

CLINICAL CORRELATES OF GLOBAL FUNCTIONING IN OBESE TREATMENT SEEKING PERSONS WITH BINGE EATING DISORDER

Davy Vancampfort^{1,2}, Michel Probst^{1,2}, An Adriaens¹, Guido Pieters¹, Marc De Hert¹,
Andrew Soundy³, Brendon Stubbs⁴ & Johan Vanderlinden¹

¹KU Leuven Department of Neurosciences, UPC KU Leuven Campus Kortenberg, Kortenberg, Belgium

²KU Leuven Department of Rehabilitation Sciences KU Leuven, Leuven, Belgium

³School of Health and Population Sciences, College of Medicine and Dentistry, University of Birmingham, UK

⁴School of Health and Social Care, University of Greenwich, Eltham, London SE9 2UG, UK

received: 27.1.2014;

revised: 20.6.2014;

accepted: 5.7.2014

SUMMARY

Background: In recent years, research has called for an increased emphasis on clinical outcomes that are meaningful to patients with binge eating disorder (BED). This cross-sectional study examined the Global Assessment of Functioning (GAF) and its relation to clinical and demographic factors in BED patients.

Subjects and methods: Thirty-two patients (28 women and 4 men) with BED (age=41.1±10.7; body mass index=38.9±5.8) seeking treatment to a weekly multidisciplinary programme at the UPC KU Leuven, Campus Kortenberg in Belgium, were asked to participate at intake. All participants were assessed with the GAF scale, completed the Eating Disorder Inventory (EDI), the Body Attitude Test (BAT), the Symptoms Checklist-90, the Baecke Physical Activity Questionnaire (BPAQ), and performed a 6 minute walk test.

Results: The GAF-score (55.9±13.9) was only significantly associated with the BPAQ score (7.0±1.4) ($r=0.383$, $p=0.03$) and the BAT score (63.9±16.1) ($r=-0.443$, $p=0.011$). The regression model including both of these variables explained 25.3% of the variability in the GAF-score.

Conclusions: This study highlights the value of clinicians assessing physical activity and body image in patients with BED. Research is needed to elucidate whether incorporating body image treatments and physical activity in the care of patients with BED can promote global functioning.

Key words: Global Assessment of Functioning - binge eating - physical activity - body attitude

* * * * *

INTRODUCTION

Binge eating disorder (BED) is characterised by frequent and persistent episodes of binge eating accompanied by feelings of loss of control and marked distress in the absence of regular compensatory behaviours. Binges are associated with 3 or more of the following: (a) eating much more rapidly than normal, (b) eating until uncomfortably full, (c) eating large amounts of foods when not feeling physically hungry, (d) eating alone because of being embarrassed by how much one is eating, and (e) feeling disgusted with oneself, depressed, or very guilty after overeating (American Psychiatric Association 1994). In the recently published fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association 2013), the frequency of binge eating reduced from at least twice weekly during 6 months to at least once weekly for 3 months.

In recent years, research has called for an increased emphasis on clinical outcomes that are meaningful to patients, families, and clinicians, as well as for a greater focus on functional recovery (Vanderlinden et al. 2012, Stice et al. 2013, Vancampfort et al. 2014a). This is

important because if the functional outcome in patients with BED is measured exclusively in terms of remission of binges, most patients would be rated as much improved following psychological and pharmacological treatments (Vocks et al. 2010). However, patients with BED who experience significant reductions in binges when receiving treatment may still have impairments in a variety of other domains, including subjective outcome variables, such as quality of life (Vanderlinden et al. 2007).

