

Original article

# Suicide attempts in bulimia nervosa: Personality and psychopathological correlates

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## Abstract

**Background.** — Little evidence exists about suicidal acts in eating disorders and its relation with personality. We explored the prevalence of lifetime suicide attempts (SA) in women with bulimia nervosa (BN), and compared eating disorder symptoms, general psychopathology, impulsivity and personality between individuals who had and had not attempted suicide. We also determined the variables that better correlate with of SA.

**Method.** — Five hundred sixty-six BN outpatients (417 BN purging, 47 BN non-purging and 102 subthreshold BN) participated in the study.

**Results.** — Lifetime prevalence of suicide attempts was 26.9%. BN subtype was not associated with lifetime SA ( $p=0.36$ ). Suicide attempters exhibited higher rates on eating symptomatology, general psychopathology, impulsive behaviors, more frequent history of childhood obesity and parental alcohol abuse ( $p < 0.004$ ). Suicide attempters exhibited higher scores on harm avoidance and lower on self-directedness, reward dependence and cooperativeness ( $p < 0.002$ ). The most strongly correlated variables with SA were: lower education, minimum BMI, previous eating disorder treatment, low self-directedness, and familial history of alcohol abuse ( $p < 0.006$ ).

**Conclusion.** — Our results support the notion that internalizing personality traits combined with impulsivity may increase the probability of suicidal behaviors in these patients. Future research may increase our understanding of the role of suicidality to work towards rational prevention of suicidal attempts.

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## 1. Introduction

Suicidal behaviors are common in several psychiatric disorders, including psychotic disorders [48], affective disorders [6,61], personality disorders [68], psychoactive substance use disorders [18,45], impulse control disorders [22], body

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dysmorphic disorder [54] and eating disorders [7,9]. Suicidality in eating disorders [54] has been reported in patients with bulimia nervosa (BN) [14,63] and in individuals with the bingeing–purging subtype of anorexia nervosa (AN) [63]. In these patients 54–62% report suicidal ideation and 13–31% suicide attempts ([14,20,27]; Milos et al., 2004 [51]).

Suicidal ideation or attempts in eating disorders are related to comorbid mood disorders [7,64,67], personality disorders [2], substance use disorders [19,23] and axis I and axis II disorders (Milos et al., 2004 [51]; [62]), although they appear to be unrelated to the temporal pattern of onset of the major depression disorder in eating disorders [24]. Suicidal behavior in eating disorders has also been associated with high levels of impulsivity ([44]; Milos et al., 2004 [50]), bingeing/purging behavior including diuretic and laxative abuse [20,27,64], psychopathological distress [59], longer duration of illness [62], a history of physical/sexual abuse [27,30] and lower cholesterol levels [19]. Several personality traits have been associated with suicidality in eating disorders including high persistence (tendency to persevere despite frustration and fatigue), low self-directedness (individual tendency to be responsible, reliable, resourceful, goal-oriented, and self-confident), high self-transcendence (individual tendency to conceive yourselves as integral parts of the universe as a whole) [7], psychasthenia (tendency to suffer phobias, obsessions, compulsions, or excessive anxiety) and aggressive and fear-related traits [14,42,69]. These observations parallel other psychiatric disorders in which suicidality has been associated with aggressive/impulsive traits [48], hopelessness, neuroticism, and external locus of control [5].

Several models of suicidality have highlighted the role of personality as a vulnerability factor. Verona and colleagues [65] underscored the robust association between externalizing syndromes (e.g., alcohol and drug abuse, antisocial personality disorder) and suicidal behaviors in general psychiatric patients. Gruzca and colleagues [34] posited a common underlying factor in individuals who attempt suicide marked by high harm avoidance and low self-directedness. These models are directly relevant to BN which is characterized by both impulsive behaviors [22,23,27] and high harm avoidance and low self-directedness [1,7].

The goals of the current study were threefold: (a) to report the lifetime prevalence of suicide attempts in a clinical sample of individuals with BN (purging vs. non-purging subtype); (b) to determine whether BN patients with a history of suicide attempts exhibit more severe eating disorder symptomatology and greater general psychopathology than BN patients without suicide attempts and (c) to determine the optimal combination of predictors of suicide attempts in BN.

