

# Suicidality in Obsessive-Compulsive Disorder: Prevalence and Relation to Symptom Dimensions and Comorbid Conditions

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**Background:** Suicidal thoughts and behaviors, also known as suicidality, are a fairly neglected area of study in patients with obsessive-compulsive disorder (OCD).

**Objective:** To evaluate several aspects of suicidality in a large multicenter sample of OCD patients and to compare those with and without suicidal ideation, plans, and attempts according to demographic and clinical variables, including symptom dimensions and comorbid disorders.

*Method:* This cross-sectional study included 582 outpatients with primary OCD (*DSM-IV*) recruited between August 2003 and March 2008 from 7 centers of the Brazilian Research Consortium on Obsessive-Compulsive Spectrum Disorders. The following assessment instruments were used: the Yale-Brown Obsessive Compulsive Scale, the Dimensional Yale-Brown Obsessive Compulsive Scale, the Beck Depression and Anxiety Inventories, the Structured Clinical Interview for *DSM-IV* Axis I Disorders, and 6 specific questions to investigate suicidality. After univariate analyses, logistic regression analyses were performed to adjust the associations between the dependent and explanatory variables for possible confounders.

**Results:** Thirty-six percent of the patients reported lifetime suicidal thoughts, 20% had made suicidal plans, 11% had already attempted suicide, and 10% presented current suicidal thoughts. In the logistic regression, only lifetime major depressive disorder and posttraumatic stress disorder (PTSD) remained independently associated with all aspects of suicidal behaviors. The sexual/religious dimension and comorbid substance use disorders remained associated with suicidal thoughts and plans, while impulse-control disorders were associated with current suicidal thoughts and with suicide plans and attempts.

*Conclusions:* The risk of suicidal behaviors must be carefully investigated in OCD patients, particularly those with symptoms of the sexual/religious dimension and comorbid major depressive disorder, PTSD, substance use disorders, and impulse-control disorders.

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**S** uicidal behavior, also known as suicidality, is usually a continuum process that ranges from ideation, to planning, to attempting and eventually completing the suicidal act.<sup>1-3</sup> Psychiatric disorders are undoubtedly the most important risk factors for suicidal behaviors worldwide,<sup>1,4-7</sup> but most studies focus on mood, psychotic, substance use, and personality disorders.<sup>8,9</sup> Suicidality in anxiety disorders in general and in obsessive-compulsive disorder (OCD) in particular was, until very recently, a neglected area of study in the literature.

Recent community surveys conducted in the Netherlands,<sup>10</sup> New Zealand,<sup>5,11</sup> China,<sup>6</sup> Italy,<sup>7</sup> and United States<sup>12,13</sup> have shown that anxiety disorders are risk factors for suicidal ideation and attempts even after adjusting for the effect of comorbid depressive disorders. Another study<sup>14</sup> involving 166 college students concluded that anxiety disorders (generalized and social anxiety, panic, and obsessivecompulsive symptoms) conveyed risk for suicidal ideation above and beyond co-occurring depressive symptoms. Moreover, Simon et al<sup>15</sup> studied a group of 120 bipolar disorder outpatients and verified that those with current comorbid anxiety disorders presented more severe suicidal ideation and a higher expectancy of future suicidal behaviors, while lifetime anxiety disorders more than doubled the odds of suicide attempts. Another recent study<sup>16</sup> reported that the presence of anxiety symptoms and disorders increases the risk of suicide among depressive patients.

Historically, OCD patients have been considered at low risk for suicide,<sup>17-19</sup> and the incidence rates of suicide attempts and suicides in the follow-up periods of a series of clinical trials using the US Food and Drug Administration (FDA) database were as low as 1.5% and 0.11%, respectively.<sup>20</sup> However, these trials involved highly selected participants and were primarily designed to assess new antianxiety medications and not suicide risk.<sup>20</sup> In fact, 2 population-based surveys have shown that this risk might not be so low. Hollander et al<sup>21</sup> reported that OCD sufferers in the United States presented a 3-fold risk of suicide attempts compared to individuals without a mental disorder and a 2-fold risk compared to other mental disorder participants, even after controlling for the effect of depression and agoraphobia. Likewise, Torres et al<sup>22</sup> observed that 63% of OCD individuals in the United Kingdom presented lifetime suicidal thoughts and 25% reported at least 1 previous suicide attempt. These authors have also demonstrated an independent effect of obsessivecompulsive symptoms, since pure and comorbid OCD cases presented almost identical prevalence figures concerning

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### FOR CLINICAL USE

- Suicidal thoughts, plans, and attempts should be carefully investigated by clinicians in patients with OCD because they are not rare and can be precursors to suicide.
- Special attention should be given to OCD patients with symptoms of the sexual/religious dimension, which were associated with almost all suicide-related outcomes.
- The comorbid conditions most closely related to suicidality in OCD sufferers were major depressive disorder and posttraumatic stress disorder.

attempts (25% and 26%, respectively). Unfortunately, OCD was not included in the recent study regarding suicidality and anxiety disorders using the National Comorbidity Survey Replication (NCS-R) database.<sup>13</sup>

Although OCD has a considerable negative impact on patients' quality of life,<sup>19,23,24</sup> to our knowledge, so far only 2 studies in the literature have had as a main objective to evaluate the prevalence and correlates of suicidality in OCD patients, 1 conducted in India involving 100 patients<sup>25</sup> and 1 in Brazil involving 50 patients.<sup>26</sup> Of the participants in these 2 studies, lifetime suicidal thoughts occurred in, respectively, 59% and 46%; suicide attempts, in 27% and 10%; and current ideation, in 28% and 14%. Despite these interesting results, the outcomes were strongly associated with the severity of co-occurring depressive symptoms.

