



Impulse control disorders in eating disorders: clinical and therapeutic implications

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Abstract

Objective: Few studies have explored impulse control disorders (ICDs) in women with bulimia nervosa (BN). We explored the prevalence of lifetime ICDs in women with BN, compared the severity of eating disorder symptoms in women with BN with and without ICD, and compared their personality profiles to females with one form of ICD, namely, pathologic gambling.

Method: A total sample of 269 female patients consecutively admitted to our unit participated in the current study (173 BN without comorbid ICD [BN – ICD]; 54 BN with comorbid ICD [BN + ICD]; and 42 pathologic gamblers [PG]). All participants were diagnosed according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*, criteria.

Evaluation: Assessment measures included the *Symptom Checklist–90 revised* and the *Temperament and Character Inventory–revised*, as well as a number of other clinical and psychopathologic indices.

Results: In BN, the observed lifetime prevalence of ICD was 23.8%. Lifetime compulsive buying (17.6%) and intermittent explosive disorder (13.2%) were the most frequently reported ICD. Bulimia nervosa subtype was not significantly associated with lifetime ICD ($P = .051$) or with ICD subtype ($P = .253$). After using multinomial regression models, we observed that BN + ICD and PG showed the highest scores on novelty seeking ($P < .0001$). But BN + ICD women had the lowest scores on self-directedness ($P < .03$) and higher scores on general psychopathology ($P < .01$) and drug abuse ($P < .01$).

Conclusions: Individuals with BN + lifetime ICD presented more extreme personality profiles, especially on novelty seeking and impulsivity, and general psychopathology than individuals with BN without ICD. On some personality traits, those BN + ICD more closely resembled individuals with PG than those with BN without ICD.

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1. Introduction

Impulsivity is a trait common to several psychiatric disorders, including personality disorders (ie, borderline personality disorder) [1], psychoactive substance use disorders [2], eating disorders [3], pathologic gambling, and other impulse control disorders (ICD) [4]. The association between eating disorder and impulsivity has been documented widely in the literature [5,6]—not only in bulimia nervosa (BN), but also in the bingeing-purging subtype of anorexia nervosa [7]. In individuals with eating disorders, higher impulsivity has been associated with eating disorder subtype [8], severity of eating disorder symptoms [9], greater comorbidity [3], genetic factors [10], poorer psychologic functioning [11],

altered biochemical functioning [12], less effective coping strategies [13], feelings of hunger [14], poor personality functioning [15], and poorer treatment outcome [16]. Moreover, high rates of impulsive behaviors have been described in individuals with eating disorders, including self-injurious behavior [17], drug or alcohol abuse [3,18], stealing [19–21], and sexual promiscuity [7,22].

In the general population, impulsivity has been associated with involvement in problem behaviors during adolescence [23], drug use [24], gambling, alcohol use, and alcohol dependence [25], but also for developing an eating disorder [26,27].

Although many studies of eating disorder have explored impulsivity as a behavior or as a personality trait, the relation between eating disorder and diagnosed ICDs, including intermittent explosive disorder (IED), kleptomania,

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pyromania, pathologic gambling, and trichotillomania, has rarely been investigated. In eating disorders, our information about ICD is limited to a few case studies on kleptomania [28,29] and trichotillomania [30], as well as isolated case series examining compulsive buying [31]. Giving the paucity of systematic investigations, few firm conclusions can be drawn regarding the nature of the relation between eating disorder and ICD. Even in the absence of compelling data, clinical formulations of eating disorders that focus on shared features with ICDs have informed treatment development [32–37].

The lifetime prevalence of ICD has been reported to be between 9% and 29% in individuals with affective disorders [38,39] and between 10% and 22% in individuals with obsessive-compulsive disorders [40,41]. The few studies that have reported ICDs in eating disorders report a lifetime prevalence of between 3% and 19% [19,42]. In general psychiatric populations, individuals who also present with ICD tend to report earlier age of onset and greater severity of the primary disorder, greater comorbidity, and poorer prognosis [38,40].