As suggested in the literature [27,64], we hypothesized that lifetime prevalence of suicide attempts would be higher in individuals with purging than non-purging BN, that suicide attempters present greater general psychopathology and that high harm avoidance, low self-directedness, and externalizing symptoms (such as substance abuse) would be associated with an increased likelihood of reporting suicide attempts.

## 2. Methods

### 2.1. Participants

Entry into the study was between January 2002 and December 2006. The initial sample included 629 BN patients consecutively admitted to the outpatient clinic of the eating disorders unit in the Department of psychiatry at the University Hospital of Bellvitge. The Ethics Committee of our Institution approved this study and informed consent was obtained from all participants. All patients in this study were female and fulfilled the DSM-IV criteria for BN (APA, 2000 [3]) or Eating Disorder Not Otherwise Specified (EDNOS) if the presence of binges and/or purges is lower than two per week, or the purge exist even after a little quantity of food, as determined by a semi-structured face-to-face clinical interview, conducted by experienced psychologists and psychiatrists. For the present analysis, we excluded: (a) males ( $N = 33$ ), as the number of males was too small for meaningful comparison; (b) participants with questionnaires with relevant missing data ( $N = 25$ ). The total final sample comprised 566 patients (417 BN purging, 47 BN non-purging and 102 subthreshold BN/EDNOS). The mean age of the participants was 26.1 years ( $SD = 6.9$ ). The mean age of onset of the eating disorder was 19 years ( $SD = 6.2$ ) and the mean duration of illness was 7.1 years ( $SD = 5.5$ ). The mean weekly average number of binges was 6.7 ( $SD = 7.6$ ) of vomiting episodes was 7.2 ( $SD = 8.9$ ). Mean BMI ( $\text{kg}/\text{m}^2$ ) was 23.5 ( $SD = 4.7$ ). The majority of patients were single (77.4%), employed (77.6%), and completed primary (38.8%) or secondary (48.1%) studies.

### 2.2. Clinical assessment

#### 2.2.1. Lifetime suicide attempts

As a part of the Diagnostic Interview Schedule, participants were asked by structured clinical face-to-face interview, “Have you ever attempted suicide?” The time frame for these questions was lifetime. A suicide attempt was defined as a self-destructive act with some degree of intent to end one’s life. Thus, to be considered an attempt, the attempt was required to have two components, an action that was self-destructive and acknowledgement of intent to die.

#### 2.2.2. Evaluation of comorbid impulsivity

The patients were assessed with a face-to-face structured clinical interview, covering lifetime substance abuse (drug and alcohol) with the structured clinical interview for DSM-IV axis I disorders, SCID-I [26] and impulsive behaviors (namely substance abuse, kleptomania, compulsive buying) according to the DSM-IV criteria and self-injurious behaviors (defined as a self-destructive act with no intention to end one’s life [25]).

#### 2.2.3. Evaluation of further sociodemographic and clinical variables

Additional demographic information including age, marital status, education, occupation, living arrangements, parental occupation was obtained via a semi-structured face-to-face

interview conducted by experienced psychologists [21]. The same interview also assessed family history of alcohol abuse/dependence, frequency of previous eating disorder treatments (“have you ever been treated for your eating disorder”) and the presence of childhood obesity (“have you ever been diagnosed with childhood obesity?”).

#### 2.2.4. Evaluation of weekly binge eating and purging frequencies

At the first face-to-face interview, patients were given food diaries, where they recorded episodes of binge eating and purging along three weeks prior to the initial assessment. Experienced psychologist and psychiatrist evaluated weekly bingeing and purging frequency by examining these food diaries.