Considering that clinical studies of suicidal behaviors in OCD are rare, the aim of the present exploratory study was to systematically evaluate 6 aspects of suicidal behavior (the belief that life is not worth living, wishing to be dead, having previous suicidal thoughts, having made suicidal plans, having attempted suicide, and presenting current suicidal ideation) in a large multicenter clinical sample of OCD patients, focusing mainly on suicidal thoughts, plans, and attempts and their associations with clinical features of OCD (including symptom dimensions) and comorbid disorders. We hypothesized that the presence of comorbid psychiatric conditions and higher severity of obsessive-compulsive, anxiety, and depressive symptoms would be correlated with suicidality.

#### METHOD

#### **Study Design**

The study was cross-sectional, comparing OCD patients with and without suicidal thoughts, plans, and acts according to demographic and clinical variables considered as possible risk factors for suicidality.

## Subjects

A total of 582 outpatients with lifetime OCD, according to the *DSM-IV* criteria,<sup>27</sup> as their main psychiatric diagnosis participated in the study. Participants were consecutively recruited between August 2003 and March 2008 from 7 centers of the Brazilian Research Consortium on Obsessive-Compulsive Spectrum Disorders (C-TOC).<sup>28</sup> Of the 630 individuals from the C-TOC, 48 had missing data on suicidality. The only exclusion criteria to entering the C-TOC were the presence of comorbid schizophrenia, dementia, mental retardation, or any other psychiatric condition that would render the individual incapable of understanding the assessment instruments. Further details regarding C-TOC implementation and initial descriptive results can be obtained elsewhere.<sup>28</sup> After being fully informed concerning the study purposes and methods, all participants agreed to enter the study and signed a term of written informed consent. The present study was approved by the Ethical Research Committee of Botucatu Medical School—UNESP on December 3, 2007 (protocol 471/2007).

#### **Assessment Instruments**

Trained psychiatrists or psychologists applied the following instruments for this study.

A specifically created questionnaire (available from the authors on request) was used to assess sociodemographic and clinical variables, including age at onset of obsessivecompulsive symptoms and suicidality. The questions regarding patients' suicidal behavior (yes-or-no answers; English translation in eAppendix 1) asked if the patient had ever (1) thought life was not worth living, (2) wished to be dead, (3) thought about killing himself/herself, (4) made suicidal plans, or (5) attempted suicide (if yes, how many times); the sixth question asked if the patient had current suicidal thoughts. Patients were also asked whether someone in their families had previously attempted or committed suicide.

The Yale-Brown Obsessive Compulsive Scale (YBOCS)<sup>29,30</sup> was used to measure the severity of obsessive-compulsive symptoms, and the Dimensional Yale-Brown Obsessive Compulsive Scale (DYBOCS)<sup>31</sup> was used to evaluate the occurrence of 6 different dimensions of obsessive-compulsive symptoms (aggressive/violent thoughts and checking rituals, sexual/religious thoughts and related rituals, symmetry/ordering obsessions and compulsions, contamination obsessions and cleaning rituals, hoarding symptoms, and miscellaneous obsessions and compulsions). OCD symptom dimensions were determined according to the presence of lifetime symptomatology.

The Beck Depression Inventory (BDI)<sup>32</sup> and Beck Anxiety Inventory (BAI)<sup>33</sup> were used to evaluate the severity of depressive and anxious symptoms, respectively.

The Structured Clinical Interview for *DSM-IV* Axis I disorders (SCID I)<sup>34</sup> was used to confirm OCD diagnosis and to assess all other comorbid psychiatric disorders. Exposure to traumatic experiences was also assessed using the SCID I.

## **Data Analysis**

All statistical analyses were conducted using the STATA 8.0 software.<sup>35</sup> After a descriptive analysis, univariate analyses of the associations between the independent variables and the outcomes of interest (presence of suicidal thoughts, plans, or attempts) were performed, using the  $\chi^2$  test for categorical variables. Approximately 90  $\chi^2$  tests were carried out. Odds ratios with 95% confidence intervals were also calculated. The distributions of continuous variables were presented as mean and standard error (SE). The Student t test was used for between-group comparisons, including continuous variables with normal distributions (YBOCS scores), and the Mann-Whitney test was used for variables with nonnormal distributions (BDI and BAI scores). Twelve t tests and 8 Mann-Whitney tests were conducted. Spearman correlation coefficients were used to examine the relation between the scores in the YBOCS and in the BDI. All demographic and clinical categorical variables that presented an a level of .10 or lower in the univariate analysis were included in a multivariate analysis (logistic regression) to adjust the associations for possible confounders.

The variables that were included in the stepwise backward logistic regression model ( $P \le .10$  in the univariate analysis) for each outcome of interest are as follows: (1) current suicidal thoughts-marital status; social class; history of suicide attempts in the family; having children; aggressive and sexual/religious symptom dimensions; and comorbid major depressive, generalized anxiety, dysthymic, substance use, and impulse-control disorders; (2) lifetime suicidal thoughts-occupational status; educational level; social class; religious practice; income; having no children; sexual/religious, symmetry/ordering, and hoarding dimensions; and comorbid major depressive, generalized anxiety, dysthymic, substance use, and impulse-control disorders; (3) lifetime suicidal plans—educational level; social class; income; history of suicide attempts in the family; sexual/ religious and hoarding dimensions; and comorbid major depressive, generalized anxiety, dysthymic, substance use, and impulse-control disorders; and (4) lifetime suicide attempts-history of suicide attempts in the family; sexual/ religious, symmetry-ordering, and hoarding dimensions; and comorbid major depressive, generalized anxiety, substance use, and impulse-control disorders.