Several factors can affect subjective and functional outcomes in patients with BED. For instance, BED patients who report extreme weight and shape concerns report a significantly lower health related quality of life compared to those who do not report such concerns (Hrabosky et al. 2007, Mond & Hay 2007, Grilo et al. 2009). Patients with BED therefore report that improving weight concerns, self-esteem and body experience are key goals of their treatment (Vanderlinden et al. 2007). In addition to these factors, an active lifestyle is associated with reduced eating disorder pathology and improved mental health (Vancampfort et al. 2014b). In particular moderate intensity physical activity may be effective in reducing binge eating,

especially among those BED patients with high anxiety sensitivity as physical activity has been shown to reduce anxiety sensitivity levels (De Boer et al. 2012). In addition, physical activity participation would likely lead to improvement in other domains of life functioning, given the associated physical health benefits (Vancampfort et al. 2013).

To date, although the mental and physical health is being studied in BED patients (Vancampfort et al. 2014b), clinical and demographical variables associated with global functioning in daily life are receiving little attention in current research. The aim of the present study therefore is to examine how global functioning is associated with clinical and demographic variables in obese treatment-seeking patients with BED. We hypothesised that that older age, higher body mass index, more severe eating disorder pathology, more psychopathology, and a more negative body attitude were negatively associated with global functioning, whilst higher levels of physical activity participation and physical fitness would be positively associated with the global assessment of functioning score.

SUBJECTS AND METHODS

Subjects

Before the start of the study, all local general practitioners, psychiatrists, psychologists, and patients' groups were informed about a weekly multidisciplinary programme at the UPC KU Leuven, campus Kortenberg in Belgium by information leaflets. All were informed that obese outpatients meeting the DSM-IV criteria for BED (APA 1994) could participate in the study. Diagnosis for those who were willing to participate was made at intake by a psychiatrist using the Structured Clinical Interview for DSM-IV Disorders (SCID) (First et al. 1996). Only obese (BMI > 30) participants meeting the DSM-IV criteria for BED were included. The somatic exclusion criteria included evidence of significant cardiovascular, neuromuscular and endocrine disorders which, according to American Thoracic Society (2002) guidelines, might prevent safe participation in the study.

Procedure

Data was collected between October 2008 and October 2012 using assessment tools with good psychometric properties (Westerterp 1999, Tasca et al. 2003, Carano et al. 2006, Larsson & Reynisdottir 2008, Beriault et al. 2009). The study procedure was performed in agreement with the Declaration of Helsinki in 1995 (as revised in Edinburgh 2000) and approved by the Scientific and Ethical Committees of the participating centres. All participants gave their written informed consent. Participation in the study did not affect the pre-treatment screening and approval process.

Instruments

Global Assessment of Functioning (GAF)

The GAF (APA 1994) combines the evaluation of symptoms as well as relational, social, and occupational functioning on a single axis. The scale runs from 1 to 100. A lower rating reflects worse symptoms and a poorer level of functioning, whereas a higher rating reflects less symptoms and a better level of functioning. The GAF was recorded as a single score. The assessment was performed through consensus by two psychologists responsible for the intake and treatment procedure of all patients but blinded to the outcomes on the walk test and questionnaires. Previous research (Rey et al. 1995) indicates that the GAF is a reliable assessment tool in clinical settings.

Eating Disorder Inventory (EDI)

The EDI (Garner et al. 1983, Vandereycken & Meermann 1984) is a widely used 64-item questionnaire aimed at assessing the psychological characteristics, eating related attitudes and traits of eating disorders. The subscales of the EDI include: drive for thinness, bulimia, body dissatisfaction, perfectionism, ineffectiveness, interpersonal distrust, interoceptive awareness, and maturity fears. For each item a 6-point forced-choice format is used that rates how much the item applied to them. Options range from 'always' to 'never'. Scores for each item identify the extremity of the eating disorder (3 = the most extreme eating disorder response, 2 = an intermediate response, and 1 indicates a low response; the other three responses receive no score). The Cronbach's alpha of the EDI subscales ranged from 0.66 (perfectionism) to 0.87 (bulimia). Only the total score which ranges from 0 to 192 was included. A higher total score indicates more severe eating disorder pathology.

