



REVIEW ARTICLE

Binge eating disorder and depression: A systematic review

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Abstract

The purpose of this systematic literature review is to examine previous studies that investigated the relation between depression and binge eating disorder (BED). Medline/PubMed published data from 1980 through 2006 was tracked using the following keywords: “binge eating disorder and depression”, “periodic binge eating and depression”, “binge eating disorder” and “periodic binge eating”. The findings of 14 studies were successfully highlighted: one cohort, four cross-sectional and nine case–control studies. Most studies (7/14) were conducted in the United States, with missing data varying between 2.3 and 44.32%, and seven studies emphasizing the most important variables. The majority of the studies (10/14) showed an association between depression and binge eating disorder, but carefully designed studies are required to minimize the limitations found in these studies.

Key words: *Binge eating disorder, periodic binge eating, depression*

Introduction

Binge eating is a deviation in eating behavior, which has undergone 30 years of extensive study to delineate the diagnosis criteria. It is defined as a disorder and not as a disease since its origin has not been discovered (Christy and Eric 1998; Ballone 2003). Moreover, individual, family and social damage have forced researchers to consider binge eating as one of the most severe disorders, often resulting in the victim’s death.

Recent mental disorders classification such as DSM-IV (Diagnostic and Statistical Manual, IVth edition) and CID-10 (International Classification of Disease, 10th edition), points out anorexia nervosa (AN) and bulimia nervosa (BN) as the two major entities. There is, however, another eating disorder known as binge eating disorder (BED), which has no other specification (Fontenelle et al. 2003).

BED diagnosis can be applied to individuals who have disturbing, uncontrollable appetent episodes of eating compulsion that last 2 h, at least 2 days during the week, in a period of 6 months. However, no

compensatory behavior, such as laxative or diuretic abuse and intensive exercising, is observed as in individuals with bulimia (Morgan et al. 2002; Ballone 2003; Appolinario 2004; Azevedo et al. 2004; Lesinskiene et al. 2007; Vigo et al. 2007).

The prevalence of BED is variable, in part because of the use of a variety of definitions for compulsive eating (Azevedo et al. 2004). Recent evaluation of the prevalence of BED in the US population points out that from 2 to 3% of adults in community samples suffer from compulsive eating. Among obese patients who seek treatment for weight loss, the prevalence ranges from 5 to 30%. In Brazil, Appolinario et al. (1995), Coutinho (2000) and Borges et al. (2002) described prevalence estimates ranging from 15 to 22% among patients who were seeking treatment for weight loss. Among patients who may have undergone bariatric surgery, the prevalence ranges between 27 and 47% (Azevedo et al. 2004).

Behavioral studies report that patients with this disorder usually have higher rates of eating psychopathology (body image distorted) and higher rates of

general psychopathology (depression, anxiety, impulsivity and low self-esteem) than expected (Burrows et al. 2004; Malevani et al. 2007). These patients are more concerned about their weight and body shape when compared to those who are obese but do not have binge eating disorder (Azevedo et al. 2004; Didie and Fitzgibbon 2005).

Taking all probable factors into account, this review examines previous studies that investigated the relation between BED and depression.

Methods

The method of systematic literature review was used to carry out the investigation. This method consists of a retrospective review of scientific articles; in this particular case, only those articles that investigated an association between BED and depression were considered.

The articles were searched through the Medline database, Pub-Med version (www.pubmed.gov), from 1980 to 2006, and the keywords used to conduct the research were “binge eating disorder and depression” and “periodic binge eating and depression” and “binge eating disorder” and “periodic binge eating”. Those keywords were used to search in the abstract of the papers.

The language (Portuguese, English and Spanish) and the following designs: cohort, case-control and cross-sectional were the criteria chosen to select the articles to be used in the review. All the selected articles were compared in relation to the following aspects: origin country, sample size, average age of subjects, time period of the study, study design, exclusion rates, gender, sample base/selection, confounders, major results, scales and estimators.

The selected papers were assessed and scored according to the methodology proposed by Downs and Black (1998), applicable to the design of the papers to evaluate their quality. Such criteria evaluate the quality of information, the internal validity (bias and confounders), the power of the study and external validity. It consisted originally of 31 items; however, in the present paper a version consisting of 27 items was used, from which selected items related to experimental studies were excluded. Therefore, in the end, 19 items were evaluated, scoring no more than 20 points.