#### 2.2.5. Self-report questionnaires

Participants completed a battery of self-report questionnaires designed to assess eating disorders pathology, general psychopathology, and personality. Questionnaires included the Eating Attitudes Test (EAT-40; [33]) providing an index of the severity of the eating disorder as adapted to the Spanish population (Cronbach’s alpha coefficient = 0.93) [11]; the Eating Disorders Inventory-2 (EDI-2; [31]) also validated in a Spanish population [32] and obtaining a mean internal consistency of 0.63 (coefficient alpha); the Bulimic Investigatory Test Edinburgh (BITE; [38]) yielding two subscales: the symptomatology scale (30 items), that determines the seriousness of the symptoms, and the severity scale (three items) that offers a severity index, also adapted to the Spanish population [57]; the Social Avoidance Distress Scale (SAD) measuring the degree of distress, discomfort, anxiety, and avoidance of social situations also adapted to the Spanish population and yielded a high internal consistency (Cronbach’s alpha coefficient = 0.90) [60]; The Symptom Check-List revised (SCL-90-R; [16]) as validated in Spanish population [15] obtaining a mean internal consistency of 0.75 (Coefficient alpha); and the Temperament and Character Inventory – revised version – (TCI-R; [13]). The TCI-R is a 240-item, five-point Likert scale, reliable and valid questionnaire that measures, as in the original TCI version [12], seven dimensions of personality: four temperament (harm avoidance, novelty seeking, reward dependence and persistence) and three character dimensions (Self-Directedness, Cooperativeness and Self-Transcendence). The performance of the Spanish version of the original questionnaire [37] and the revised version [36] have been documented. The scales in the latter showed an internal consistency (Coefficient alpha) of 0.87.

#### 2.3. Procedure

Experienced psychologists–psychiatrists conducted the structured face-to-face interviews outlined above. At this time, specific questions about the presence of lifetime SIB and psychopathological information about their families were also obtained. Participants were weighed and measured by the interviewers, before any therapy had begun.

#### 2.4. Statistical analysis

Statistical analyses were conducted with SPSS 14.0 for Windows. Firstly, prevalence was estimated for suicide attempts. Secondly, clinical and personality profiles for patients with and without suicide attempts were compared with Student–Fisher’s *t*-tests. Categorical variables were compared with chi-square tests. To correct for multiple testing, an alpha level of  $p < 0.01$  was established.

In order to conduct a predictive analysis of suicide attempts, those variables that differed significantly in the bivariate analyses (presence/absence of suicide attempt) and all sociodemographic, clinical, and psychometric variables were entered in a binary logistic regression model. The final model was selected by means of backward stepwise procedures. The criterion of entrance into the model was established at 0.01 level in order to correct for multiple comparisons. The global predictive capacity of the final selected model was measured with Nagelkerke’s  $R^2$  coefficient.

### 3. Results

#### 3.1. Prevalence of lifetime suicide attempts in individuals with BN

The observed lifetime prevalence of suicide attempts was 26.9% ( $N = 152$ , CI 95%: 23.2–30.5). No statistical association between BN subtype and presence of suicide attempts was observed (26.9% in BN-P, 19.1% in BN-NP and 30.4% in subthreshold BN/EDNOS,  $p = 0.36$ ).

#### 3.2. Sociodemographic variables

The group of patients with lifetime suicide attempts showed higher unemployment rates (32.2% in attempters vs. 18.7% in non-attempters,  $\chi^2(1) = 11.1$ ,  $p = 0.001$ ) and a lower educational level, ( $\chi^2(2) = 10.93$ ,  $p = 0.004$ ), than patients without attempts. No statistically significant differences in age or marital status were observed between these groups.

#### 3.3. Clinical variables

As shown in Table 1, patients with lifetime suicide attempts were more likely to have had previous treatment for eating disorders, presented earlier age of onset, childhood obesity, higher total amount of impulsive behaviors (namely substance abuse, kleptomania, compulsive buying and self-injurious behaviors) and more parental alcohol abuse.

#### 3.4. Psychopathology self-report measures

In general, patients with lifetime suicide attempts had higher scores on all clinical measures administered, i.e., they showed greater severity of eating disorder symptomatology (measured by the total EDI score,  $p < 0.0005$ ) and greater general psychopathology (measured by all SCL-90-R scores). These differences with respect to patients without suicide

**Table 1**  
Clinical characteristics of the sample according to presence/absence of suicidal attempts: results of comparison analyses.