Body Attitude Test (BAT)

The BAT (Probst et al. 1995) consists of 20 items scored on a 6-point scale ranging from 0 (never) to 5 (always). The BAT is intended to measure the subjective body experience and the attitude towards one's body. It comprises 4 factors: (1) negative appreciation of body size, (2) lack of familiarity of one's own body, (3) general body dissatisfaction, and (4) a rest factor. The maximum total score is 100 and the higher the score, the more deviating the body experience is. The internal consistency of the BAT in the current study was excellent with Cronbach's alpha ranging from 0.87 (lack of familiarity of one's own body) to 0.90 (negative appreciation of body size). Only the total score was included in this study.

Symptom Checklist-90 (SCL-90)

The SCL-90 (Derogatis 1983, Arrindel et al. 1986) assesses several psychopathological complaints. It is composed of 90 items, which might be answered according to a 5-point scale, graded from 0 to 4, from 'none' to 'extremely'. The scale evaluates, besides a

total general psychoneuroticism score, 8 primary domains of symptoms: agoraphobia, anxiety, depression, somatization, cognitive-performance deficits, interpersonal sensitivity and mistrust, acting-out hostility and sleep difficulties. The Cronbach's alpha of the SCL-90 scales ranged from 0.73 (acting-out hostility) to 0.88 (depression). Only the total score was used with a higher score indicating higher psychopathology.

Physical Activity: Baecke Physical Activity Questionnaire (BPAQ)

The 12-month recall BPAQ (Baecke et al. 1982) consists of 16 questions organised in three sections: at work (8 items), sport during leisure time (4 items), and during leisure excluding sport (4 items). Questions in each section are scored on a 5-point Likert scale (never, seldom, sometimes, often, always). The two most frequently reported sports activities are explored in additional questions about the number of months per year and hours per week of participation. The Cronbach's alpha values of the work, sports, and leisure scores in the current study were 0.73, 0.74 and 0.74, respectively. Only the total score was used with a higher score indicating a higher level of physical activity participation.

Physical Fitness: the 6 Minute Walk Test (6MWT)

The 6MWT was performed according to the American Thoracic Society (2002) guidelines. The total distance walked in 6 minutes was recorded to the nearest decimetre. Supervision and measurement of the 6MWT was performed by one trained physiotherapist. The 6MWT has been shown to be a reliable and valid test to assess the physical fitness of obese patients (Larsson & Reynisdottir 2008, Beriault et al. 2009).

Anthropometric data

Body weight was measured in light clothing to the nearest 0.1 kg using a SECA beam balance scale, and height to the nearest 0.1 cm using a wall-mounted stadiometer.

Statistical analyses

Descriptive statistics were undertaken and included the mean ± SD for each variable. The Shapiro-Wilks test was used to assess the normal distribution of the data. All variables were normally distributed. Therefore, the Pearson's correlation test was used to determine associations between the GAF with clinical and demographical variables. Next a multiple regression analysis was performed with significant correlates as

predictors to evaluate independent variables explaining the variance in the GAF score. The significance level was set at 0.05. Statistical analysis was performed using the statistical package SPSS version 20.0 (SPSS Inc., Chicago, IL).

RESULTS

Participants

A total of 38 persons with BED were initially screened. Two persons were diagnosed with bulimia nervosa and did not meet DSM-IV criteria for BED. Two persons with BED were excluded as a consequence of a locomotor disorder that could prevent safe participation in the 6MWT. Two patients were excluded as they required another residential treatment (one for depression and one for psychotic symptoms). Of the 32 included persons, nobody declined to participate. Characteristics of the 32 included patients are presented in Table 1.

Table 1. Characteristics of the included participants with binge eating disorder (n=32)

Variables	
Gender (M/F)	4/28
Age	41.1±10.7
GAF	55.9±13.9
BMI (kg/m ²)	38.9±5.8
6MWT (m)	513.3±69.9
Baecke Physical Activity total score	7.0±1.4
EDI Total score	74.1±30.5
BAT total score	63.9±16.1
SCL-90 total score	196.0±47.3

GAF=Global Assessment of Functioning; BMI=Body Mass Index; 6MWT=six minute walk test; EDI=Eating Disorders Inventory; BAT=Body Attitude Test; SCL-90=Symptom Checklist-90.

