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Development and validation of the Binge Eating Disorder Scale (BEDS)

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ABSTRACT

Objective: Binge Eating Disorder (BED) is one of the most frequent eating disorders presentations. The primary symptom is recurrent episodes of binge eating, characterized by a large amount of food in a short period and a sense of losing control over eating. BED could contribute to the development of obesity and its complications. The study aimed to design and validate a scale to identify risk behaviors for BED.

Methods: An instrumental design was used to describe the development and initial validation of the new brief scale, BEDS. Participants were 345 adults who completed the self-report questions and reported BED episodes in the past three months.

Results: The BEDS was initially composed of 10 items to ended up with 6 items due to analysis and exploratory factor analysis (EFA). In the analysis process, 3 models were explored within which a unidimensional model with 6 items was maintained. Likewise, reliability was adequate (α = 0.922; ω = 0.924). On the other hand, it was proved that the instrument correctly assesses binge eating behavior when comparing groups, where it was obtained that those who had identified episodes of binge eating in their life maintained higher averages in the test than those who did not present this problem. Similarly, there were more episodes in women than in men, and in those who presented burnout.

Conclusion: BEDS demonstrated adequate psychometric properties and is useful for future research.

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KEYWORDS

Eating disorders, eating behavior, obesity, psychometrics properties.

INTRODUCTION

Eating disorders (ED) are serious mental health conditions marked by an intense preoccupation with eating-related behaviors, a deep fear of weight gain, and a distorted body image[1]. They are a global mental health problem affecting people of all genders, ages, backgrounds, and locations; it is a phenomenon that has been increasing over the years and has several consequences associated with high morbidity and mortality. Although they can affect anyone, evidence suggests that these disorders are more prevalent among young females, often beginning in adolescence and continuing into adulthood[2].

Among the EDs, Binge Eating Disorder (BED) is a common form of eating disorder listed in the Diagnosis and Statistical Manual of Mental Disorders, 5th Edition (DSM-5)[1]. Several criteria define BED, the primary symptom is recurrent episodes of binge eating, characterized by a large amount of food in a short period and a sense of losing control over eating. Episodes occur at least once a week for the previous three months and are usually without compensatory behavior[1].

The prevalence of Binge Eating Disorder (BED) varies widely depending on diagnostic criteria and study location. According to the World Health Organization (WHO), in a survey of 14 countries, a BED lifetime prevalence rate of 1.4% [3]. In the United States, the prevalence is higher, at 2.8% [4]. In Latin America, data is limited, and prevalence ranges vary, making it challenging to provide a specific range[5]. However, some studies indicate that in urbanized regions of Latin America, BED prevalence can be similar to that of Europe and the United States[3,6]. In Peru, there is no reported epidemiological data on BED[7]. Due to the lack of information and val-

idated screening tools, this condition remains underdiagnosed and undertreated.

Furthermore, BED is strongly related to overweight and obesity[8,9], making it a more common issue than it seems. BED can contribute to obesity and its complications for several reasons, including excessive caloric intake in a short period, impulsive eating in response to emotions, and the absence of compensatory behaviors[8,10]. Despite the well-known health burden of BED and obesity, few individuals receive adequate professional treatment. This is partly due to limited information, lack of knowledge, and limited experience among healthcare professionals not specialized in eating disorders[11]. Several self-report instruments, such as the Binge Eating Scale (BES)[12] and the Questionnaire on Eating and Weight Patterns-R (QEWP-R)[13], have been developed to measure binge eating episodes. While the BES is commonly used among individuals with obesity, research on its psychometric properties in the general population is limited. Hence, this study aimed to create and validate a scale for identifying BED risk behaviors.

METHODS

Study Design

An instrumental design was used, encompassing the design of instruments and evaluations of psychometric properties. Recruitment of participants and data collection occurred between June and July 2023. Primary demographic data were collected, such as sex, age, marital status, educational level, and whether they had experienced a binge eating episode in recent weeks, to adequately characterize the sample and allow for a comprehensive analysis of the results.