The papers were evaluated according to the following aspects: (1) hypothesis or objectives; (2) main outcomes; (3) characteristics of the patients included; (4) distribution of the main confounding variables in each group of subjects to be compared; (5) main findings; (6) information on the estimated random variability of the data for the main outcomes; (7) information on the characteristics of

losses; (8) information on the probability of the main outcomes; (9) representativeness of the individuals invited to participate in the study; (10) representativeness of the individuals included in the study; (11) when the results are not based on previously established hypothesis, in case this had been made clear; (12) if, in clinical trials and cohort studies, the analysis was adjusted for different periods of time during follow-up or if, in studies of cases and controls, the time between intervention and outcome were the same for cases and controls; (13) if the statistical tests used to measure the main outcomes were adequate; (14) if the measures used for the main outcomes were accurate; (15) if the patients in different groups were recruited in the same population; (16) if the patients in different groups were recruited in the same period of time; (17) if the analysis included adequate adjustments for the main confounding variables; (18) if loss of patients were considered during follow-up; (19) if the study was powerful enough to detect an important effect, with a level of significance of 5%.

The association between BED and depression was verified in the selected studies, and the studies selected for this systematic review do not emphasize the relation of cause and effect, but the association between the variables.

Results

With keywords established, the literature research resulted in 198 scientific articles. After reading the abstracts, 49 articles were selected; however, only 14 investigated the relation between BED and depression. We also searched for cross-references, looking at the references of the selected articles and reviews of the theme. The discarded articles measured the relation between BED or depression and other variables, but never the relation between BED and depression.

Out of the 14 studies, seven were carried out in the United States, three in Brazil, two in France, one in Italy and one in the United Kingdom (data not shown). In relation to age group, strictly taking into consideration the teenage group, defined by the World Health Organization as 10–19 years of age, 11 studies included teenagers in their sample, only one of them presented information on the average age of the participants and two of them included adults of different ages (Table I).

Of the 14 selected studies, one was a cohort study, nine were case-control studies, four were cross-sectional studies. Missing data due to different kinds of problems, such as non-response or loss in cross-sectional and case-control studies and loss to follow up in cohort studies varied between 2.3% in the

Table I. Characteristics of the studies that associated depression and binge eating disorder (BED), 1980–2006.

Authors	Year of publication	Sample (n)	Age (years)	Time of the study	Study design	Loss (%)	Gender	BMI (kg/m ²)	Sample base/selection
Christy and Eric	1998	139	18–65	NI	Case-control	12.94	Female	NI	The sample were recruited from the community
Fairburn et al.	1998	360 BED = 52 Without BED = 104 Psychiatric disorders = 102 Bulimia nervosa = 102	16–35	NI	Case-control	NI	Female	Any BMI was established	NI
Smith et al.	1998	3948	28–40	NI	Cohort	NI	NI	It was only used as a baseline to define obese men and women	The sample were recruited form a longitudinal study of cardiovascular risk factor
Borges et al.	2002	217	15–59	NI	Case-control	12.86	Female	≥25	Participants were recuted from a weight control program
Barry et al.	2003	162	18–60 Mean = 38.7	NI	Case-control	NI	Female	All BMI were included	NI
Fontenelle et al.	2003	53 Bulimia and BED = 18 Bulimia = 16 Obesity = 19	18–65	January–March 2001	Case-Control	NI	Female	≥30– <45	Obese people were recruited for a weight-loss program
Pinaquy et al.	2003	173	18–60	NI	Case-control	2.3	Female	>25– <60	Volunteers seeking weight-loss treatment were accepted in the Nutrition Department for the study
Zwaan et al.	2003	110 BED = 19 Without BE = 91	19–62 Mean = 39.6	April 1999–September 2001	Case-control	12.0	Female (87.3%) Male (12.7%)	>27.5	Surgery candidates from the Department of Surgery were recuted for the study
Didie and Fitzgibbon	2005	96	Age ≥ 18 Mean = 38.9 ± 10.6	NI	Cross-sectional	0	12 males 84 females	< 18.5 kg/m ²	NI
Fassino et al.	2004	196	20–60	November 1999–December 2001	Case-control	44.32	103 females (cases) 93 females (controls)	IMC ≥ 30 kg/m ²	Participants applied to the study spontaneously
Doll et al.	2005	1439	18–64 Mean = 23.4 ± 6.76	NI	Cross-sectional	0	906 female (63%) 533 male (37%)	All BMI were included	NI