Associations with and predictors of the GAF score

While age (r=0.18, p=0.33), the body mass index (r=-0.21, p=0.26) and physical fitness (r=0.07, p=0.70) did not correlate significantly with the GAF-score, the BPAQ total score (r=0.383, p=0.03) and the BAT total score (r=-0.443, p=0.011) did. Both were also independent predictors for the GAF-score. The regression model including both variables explained 25.3% of the variability in the GAF-score. Parameter estimates, F-values, standard error of measurements and significance are shown in Table 2.

Table 2. Multiple stepwise regression analysis with the GAF Score as the dependent variable

Variables	Cumulative r ²	F	df	p	SEE
BAT total score	0.196	7.4	1	0.011	12.6
BPAQ total score	0.253	4.9	2	0.015	12.4

GAF= Global Assessment of Functioning; BAT=Body Attitude Test; BPAQ=Baecke Physical Activity Questionnaire; df=degrees of freedom; SEE=standard error of estimate

DISCUSSION

To our knowledge the present study is the first to demonstrate that the attitude towards one's own body and the level of physical activity are associated with global relational, social, and occupational functioning in daily life as measured with the GAF-score. In contrast, eating behaviour factors as measured with the EDI, psychopathological complaints as measured with the SCL-90 and physical fitness as measured with the 6MWT were not significantly related with the GAF-score.

Our data in an obese clinical sample of patients with BED support previous epidemiological data indicating that body image concerns might be more important mediators of the relationship between obesity and impairment in psychosocial functioning as measured with Medical Outcomes Study Short-Form Disability Scale (Ware et al. 1996), whereas the binges itself may not be of primary importance. The current data also supports the recent suggestions that body image concerns are of clinical relevance among obese binge eaters (Goldschmidt et al. 2010, Legenbauer et al. 2011). It has been suggested that a diagnostic criterion reflecting a negative body image may be as relevant for BED as it is for anorexia nervosa and bulimia nervosa (Legenbauer et al. 2011). In particular, overvaluation of shape/weight warrants consideration as a diagnostic criterion for BED (Grilo 2013).

The present data also endorse the importance of considering the sedentary lifestyle of patients with BED. Several studies (Levine et al. 1996, Sherwood et al. 1999, Hrabosky et al. 2007) have reported that patients with BED are indeed less involved in physical activities.

The findings of the present study must be interpreted with caution due to some methodological limitations. First, the BED sample was entirely composed of obese individuals with BED seeking treatment and cannot be considered representative of the general population of obese persons with BED. Second, physical activity participation was only measured with a self-report questionnaire which is prone to both systematic and random errors (Soundy et al. 2007). Future research should therefore incorporate an objective measure of physical activity (e.g., accelerometers). Third, the sample sizes were rather small and consisted almost completely of female participants, both of these factors will need to be considered when attempting to generalise our findings. Fourth, we did not include parameters such as socio-economic status, educational level and duration of illness in order to increase the external validity. Fifth, it needs to be emphasised that the present study was cross-sectional which precludes any speculation regarding the direction of the relationships between the variables of interest. More longitudinal and interventional studies are needed to better understand the potential impact of a

negative body image and a sedentary lifestyle on the relational, social, and occupational functioning of obese people with BED. Lastly, the inclusion of an obese control group would have allowed us to investigate whether the associations found are specific for obese people with BED.

CONCLUSIONS

In summary, the current study identified associations of global functioning with measurements of body attitude and physical activity behaviour. Research is needed to elucidate whether incorporating body image treatments and physical activity in the care of patients with BED may promote global functioning in this patient population.

Acknowledgements: None.