1.1. Aims of the study

The goals of the present article were 3-fold: (1) to identify the prevalence of lifetime ICD in a clinical sample of individuals with BN, (2) to analyze whether patients with BN with lifetime ICD exhibit more severe eating disorder symptoms and greater general psychopathology than patients with BN without ICD, and (3) to compare the personality profiles of females with BN only, BN + ICD, and individuals with pathologic gambling (a common form of ICD) who do not have history of an eating disorder.

2. Material and methods

2.1. Participants

A total sample of 269 female patients participated in the current study (173 BN without comorbid ICD [BN – ICD], 54 BN with comorbid ICD [BN + ICD], and 42 pathologic gamblers [PG]). All participants were diagnosed according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* [43], criteria using a semi-structured clinical interview conducted by experienced psychologists and psychiatrists. Participants were consecutive referrals for assessment and treatment at the Department of Psychiatry of the Bellvitge University Hospital in Barcelona, Spain. With regard to the diagnostic subtypes, 86.3% ($n = 196$) of the patients with BN were purging subtype, but this percentage did not differ across the BN + ICD and BN – ICD groups ($\chi^2_1 = 1.421, P > .05, 87.9\%$ in BN – ICD vs 81.5% in BN + ICD). Eighty-eight percent ($n = 37$) of the patients with PG were slot machine gamblers and 12% ($n = 5$) bingo players.

Sociodemographic and clinical characteristics of the 3 groups follow. For patients with BN – ICD ($n = 173$),

the mean age was 25.7 years (SD, 6.9); the mean age of onset of their disorder was 19.4 years (SD, 6.5); and the mean duration of eating disorder was 6.4 years (SD, 4.8). They reported a weekly average of 7.3 binges (SD, 6.2) and 6.9 vomiting episodes (SD, 8.1), and their mean body mass index (BMI) was 24.2 kg/m^2 (SD, 4.6). Patients with BN + ICD ($n = 54$) were on average 26.7 years (SD, 6.7), reported the mean age of onset of their eating disorder of 18.9 years (SD, 6.2), and a reported a mean duration of illness of 7.9 years (SD, 6.3). They reported a weekly average of 7.9 (SD, 6.8) binges and 6.3 (SD, 8.1) vomiting episodes. Their mean BMI was 25.4 kg/m^2 (SD, 5.4). Finally, the mean age of the PG group ($n = 42$) was 43.7 years (SD, 11.9); the mean age of onset of their disorder was 33.9 years (SD, 12.1); and mean duration of illness 8.8 years (SD, 8.2).

Individuals were excluded from the analyses if they had missing values for any diagnostic items. For the present analysis, from an initial sample of 526 eating disorder and 693 PG, the following individuals were excluded: (a) males (34 eating disorder and 646 PG), (b) participants with anorexia nervosa ($n = 121$) or eating disorder not otherwise specified ($n = 144$), (c) patients with ICD who presented other lifetime ICD ($n = 5$, compulsive buying). The entry into the study was between January 2003 and May 2005. The Ethics Committee of the Bellvitge University Hospital approved this study and informed consent was obtained from all participants.

2.1.1. Assessment

The patients completed the *Temperament and Character Inventory–revised (TCI-R)* [44] and the *Symptom Checklist–90 revised (SCL-90-R)* [45]. Demographic-clinical information, including age, weight, height, and clinical-psychopathologic variables, was also obtained. Additional demographic information, including education, occupation, and living arrangements, was obtained via semistructured interview.

2.2. Evaluation of ICD and substance abuse/dependence

Lifetime ICDs and alcohol and drug abuse/dependence were assessed with the Structured Clinical Interview for *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*, axis I disorders [46].

2.3. Symptom checklist–90 revised

The *SCL-90-R* [45] is a widely used 90-item scale for assessing self-reported psychologic distress and psychopathology [47]. The test is usually scored on 9 primary symptom dimensions (comprising a total of 83 items): somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The global severity index, which is the participant's mean score (using all the 90 items), is a widely used global index of distress. This scale has been validated in Spanish population [48], obtaining a mean internal consistency of .75 (coefficient α).