Table I (Continued)

Authors	Year of publication	Sample (n)	Age (years)	Time of the study	Study design	Loss (%)	Gender	BMI (kg/m ²)	Sample base/selection
Petribu et al.	2006	67	19-57 Mean = 42.10	August-May of 2005	Cross-sectional	0	Female (73.10%) Male (26.9%)	36.06-81.79	Alleatory selection was made from hospital archives of candidates for surgery All candidates to bariatric surgery were recruited by using hospital archives People seeking treatment were recruited from a multicentric study on addictive behaviors
Mazzeo et al.	2006	487	Mean = 39.94 ± 11.24	NI	Cross-sectional	0	409 females 74 males	≥ 30 kg/m ²	
Godart et al.	2006	271	15-30 years to AN 15-40 years to BN	NI	Case-control	NI	Female	29 ≥ IMC ≥ 13 kg/m ²	

NI, no information was given.

study of Pinaguy et al. (2003) and 44.32% in the study of Fassino et al. (2004) (Table I).

Among the selected studies, 10 showed significant association between binge eating disorder and depression; whereas four found no association between the variables in question (Table II).

All selected studies used self-report questionnaires in order to collect data. In those questionnaires, some variables were investigated, such as BMI (body mass index), symptoms and BED severity, depression, anxiety, stress, alexithymia, anger, quality of life, body image and others.

The results are difficult to compare as they differ in relation to scales used to identify depression and BED. The scales used to identify or measure binge eating disorder were the Questionnaire on Eating and Weight Patterns-Revised (QEWP-R), the Eating Disorder Inventory (EDI-2), the Eating Disorder Inventory – Symptom Checklist (EDI-SC), the Binge Eating Scale (BES), the Diagnostic Survey of Eating Disorders-Revised (DSED-R), the Eating Disorders Examination-Questionnaire version (EDE-Q4), the Three Factor Eating Questionnaire and the Dutch Behavior Questionnaire (Table II).

The symptoms of depression were measured by the Beck Depression Inventory, Symptom Checklist 90-R, the Rosenberg Self-Esteem Scale, the Inventory of Depressive Symptoms, the Study Depression Scale, the Mini International Neuropsychiatric Interview – MINI and the Depressive Experiences Questionnaire (Table II).

According to the criteria proposed by Downs and Black, the average score assigned to the selected papers was 15, with a maximum score of 20 and a minimum of 15. With this score, six papers stood out: one with 18 points (Godart et al. 2006) and two with 17 points each (Doll et al. 2005; Zwaan et al. 2003).

Still, according to the evaluation using Downs and Black scoring system, it is important to notice the fragility of the publications in relation to the following items evaluated: two papers were not able to determine the power of the study; seven papers did not describe information on confounding variables; nine papers did not provide information on the losses. In relation to external validity, the majority of the papers were representative and subject to generalization; however, six of them were not able to determine the representativeness of the individuals invited to participate in the study and five of them, of the individuals included in the study. As for internal validity, five studies were not able to determine if the analysis was adjusted for the different periods of time of follow-up or if the period of time between intervention and outcome was the same for case and control.

Discussion

Dobrow et al. (2002) pointed out that individuals who suffer from BED show higher rates of psychopathology, especially depression and personality disorders; however, some studies that investigated the relation between BED and depression are contradictory. Some inconsistencies in this association could be due to the diversity of instruments used to identify or measure the severity of BED, comparison of subjects of different ages, high loss to follow-up, lack of confounding control and comparison between different study designs.

Binge eating disorder might be influenced by several factors; therefore, it requires an evaluation that takes into account different aspects involving its origin and maintenance (Mazzeo et al. 2006). The use of instruments that evaluate comorbidities (depressive symptoms and anxiety), body image, quality of life and social adequacy, as well as those used to identify the disorder, are essential for a better understanding of the clinical aspects and for elaborating strategies of intervention to improve those clinical aspects (Fontenelle et al. 2003).