The threshold for statistical significance was set at P < .05, because we felt that given the lack of research in the area it was important to provide data for hypotheses that could be definitively proven in future studies.

#### RESULTS

## **Descriptive Analysis**

The main demographic and clinical characteristics of the sample, including the frequencies of OCD symptom dimensions, lifetime Axis I comorbid disorders, and suicide-related behaviors, are presented in Table 1. The symmetry/ordering dimension was the most common, followed by miscellaneous symptoms. Although as many as 363 (62.4%) participants

Variable	n	%
Gender		
Male	254	43.6
Female	328	56.4
Ethnicity, white	488	83.9
Marital status		
Single	310	53.3
Married or cohabiting	224	38.5
Separated or divorced	37	6.4
Widowed	11	1.9
Social class		
A or B (higher)	337	57.9
C or D (lower)	245	42.1
Occupational status, currently working	315	54.2
Religious practice		
Yes	326	56.0
No	256	44.0
Symptom dimensions (DYBOCS)		
Symmetry/ordering/counting	510	86.9
Contamination/cleaning	419	72.0
Aggressive	383	65.8
Sexual/religious	299	51.4
Hoarding	297	51.0
Miscellaneous	506	86.9
Comorbid Axis I disorders (lifetime)		
Major depressive disorder	389	66.8
Impulse-control disorders	219	37.6
Generalized anxiety disorder	208	35.7
Tic disorders	164	28.2
Posttraumatic stress disorder	93	16.0
Dysthymia	62	10.6
Substance use disorders	43	7.3
Tourette syndrome	42	7.2
Panic disorder	35	6.0
Suicide-related aspects		
Had already thought life was not worth living	329	56.7
Had already wished to be dead	250	43.0
Had already presented suicidal thoughts	210	36.1
Had already made suicidal plans	117	20.1
Had already attempted suicide	64	11.0
Had current suicidal thoughts	58	10.0
Thad current succear thoughts	Mean	SE
A		0.52
Age, y	34.74	0.52
Educational level, y	14.52	0.22

Table 1. Demographic and Clinical Characteristics of the

reported exposure to potentially traumatic events, only 16.0% presented PTSD. Among those who presented previous suicide attempts (n = 64), 32 patients (50.0%) reported just 1 attempt, 18 patients (28.1%) reported 2, 9 patients (14.1%) reported 3, and 5 patients (7.8%) reported more than 3. Suicide attempts in the family were reported by 109 subjects (19.1%), and completed suicide, by 92 (16.1%).

#### **Univariate Analyses**

In the univariate analyses including all demographic variables possibly related to suicidality (sex, marital and occupational status, having children, educational level, income and social class, religious practice), as well as suicide acts and attempts in the family, only 3 were significantly associated with some aspects of suicidality. Lower social class was associated with lifetime suicidal thoughts (P=.004) and plans (P=.041). The absence of religious practice was associated with lifetime suicidal thoughts (P=.043). History of suicide attempts in the family was associated with suicidal plans (P=.02) and attempts (P = .02). Men and women did not differ significantly in any of the aspects of suicidality investigated.

In Table 2, the associations between the outcomes (dependent variables) and the occurrence of specific obsessivecompulsive symptom dimensions (categorical data) are described. Symptoms of the sexual/religious dimension were significantly associated with all aspects of suicidality except attempts, which were associated at a trend level, and symptoms of the hoarding dimension were significantly associated with suicidal plans. The aggressive, contamination/cleaning, symmetry/ordering, and miscellaneous dimensions were not significantly associated with any aspect of suicidality (Table 2).

Data regarding continuous variables (scores on the YBOCS and the BDI and BAI) are presented in Table 3. Suicidal thoughts (both current and lifetime) and plans were associated with higher scores on the obsession subscale of the YBOCS and on the BDI and BAI. Suicide attempts were associated only with the severity of depressive and anxious symptoms. The mean YBOCS total score and the compulsion subscale score were not significantly associated with suicidality (Table 3).

Data regarding comorbid conditions and suicidal aspects are presented in Table 4. Lifetime major depressive episode, PTSD, generalized anxiety disorder (GAD), substance use disorders, and impulse-control disorders were all significantly associated with suicidal thoughts, plans, and acts. Dysthymia was associated with suicidal thoughts and plans, but not attempts, and traumatic experiences were associated only with lifetime suicidal thoughts (Table 4). In fact, comorbid major depressive disorder, PTSD, GAD, and impulse-control disorders (which includes intermittent explosive disorder, kleptomania, pyromania, pathological gambling, compulsive shopping, skin picking, trichotillomania, self-mutilation disorders, and impulse-control disorders not otherwise specified) were significantly associated with all 6 suicide-related phenomena investigated, including thinking life was not worth living and wishing to be dead (data not shown). Panic disorder, tic disorders, and Tourette syndrome were not associated with suicidality.