Study Sample

The sample was non-probabilistic for convenience. Participants were recruited through online recruitment strategies, including posting on social media, mailing, and announcements. The main inclusion criterion was that participants were over 18 years of age; there were no exclusion criteria. The participants were 345 Peruvian adults (32.2% male, 67.8% female). Data were obtained from single (87.8%), married (7.5%), cohabiting (2.6%) and divorced (2.0%) with an average age of 24.19 years (SD = 7.76 years). Regarding education, 22.1% had basic education, and 77.9% had higher education. Additionally, participants were asked about experiencing binge eating episodes, with 58.3% acknowledging such episodes and 41.7% reporting no such experiences.

Measure

Binge Eating Disorder Scale (BEDS), derived from scientific literature and DSM-5 criteria, initially comprised by 10 self-report questions. It assesses risk behaviors related to BED within the past three months. These items present statements about risky eating behaviors, and respondents use a five-point Likert scale (1 = "never" to 5 = "always") to indicate their frequency. The content validity of the items was assessed by three expert judges, yielding Aiken's V coefficient values with appropriate confidence intervals for relevance, consistency, and clarity (Appendix A).

Statistical Analyses

Initially, the descriptive statistics of the items were analyzed. Likewise, to determine the univariate normality of the items, the criteria of skewness (±2) and kurtosis (±7) coefficients were followed. In addition, the matrix of polychoric correlations was obtained due to the ordinal nature of the items.

Consequently, we proceeded with exploratory factor analysis (EFA) and explored the sample adequacy of KMO (>0.80) and Bartlett's sphericity. Likewise, the Kaiser and Acceleration Factor criteria were evaluated to determine the number of factors. Likewise, factor loadings were expected to exceed 0.50 [14]. Reliability was obtained by internal consistency through the alfa y omega coefficient[15].

To provide further empirical evidence, differences in BEDS scores were established between groups. For these differences, the t-Student test was calculated and the effect size (*d*) of each analysis was evaluated to assess the differences[16].

Ethical Statement

The study was conducted following the principles of the Helsinki Declaration and approved by the Research Committee of the University of Sciences and Humanities, Lima, Peru (Registration code 034-23). All participants were given written information about the aim and the procedures of the study and gave informed consent.

RESULTS

Table 1 presents descriptive statistics for the items. The mean values exhibit a central tendency, except for items 8, 9, and 10, which deviate from the rest. Skewness and kurtosis coefficients fall within an acceptable range, indicating univariate normality for the items. However, items 8, 9, and 10 display negative skewness, contrasting the first seven items. Examining the polychoric correlation matrix, item 9 displays a negative association with the other items, while item 10 exhibits weak associations with the rest. These findings suggest that items 7, 8, 9, and 10 warrant further scrutiny in subsequent analyses.

During our EFA, we initially identified a two-factor model. In this model, items 8, 9, and 10 formed a single factor, accounting for 16% of the total variance. Notably, items 9 and 10 exhibited higher uniqueness and limited shared variance with other items. When reviewing these items, it was observed that their content was associated with general questions on eating disorders but not focused on the binge eating disorder construct. Therefore, it was decided to remove them since they had content that was not intended to be measured.

Table 1. Descriptive and polychoric correlation of items

Items	M	SD	g_1	g_2	Item total	Polychoric Correlation									
						1	2	3	4	5	6	7	8	9	10
1	2.82	1.18	0.10	-0.65	0.75	-									
2	2.52	1.30	0.43	-0.88	0.76	0.80	-								
3	2.81	1.34	0.11	-1.08	0.74	0.73	0.78	-							
4	2.54	1.33	0.37	-1.00	0.76	0.73	0.80	0.77	-						
5	2.83	1.38	0.13	-1.14	0.75	0.70	0.67	0.68	0.74	-					
6	2.89	1.50	0.08	-1.43	0.76	0.70	0.74	0.72	0.72	0.76	-				
7	2.64	1.34	0.28	-1.07	0.62	0.56	0.54	0.57	0.57	0.62	0.63	-			
8	3.40	1.44	-0.35	-1.21	0.51	0.49	0.54	0.44	0.48	0.54	0.64	0.48	-		
9	3.17	1.29	-0.21	-0.96	-0.36	-0.32	-0.33	-0.28	-0.27	-0.31	-0.43	-0.10	-0.48	-	
10	3.81	1.21	-0.67	-0.56	0.28	0.28	0.21	0.22	0.24	0.33	0.33	0.24	0.38	-0.20	-

M=mean; SD=standard deviation; g_1=skewness, g_2=kurtosis.

