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Abstract

The aims of the present study were to determine the prevalence of non-suicidal self-injury (NSSI) in different eating disorder (ED) groups and morbid obesity, and to investigate whether NSSI in different ED/obesity groups co-occur with impulsivity. We assessed 535 individuals (365 ED and 170 obese patients) by means of a single item assessing lifetime NSSI and the Barratt Impulsivity Scale, which measures different dimensions of impulsivity. The results showed that 19.1% of the ED patients engaged in at least one act of NSSI during their life-time. NSSI was more prevalent in Bulimia Nervosa, Binge Eating Disorder, Eat- ing Disorder Not Otherwise Specified compared to Anorexia Nervosa, Restrictive type and morbid obesity. Finally, ED/obese patients who engaged in NSSI scored significantly higher on the attentional, motor and non-planning subscales than patients without NSSI. The implications of these findings for the treatment of NSSI in binge/purging ED patients are discussed.

1. Introduction

Non-suicidal self-injury (NSSI) refers to the intentional destruc- tion of one's body tissue without suicidal intent and for purposes not socially sanctioned (Claes & Vandereycken, 2007), and includes behaviors such as cutting, carving and burning the skin. Eating dis- order (ED) patients display rather high rates of NSSI (Favaro & Santonastaso, 1999, 2000; Solano, Fernandez-Aranda, Aitken, Lo- pez, & Vallejo, 2005). In their review of 62 studies on NSSI and ED, Svirko and Hawton (2007) reported that the occurrence of NSSI in ED patients varied between 13.6% and 42.1% for Anorexia Nerv- osa Restrictive subtype (AN-R), between 27.8% and 68.1% for Anor- exia Nervosa binge eating/purging subtype (AN-BP), and between 26% and 55.2% for Bulimia Nervosa (BN) (Svirko & Hawton, 2007).

The increase in NSSI prevalence from AN-R over AN-BP to BN has often been attributed to observations of increased impulsivity from restrictive to binge–purging ED's (e.g., Claes, Vandereycken, & Vertommen, 2002). Research has consistently supported hypothe- ses that individuals who self-injure are more impulsive than those who do not self-injure (Claes, Vandereycken, & Vertommen, 2003; Glenn & Klonsky, 2010; Janis & Nock, 2009; Klonsky, Muehlenkamp, Lewis, & Walsh, 2012). Many studies in the field of eating dis- orders have shown that self-injurious ED patients score signifi- cantly higher than ED patients without NSSI on trait impulsivity/ sensation seeking (Claes, Vandereycken, & Vertommen, 2004), lack of self-directedness (Baetens, Claes, Willem, Muehlenkamp, & Bijttebier, 2011), impulsive behaviors (Claes et al., 2011; Solano et al., 2005), and cluster B personality disorders (Claes et al., 2004).

Although the prevalence of NSSI in the traditional eating disor- ders and the role of impulsiveness within each behavior have been well established, no known data are available concerning the prev- alence of NSSI in the Eating Disorder Not Otherwise Specified (ED- NOS), Binge Eating Disorder (BED), and morbid obesity diagnostic categories. Therefore, the first aim of the present study was to determine the prevalence of NSSI in EDNOS, BED and obesity. Gi- ven that some studies have found self-injurious patients to report difficulties with some aspects of impulsivity (e.g., non-planning impulsivity, sense of urgency) but not with others (e.g., attentional or motor impulsivity) (Glenn & Klonsky, 2010), a secondary aim was to investigate the associations between different dimensions of impulsivity in ED diagnostic groups with and without NSSI. Eval- uating this second aim could provide valuable information to bet- ter understand the disparate prevalence estimates of NSSI across ED/obese diagnostic groups.

2. Method

2.1. Participants and procedures

The sample consisted of 535 female ED/obese patients (mean age = 32.60, SD = 11.18, range 14–68 years) recruited from consec- utive referrals for ED treatment or bariatric surgery at the Univer- sity Hospital of Bellvitge Department of Psychiatry in Barcelona. Participants completed self-report questionnaires and diagnostic interviews as part of their treatment intake assessment. A de-iden- tified database including diagnostic information and total scale/ item scores on this study's assessment measures were provided to the researchers for analysis. The study procedures were ap- proved by the Ethics Committee of the University Hospital of Bell- vitge, which makes decisions based on the ethical principles of the Declaration of Helsinki. All participants gave informed consent for their data to be used.