Conflict of interest:

Professor Dr. M. De Hert has been a consultant for, received grant/research support and honoraria from, and been on the speakers/advisory boards of AstraZeneca, Lundbeck JA, Janssen-Cilag, Eli Lilly, Pfizer, Sanofi-Aventis and Bristol-Myers Squibb. Dr. Davy Vancampfort is funded by the Research Foundation – Flanders (FWO - Vlaanderen). The other authors declare that they have no conflicts of interest.

References

1. American Psychiatric Association: *Diagnostic and statistical manual of mental disorders (4th ed.)*. APA, Washington, DC, 1994.
2. American Psychiatric Association: *Diagnostic and statistical manual of mental disorders, (5th ed.)*. APA, Washington, DC, 2013.
3. American Thoracic Society: *ATS statement: guidelines for the six-minute walk test*. *Am J Respir Crit Care Med* 2002; 166:111-7.
4. Arrindell WA, Ettema, JHM: *SCL-90: Handleiding bij een multidimensionele psychopathologie-indicator*. Swets & Zeitlinger, Lisse, 1986.
5. Baecke J, Burema J, Frijters J: *A short questionnaire for the measurement of habitual physical activity in epidemiological studies*. *Am J Clin Nutr* 1982; 36:936-42.
6. Beriault K, Carpentier AC, Gagnon C, Menard J, Baillargeon JP, Ardilouze JL, et al: *Reproducibility of the 6-minute walk test in obese adults*. *Int J Sports Med* 2009; 30:725-7.
7. Carano A, De Berardis D, Gambi F, Di Paolo C, Campanella D, Pelusi L, et al: *Alexithymia and body image in adult outpatients with binge eating disorder*. *Int J Eat Disord* 2006; 39:332-40.
8. De Boer LB, Tart CD, Presnell KE, Powers MB, Baldwin AS, Smits JA: *Physical activity as a moderator of the association between anxiety sensitivity and binge eating*. *Eat Behav* 2012; 13:194-201.