	Suicidal attempts				<i>t</i>	<i>p</i>
	Absent ( <i>N</i> = 414)		Present ( <i>N</i> = 152)			
	Mean	SD	Mean	SD		
Bulimic episodes <sup>a</sup>	6.48	6.74	7.42	9.58	-1.11	0.27
Vomiting episodes <sup>a</sup>	6.82	8.38	8.07	10.23	-1.47	0.14
Current BMI <sup>b</sup>	23.44	4.7	23.59	4.77	-0.32	0.75
Maximum BMI	26.61	5.29	27.43	5.07	-1.58	0.12
Minimum BMI	19.42	2.69	18.74	2.84	2.53	0.012
Age of onset	19.37	6.1	17.84	6.43	2.59	0.010
Duration of disorder (years)	6.85	5.65	7.9	5.16	-1.99	0.047
					$\chi^2$	<i>p</i>
Previous treatments <sup>c</sup>	49.90%		67.80%		14.34	<0.0005
Childhood obesity	7.10%		16.10%		10.27	0.001
Impulsive behaviors						
Drug abuse	19.70%		29.6%		6.33	0.012
Compulsive buying	18.20%		28.06%		6.41	0.011
Kleptomania	3.20%		8.00%		6.04	0.014
Self-injury behaviors	27.00%		52.80%		31.07	<0.0005
Familiar antecedents <sup>d</sup>						
Alcohol abuse	21.20%		38.80%		17.53	<0.0005

<sup>a</sup> Frequency per week.

<sup>b</sup> BMI: body mass index (kg/m<sup>2</sup>).

<sup>c</sup> This variable reflects the percentage of participants that have been involved in other treatments for eating disorders before starting treatment at our unit.

<sup>d</sup> Only statistically significant results are showed.

attempts were statistically significant on the following EDI-2 subscales: Interpersonal Distrust, Ineffectiveness, Impulsivity and Social Insecurity ( $p < 0.0005$ ). Statistically significant differences were also observed in the SAD scale ( $p = 0.001$ ), and in all SCL-90-R subscales ( $p < 0.001$ ), including its global indices (GSI, PST, and PSDI,  $p < 0.0005$ ). The only non-significant finding was obtained for the Interpersonal Sensitivity SCL-90-T subscale.

### 3.5. Personality scores

Table 2 displays mean TCI-R scores and results of Student–Fisher's *t*-tests comparing patients with and without lifetime suicide attempts. Patients with suicide attempts showed statistically higher harm avoidance and lower scores on: reward dependence, self-directedness, and Cooperativeness than those without suicide attempts.

### 3.6. Predictive analysis

The variables that were significantly associated with suicide attempts in the bivariate analyses (education level, employment status, minimum lifetime BMI, age of onset and duration of the eating disorder, previous treatment for an eating disorder, childhood obesity, family history of alcohol abuse, presence of impulsive behaviors, substance abuse, TCI-R harm avoidance, reward dependence, Self-Directedness, Cooperativeness and Self-Transcendence subscales, and all SCL-90-R subscales) were included in a binary logistic regression

**Table 2**  
TCI-R scores according to presence/absence of suicidal ideation and attempts: results of *t*-test analyses.

	Suicidal attempts				<i>t</i>	<i>p</i>
	Absent ( <i>N</i> = 414)		Present ( <i>N</i> = 152)			
	Mean	SD	Mean	SD		
Novelty seeking	104.99	15.55	106.57	17.41	-0.95	0.341
Harm avoidance	115.99	21.56	123.37	17.68	-3.49	0.001
Reward dependence	104.36	16.13	99.10	16.68	3.14	0.002
Persistence	107.39	20.96	109.97	19.95	-1.21	0.227
Self-directedness	113.33	19.40	103.71	20.50	4.74	<0.0005
Cooperativeness	135.04	18.04	127.68	20.68	3.80	<0.0005
Self-transcendence	66.22	15.23	70.12	15.09	-2.50	0.013

analysis. Table 3 presents the final model. As can be seen, lower education, lower minimum lifetime BMI, familial alcohol abuse, prior treatment for an eating disorder, and low TCI-R Self-Directedness were statistically significant correlated with suicide attempts in our sample. This model was statistically significant,  $\chi^2(6) = 58.78$ ,  $p < 0.0005$  and explained 20.3% of the variability in suicide attempts (Nagelkerke's  $R^2 = 0.203$ ).

