.854, meaning that female participants in the study have an 7-fold higher risk of developing BED symptoms than males after controlling for dietary restrictions, anxiety, and depression. This found was similar to another study explained that females adolescents have a complex interplay of biological vulnerability, sociocultural pressures, and emotional processing. The theory of the biological and sex hormone expalined that women's neurological susceptibility to binge eating and mood-related triggers can be increased by changes in ovarian hormones (such as estradiol) during adolescence and the menstrual cycle. Sociocultural pressures also stated that women are under tremendous pressure to uphold a slender ideal due to Western beauty ideals. One of the main causes of disordered eating is the high rates of body dissatisfaction that result from this. While, the concept of emotional coping showed that anxiety, worry, and despair are among the unpleasant feelings that women are more likely to use food as a coping strategy, which can lead to binge episodes.[39,40]

Given that South Jakarta is the busiest culinary hub in Jakarta and offers a wide range of culinary options, from renowned street food to cafes and upscale restaurants, the study conducted in Jakarta indicates that participants living in South Jakarta will find it easier to obtain a variety of foods. However, the majority of people prioritize the food's taste and look over its nutritional value. This will ultimately lead to dietary imbalances including obesity and elevated BMI. Furthermore, few studies have examined ideas from social comparison theory and the integrated cognitive and behavioral model of binge eating, despite the fact that some researchers have documented connections between potential causes of binge eating. The presentation of the theoretical framework along with these factors provides a rational explanation for overeating habits among adolescents and young adults in Jakarta, Indonesia.

Limitations

A number of restrictions must be recognized in order to comprehend the findings. First, a causal relationship could not be established because the study was cross-sectional. Second, despite our best efforts to find influencers who cover a range of topics, there might have been bias in the participant selection process. Third, the majority of respondents were female. The results of the study might have been better if the sample

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had been more uniformly distributed by sex. Fourth, due to the instruments used were self-report, it might influence to the results. Thus, future studies should control this issue by using dedicated scales, such as the Balanced Inventory of Desirable Responding (BIDR). Last, sampling method in this study was a convenience sampling, it might be a bias sampling due to the selection of samples is based on ease of access and availability, and it may limit the generalizability of the study's findings. Thus, future research should be considering to choose a random sampling to avoid the bias.

Strengths of the study

this study has several important implications and strengths. The results of this study can serve as a foundation for screening and early identification of BED in adolescents and young adults, taking into consideration BED-related characteristics such gender, food restriction, and symptoms of anxiety and depression. In order to avoid BED, medical personnel are also obliged to create health interventions that concentrate on enhancing psychological variables and nutritional status by considering gender. Early BED prevention might also benefit from incorporating these findings into health education programs for adolescents and non-communicable units at the community health center. Our study is the first that we are aware of that focuses solely on BED, especially among adolescents and young adults in Jakarta.

CONCLUSION

BED in adolescents and young adults is a multidimensional mental health issue influenced by the interaction of psychological factors, eating behaviors, and urban social pressures. The study's results show that women made up the majority of participants, with 52.5% of them experiencing BED. Gender, psychological problems, such as anxiety and depression, and dietary restrictions are associated with BED among adolescents and young adults. Further analysis explained that those factors are also determinants in developing BED among adolescents in Jakarta. The results of this study suggest serve as a reference and initial data for further study on BED screening among those populations. In addition, these results can also serve as preliminary material for developing appropriate health interventions for the prevention of BED among adolescents, particularly in Jakarta and in Indonesia in general.

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