9. Derogatis LR: *SCL-90-R. Administration, scoring and procedures manual, II. Clinical Psychometric Research*, Towson, MD, 1983.
10. First MB, Spitzer RL, Gibbon M, Williams JBW: *Structured clinical interview for DSM-IV Axis I Disorders - Patient Edition (SCID-I/P)*, 2nd ed. New York State Psychiatric Institute, New York, 1996.
11. Garner DM, Olmsted MP, Polivy J: *Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia*. *Int J Eat Disord* 1983; 2:15-34.
12. Goldschmidt AB, Hilbert A, Manwaring JL, Wilfley DE, Pike KM, Fairburn CG, Dohm FA, Striegel-Moore RH: *The significance of overvaluation of shape and weight in binge eating disorder*. *Behav Res Ther* 2010; 48:187-93.
13. Grilo CM, Crosby RD, Masheb R, White M, Peterson C, Wonderlich S, et al: *Overvaluation of shape and weight in binge eating disorder, bulimia nervosa, and sub-threshold bulimia nervosa*. *Behav Res Ther* 2009; 47:692-6.
14. Grilo CM: *Why no cognitive body image feature such as overvaluation of shape/weight in the binge eating disorder diagnosis?* *Int J Eat Disord* 2013; 46:208-11.
15. Hrabosky JI, White MA, Masheb RM, Grilo CM: *Physical activity and its correlates in treatment-seeking obese patients with binge eating disorder*. *Int J Eat Disord* 2007; 40:72-6.
16. Larsson UE, Reynisdottir S: *The six-minute walk test in outpatients with obesity: reproducibility and known group validity*. *Physiother Res Int* 2008; 13:84-93.
17. Legenbauer T, Vocks S, Betz S, BáguenaPuigcerver MJ, Benecke A, et al: *Differences in the nature of body image disturbances between female obese individuals with versus without a comorbid binge eating disorder: an exploratory study including static and dynamic aspects of body image*. *Behav Modif* 2011; 35:162-86.
18. Levine MD, Marcus MD, Moulton P: *Exercise in the treatment of binge eating disorder*. *Int J Eat Disord* 1996; 19:171-7.
19. Mond JM, Hay PJ: *Functional impairment associated with bulimic behaviors in a community sample of men and women*. *Int J Eat Disord* 2007; 40:391-8.
20. Probst M, Van Coppenolle H, Vandereycken W: *The body attitude test for patients with an eating disorder: Psychometric characteristics of a new questionnaire*. *Eat Disord* 1995; 3:133-45.
21. Rey JM, Starling J, Wever C, Dossetor DR, Plapp JM: *Inter-rater reliability of Global Assessment of Functioning in a clinical setting*. *J Child Psychol Psychiatr* 1995; 36:787-92.
22. Sherwood NE, Jeffery RW, Wing RR: *Binge status as a predictor of weight loss treatment outcome*. *Int J Obesity* 1999; 23:485-93.
23. Stice E, Marti CN, Rohde P: *Prevalence, incidence, impairment, and course of the proposed DSM-5 eating disorder diagnoses in an 8-year prospective community study of young women*. *J Abn Psychology* 2013; 122:445-57.
24. Soundy A, Taylor A, Faulkner G, Rowlands A: *The psychometric properties of the seven-day physical activity recall questionnaire in individuals with severe mental illness*. *Arch Psychiatr Nurs* 2007; 21:309-16.
25. Tasca GA, Illing V, Lybanon-Daigle V, Bissada H, Balfour L: *Psychometric properties of the Eating Disorders Inventory - 2 among women seeking treatment for Binge Eating Disorder*. *Assessment* 2003; 10:228-36.
26. Vancampfort D, Vanderlinden J, De Hert M, Adámkova M, Skjaerven LH, Catalán-Matamoros D, et al: *A systematic review on physical therapy interventions for patients with binge eating disorder*. *Disabil Rehabil* 2013; 35:2191-6.
27. Vancampfort D, De Herdt A, Vanderlinden J, Lannoo M, Pieters G, Adriaens A, et al: *Physical and mental health parameters in obese treatment-seeking persons with and without binge eating disorder*. *Disabil Rehabil* 2014a; submitted for publication.
28. Vancampfort D, De Herdt A, Vanderlinden J, Lannoo M, Soundy A, Pieters G, et al: *Health related quality of life, physical fitness and physical activity participation in treatment-seeking obese persons with and without binge eating disorder*. *Psychiatr Res* 2014b; doi: 10.1016/j.psychres.2014.05.016.
29. Vandereycken W, Meermann R: *Anorexia nervosa: a clinician's guide to treatment*. De Gruyter, Berlin, 1984.
30. Vanderlinden J, Buis H, Pieters G, Probst M: *Which elements in the treatment of eating disorders are necessary 'ingredients' in the recovery process? A comparison between the patient's and therapist's view*. *Eur Eat Disord Rev* 2007; 15:357-65.
31. Vanderlinden J, Adriaensen A, Vancampfort D, Pieters G, Probst M, Vansteelandt K: *A cognitive-behavioral therapeutic program for patients with obesity and binge eating disorder: short- and long-term follow-up data of a prospective study*. *Behav Modif* 2012; 36: 670-86.
32. Vocks S, Tuschien-Caffier B, Pietrowsky R, Rustenbach SJ, Kersting A, Herpertz S: *Meta-analysis of the effectiveness of psychological and pharmacological treatments for binge eating disorder*. *Int J Eat Disord* 2010; 43:205-17.
33. Ware JE, Kosinski M, Keller SD: *A 12-item short-form health survey: construction of scales and preliminary tests of reliability and validity*. *Med Care* 1996; 34:220-33.
34. Westerterp KR: *Assessment of physical activity level in relation to obesity: current evidence and research issues*. *Med Sci Sports Exerc* 1999; 31:522-5.

Correspondence:

Davy Vancampfort
KU Leuven Department of Neurosciences, UPC KU Leuven Campus Kortenberg
Kortenberg, Belgium
E-mail: Davy.Vancampfort@uc-kortenberg.be