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RESEARCH ARTICLE

Psychometric Properties of Binge Eating Scale Indonesian Version

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Abstract:

This research aims to examine the psychometric properties of the Indonesian version of the Binge Eating Scale (BES) and to describe characteristics of binge eating among emerging adults aged 19 – 25 years old in 3 private universities in Indonesia. The Indonesian version of BES *was* translated forward and backwards, according to the second edition of the ITC guidelines to confirm conceptual and linguistic equivalence. The result provided factor structure evidence and showed good reliability of the BES Indonesian version. No significant difference between man and woman and Body Mass Index was observed.

Keywords: Binge eating scale, Factor analysis, Psychometric, Body mass index, Emotional symptoms, Cognitive symptoms.

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1. INTRODUCTION

Binge Eating Disorder (BED) is a behavior characterized by eating large amounts, accompanied by feelings of loss of control in this episode, followed by repeatedly occurring sadness, without any anticipation of weight gain as in bulimia nervosa [1].

Binge eating disorder is associated with severe implications in both clinical and non-clinical populations [2, 3]. Binge eating disorder is also associated with increased BMI, anxiety, depression, decreased quality of life, increased risk of death as well as the risk of suicide [2 - 9].

Its prevalence in various countries seems to be increasing, especially in adolescence and emerging adults [10]. There are two peaks of binge eating onset, after puberty, on average at 14 years and 19-25 years [11, 12]. Various studies show binge can occur in both men and women [12, 13].

Binge eating was increasingly found in various parts of the world, Indonesia, as a country that has an increasing economy, and the rise of social media use, which tends to increase the external influence on the prevalence of binge eating.

The prevalence of binge eating withvarious problems had to be anticipated. So far in Indonesia, no research has found the prevalence of binge eating, therefore, valid and reliable measurements are undoubtedly needed. For this reason, it was important to have a valid measurement tool to measure binge eating in the Indonesian population.

Binge Eating Scale (BES) is a very well-known measurement for binge eating severity as well as a screening tool [3, 14, 15]. The purpose of this study is to examine the factor structure and reliability of the BES Indonesian version and relationships between BES with BMI and sex.

2. METHODS

2.1. Participants

Participants were 553 undergraduate, Indonesian students from 3 private universities in Semarang city. Female (n = 373; 67%;), average age 19 years (Mean = 19.37, SD = 1), BMI (Mean = 21.64, SD = 4.73), Javanese ethnic = 382 people and non javanese = 171 people. Marital status = 551 unmarried, 1 person refused to answer, and 1 person was married. Participation in this study was voluntary, informed consent was obtained by participants before filling out the questionnaire.

2.2. Measure

A self-report instrument, BES measures cognitive/ emotional symptoms and behaviors related to binge eating, consisting of 16 items, out of which 8 items describe behavioral manifestations and 8 items describe cognition/ feelings, each item consists of 3-4 choice statements/responses

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that indicate the severity of each binge eating characteristic being measured. Weighted scores range from 0-3 (0 indicate no Binge problems, 3 indicates a severe binge eating problem). The total score has a range of 0-46. Cut off score: non / mild ≤ 17, moderate 18–26, severe ≥ 27.

The Indonesian version of BES was carried out through a process of translational adaptation, namely forward and back translation, according to guidelines issued by the second edition of the ITC. The translation was carried out separately by three people, who were fluent in English and professionals and then reviewed by a bilingual research expert who knows the purpose of the research to get the translation appropriate. The panel results were then translated back into English by 3 professionals and one of them was a native speaker. The results of the translation were reviewed once again by bilingual researchers, who understood the purpose of the study. The Indonesian version of BES carried out trials on 40 students, then reviewed by a bilingual researcher who understood the purpose of the study to obtain a simple and easy-to-read measurement tool.

2.3. Statistical Analysis

Confirmatory Factor Analysis (CFA) was used to examine the factor structure of the BES Indonesian version. Some fit was used to test the CFA model with a fit or fit number as used by Escrivá-martínez (2019), chi-square has $p < .05$, CFI shows good fit if the value is more than .09, and root-mean-squared. The error of approximation (RMSEA) was declared fit if the value was less than .08, the Comparative Fit Index (CFI), the Goodness of Fit Index (GFI) and the Relative Fit Index (RFI) were declared fit if the value was greater or equal to 0.90. The analysis of BES was performed using SPSS and Lisrel Student 8.8 (Jöreskog & Sörbom). The reliability coefficient was calculated by Cronbach Alpha.

3. RESULTS

3.1. Factor Structure and Reliability of the BES Indonesian version.

The results of the translation of each item of BES are shown in Table **1**. Summarized results of the analysis and loading factors of each item of BES are shown in Table **2**. Each item showed a loading factor greater than 0.05 so that all items are significant. Match / fit is seen from $X^2 = 169.49$ (N = 553; $p = .000$); df = 86; RMSEA = 0.042; CFI = 1.00; CGI =, RFI = 0.99; GFI = .96. The results indicate that RMSEA, CFI, CGI, RFI, and GFI all show a good fit. Unidimension of BES Cronbach's alpha = 0.831, emotional/cognitive factors Cronbach's alfa = .754 and behavior factor Cronbach's alpha = 0.612.