Participants were diagnosed by experienced psychologists and psychiatrists according to the DSM-IV criteria (American Psychiat- ric Association, 1994) using the Structured Clinical Interview for DSM-IV Axis I Disorders (First, Spitzer, Gibbon, & Williams, 1997). To assess Binge Eating Disorder (BED) during the interview, we used the DSM-IV criteria (American Psychiatric Association, 1994); defining BED as uncontrolled binge eating without emesis or laxative abuse. Almost 11% (n = 56) were diagnosed with Anor- exia Nervosa, Restrictive type (AN-R); 29.5% (n = 158) with Bulimia Nervosa (BN); 16.1% (n = 86) with Binge Eating Disorder (BED); 12.1% (n = 65) with eating disorders not otherwise specified (EDNOS); and 31.8% (n = 170) as morbid obese bariatric surgery pa- tients without BED. Due to the linkage between obesity and ED (Villarejo et al., 2012), we included both ED patients and obese pa- tients to have a representative sample of the weight spectrum ranging from underweight to morbid obesity. Patients with a psy- chotic disorder were excluded along with binge eating/purging AN patients because they share common features with both AN-R pa- tients (underweight) and BN patients (similar levels of impulsivity) (Hoffman et al., 2012), and we wanted orthogonal ED groups.

Table 1 describes the mean age, BMI (weight in kg/length in m2), onset and duration of ED/obesity for each patient group. Al- most 33% of the patients completed elementary education (32.8%, n = 170), 52.6% secondary education (n = 273) and 14.6% university (n = 76). Compared to the ED patients, a greater portion of obese patients fell into the lower educational categories (e.g., only completed elementary education) [$X2(8) = 52.37$, $p < 0.001$]. Almost two thirds of the patients were employed (73.3%, n = 357), and there were no significant differences between the five groups for employment [$X2(4) = 4.88$, ns].

2.2. Instruments

The presence/absence of NSSI was investigated by a 1-item question asking, ''Have you ever engaged in self-injury without the intent to die?'' Using a single-item measure of NSSI is common to NSSI research, has been shown to render consistent estimates of prevalence (e.g., Muehlenkamp, Claes, Havertape, & Plener, 2012), and in the behavioral sciences should not be perceived as a fatal er- ror (Baruch, 2005; Ganzach, 1998; Levine, Rabinowitz, Engel, Etschel, & Leucht, 2008).

Impulsivity was assessed by means of the Barrett Impulsiveness Scale-version 11 (BIS-11; Patton, Stanford, & Barratt, 1995; Spanish version: Oquendo et al., 2001). The BIS-11 is a 30 item self-report instrument designed to assess the multidimensional personality construct of impulsivity. Factor analyses on the BIS-11 revealed six first-order and three second-order factors. The first-order fac- tors were labeled as follows: attention (focusing on the task at hand); motor impulsiveness (acting on the spur of the moment); self-control (planning and thinking carefully); cognitive complex- ity (enjoy challenging mental tasks), perseverance (a consistent life style) and cognitive instability (thought insertions and racing thoughts). The three second-order factors are: Attentional Impul- siveness, combining Non-Attention and Cognitive Instability; Motor Impulsiveness, combining Motor Impulsiveness and Non-Persever- ance; and Non-

planning Impulsiveness combining Self-control and Cognitive Complexity, which were used in the current study.

3. Results

Overall, 19.1% (n = 102) of the ED patients engaged in at least one act of NSSI during their life-time. Significant differences in the presence/absence of NSSI were observed between the different ED/obese groups (see Table 2). NSSI was most prevalent in BN pa- tients (27.8%), followed by EDNOS (26.2%), BED (19.8%), AN-R (17.9%) and obesity (8.2%), suggesting that NSSI may be less com- mon in patients with extreme low and extreme high body weights. However, the only significant difference in prevalence was be- tween the obesity group and the BN and EDNOS groups.

Differences in impulsivity between the ED/obese groups with and without NSSI were compared using a MANCOVA with pres- ence/absence of NSSI and ED group membership as independent variables, and the BIS-II second-order impulsivity dimensions as dependent variables and age as covariate. The results of the MAN- COVA showed significant main effects for both presence/absence of NSSI [Wilks' Lambda = 0.981, $F(3,523) = 3.41$, $p < 0.01$] and ED group membership [Wilks' Lambda = 0.983, $F(12,1384,019) = 5.06$, $p < 0.001$] on each of the BIS-11 second order impulsivity dimensions but no significant interaction effects. ED/obese pa- tients with NSSI scored significantly higher on each of the three impulsivity dimensions and the total BIS-11 score compared to ED/obese patients without NSSI (see Table 3). Scheffé's post hoc tests were used to compare the five ED/obese diagnostic groups on the BIS-II dimensions. AN-R patients scored significantly lower on all BIS-11 dimensions compared to BN and BED patients; whereas obese patients score significantly lower on all BIS-11 scales compared to BN, BED and EDNOS patients (except for motor impulsiveness; see Table 4).

4. Discussion

The aim of the present study was to determine the prevalence of NSSI across different ED diagnoses and obesity, and to investigate whether the presence of NSSI in ED/obesity co-occur with different dimensions of impulsivity. NSSI was most prevalent in BN patients and least common among obesity and AN-R patients, indi- cating that NSSI is less prevalent within extreme weight condi- tions. The prevalence data of NSSI in our BN and AN-R groups also resemble the estimations of Svirko and Hawton (2007), who described prevalence rates of NSSI between 13.6% and 42.1% for AN-R and between 26% and 55.2% for BN. The consistency of these findings suggests that it is appropriate to assess for NSSI within ED patients, but also that NSSI and certain ED symptoms may share similar underlying properties such as impulsivity.