No differences in these results were observed after adjustment for either the presence of subthreshold or full BN, or for level of general psychopathology (SCL-90-R global indices).

## 4. Conclusions

We examined the prevalence of suicide attempts in a large clinical sample of individuals with BN, addressing whether those patients with history of suicide attempts exhibit more severe eating disorder symptomatology, greater general psychopathology and differential personality traits than BN patients without attempts. Furthermore, we explored whether lifetime suicide attempts were associated both with specific personality traits and substance abuse.

### 4.1. Lifetime prevalence of suicidal attempts

Confirming previous studies [7,27,69], we observed similar prevalence of suicide attempts (26.1 %) in BN individuals. However, no differences across the diagnostic subcategories were observed in our study. Somewhat unexpectedly, the rate of suicide attempts was numerically larger in the subthreshold BN/EDNOS

**Table 3**  
Predictive value of sociodemographics, clinical history and personality traits on suicidal attempts: binary logistic regression (backward stepwise method).

	Suicidal attempts			Sig.
	OR	95%CI (OR)		
Education	0.340	0.172	0.674	0.002 <sup>a</sup>
Minimum BMI	0.870	0.789	0.959	0.005
Family history of alcoholism	2.147	1.292	3.565	0.003
TCI-R: self-directedness	0.977	0.964	0.989	<0.0005
Previous treatments	2.035	1.226	3.376	0.006
Constant	24.861			0.011

Dependent variable: suicidal attempts.

<sup>a</sup> This parameter reflects the linear trend of the variable education ( $k = 3$ ).

group suggesting that on this dimension, having a subthreshold diagnosis is not associated with lower risk of suicide.

#### 4.2. Sociodemographic and clinical variables

Several sociodemographic and clinical variables indexed suicide attempts in this sample including, unemployment, lower educational level, childhood obesity, parental alcohol abuse, and the presence of impulsive behaviors (namely substance abuse, kleptomania, compulsive buying and self-injury behaviors). The unemployment and lower educational level results parallel observations in other psychiatric disorders [29,35,46,52]. Impulsivity has been previously recognized to be associated with suicidality in eating disorders [14,53] as has greater substance abuse [27,28]. Previous research found that individuals with eating disorders with high impulsivity were characterized by extreme deficits in impulse regulation that extend beyond the domain of appetite and feeding behavior, including propensities for affective and interpersonal instability, poor frustration tolerance, drug and alcohol misuse and suicidality [7,44,69], but also in psychiatric patients [17]. That suicide attempts in individuals with eating disorders were associated with more previous treatment confirms previous observations [20] and supports the notion that more protracted and severe illness is associated with a greater likelihood of suicide attempts. In general, this pattern of findings suggests a greater burden of comorbidity (in both patients and family members) coupled with greater social disadvantage, which when seen together in a patient with BN, may suggest greater risk for suicide attempts. The presence of childhood obesity may reflect early behavioral deregulation of eating, and could be operative in increasing suicide risk via the negative stigma associated with overweight in childhood which has known adverse effects on self-esteem and self-worth [58,66].

#### 4.3. Eating symptoms and general psychopathology

Patients with suicide attempts also reported more general psychopathology than women without those behaviors (measured by SCL-90-R). Confirming the study of Franko et al. [28], patients with suicide attempts, scored higher on all subscales of the SCL-90-R than patients without those behaviors. We also observed that these individuals reported greater severity of general eating disorder symptoms (as measured by total EDI scores), and in some specific EDI-subscales, namely interoceptive awareness, interpersonal distrust, ineffectiveness, impulsivity, asceticism, and social insecurity. These results further underscore the observation of greater eating disorder severity and comorbid burden as reflected in measures of general psychopathology [14].