Table 1. BES Indonesian version.

1.	a. I don't feel worried about my weight or body shape when I'm with other people.
	b. I worry about how I will look to others, but usually that doesn't make me feel disappointed in myself.
	c. I was worried about my appearance and weight which made me feel disappointed in myself.
	d. I feel very worried about my weight, and many times I feel very embarrassed and disgusted with myself. I try to avoid social contact with other people because of it.
2.	a. I have no trouble eating slowly according to the prevailing regulations.
	b. Even though it looks like I am "gobbling up" food, I don't feel full from eating too much.
	c. Sometimes, I tend to eat quickly and then, I feel uncomfortable because of the fullness afterward.
	d. I have the habit of swallowing my food, without actually chewing it. When this happens, I usually feel uncomfortable because of being full, because I have eaten too much.
3.	a. I feel able to control or control my appetite when I want to.
	b. I feel like I have failed to control or control my eating, more than the average person.
	c. I feel completely helpless when it comes to controlling or controlling my appetite for food.
	d. Because I felt so powerless to control or control my eating, I became very desperate to try to control it.
4.	a. I don't have the habit of eating when I'm bored.
	b. I sometimes eat when I'm bored, but most of the time I'm able to "keep busy". and take my mind off the food.
	c. I have a regular habit of eating when I'm bored, but sometimes, I can use other activities to take my mind off eating.
	d. I have a strong habit of eating when I'm bored. It seems that nothing can help me to break this habit.
5.	a. Usually I eat when I am physically hungry.
	b. Sometimes, I eat because of the urge / impulse to eat even though I'm not really hungry.
	c. I have a regular habit of eating foods, which I may not really like or enjoy, to satisfy my hunger, even though I don't physically need them.
	d. Even though I am not physically hungry, I have a hunger in my mouth, which seems to be satisfied only when I eat food that fills my mouth, such as a sandwich or sandwich. Sometimes, when I eat food to satisfy the hunger in my mouth, I then vomit it or take it back out so that I won't gain weight.
6.	a. I don't feel guilty or hate myself after I overeat.
	b. After I overeat, sometimes I feel guilty or hate myself.
	c. Most of the time I experience strong guilt or self-loathing after I overeat.

(Table 1) contd.....

7	a. I don't lose total control over my eating when dieting (regulating food intake), even after periods of overeating.
	b. Sometimes when I eat "forbidden food" I eat. on a diet (regulating food intake), I feel as if I have "failed". and even eat more.
	c. Often, when I overeat on a diet, I have the habit of telling myself, "I've failed now, why not just". When that happens, I eat even more.
	d. I have the habit of regularly starting a strict diet for myself, but I break my diet by continuing to overeat. My life seems like "in a party situation (a lot of eating)" or in a "starvation" situation.
8.	a. I rarely eat so much food that I feel uncomfortably full afterwards.
	b. Usually around once a month, I eat large amounts of food, and eventually I feel very full
	c. I have regular periods or times throughout the month for eating large amounts of food, whether at mealtimes or at snack times or snacks.
	d. I eat so much food that I regularly feel very uncomfortable after eating, and sometimes feel a little nauseous .
9.	a. My calorie intake levels generally don't go up very high or fall very low
	b. Sometimes after I overeat, I will try to reduce my calorie intake to almost nothing (or eat almost nothing) to compensate for the excess calories I have eaten.
	c. I have a regular habit of overeating at night. It seems that my routine is not feeling hungry in the morning, but overeating at night.
	d. In my adult years I have had week long periods where I starved myself. This period occurs after a period I overeat. It seems that I live a life like the "in a party situation (a lot of eating)" or in a "starvation" situation.
10.	a. I can usually stop eating when I want to. I know when "enough is really enough" I know. .
	b. Occasionally, I have an urge to eat that I can't seem to control.
	c. Often times, I have a strong urge to eat that I can't seem to control, but other times I can control my urge to eat.
	d. I felt unable to control my urge to eat. I was afraid that I couldn't stop eating voluntarily
11.	a. I have no trouble or trouble stopping eating when I feel full.
	b. I can usually stop eating when I feel full, but sometimes overeating makes me feel uncomfortable because of being full (my stomach is full).
	c. I have difficulty or problems stopping eating once I start eating, and usually after eating I feel uncomfortable because of being full (my stomach is full).
	d. Because I have the problem of not being able to stop eating when I want to, sometimes I have to make myself vomit to relieve feelings of fullness.
12.	a. It seems that I eat as much when I am with other people (family, social gatherings) and when I am alone.
	b. Sometimes, when I'm with other people, I don't eat as much as I want because I feel worried about my eating.
	c. Often times, I only eat small amounts when there are other people around, because I am so embarrassed by my eating.
	d. I feel so embarrassed by the overeating that I have, that I choose times to overeat when I know no one will see me. I feel like a "hidden eater".
13.	a. I eat three times a day with only one snack once in a while.
	b. I eat three times a day, but I usually also eat small meals between meals.
	c. When I eat small meals that make me full, I get used to skipping my regular meals.
	d. There are regular periods when I seem to be eating constantly, without a planned meal schedule or without eating
14.	a. I didn't think much about controlling or controlling my unwanted appetites.
	b. There are at least certain times when I feel my thoughts are occupied (preoccupied with) trying to control or control my appetite.
	c. I feel that I often spend a lot of time thinking about how much food I've eaten or about trying not to eat anymore
	d. It seemed that most of the time I was awake I was occupied (preoccupied with) thoughts about eating or not eating. I felt like I was constantly struggling not to eat.
15.	a. I don't think much about food
	b. I have a strong desire to eat but it only lasts for a short time.
	c. I have days when it seems I can think of nothing but food.
	d. Most of my days, I seem to be occupied (preoccupied with) thoughts about food. I feel like I live to eat.
16.	a. I usually know whether I am physically hungry or not. I take the right portion of food to satisfy my hunger
	b. Sometimes, I am not sure whether I know that I am physically hungry or not. At such times, it is difficult for me to know how much food I should take to satisfy my hunger.
	c. Although I may know how many calories I should eat, I don't know the amount of "normal" food. for me.