Table 2. Associatio	ons of Suici	idal Thou	ights, Plans, and	1 Atten	npts and C	)hsessive-C	Compulsiv	e Sympto	m Dir	nensions	; (univariat	e analysis) <sup>a</sup>					
	Su	iicidal Thou	ughts (current)			Suicidal Tho	ughts (lifeti)	me)			Suicidal Plan	ns (lifetime)		S	uicide Atter	npts (lifetime)	
	No	Yes			No	Yes				No	Yes			No	Yes		
DYBOCS Symptom	(n=524),	(n = 58),			(n = 372),	(n = 210),			0	(n = 465),	(n = 117),			(n = 518),	(n = 64),		
Dimension	n (%)	n (%)	OR (95% CI)	Ρ	n (%)	n (%)	OR (95%	6 CI)	Ρ	(%) u	n (%)	OR (95% CI)	Ρ	n (%)	n (%)	OR (95% CI)	Ρ
Aggressive $(n = 383)$	339 (88.5)	44 (11.5)	1.70 (0.91-3.19)	.092	236 (61.6)	147 (38.4)	1.34 (0.93	-1.93) .	11 3	303 (79.9)	80 (20.1)	1.15 (0.75-1.78)	.51	340 (88.8)	43 (11.2)	1.07 (0.62-1.86)	.80
Sexual/religious	257 (85.9)	42(14.1)	2.72 (1.49-4.95)	.001	164 (54.8)	135 (45.2)	2.28 (1.61	-3.23) <.	001 2	23 (74.6)	76 (25.4)	2.01 (1.32-3.06)	.001	259 (86.6)	40 (13.4)	1.67 (0.98–2.84)	.061
(n = 299)																	
Symmetry/ordering $(n = 510)$	460 (90.2)	50 (9.8)	0.86(0.39 - 1.89)	.70	319 (62.5)	191 (37.5)	1.67 (0.96	2.91) .	.067 4	403 (79.0)	107 (21.0)	1.64(0.82 - 3.32)	.16	449 (88.0)	61 (12.0)	3.12 (0.95-10.23)	.06
Contamination/	376 (89.7)	43(10.3)	1.12(0.60-2.08)	.72	261 (62.3)	158 (37.7)	1.29 (0.88	-1.90) .	.19 3	331 (79.0)	88 (21.0)	1.23 (0.77-1.95)	.38	371 (88.5)	48 (11.5)	1.19 (0.65-2.16)	.57
cleaning $(n = 419)$																	
Hoarding $(n = 297)$	263 (88.5)	34(11.5)	1.40(0.81 - 2.43)	.23	180 (60.6)	117 (39.4)	1.34(0.95	-1.88)	089 2	25 (75.8)	72 (24.2)	1.71 (1.13-2.58)	.011	258 (86.9)	39 (13.1)	1.57 (0.92-2.67)	.095
Miscellaneous	452(89.5)	53(10.5)	1.66(0.64 - 4.31)	.29	317 (62.6)	189 (37.4)	1.56(0.91)	-2.66) .	10 4	100 (79.0)	106(21.0)	1.56(0.80 - 3.07)	.19	447 (88.3)	59 (11.7)	1.87 (0.73-4.83)	.19
symptoms																	
(000 = 11)																	
<sup>a</sup> Boldface indicates s	ignificant ass	sociations.															
Abbreviation: DYBC	)CS = Dimen	sional Yale	-Brown Obsessive	Compu	ılsive Scale.												
Table 3. Presence	of Suicidal	Thought	s. Plans. and At	tempts	s Accordir	ng to Score	s on the V	(BOCS an	nd the	Beck De	pression an	d Anxiety Inver	ntories	s (univaria	ate analys	es) <sup>a,b</sup>	
			Suicidal Thou	ghts (cu	irrent)		Suicidal The	oughts (life	time)		Suicic	lal Plans (lifetime		-	Suicide At	tempts (lifetime)	
		Z	Io $(n = 524)$ , Ye:	s (n = 58	3),	No (n=	= 372), 1	Yes (n = 210	)),		Vo (n = 465),	Yes (n = 117),		No (i	n = 518),	Yes (n = 64),	
Score		1	Mean (SE) M	tean (SE	3) P	Mean	1 (SE)	Mean (SE)	~	Ρ	Mean (SE)	Mean (SE)	Р	Meä	an (SE)	Mean (SE)	Ρ
YBOCS obsessive (n	= 574)	1	2.33 (0.18) 13	.64 (0.5	3) .02	6 12.18 (	(0.22)	12.94 (0.30	()	.038	12.26 (0.19)	13.23 (0.41)	0.	26 12.3	6(0.19)	13.23 (0.48)	.12
YBOCS compulsive	(n = 575)	1	2.57 (0.20) 13	.23 (0.5.	2) .28	12.51	(0.23)	12.85 (0.31		.36 ]	12.52 (0.21)	13.07(0.40)	5	3 12.5	6 (0.20)	13.25 (0.52)	.24
YBOCS total $(n = 57)$	5)	2	4.87 (0.36) 26	.87 (1.0	1) .08	24.66 (	(0.42)	25.79 (0.58	() ()	.11 2	24.76 (0.38)	26.30 (0.77)	0	7 24.8	9 (0.36)	26.48 (0.95)	.14
Beck Depression Inv	entory <sup>c</sup> $(n = t)$	573) 1.	4.64 (0.47) 25	.91 (1.50	6) <.00	1 13.10 (	(0.53)	20.45 (0.82	<ul> <li></li> <li><td>.001</td><td>14.29(0.49)</td><td>21.52 (1.17)</td><td>0. ^</td><td>01 15.0</td><td>3 (0.48)</td><td>21.60(1.58)</td><td>&lt;.001</td></li></ul>	.001	14.29(0.49)	21.52 (1.17)	0. ^	01 15.0	3 (0.48)	21.60(1.58)	<.001
Beck Anxiety Invent	$arv^{c}$ (n = 573)	) 1.	4.86 (0.50) 21.	.33 (1.4	9) > (6	1 13.60 (	(0.57)	18.85 (0.84	(i)	100.	14.44(0.52)	19.64(1.14)	0. ^	01 14.9	4 (0.51)	19.86(1.46)	<.001

was used.