Table 2. Three Models obtained in the Exploratory Factor Analysis

Items	Two-Factors Model			One-Factor Models			
	F1	F2	h^2/u^2	F1	h^2/u^2	F1	h^2/u^2
1	0.82	0.05	0.72/0.28	0.85	0.73/0.27	0.85	0.73/0.27
2	0.89	0.00	0.79/0.21	0.88	0.77/0.23	0.9	0.80/0.20
3	0.93	-0.09	0.76/0.24	0.86	0.74/0.26	0.86	0.74/0.26
4	0.93	-0.07	0.78/0.22	0.88	0.77/0.23	0.88	0.78/0.22
5	0.69	0.20	0.69/0.31	0.83	0.69/0.31	0.81	0.66/0.34
6	0.59	0.39	0.81/0.19	0.86	0.74/0.26	0.84	0.71/0.29
7	0.61	0.10	0.45/0.55	0.68	0.46/0.54		
8	0.06	0.79	0.69/0.31				
9	0.04	-0.57	0.29/0.71				
10	-0.01	0.45	0.20/0.80				
Eigenvalue	4.59	1.58		4.88		4.42	
Variance	46%	16%		70%		74%	
α	0.915	0.666		0.919		0.922	
ω	0.922	0.601		0.922		0.924	

F1=One factor; F2=Two Factor; h^2=communality; u^2=uniqueness; α=alfa coefficient; ω=omega coefficient.

In a secondary analysis, we explored a unidimensional model consisting of seven items. However, item 7 exhibited lower communality and greater uniqueness than the other items. We subsequently reviewed item 7, which focused on compensatory behavior. Notably, according to the DSM-5 criteria, compensatory behavior is not a component of binge eating disorder. Consequently, we decided to remove it from the model. With the final unidimensional model comprising six items, we achieved a model that explained 74% of the total variance. Furthermore, the factor loadings exceeded 0.80, indicating a strong representation of the common factor and enhancing the instrument's reliability.

In our final analysis, we tested the instrument by comparing different groups. We found a statistically significant difference between males and females, with females showing a higher mean binge eating behavior score, and this difference had a strong effect size (*d*=0.41). Additionally, among those who reported binge eating behavior, the mean score was substantially higher than those who did not identify this behavior, indicating a considerably strong effect size (*d*=1.12). We also compared participants with burnout to those without burnout and found a significant difference between the two groups, with a strong effect size (*d*=0.53) (Table 3).

DISCUSSIONS

Creating a scale to assess risk behaviors for BED has significant value in both clinical and scientific fields. This study aimed to design and validate a brief scale, BEDS, for identifying BED risk behaviors. Overall, the psychometric results for BEDS were positive, indicating its potential utility.

It should be emphasized that, during the design process, attention was given to understandable writing since from the outset, it was intended to be self-reported by the participant. The language was kept simple, avoiding lengthy sentences and complex terminology to ensure accessibility for participants. In addition, the answers were established using a Likert-type response scale with five frequency alternatives.

The instrument's validity was evaluated using exploratory techniques, a common approach in ED research[17-20]. When reviewing the factorial structures, we found a unidimensional model, unlike other studies where multidimensional models were found. In many cases due to the number of items they had[18,19]. Although it would not be appropriate to make comparisons of reliability indices, it's worth noting that BEDS demonstrated stability and even exhibited higher reliability coefficients than other measures. The advantage of BEDS lies in its concise application and ability to identify risk behaviors efficiently.

The best psychometric properties observed in the present research could be due to the initial filter question ("*During the last 3 months, have you experienced any eating episodes where you overeat (more amount of food than usual?)*"), which measured whether the participant had experienced a binge eating episode during the last 3 months. In addition, by removing items that were not specifically related to DSM-5 diagnostic criteria ("*In general, are you afraid of gaining weight?", "In general, do you feel good about your physical appearance?*"," *In general, do you think that by changing your physical shape, several aspects of your life could improve?*"); and by removing a compensatory behavior question (*After these episodes, do you usually make up for it by exercising or not eating at your following meals?*). These changes had a potential impact on the instrument's validity as the coefficient increased.