Table 1
Lifetime prevalence of ICD not elsewhere classified from 227 patients with BN

	n	Prevalence (%)	95% CI (%)
IED	30	13.2	8.81-17.6
Kleptomania	7	3.08	1.25-6.26
Pyromania	0	0.00	0.00-1.61
Pathologic gambling	2	0.88	0.10-3.14
Trichotillomania	2	0.88	0.10-3.14
Compulsive buying	40	17.6	12.7-22.6

2.4. Temperament and character inventory—revised version

The *TCI-R* [44] is a 240-item, 5-point Likert scale, reliable, and valid questionnaire that measures, as in the original TCI version [49], 7 dimensions of personality: 4 temperament (harm avoidance, novelty seeking, reward dependence, and persistence) and 3 character dimensions (self-directedness, cooperativeness, and self-transcendence). The performances of the Spanish version of the original questionnaire [50] and the revised version [51] have been well documented. The scales in the latter showed an internal consistency (coefficient α) of .87.

2.4.1. Procedure

Experienced psychologists and psychiatrists completed the anamnesis during 2 structured face-to-face interviews. All assessors had undergone training for the Structured Clinical Interview for *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*, interview, although interrater reliability was not calculated for this study. In addition to a comprehensive clinical and psychological evaluation, additional demographic information was obtained.

2.4.2. Statistical analysis

The statistical analysis was conducted with SPSS, version 13 for Windows (SPSS, Chicago, Ill).

We first explored the prevalence of ICD across individuals with BN. Second, to determine whether the personality factors (measured by means of *TCI-R*) explained the factor group (BN + ICD vs BN – ICD vs PG), we used multinomial regression models. This procedure is a generalization

of binary logistic regression for categorical responses, and its parameters are also interpreted as odds ratio (OR) values. Because the *TCI-R* contains numerous subscales, we obtained different models: 1 global model that included the 7 total scales simultaneously and 7 additional models that represented each personality factor separately. The predictive capacity of each model was determined with the Nagelkerke’s R^2 statistic. Third, for obtaining the association between the diagnoses and the actual psychopathologic state of patients, *SCL-90-R* mean scores (adjusted by age) were compared with analysis of variance procedures and Bonferroni post hoc comparisons.

Finally, abuse of alcohol and drugs was compared across the 3 groups using logistic regression analysis. In all analyses, age was included as covariate. The adjustment level was analyzed by using the Hosmer and Lemeshow test.

3. Results

3.1. Sociodemographic and clinical variables

There were significant differences in age ($F = 91.0, P = .0001$), indicating that bulimic patients were younger than PGs. Age of onset of the primary disorder and duration of the primary disorder were also lower for patients with eating disorder ($F = 48.8, P = .0001$, and $F = 3.1, P = .05$, respectively).

Between the 2 bulimic groups (BN + ICD vs BN – ICD), there were no significant differences on BMI ($F = 1.1, P = .345$) or frequency of binges ($F = 0.2, P = .831$) or vomiting episodes ($F = 0.1, P = .901$).

3.2. Prevalence of ICD in individuals with BN

The total BN sample considered in this study was 227 individuals. As shown in Table 1, the observed lifetime prevalence of ICD was 23.8% (95% confidence interval [CI], 18.2%-29.3%). Lifetime compulsive buying and IED were the most frequently reported ICD. Bulimia nervosa subtype was not significantly associated with lifetime ICD ($\chi^2_1 = 3.8, P = .051$) or with ICD subtype ($\chi^2_4 = 5.35, P = .253$); eating disorder subtype was therefore not used as a covariate in other analyses. Furthermore, 13.2% of women

Table 2
Predictive value of personality traits (measured with *TCI-R*) on the diagnosis