Boldface indicates significant associations. <sup>b</sup>A few patients had missing values. <sup>c</sup>Mann-Whitney test Abbreviation: YBOCS = Yale-Brown Obsessive Compulsive Scale.

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dal Thou	thts (current)		S	buicidal Thou	ıghts (lifetime)			Suicidal Pl	ans (lifetime)			Suicide Att	empts (lifetime)	
Yes			No	Yes			No	Yes			No	Yes		
(n = 58),			(n = 372),	(n=210),			(n = 465),	(n = 117),			(n = 518),	(n = 64),		
u (%)	OR (95% CI)	Ρ	n (%)	n (%)	OR (95% CI)	Ρ	n (%)	n (%)	OR (95% CI)	Ρ	n (%)	n (%)	OR (95% CI)	Ρ
51 (13.1) 3	.98 (1.77-8.96)	<.001	207 (53.2)	182 (46.8)	5.18 (3.31-8.10)	<.001	282 (72.5)	107 (27.5)	6.94 (3.54–13.62)	<.001	326 (83.8)	63 (16.2)	37.10 (5.10–269.67)	>.00
13 (21.0) 2	.79 (1.41-5.53)	.002	32 (51.6) 120 (57 7)	30 (48.4) 88 (47 2)	1.77 (1.04 - 3.01)	.03	43 (69.3) 155 (74 5)	19 (30.7)	1.90 (1.06 - 3.41)	.028	57 (91.9)	5 (8.1) 35 (16 9)	0.68 (0.26–1.78)	6 <del>4</del> .
, (N.CI) IC	(16.6-16.1) 07.	con.	(1.16) 021	((	(61.2-10.1) 16.1	70.	(0.17) 001	(0.07) 00	(06.7-01.1) 60.1	010	(7.00) 6/1	(0.01) 66	2:40 (1:42-4:07)	8
11 (25.6) 3	.59 (1.70-7.58)	<.001	18 (41.9)	25 (58.1)	2.66 (1.41-5.00)	.002	26 (60.5)	17 (39.5)	2.87 (1.50-5.49)	.001	32 (74.4)	11 (25.6)	3.15 (1.50-6.61)	00.
) 33 (15.1) 2	39 (1.38-4.14)	.001	121 (55.2)	98 (44.8)	1.81 (1.28–2.57)	.001	159 (72.6)	60 (27.4)	2.02 (1.34-3.05)	.001	183 (83.6)	36 (16.4)	2.35 (1.39–3.98)	00.
20 (21.5) 3	.24 (1.79–5.88)	<.001	43 (46.2)	50 (53.7)	2.39 (1.52-3.75)	<.001	60 (64.5)	33 (35.5)	2.65 (1.63-4.31)	<.001	73 (78.5)	20 (21.5)	2.77 (1.54-4.96)	>.00
41 (11.3) i	.49 (0.83-2.71)	.18	215 (59.2)	148(40.8)	1.73 (1.21–2.48)	.003	283 (78.0)	80 (22.0)	1.38 (0.90-2.13)	.14	319 (87.9)	44 (12.1)	1.36 (0.78-2.38)	.27

## **Multivariate Analyses**

Table 5 presents the results of the multivariate analyses (logistic regression), adjusting the associations of the 4 main outcomes (current and past suicidal thoughts, suicidal plans, and suicide attempts) and explanatory variables for possible confounders.

In the final models, only lifetime comorbid major depressive disorder and PTSD remained independently associated with all 4 aspects of suicidality (dependent variables). Symptoms of the sexual/religious dimension and comorbid substance use disorders remained associated with suicidal thoughts and plans, while impulse-control disorders were independently associated with current suicidal thoughts and suicidal plans and attempts. Dysthymia remained associated only with current suicidal thoughts, and GAD, with suicide attempts. Lower social class, having no children, and having no religious practice remained associated with lifetime suicidal thoughts, whereas marital status (not married) was independently associated with current suicidal thoughts (Table 5).

## DISCUSSION

This is the largest clinical study to systematically evaluate the prevalence and several correlates of suicidality in OCD patients. It included a comprehensive, structured, and standardized evaluation of clinical features of individuals recruited from 7 specialized university centers conducted by well-trained mental health professionals. It also adds to the literature by evaluating, for the first time, several aspects of suicidality according to different OCD symptom dimensions, as well as including a complete Axis I comorbidity assessment.

Preventing deaths by suicide is one of the most important aspects of psychiatric practice, but suicidality is a very complex phenomenon with a multifactorial nature, involving both genetic and environmental or psychosocial aspects.<sup>36</sup> Suicide-related behaviors or outcomes (ideation, plans, and attempts) are highly interrelated, so that, in the National Comorbidity Surveys, the strongest predictors of later suicidal behaviors were baseline suicidal behaviors.<sup>37</sup> In an Italian survey,<sup>7</sup> the probability of a person with suicidal ideation making a plan was 25%, and the probability of a person with a plan making an attempt was 50%, indicating that suicidality is a continuum phenomenon. Likewise, in China,<sup>6</sup> among those with suicidal ideation, the probability of ever making a plan or an attempt was 29.5% and 32.3%, respectively. Therefore, the study of all nonfatal aspects of suicidality is very important in clinical psychiatry, and the paucity of research addressing OCD is a cause for concern.