The current results showed that self-injurious ED/obese pa- tients reported significantly more racing thoughts (attentional impulsivity), acting on the spur of the moment (motor impulsivity) and lack of planning/thinking carefully (non-planning) compared to patients who do not engage in NSSI, which offers additional con- firmation of these difficulties within AN and BN samples (Claes et al., 2003, 2004, 2011; Solano et al., 2005) and underscores the importance for treatment to address impulsivity. Furthermore, AN and morbid obese patients showed lower levels of attentional, motor, and non-planning impulsivity compared to BN, BED and ED- NOS patients. These observed differences in impulsivity across diagnostic groups may help explain why these patients also en- gaged in NSSI less frequently (Müller et al., 2012).

Although our study was the first to show that NSSI also occurs in BED, EDNOS and morbid obese patients, and is differentially re- lated to impulsivity across diagnoses, some limitations warrant consideration. This study included only female ED/obese patients and can't be generalized to male ED patients, which is an under- studied group. Additionally, information about the ethnicity of the participants was not available nor was inter-rater reliability of the ED/obesity diagnoses. Life-time prevalence of NSSI was as- sessed by a single item, so data pertaining to the type, frequency, severity and functionality of the self-injurious acts was not avail- able. Some of these aspects of NSSI may also show variations across diagnostic groups and/or impulsivity features and can be examined in future studies. Finally, the different dimensions of

impulsivity were based on patient self-reports and could be biased. Future studies can add performance-based measures (e.g., stop-go task) to assess different aspects of impulsivity (e.g., Janis & Nock, 2009) to ensure generalization.

To conclude, our results indicate that NSSI occurs in BN/BED and EDNOS to a greater extent than AN-R and obesity diagnoses, and that impulsivity is significantly associated with both sets of behav- iors. Patients presenting with these behavioral problems can be encouraged to take advantage of clinical interventions which focus on impulse-regulation by means of cognitive training strategies (PlayMancer; Fernandez-Aranda et al., 2012), as these interven- tions target mechanisms, such as impulsivity, underlying both binge/purging behaviors as well as NSSI.

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Table 1

	AN-R (n = 56)		BN (n = 158)		EDNOS (n = 65)		BED (n = 86)		Obesity (n = 170)		F	Partial η^{2a}
	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)		
Age	26.05	(11.41)	28.15	(7.82)	27.14	(9.45)	33.80	(9.87)	40.39	(10.34)	48.51***	.27
BMI	16.13	(1.32)	24.76	(6.78)	22.43	(4.20)	35.33	(7.37)	43.42	(6.10)	324.31***	.72
ED onset	20.44	(9.18)	19.32	(6.80)	19.92	(6.48)	23.05	(10.54)	24.60	(12.93)	3.15**	.04
ED duration	5.01	(6.36)	9.09	(6.80)	6.41	(6.41)	10.75	(8.65)	15.00	(11.20)	7.77***	.08

Table 2

	AN-R (n = 56)		BN (n = 158)		EDNOS (n = 65)		BED (n = 86)		Obesity (n = 170)		X^2
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	
NSSI	$10^{a,b}$	(17.9)	44^{b}	(27.8)	17^{b}	(26.2)	$17^{a,b}$	(19.8)	14^{a}	(8.2)	23.01***

Table 3

	No NSSI (n = 433)		NSSI (n = 102)		F	Partial η^{2a}
	M	(SD)	M	(SD)		
Attentional impulsivity	14.90	(4.61)	16.92	(4.92)	7.31**	.01
Motor impulsivity	16.24	(6.70)	19.63	(7.82)	5.45*	.01
Non-planning	18.13	(6.57)	20.10	(7.62)	4.88*	.01
Total score	49.27	(13.76)	56.65	(16.16)	9.92**	.02

Table 4

	AN-R (n = 56)		BN (n = 158)		EDNOS (n = 65)		BED (n = 86)		Obesity (n = 170)		F	Partial η^{2a}
	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)		
Attentional impulsivity	14.21^{ab}	(4.53)	17.33^{acd}	(4.67)	15.48^{cf}	(4.79)	16.47^{be}	(4.71)	13.06^{def}	(3.75)	4.92***	.05
Motor impulsivity	14.75^{abc}	(6.25)	19.82^{ad}	(6.51)	18.78^{cf}	(7.24)	18.63^{be}	(7.12)	13.26^{def}	(5.80)	5.06***	.09
Non-planning impulsivity	15.61^{ab}	(6.70)	20.06^{a}	(7.57)	17.71	(7.42)	20.41^{b}	(5.91)	18.51	(6.82)	5.18***	.02
Total score	44.57^{ab}	(13.52)	57.22^{ac}	(14.45)	51.97^{e}	(15.39)	55.50^{bd}	(13.99)	50.68^{cde}	(14.5)3	14.22***	.08