Table 3. Differences between groups on BED

Groups	N	M	SD	t	p	dif.	*d*
Sex							
Male	111	14.6	5.99	3.55	<0.001	2.75	0.41
Female	234	17.3	7.03				
BED episodes							
Yes	201	19.7	5.86	12.7	<0.001	7.83	1.39
No	144	11.9	5.29				
Burnout							
Yes	146	18.4	6.92	4.83	<0.001	3.48	0.53
No	199	14.9	6.38				

t=Student's t; dif.=mean differences; *d*=effect size.

This research has some limitations to consider. Firstly, convenience sampling restricts the ability to apply the findings to the entire population. Secondly, the predominance of female participants means the results may not represent the male population, limiting generalizability. Future studies should aim for more diverse participant samples. Lastly, because it relies on self-reports, there is a potential for information biases and misclassification. Despite these limitations, this research offers valuable insights into the BED issue.

CONCLUSIONS

In conclusion, the good results obtained, based on the validity and reliability of BEDS, allow us to recommend the use to identify BED risk behaviors. This new scale is a useful tool in research and may be used as a basis for future research in this field. In addition, when the results are extrapolated, its application will contribute to obtaining data on the prevalence of BED in our country since there is no published information; it will allow the appropriate identification of cases and, consequently, promote opportune attention and treatment. Finally, it will be the scientific evidence for developing public strategies for preventive and therapeutic interventions for unattended populations.

REFERENCES

1. Diagnostic and Statistical Manual of Mental Disorders: DSM-5. 5th ed., American Psychiatric Association, 2013.
2. Guerdjikova AI, Mori N, Casuto LS, McElroy SL. Binge Eating Disorder. Psychiatr Clin North Am. 2017 Jun;40(2):255-266. https://doi.org/10.1016/j.psc.2017.01.003
3. Kessler RC, Berglund PA, Chiu WT, Deitz AC, Hudson JI, Shahly V,et al. The prevalence and correlates of binge eating disorder in the World Health Organization World Mental Health Surveys. Biol Psychiatry. 2013 May 1;73(9):904-14. https://doi.org/10.1016/j.biopsych.2012.11.020.
4. Hudson JI, Hiripi E, Pope HG Jr, Kessler RC. The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. Biol Psychiatry. 2007 Feb;61(3):348-58. https://doi.org/10.1016/j.biopsych.2006.03.040.
5. Kolar DR, Rodriguez DL, Chams MM, Hoek HW. Epidemiology of eating disorders in Latin America: a systematic review and meta-analysis. Curr Opin Psychiatry. 2016 Nov;29(6):363-71. https://doi.org/10.1097/YCO.0000000000000279
6. Amorim Palavras M, Higa Kaio G, de Jesus Mari J, Medeiros Claudino A. A review of Latin American studies on binge eating disorder. Braz. J. Psychiatry. 2011 May; 33 (1)95-108. https://doi.org/10.1590/S1516-44462011000500007
7. Dîaz A. Trastorno por atracón y obesidad. [Binge eating disorder and obesity]. Rev Peru Cienc Salud. 2019;1(2):61-2. https://doi.org/10.37711/rpcs.2019.1.2.42
8. Agüera Z, Lozano-Madrid M, Mallorquí-Bagué N, Jiménez-Murcia S, Menchón JM, Fernández-Aranda F. A review of binge eating disorder and obesity. Neuropsychiatr. 2021 Jun;35(2):57-67. https://doi.org/10.1007/s40211-020-00346-w
9. McCuen-Wurst C, Ruggieri M, Allison KC. Disordered eating and obesity: associations between binge-eating disorder, night-eating syndrome, and weight-related comorbidities. Ann N Y Acad Sci. 2018 Jan;1411(1):96-105. https://doi.org/10.1111/nyas.13467
10. Marcus MD, Wildes JE. Disordered eating in obese individuals. Curr Opin Psychiatry. 2014 Nov;27(6):443-7. https://doi.org/10.1097/YCO.0000000000000103
11. Hamilton A, Mitchison D, Basten C, Byrne S, Goldstein M, Hay P, Heruc G, Thornton C, Touyz S. Understanding treatment delay: Perceived barriers preventing treatment-seeking for eating disorders. Aust N Z J Psychiatry. 2022 Mar;56(3):248-259. https://doi.org/10.1177/00048674211020102
12. Gormally J, Black S, Daston S, Rardin D. The assessment of binge eating severity among obese persons. Addict Behav. 1982; 7(1):47-55. https://doi.org/10.1016/0306-4603(82)90024-7
13. Spitzer RL, Yanovski S, Wadden T, Wing R, Marcus MD, Stunkard A, Devlin M, Mitchell J, Hasin D, Horne RL. Binge eating disorder: its further validation in a multisite study. Int J Eat Disord. 1993 Mar;13(2):137-53. PMID: 8477283.
14. Dominguez-Lara, S. Propuesta de puntos de corte para cargas factoriales: una perspectiva de fiabilidad de constructo [Proposal for cut-offs for factor loadings: A construct reliability perspective]. Enferm Clin. 2018 Nov;28(6):401–402. https://doi.org/10.1016/j.enfcli.2018.06.002
15. Raykov, T, Hancock GR. Examining change in maximal reliability for multiple-component measuring instruments. Br J Math Stat Psychol. 2005 May;58(1):65-82. https://doi.org/10.1348/000711005X38753
16. Cohen J. Statistical Power Analysis for the Behavioral Sciences. 2nd Ed. New York: Lawrence Erlbaum Associates; 1988. http://utstat.toronto.edu/~brunner/oldclass/378f16/readings/CohenPower.pdf
17. Bellace DL, Tesser R, Berthod S, Wisotzke K, Crosby RD, Crow SJ, et al. The Yale-Brown-Cornell eating disorders scale self-report questionnaire: a new, efficient tool for clinicians and researchers. Int J Eat Disord. 2012 Nov;45(7):856-60. https://doi.org/10.1002/eat.22023
18. Stanghellini G, Castellini G, Brogna P, Faravelli C, Ricca V. Identity and eating disorders (IDEA): a questionnaire evaluating identity and embodiment in eating disorder patients. Psychopathology. 2012 Mar;45(3):147-58. https://doi.org/10.1159/000330258
19. Unikel-Santoncini C, Bojórquez-Chapela I, Carreño-García S. Validación de un cuestionario breve para medir conductas alimentarias de riesgo. [Validation of a brief questionnaire to measure the risk of abnormal eating behaviors]. Salud Publica Mex. 2004 Nov;46(6):509-15. https://doi.org/10.1590/s0036-36342004000600005.
20. Padrós-Blázquez F, Pintor-Sánchez BE, Martínez-Medina MP, Navarro-Contreras G. Análisis factorial confirmatorio del Cuestionario Breve de Conductas Alimentarias de Riesgo en universitarios mexicanos. [Confirmatory factor analysis of the Brief Questionnaire of Risk Eating Behaviors in Mexican university students]. Rev Esp Nutr Hum Diet. 2022 Mar; 26(1): 83-91. https://doi.org/10.14306/renhyd.26.1.1487