## **Descriptive Analysis**

The present study indicates that precursors to suicide (suicidal ideation, plans, and attempts) are frequent among OCD patients, in agreement with previous studies

Table 5. Logistic Regression Analyses: Variables That Remained Associated With Each Outcome (suicide-related behaviors)

		- /	Adjusted <sup>a</sup> OR	
	Crude OR (95% CI)	P	(95% CI)	Р
Suicidal thoughts (current)				
Major depressive disorder	3.99 (1.77-8.96)	.001	2.79 (1.21-6.47)	.016
Posttraumatic stress disorder	3.24 (1.79-5.88)	<.001	1.91 (1.00-3.65)	.049
Substance use disorders	3.20 (1.48-6.90)	.003	3.33 (1.44-7.68)	.005
Dysthymia	2.79 (1.41-5.54)	.003	2.62 (1.23-5.58)	.013
Impulse-control disorders	2.39 (1.38-4.14)	.002	1.93 (1.07-3.49)	.029
Sexual/religious dimension	2.71 (1.49-4.95)	.001	2.08 (1.10-3.94)	.025
Marital status (married)	0.59 (0.34-1.02)	.061	0.51 (0.28-0.92)	.026
Suicidal thoughts (lifetime)				
Major depressive disorder	5.18 (3.31-8.10)	<.001	4.99 (3.04-8.21)	<.00
Posttraumatic stress disorder	2.39 (1.53-3.75)	<.001	1.77 (1.06-2.95)	.029
Substance use disorders	3.14 (1.65-6.01)	.001	2.56 (1.21-5.45)	.014
Sexual/religious dimension	2.28 (1.61-3.23)	<.001	2.14 (1.43-3.21)	<.00
No children	1.42 (1.00-2.01)	.052	1.81 (1.20-2.73)	.005
Religious practice (yes)	0.70 (0.49-1.01)	.054	0.59 (0.39-0.89)	.013
Social class (lower)	1.66 (1.18-2.33)	.004	1.57 (1.05-2.36)	.028
Suicidal plans (lifetime)				
Major depressive disorder	6.94 (3.54-13.63)	<.001	5.75 (2.90-11.40)	<.00
Posttraumatic stress disorder	2.65 (1.63-4.31)	<.001	1.79 (1.07-3.00)	.027
Substance use disorders	2.39 (1.22-4.65)	.011	2.06 (1.01-4.23)	.048
Impulse-control disorders	2.03 (1.34-3.05)	.001	1.56 (1.00-2.41)	.047
Sexual/religious dimension	2.01 (1.32-3.06)	.001	1.65 (1.06-2.58)	.027
Suicide attempts (lifetime)				
Major depressive disorder	37.10 (5.11-269.67)	<.001	28.75 (3.93-210.10)	.001
Posttraumatic stress disorder	2.77 (1.55-4.97)	.001	1.90 (1.03-3.49)	.04
Generalized anxiety disorder	2.41 (1.42-4.07)	.001	1.80 (1.04-3.10)	.036
Impulse-control disorders	2.35 (1.39-3.98)	.001	1.77 (1.02-3.07)	.042
<sup>a</sup> The variables that entered the	backward logistic regr	ession m	odel ( $P < .10$ ) for each o	utcom

are described in the Method (Data Analysis section).

using treatment-seeking samples<sup>25,26</sup> and community-based surveys.<sup>21,22</sup> The rates of suicide-related behaviors in this study are much higher than those described in the general community samples. For example, a recent study including 84,850 adults in 17 countries<sup>3</sup> presented values for lifetime suicidal ideation, plans, and attempts of 9.2%, 3.1%, and 2.7%, respectively. In Brazil, a community-based survey reported 18.6% for suicidal thoughts, 5.2% for suicidal plans, and 3.1% for suicide attempts.<sup>2</sup> Conversely, in a study with members of an American foundation for OCD patients,<sup>38</sup> thinking about suicide was reported by 57.1% of the participants, and suicide attempts were reported by 12.2%. Interestingly, a study with schizophrenic patients<sup>39</sup> observed that those with comorbid OCD were more likely to have a previous history of suicide attempts compared to patients without this comorbidity.

In agreement with the literature,<sup>40–44</sup> comorbidity with other psychiatric disorders was the rule rather than the exception in the present sample. Major depressive disorder, a condition that is known to be the most important risk factor for suicidal behaviors,<sup>8,45</sup> was present in two-thirds of the participants. Also related to suicidality, impulse-control disorders occurred in 38% of the participants, and substance use disorders occurred in 7%. Co-occurrence of schizophrenia was an exclusion criterion in the present study.

PTSD was present in 25% of the patients who had reported having experienced some traumatic experience, confirming that most individuals who are exposed to a trauma do not develop full-blown PTSD. In the NCS,<sup>46</sup> PTSD was significantly

associated with suicide attempts, while in the NCS-R,<sup>13</sup> it was independently associated with both suicidal ideation and attempts. Some studies have also shown that suicidality can be a very important aspect in individuals with PTSD. Marshall et al<sup>47</sup> showed that even subclinical PTSD was associated with an elevated risk of suicidal ideation, independent of depression, while Maia et al<sup>48</sup> verified an association between PTSD and suicidal ideation among Brazilian policemen. Civilians with PTSD also presented an elevated suicide risk in the study conducted by Tarrier and Gregg,<sup>49</sup> and in a recent Italian survey,<sup>7</sup> the odds ratio for suicidal ideation among individuals with PTSD was 4.1 compared to those without this disorder. Furthermore, the relationship between traumatic life events and OCD has been increasingly recognized, indicating a potentially important role of environmental factors in OCD etiology.<sup>50,51</sup> Comorbid PTSD was shown to be relatively common among individuals with treatment-resistant OCD.52 Therefore, we were particularly interested in the possible impact of PTSD comorbidity on suicide risk in OCD patients, which is a relevant and still understudied topic in clinical research.