Results are divergent when obese people presenting with BED are compared to obese people without the manifestation of BED. The studies of Kolotkin et al. (2004), Fontenelle et al. (2003) and Petribu et al. (2006) demonstrated that obese people with BED were more depression-prone than those without BED; however, Zwaan et al. (2003) and Pinaquy et al. (2003) did not find any difference between the two groups.

According to Borges et al. (2002), women with BED usually find it more difficult to keep the weight off (they lose weight but put it on very fast), have higher BMI, higher maximum weight and higher scores of depression, and three times higher risk of suffering from depression than overweight women without BED. Overweight women with BED are more concerned about their physical body shape and weight than women without BED, which is typical of women with anorexia and bulimia.

There has also been discrepancy in the age groups of the studies. Barry et al. (2003) pointed out that there is an association between the effects of age and depression in eating disorders. According to them, bulimic individuals are younger and have higher scores of mental disorders when compared to individuals with BED.

The design of the studies made it more difficult to compare the results. Twenty-nine percent of the selected studies used a cross-sectional design. This kind of study does not allow researchers to draw inferences about the cause of the disorder, but it is

useful for surveying possible hypotheses and in future protocols.

Another aspect that made the comparison between studies more difficult was the gender of the samples. Some studies selected only women while others selected both genders. According to a study comparing male and female candidates to bariatric surgery, women are more depression-prone than men, which shows the significant role of depression in eating disorders in men and women (Lloyd-Richardson et al. 2000).

Some studies compared individuals with bulimia to those with BED. The study by Fontenelle et al. (2003) showed that bulimic individuals have more comorbidities, such as agoraphobia, anxiety and anger, as compared to those with BED. However, Godart et al. (2006) demonstrated that depression in individuals with BED is associated with a higher prevalence of comorbidities, such as obsessive-compulsive disorder (OCD), anxiety, phobias and panic disorder.

Most studies not only focused on depression and BED but also investigated other aspects such as quality of life. The study made by Kolotkin et al. (2004) evaluated the quality of life in individuals with and without BED. This study showed that individuals with BED report more frequently worse quality of life than those without BED, as well as higher levels of depression and psychological symptoms. These findings are in agreement with other studies (Faiburn et al. 1998; Smith et al. 1998; Coutinho 2000; Borges et al. 2002; Dobrow et al. 2002; Morgan et al. 2002; Barry et al. 2003; Pinaquy et al. 2003; Fassino et al. 2004; Kolotkin et al. 2004; Doll et al. 2005; Godart et al. 2006).

Loss of subjects during the study might decrease the validity of the results. In one study (Fassino et al. 2004), the loss was higher than 30%. The association between the variables might be affected, because some studies did not count the loss rates or control the confounders.

Most studies comment on their limitations and make recommendations to improve future studies, and are therefore less biased and embrace more variables. For example, some studies criticize the exclusive use of self-report questionnaires, because they are less accurate and might under or overestimate what individuals say (Lloyd-Richardson et al. 2000; Borges et al. 2002; Claudino and Borges 2002; Dobrow et al. 2002; Kolotkin et al. 2004; Godart et al. 2006).

Some studies reported that a cross-sectional study was not adequate to verify the association between BED, depression and other comorbidities, suggesting that it would be more adequate to carry out prospective studies (Lloyd-Richardson et al. 2000;

Table II. Variables controlled in the analysis, kind of association found, symptoms evaluated in the scales used to measure binge eating disorder (BED) and depression and estimators, 1980–2006.