Table 2. Summary of analysis results of CFA BES version indonesia.

Item	Factor Loading		Standar Error	t-value	R^2
	Behav	Cog/Em			
1		.65	.27	21,45	.61
2	.71		.58	17,97	.46
3		.72	.27	21,15	.59
4	.57		.21	21,9	.61
5	0.68		.42	19,48	.53

(Table 2) contd.....

Item	Factor Loading		Standar Error	t-value	R^2
	Behav	Cog/Em			
6		.68	.34	20,81	.58
7	.81		.73	18,03	.48
8	.65		.44	18,52	.49
9		.72	.37	21,15	.59
10		.70	.26	22,94	.66
11	.37		033	13,34	.29
12		.68	.29	21,35	.60
13	.57		.91	12,70	.26
14		.65	.33	20,54	.57
15		.68	.29	21,85	.61
16		.68	.19	24,38	.71
CR	0.845	0.861			
t tabel			.253		
X^2 = 169.49, p = 0.000 df = 86 RMSEA = 0.042 CFI = 1,00					

Note: Bev: Bahavior; Cog/Em: Cognition/Emotion; CR: Construct/compose Reliability; df: degree of freedom; X^2: Normal Theory Weighted Least Squares Chi-Square; RMSEA: Root Mean Square Error of Approximation; CFI: Comparative Fit Index

3.2. Sex Difference in BES scores

Analysis of the differences in BES scores based on sex grouping, obtained in men (M = 7.756; SD = 7.271) and women (M = 8.836; SD = .348); obtained t (330) = -1.679, p > .05. It was found that there were no differences in BES scores in men and women.

3.3. The Relationship between BES Scores Based on BMI

The relationship between the Indonesian version of BES scores with BMI using Pearson's Moment coefficient analysis obtained r = 0.304; (p <0.05). There is no relationship between BMI and BES scores. The relationship between BMI with the two factors of BES, namely behavioral and cognitive/emotional manifestations, was carried out and the results obtained showed no relationship between BMI and behavioral manifestations *(r* = .308; p> 0.05) and BMI with factors cognitive / emotions (r = 0.422; p > 0.05).

4. DISCUSSION

Based on the research results obtained, the Indonesian version of BES looks valid to be used to measure the prevalence and severity of binge eating in the population of Indonesia.

The results of this study also show the validity of the two factors present in BES, namely, behavioral and cognitive/emotional manifestations. The loading factor *was* examined by the BES factors in accordance with the original version. The results of this study show similarities with studies conducted in populations of Saudi Arabia and Spain. There was a weak correlation between BMI and BES scores, the same results were obtained in studies conducted in populations of Spain and Portugal [3, 14]. Another study also found there was no BMI difference [15].

CONCLUSION

Binge eating has high rates of persisting or worsening in early young adulthood [14]. This study support the existing literature that found binge eating in emerging adulthood. The Indonesian version of BES has good validity. The 2-factor BES was revealed to be important in Indonesia, cross-culturally. There were language and cultural differences among Indonesian ethnics, which required a scale that uses standard language.

This Indonesian version of BES can be used immediately. Thus, it can help improve planning of health promotion, prevention, and treatment of binge eating.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

No Animals were used in this research. All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Informed consent was taken from all the patients when they were enrolled.

AVAILABILITY OF DATA AND MATERIALS

Not applicable.

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None.

CONFLICT OF INTEREST

The author declares no conflict of interest, financial, or otherwise.

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