### **Univariate Analysis**

Concerning demographic and family history variables possibly relevant to the outcomes, only lower social class was significantly associated with suicidal thoughts and plans. Furthermore, the absence of any religious practice was associated with previous suicidal ideas, and suicide attempts in the family were associated with patients reporting their own plans and attempts. Socioeconomic disadvantage was also related to suicidal plans and attempts in other studies.<sup>1,5,53,54</sup> Religious affiliation or attendance was associated with decreased odds of suicidal behaviors in previous studies.55,56 In Brazil, less frequent church attendance was independently associated with suicidal ideation in a community survey.<sup>57</sup> Interestingly, according to some researchers, 58-60 familial suicidal behavior may have an independent effect on patients' suicide attempts beyond the transmission of psychiatric illness or psychopathology. No sex differences were observed in any of the investigated aspects of suicidality, contrary to a recent community-based prospective study<sup>61</sup> that observed important differences in predictors of severe suicidal behaviors between male and female young adults. However, that study was focused on general psychopathology and not on obsessive-compulsive symptoms.

*Clinical explanatory variables.* Symptoms from the sexual/religious dimension were those most consistently associated with all aspects of suicidal behavior, approaching statistical significance only for attempts, a rarer outcome. Interestingly, symptoms from this dimension were

independently associated with treatment refractoriness in a study conducted by Ferrão et al.<sup>62</sup> This finding indicates that this specific content may present peculiarities and worse prognosis, demanding careful attention from mental health professionals assisting these patients. In a study by Kamath et al,<sup>25</sup> religious symptoms were the only ones significantly associated with suicide attempts.

It is noteworthy that the hoarding dimension, which may be more closely related to the symmetry dimension, <sup>63,64</sup> was associated with suicide attempts. Interestingly, a study<sup>65</sup> has shown that traumatic life events were more frequently reported by OCD patients with hoarding symptoms. Moreover, hoarding has been consistently associated with worse treatment response in OCD patients.<sup>66–68</sup>

In contrast, the aggressive, contamination/cleaning, and symmetry/ordering dimensions, although quite common, were not significantly associated with any suicidal outcome, possibly indicating that these symptoms confer lower burden on OCD patients. Concerning the aggressive dimension, a crucial distinction has to be made in clinical practice between suicidal obsessions (ego-dystonic obsessive thoughts of suicide), which are part of the intrinsic clinical picture of OCD and apparently do not involve a particular risk for suicidal behaviors and should be treated with exposure therapy, and true suicidal thoughts—involving genuine death desire—which demand preventive measures.<sup>69</sup>

Another interesting finding was that higher severity on the obsessive subscale of the YBOCS was associated with suicidal thoughts (current and lifetime) and plans, while higher mean scores in the compulsive subscale and in the total YBOCS score were not. Two studies have shown that severity of obsessions has a particularly negative impact on the quality of life of OCD sufferers and on the intensity of co-occurring depressive symptoms.<sup>23,70</sup> Additionally, Besiroglu et al<sup>71</sup> observed that depression severity was associated with obsession but not with compulsion severity. Finally, Fullana et al<sup>72</sup> reported that obsessions were associated with higher distress/interference than compulsions in a community sample, mirroring findings in OCD clinical samples.<sup>70</sup>

Probably indicating greater psychopathologic severity in general, higher scores on both the BDI and BAI were strongly associated with all suicidal behaviors. The severity of symptom-related impairment, irrespective of psychiatric profile, explained most of the suicide risk in one study involving young patients.<sup>53</sup> Among adolescents at high risk of psychosis, obsessive-compulsive symptom severity was associated with more severe depression and suicidality.<sup>73</sup> In line with the present results, a recent study by Norton et al<sup>14</sup> examining the relationship of anxiety disorders and suicidality using continuous measures, including YBOCS and BDI scores, concluded that anxiety and depressive symptoms together conveyed an additional interactive risk that was not simply a by-product of comorbid depression. Measurements of OCD severity, however, showed only minimally significant associations. Of note in the present study was that significant positive correlations were obtained between

YBOCS scores (total, obsession, and compulsion subscales) and BDI scores (P<.001, Spearman coefficient, data not shown).

As expected, comorbid major depressive disorder, PTSD, dysthymia, GAD, substance use disorders, and impulsecontrol disorders were all associated with suicidality in the present sample (except for dysthymia and attempts). Major depressive disorder presented the highest odds of all suicidal outcomes, particularly suicidal acts (OR = 37.1), further corroborating that depression is the mental disorder most strongly related to suicide.<sup>8,45</sup>

## **Multivariate Analysis**

After the logistic regression, aimed at controlling the effects of possible confounders, only certain clinical variables remained independently associated with the outcomes of interest. It is worthy of note that the presence of symptoms from the sexual/religious dimension remained significantly associated with suicidal ideation and plans, while in another clinical study<sup>25</sup> they were associated with attempts. Lower social class,<sup>53,54</sup> having no religious practice,<sup>55–57</sup> and having no children remained associated with lifetime thoughts.

Comorbid PTSD was still associated with all aspects of suicidality. Therefore, PTSD was an independent and important factor to be taken into consideration in clinical practice when assessing suicide risk in OCD patients. In fact, in a study involving bipolar disorder adolescents,<sup>74</sup> PTSD also remained related to suicide attempts after adjustment for other concurrent anxiety disorders, indicating that the relationship was not an artifact of confounding effects. It is also important to consider that comorbid PTSD may adversely affect the response of OCD patients to treatment<sup>75</sup> and, consequently, increase suicide risk, although this finding has not been replicated in other studies.<sup>76</sup> This hypothesis can only be tested in prospective and intervention studies, which may clarify the pathways involved in this association.