Total scores	BN – ICD vs PG			BN + ICD vs PG			BN – ICD vs BN + ICD		
	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI
Total novelty seeking ^a	<.0005	0.902	0.86-0.94	.006	0.937	0.90-0.98	.002	0.962	0.94-0.99
Total harm avoidance	.147	0.973	0.94-1.01	.160	0.973	0.94-1.01	.994	1.000	0.98-1.02
Total reward dependence	.417	0.985	0.95-1.02	.361	0.982	0.95-1.02	.814	1.003	0.98-1.03
Total persistence	.530	0.992	0.97-1.02	.663	0.994	0.97-1.02	.789	0.998	0.98-1.02
Total self-directedness ^a	.169	0.970	0.93-1.01	.031	0.951	0.91-0.99	.090	1.020	0.99-1.04
Total cooperativeness	.821	1.004	0.97-1.04	.946	0.999	0.96-1.04	.607	1.005	0.99-1.03
Total self-transcendence	.948	1.000	0.96-1.04	.814	1.005	0.97-1.05	.615	0.994	0.97-1.02

Multinomial regression models adjusted by age.

^a The score is predictive of the group.

Table 3
Psychopathology (measured with *SCL-90-R*) related with the diagnosis

Subscale	BN – ICD (n = 173)	BN + ICD (n = 54)	PG (n = 42)	P	Post hoc comparison ^a (95% CI)
	Mean (SE)	Mean (SE)	Mean (SE)		
Somatization	1.783 (0.075)	2.147 (0.129)	1.469 (0.181)	.006	$\phi_1 = -0.364 (-0.718 \text{ to } -0.010)^b$ $\phi_2 = 0.313 (-0.188 \text{ to } 0.815)$ $\phi_3 = 0.677 (0.124 \text{ to } 1.231)^b$
Obsessive-compulsive	1.987 (0.067)	2.379 (0.115)	1.567 (0.161)	<.0005	$\phi_1 = -0.392 (-0.708 \text{ to } -0.077)^b$ $\phi_2 = 0.420 (-0.027 \text{ to } 0.867)$ $\phi_3 = 0.812 (0.319 \text{ to } 1.305)^b$
Interpersonal sensitivity	2.144 (0.070)	2.352 (0.120)	1.468 (0.169)	<.0005	$\phi_1 = -0.207 (-0.537 \text{ to } 0.122)$ $\phi_2 = 0.676 (0.210 \text{ to } 1.143)^b$ $\phi_3 = 0.884 (0.369 \text{ to } 1.399)^b$
Depression	2.389 (0.069)	2.537 (0.118)	1.996 (0.166)	.038	$\phi_1 = -0.148 (-0.473 \text{ to } 0.176)$ $\phi_2 = 0.393 (-0.067 \text{ to } 0.852)$ $\phi_3 = 0.541 (0.034 \text{ to } 1.048)^b$
Anxiety	1.860 (0.072)	2.146 (0.124)	1.454 (0.174)	.007	$\phi_1 = -0.286 (-0.628 \text{ to } 0.055)$ $\phi_2 = 0.406 (-0.078 \text{ to } 0.889)$ $\phi_3 = 0.692 (0.159 \text{ to } 1.225)^b$
Hostility	1.467 (0.075)	1.829 (0.129)	1.421 (0.181)	.039	$\phi_1 = -0.362 (-0.716 \text{ to } -0.008)^b$ $\phi_2 = 0.046 (-0.456 \text{ to } 0.548)$ $\phi_3 = 0.408 (-0.145 \text{ to } 0.962)$
Phobic anxiety	1.177 (0.075)	1.479 (0.130)	0.833 (0.182)	.015	$\phi_1 = -0.302 (-0.658 \text{ to } 0.054)$ $\phi_2 = 0.344 (-0.161 \text{ to } 0.848)$ $\phi_3 = 0.646 (0.089 \text{ to } 1.202)^b$
Paranoid ideation	1.557 (0.071)	1.797 (0.122)	1.428 (0.172)	.137	$\phi_1 = -0.240 (-0.576 \text{ to } 0.096)$ $\phi_2 = 0.130 (-0.346 \text{ to } 0.605)$ $\phi_3 = 0.370 (-0.155 \text{ to } 0.894)$
Psychoticism	1.372 (0.056)	1.715 (0.096)	1.014 (0.135)	<.0005	$\phi_1 = -0.344 (-0.607 \text{ to } -0.080)^b$ $\phi_2 = 0.358 (-0.015 \text{ to } 0.731)$ $\phi_3 = 0.701 (0.290 \text{ to } 1.113)^b$
Global severity index	1.841 (0.058)	2.114 (0.099)	1.460 (0.139)	.001	$\phi_1 = -0.273 (-0.544 \text{ to } -0.001)^b$ $\phi_2 = 0.381 (-0.003 \text{ to } 0.765)$ $\phi_3 = 0.654 (0.230 \text{ to } 1.078)^b$
Positive symptom total	66.75 (1.36)	72.01 (2.34)	58.08 (3.28)	.004	$\phi_1 = -5.257 (-11.68 \text{ to } 1.167)$ $\phi_2 = 8.671 (-0.424 \text{ to } 17.77)$ $\phi_3 = 13.93 (3.893 \text{ to } 23.96)^b$
Positive symptom distress index	2.38 (0.044)	2.563 (0.076)	2.194 (0.107)	.016	$\phi_1 = -0.187 (-0.396 \text{ to } 0.023)$ $\phi_2 = 0.183 (-0.113 \text{ to } 0.479)$ $\phi_3 = 0.370 (0.043 \text{ to } 0.697)^b$