#### 4.4. Personality traits

According to the few existing studies in the eating disorder literature [7,69], that have linked personality characteristics to suicide behavior, we found that suicide attempters scored significantly higher on harm avoidance and lower scores on

self-directedness, reward dependence and cooperativeness than non-attempters. High harm avoidance (or the tendency to inhibit responses to signals of aversive stimuli that lead to avoidance of punishment) has also been observed in individuals with anorexia nervosa who have lifetime histories of suicide attempts [9]. As currently suggested in several studies, suicidality is associated with anxious personality traits such as harm avoidance and neuroticism in various psychiatric and community samples [34], but also impulsivity and high novelty seeking in individuals who attempt or complete suicide [49,55]. The co-existence of anxious and impulsive traits may converge to increase suicidal risk.

Moreover, the presence of low self-directedness and low cooperativeness comprises a personality cluster that is predictive of the presence of borderline personality pathology [8], higher impulsivity, and also observed to be associated with suicide attempts in AN [9].

#### 4.5. Analysis of correlations of lifetime suicidal attempts

Our regression model revealed that lower educational attainment, having had previous treatments for eating disorders, lower minimum BMI, a family history of alcohol abuse and lower scores on self-directedness were statistically associated with suicide attempts in the entire sample. The finding that a lower educational level is associated with suicidality is consistent with previous studies conducted with psychiatric patients ([39,41]; Kuo et al., 2001 [43]) as well as in general population [46,56]. Similarly in general psychiatric patients, suicide attempt(s) have been found to occur reasonably early in the course of the illness [47]. Considering previous treatments, previous research has also indicated a longer clinical history, and a number of failed treatments in psychiatric patients who attempt suicide compared to those without attempts, but also lower motivation to change [10].

Summarizing, the data from the present study provides considerable support for the Cloninger and Joiner models, where personality vulnerabilities in conjunction with externalizing–internalizing symptoms are explanatory models of suicidal behavior. Specifically in BN, those individuals who exhibit higher internalizing personality traits (namely harm avoidance) as well as the cluster of low cooperativeness and self-directedness, in conjunction with comorbid externalizing symptoms (e.g., impulsive behaviors) and longer duration of the eating disorder, are more likely to engage in suicidal acts. Family history of alcohol abuse may signal both an underlying genetic predisposition to addictive disorders as well as the possibility of dysfunctional family environments which could also contribute to or trigger the emergence of BN [4].

Clinical implications of these results are clear. First, clinicians would profit from consistently assessing suicidal intentions in eating disorder patients — especially in those with considerable comorbid burden and combined anxious — impulsive traits. Second, interventions should target affect regulation skills and interventions that underscore techniques to address harm avoidance, impulsivity, and self-directedness directly in these patients [40].

Certain limitations of the current study should be considered in interpreting the findings. First, we relied on participants' retrospective reports of lifetime diagnosis. Second, the cross-sectional design does not allow us to determine causality of the variables assessed. Third, the risk of observed results being related to undiagnosed comorbidity of index patients, especially mood disorders, comorbid social phobia and personality disorders should be considered.

Finally, because we lacked a control group, we were unable to evaluate rates of attempted suicide in other psychiatric disorders and to compare these with the occurrences in BN patients. However, future research should compare across samples of individuals with different psychiatric disorders who exhibit similar suicidal acts.

Future research could expand these results employing longitudinal designs addressing the potential mediating role of suicide attempts in the etiological factors and clinical course of eating disorders as part of an effort to develop a predictive model of suicidal acts. In addition upcoming studies would profit from assessing the frequency and severity of suicidal attempts.

In conclusion, suicide attempts occur with equal frequency across all BN subtypes – even subthreshold cases. While suicide attempts were characterized primarily by difficulties of impulse control, greater general comorbidity and high harm avoidance were also present. Additional research is required to determine the optimal approach to treatment of individuals with BN and suicidality in order to decrease the suffering and mortality associated with eating disorders.

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