In agreement with previous clinical studies involving OCD patients,<sup>25,26</sup> the effect of comorbid major depressive disorder on suicide risk was not ruled out in the present study. On the contrary, this comorbidity remained strongly associated with all suicidal aspects, particularly suicide attempts (OR = 28.7). Norton et al<sup>14</sup> studied suicidal ideation in college students and concluded that anxious symptoms (including obsessive-compulsive symptoms) convey a risk for ideation above and beyond any co-occurring depressive symptoms. Moreover, anxious and depressive symptoms together conveyed an additional interactive risk. This possibility is also plausible for treatment-seeking patients, and psychiatrists should be alert, since depressive symptoms are very frequent in OCD clinical samples. Recurrent major depressive disorder, which is the most common comorbidity in OCD, appears to confer greater risk as compared to dysthymia.<sup>77</sup> Interestingly, a study of suicidality in bipolar disorder patients<sup>15</sup> showed that comorbid anxiety disorders increase the risk for both ideation and attempts. Conversely, adolescents with anxiety disorders who developed major depression presented a higher risk of suicide, indicating the need of early detection of depressive episodes.<sup>78</sup> Kamath et al<sup>25</sup> described depression and hopelessness as the major correlates of suicidal behavior in OCD patients and recommended aggressive treatment of depression in order to modify the risk of suicide. Although the cross-sectional design of the present study is not appropriate for assumptions regarding temporal relationships, depressive symptoms may be secondary to the severity of OCD symptoms. Prospective studies show that mood changes are a consequence of the chronic distress and impairment associated with obsessivecompulsive symptom severity in most OCD patients.<sup>79-81</sup> In this case, depression can be considered as a factor in the causal pathway of suicide-related phenomena and not a true confounder in OCD patients.<sup>26</sup> It is noteworthy that in the present study the severity of obsessive-compulsive symptoms was significantly correlated with the severity of depressive symptoms, as determined by the BDI.

Likewise, comorbidity with impulse-control and substance use disorders, although less frequent than comorbidity with depression, seems to contribute independently to some aspects of suicidal behaviors and should be carefully investigated. Interestingly, in the community-based survey conducted by Lee et al<sup>6</sup> in China, these 2 groups of disorders were strongly associated with suicide attempts. Substance abuse and depression were especially associated with nonfatal suicidal behaviors in one survey,<sup>1</sup> while alcohol-related disorders and major depression were independent predictors of completed suicide in another study.<sup>45</sup> Moreover, substance use disorders are not infrequent among PTSD sufferers, and, in an Australian survey,<sup>82</sup> those with both diagnoses were more likely to have a history of attempted suicide. Finally, in a previous study with the same sample, Gentil et al<sup>83</sup> compared OCD patients with and without alcohol use disorders and verified that the former were more likely to present lifetime suicidal thoughts and attempts and to have higher scores in the hoarding dimension.

## Limitations

The results of the present study should be considered in light of certain limitations. The cross-sectional design does not permit causal inferences to be made, but only indicates associations between the dependent and explanatory variables. Suicidality was assessed only by retrospective self-reporting and may be subject to report bias. Personality disorders, which may also be important risk factors for suicidality,<sup>45</sup> were not assessed. All patients were being treated at centers specializing in OCD research and treatment, which probably limited to some extent the possibility of generalizing the results. Although commonly used as risk factors, suicidal ideas, plans, and attempts may not necessarily predict completed suicides.<sup>2,13,36</sup> Additionally, other parameters of suicidal behavior (intensity, duration, variability, persistence) that might be relevant<sup>84</sup> were not assessed. Despite the large clinical sample, the relatively small number of participants with suicide attempts (n = 64) may have reduced the power of some of the analyses. Finally, because multiple demographic and clinical explanatory variables were investigated, the risk of type I or false-positive error cannot be ruled out; however, a conservative approach was used, with only the variables with a *P* value < .10 in the univariate analyses being included in the final logistic regression models.

## CONCLUSIONS

Despite these limitations, the present study provides stronger evidence that suicidal behaviors are relatively common among OCD patients and reinforces the importance of suicide risk assessment, particularly in individuals with symptoms of the sexual/religious dimension and those with comorbid major depressive disorder, PTSD, substance use disorder, and impulse-control disorders. Clinical assessment should include a direct inquiry concerning suicidal ideation and plans, since most OCD patients may not spontaneously report them. Risk identification is a crucial factor for the establishment of preventive interventions during the course of treatment, for patients' protection. Specific interventions designed for OCD patients with these phenotypic features are warranted.

Further research is required in order to more clearly understand the precise reasons, mechanisms, and pathways by which OCD leads to suicidal behaviors (qualitative studies); to elucidate the temporal relationship between certain OCD clinical features and suicide-related outcomes (prospective observational studies); and to evaluate the impact of preventive measures on minimizing suicide risk (intervention studies).

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#### eAppendix 1. Questions Assessing Suicidal Behaviors and Family History of Suicidality

- Questions regarding patient's suicidal behaviors (yes or no answers): 1) Have you ever thought that life was not worth living?

  - 2) Have you ever wished you were dead?
  - 3) Have you ever thought about killing yourself? 4) Have you ever planned how to kill yourself?
  - 5) Have you already attempted suicide? If yes, how many times have you done this?
- 6) And currently, do you have suicidal thoughts?
- Questions regarding family history of suicidality:
- 7) Has anyone in your family ever committed suicide?8) Has anyone in your family ever attempted suicide?