Analysis of variance adjusted for age.

ϕ_1 = contrast for diagnoses BN – ICD vs BN + ICD; ϕ_2 = contrast for diagnoses BN – ICD vs PG; ϕ_3 = contrast for a diagnoses BN + ICD vs PG.

^a Bonferroni procedure; means adjusted by age.

^b The contrast is significant at .05 level.

with BN presented a single lifetime comorbid ICD (95% CI, 8.81%–17.6%).

3.3. Impulse control disorder and personality traits

Comparing the *TCI-R* total subscale mean values across the 3 groups, statistically significant differences were obtained in *novelty seeking* (BN – ICD: 100.4 [SE, 1.2] vs BN + ICD: 110.0 [SE, 2.1] vs PG: 119.5 [SE, 2.9], $P < .05$) and *self-directedness* (BN – ICD: 113.9 [SE, 1.6] vs BN + ICD: 104.7 [SE, 2.7] vs PG: 113.5 [SE, 3.8]). When comparing these results with *TCI-R* normative female Spanish values (described in reference [51]), the mean scores obtained on novelty seeking in all 3 groups were higher than the normal range (mean, 96.92; SD, 14.72), and the mean scores obtained on self-directedness were lower than the normal range values in females (mean, 149.85; SD, 18.35) (Table 2).

To assess the extent to which personality values were associated with group membership, we applied multinomial regression models. Results of a model that included the 7 total scores simultaneously indicated that high novelty seeking scores were more strongly associated with PG or BN + ICD than with BN without ICD. Secondarily, when comparing BN + ICD vs PG, higher scores on self-directedness were more strongly associated with a diagnosis of PG.

The models that evaluated the *TCI-R* subscales independently indicated the following: First, comparing BN without ICD with PG, we more strongly associated the diagnosis of PG with higher scores on impulsiveness-reflection, extravagance-reverse, social acceptance-intolerance, and self-conscience experience scales, and lower scores on dependence and perfectionism-pragmatism. Second, comparing BN + ICD with PG, we more strongly associated a PG

diagnosis with higher scores on extravagance-reserve. Finally, comparing the 2 BN groups, we associated the presence of ICD with higher scores on extravagance-reserve, ambitious, and self-conscience experience, and lower scores on dependence.