Authors	Variables controlled in the analysis	Results	Scales	Symptoms evaluated	Estimators
Christy and Eric (10)	NI	The prevalence of depression is higher in patients with BED	Questionnaire on Eating and Weight Patterns, Structured Clinical Interview for DSM-III-R, SCID personality disorders, Eating Disorder Examination-Questionnaire, Three-Factor Eating Questionnaire, Beck Depression Inventory, Symptom Checklist-90, Rosenberg Self Esteem Scale	Depression, BED, self-esteem	Student <i>t</i> -test
FairbuHrn et al.	Age, social class. In the control group, recent or past episode of BED was also included	There was significant association between BED and depression	The Eating Disorder Examination-Questionnaire (EDE-Q), The 30-item General Health Questionnaire (GHQ)	Depression, family problems, sexual or physical abuse, family history of psychiatric disorders, diet history, childhood characteristics, obesity risk, bipolar illness, anxiety, family history of depression, self-harming behavior	OR
Smith et al.	NI	Depression was associated with BED	Study Depression Scale, The Revised Questionnaire on Eating and Weight Patterns	BED, depression	NI
Borges et al.	NI	BED was associated with psychiatric disorders as well as with depression ($P=0.001$)	Questionnaire on Eating and Weight Patterns-Revised, Beck Depression Inventory, Toronto Alexithymia	Depression, alexithymia	<i>F</i> -test/post hoc
Barry et al.	Age and depression	No relation was found between depression, eating disorders and BED, even though individuals with eating disorder (bulimia) had higher BDI scores than individuals with BED	Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I/P), Questionnaire on Eating and Weight Patterns-Revised (QEWPR), Eating Disorder Examination-Questionnaire (EDEQ), Eating Disorders Inventory-2 (EDI-2), Beck Depression Inventory	Satisfaction with the body, depression	<i>F</i> -test
Fontelenele et al.	Neurological and endocrine disorders, inability to read and fill in questionnaires related to psychiatric disorders and severe disorders related to personality	The prevalence of depression was higher in the BED group ($P<0.001$) than in the obese control groups	Structure Clinical Interview, Binge Eating Scale, The Symptom Checklist-90 (SCL-90), Beck Depression Inventory	Depression, anxiety, anger, agoraphobia, hostility	Post hoc
Pinaquy et al.	NI	Depression was not associated with BED ($P < 0.772$)	Beck Depression Inventory, State Trait Anxiety, Stress Perceived Scale, Dutch Eating Behaviour Questionnaire, Toronto Alexithymia Scale, Questionnaire on Eating and Weight Patterns	Depression, alexithymia, anxiety, stress	

Table II (Continued)

Authors	Variables controlled in the analysis	Results	Scales	Symptoms evaluated	Estimators
Zwaan et al.	NI	There was no difference, in terms of depression symptoms, between extreme obese individuals with BED and without BED	The Eating Disorders Questionnaire (EDQ), The Questionnaire on Eating and Weight Patterns, The Three Factor Eating Questionnaire, The Rosenberg Self-Esteem Questionnaire, The Inventory of Depressive Symptoms, The Impact of Weight on Quality of Life Questionnaire	BED, self-esteem, depression	<i>F</i> -test
Didie and Fitzgibbon	BMI < 18.5 and anorexia	When psychiatric disorders and depression symptoms were analyzed in individuals with BED with different BMIs, no difference was found between the groups ($P < 0.495$)	Questionnaire on Eating and Weight Patterns-Revised; Beck Depression Inventory (BDI); Symptom Checklist (SCL)-90-Revised; Eating Disorder Inventory-2 (EDI-2)	Bulimia, body dissatisfaction, ineffectiveness	<i>F</i> -test
Fassino et al.	Overweight related to medicine use, metabolic or endocrine disorders, psychiatric disorders, bulimia nervosa	There was significant association between BED and depression	Eating Disorder Inventory-2 (EDI-2), State-Trait Anger Expression Inventory (STAXI), Beck Depression Inventory (BDI)	Emotional state, psychiatric disorders, anger	Student <i>t</i> -test
Doll et al.	Age, gender, social class, race, course and years of study, BMI	Individuals with a history of eating disorders were more prone to report depression than those without it (11 vs. 2%)	SF-36 score, DSM-IV eating disorder	BED, emotional and psychological problems, thought life is not worth living, thoughts of taking their own lives, self-harm, attempted suicide	<i>F</i> -test
Petribu et al.	NI	Depression was associated with BED ($P=0.012$)	Mini International Neuropsychiatric Interview (MINI), Binge Eating Scale-BES, The Impact of Weight on Quality of Life Questionnaire-Lite	Generalized anxiety disorder, recent depression, past depression, agoraphobia, panic disorder	<i>F</i> -test Student <i>t</i> -test
Mazzeo et al.	NI	Depression may play an important role in maintaining eating disorder symptoms. Obese women with BED presented higher levels of depression than obese men with BED ($P < 0.001$)	Questionnaire on Eating and Weight Patterns (QEWP), Beck Depression Inventory (BDI), Binge Eating Scale (BES), Rosenberg Self-Esteem Scale (RSE)	BED, depression and self-esteem	
Godart et al.	Age, eating disorder duration, episodes of anorexia nervosa in patients with bulimia, being inpatient or outpatient, BMI	The presence of at least one kind of psychological disorder increases the risk of longer duration as well as the risk of developing depression in patients with eating disorders	Mini International Neuropsychiatric Interview (MINI), DSM-IV Axis I	Anxiety, depression; AN-R, anorexia nervosa; AN-BN, meaning anorexia nervosa with bulimia episodes (vomiting and laxative abuse); BN-P, bulimia with purging; BN-NP, bulimia without purging	OR

NI, no information was given.