APPENDIX A. BINGE EATING DISORDER SCALE (BEDS)

Item	Pregunta (*Question*)	Opciones de respuesta (*Answer option*)				
		1	2	3	4	5
1	Durante los últimos 3 meses, ¿has experimentado algún episodio alimentario en donde comes en exceso (más cantidad de lo habitual)? (*During the last 3 months, have you experienced any eating episodes where you overeat (more amount of food than usual?*)					
2	Durante estos episodios, ¿has sentido que pierdes el control y no puedes dejar de comer? (*During these episodes, have you felt loss of control and couldn't stop eating?)*					
3	Durante estos episodios, ¿comes mucho más rápido de lo habitual? (*During these episodes, do you eat much more quickly than usual?)*					
4	Durante estos episodios, ¿has continuando comiendo más cantidad de alimento aún sin sentir hambre? (*During these episodes, have you continued eating more food without hungry*)					
5	Después de estos episodios ¿has llegado a sentir malestar físico (dolor de estómago, indigestión, etc.) por la cantidad de alimento que comiste? (*After these episodes, have you experienced physical discomfort (stomach pain, indigestion, etc.) due to the amount of food you ate?)*					
6	Después de estos episodios ¿te has sentido molesto o culpable contigo? (*After these episodes, have you felt upset or guilty with yourself?*)					

1 = Nunca (*Never*); 2 = Casi nunca (*Almost never*); 3 = A veces (*Sometimes*); 4 = Casi siempre (*Almost always*); 5 = Siempre (*Always*).