3.4. Impulse control disorder and psychopathology

Comparing the mean current psychopathologic symptoms (measured by *SCL-90-R*) across the groups, we observed significant differences across groups on all scales except the paranoid subscale. As shown in Table 3, the patients of the BN + ICD group reported the greatest psychopathology, with the individuals in the BN – ICD group reporting the lowest values.

3.5. Impulse control disorder and current substances abuse

Logistic regression models measuring the effect of group on alcohol and drug abuse revealed no significant differences across the groups on current alcohol abuse (the adjustment of the predictive models for alcohol abuse was 0.567, according to Hosmer and Lemeshow test). However, there were significant differences across the groups on current drug abuse, with patients with BN + ICD presenting with greater rates of drug abuse than patients with BN – ICD ($P = .012$; OR = $1/0.400 = 2.5$; CI 95% OR, 1.2–5.1) (the adjustment of the predictive models for drug abuse was 0.429, according to Hosmer and Lemeshow test).

4. Discussion

We examined the lifetime prevalence of ICD in a clinical sample of individuals with BN, addressed whether individuals with BN with ICD exhibit more severe eating disorder symptoms and greater general psychopathology than patients with BN without ICD, and compared personality profiles of females with BN with and without ICD to individuals with pathologic gambling (a form of ICD) who did not have eating disorders.

Confirming previous studies [31], we observed a modest but clinically significant lifetime prevalence of ICD among individuals with BN (23.8%). Extending previous investigations, the most frequently observed ICDs in this sample were compulsive buying (17.6%) and IED (13.6%). Furthermore, neither the presence of ICD nor the type of ICD differed across BN subtypes.

Regarding clinical variables, between the 2 groups of bulimia (BN + ICD vs BN – ICD), there were no significant differences on duration of the disorder, age of eating disorder onset, BMI, frequency of binges, or vomiting episodes. However, based on *SCL-90-R* scores, individuals with BN + ICD were more severely psychiatrically symptomatic than individuals in the other 2 groups. This could reflect the simple fact that these individuals by definition suffered from more than 1 disorder and therefore suffered under a greater burden of comorbidity.

With reference to the *TCI-R* scale of novelty seeking, individuals in all 3 groups scored above population norms. Moreover, across the 3 groups, a gradient was observed with the lowest scores in the individuals with BN without ICDs, followed by individuals with PG, and finally, those with BN + ICD.

In terms of the second *TCI-R* scale of interest, the lowest scores on self-directedness were observed in BN + ICD. The only statistically significant difference observed across groups was lower self-directedness in BN + ICD than in the PG groups. However, individuals in all 3 groups scored below population norms.

Drug use was more common in individuals with BN + ICD than BN – ICD, which, together with the temperament data, suggests that BN + ICD may represent a subset of individuals with BN with greater overall impulsive tendencies. The concept of multiimpulsive bulimia has been previously introduced to the literature [5]. The extent to which the individuals observed here who have both BN and ICD map onto this previously identified subtype remains unclear.

Nonetheless, an impulsive subset of individuals with BN may have intriguing value for genetic and biologic studies of eating disorders. Genetically, the ongoing search for informative correlates and endophenotypes [52,53] could benefit from further exploration of impulsivity markers for BN.

Limitations of this study include the relatively small sample size and the imperfect age matching with the PG group; the assessment procedures used did not allow us to evaluate either eating symptoms or impulsivity in depth; the absence of relevant measures (eg, onset of ICD and temporal relationship to the eating disorder) did not allow us to determine whether the BN or the ICD was primary in that group.

On the basis of prevalence data alone, ICDs, which are commonly omitted from the routine psychiatric evaluations, should be regularly assessed in individuals with BN because nearly one fourth of patients reported these disorders. Indeed, ICDs can be associated with severe financial (compulsive gambling) and interpersonal (IED) consequences that could interfere with the process of recovery from BN. In addition, impulsivity deserves further study as a potential informative covariate or endophenotype for genetic studies of BN as well as a potential symptom to target with both behavioral and pharmacologic interventions.

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