Tantillo and Sanftner 2003; Godart et al. 2006). Kolotkin et al. (2004) and Mazzeo et al. (2006) demonstrated the importance of analyzing other ethnical groups, because most studies included only Caucasians in their samples. Finally, Didie and Fitzgibbon (2005) mentioned the lack of studies with individuals of normal weight, since most studies included overweight and obese individuals only. This limited the recognition of the relation between BED and other comorbidities in individuals with adequate BMI.

The internal validity of the studies, that is, the validity of the inferences for the target population is also associated to their sample size. In this case, it is important to point out the discrepancy observed between the selected studies, where the sample size varied from 53 in the study of Fontenelle et al. (2003), to 3948 in the study of Smith et al. (1998). Borges et al. (2002) also pointed out the importance of a representative sample, because a small sample size decreases the analysis power.

Different kinds of scales were used to evaluate BED, each emphasizing a particular aspect of BED and with a singular object, making the comparison between the studies more difficult.

Our systematic review shows that there is no validated scale to measure the specific association between BED and depression. There is a scale that measures the association between anxiety/depressive symptoms and eating behavior, the Emotional Eating Scale (EES) (Arnow et al. 1995). The EES consists of three subscales: Anger/Frustration, Anxiety, and Depression. All three subscales correlated highly with measures of BED, providing evidence of construct validity. None of the EES subscales correlated significantly with general measures of psychopathology. With few exceptions, changes in the EES subscales correlated with treatment-related changes in binge eating (Arnow et al. 1995). In support of the measure's discriminate efficiency, when compared with obese binge eaters, subscale scores of a sample of anxiety-disordered patients were significantly lower. Lack of correlation between a measure of cognitive restraint and the EES subscales suggests that emotional eating may precipitate binge episodes among the obese regardless of the level of restraint.

It is important to point out that despite the absence of a validity scale to measure the association between binge eating disorder and depression, both disorders can be diagnosed with structured questionnaires. However, measuring the severity and other details of the association are subject to an open interview with the patient.

The use of a mathematical model, especially logistics regression, has become common practice

in epidemiology analysis. Apparently, it is related to the popularity of statistical packages of often easy and quick use, which allow multiple variables to be handled simultaneously. However, while in case-control studies the "odds ratio" (OR) estimation is obtained by a simple regression coefficient exponentiation of the independent variable in question, in cross-sectional and cohort studies with fixed populations, the measurements of association of greatest epidemiological interest are prevalence ratio (PR) and cumulative incidence ratio (relative risk or RR), respectively (Oliveira et al. 1997). As for the estimators, only eight papers mentioned Student's *t*-test or the *F*-test as estimators. Such tests are used for independent groups to evaluate the difference between the averages and only two studies with case-control design used OR as an estimator.

The limitations of this study were that database research included only articles written in English, Spanish and Portuguese and we did not review sources of references other than Medline-PubMed. Medline-PubMed is the main source of references in our university and by using cross-references we assumed that the vast majority of papers about this subject had been covered. More carefully elaborated studies are needed because when BED manifests continuously for a long time, it plays a very important role in developing obesity as well as other eating disorders (Borges et al. 2002; Petribu et al. 2006).

One of the main issues to be addressed is the difficulty in comparing results between studies in face of the methodological differences emphasized in the beginning of the discussion. There is some confusion concerning aspects that render difficult the assessment of the association between BED and depression (as the control of confounding variables, for example) and issues that render difficult the comparability of the results between the studies (as the use of different instruments to assess the addressed issues).

Therefore, if individuals with homogeneous features are recruited and similar scales are used for the trials, they may reveal new evidences about the relation between BED and depression. We point out the importance of future studies that do not have these limitations and therefore will provide us with more valid results. This methodology might lead to evidences that will be important to plan more effective actions to deal with BED associated with depression.

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Statement of interest

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