



## Prevalence and correlates of suicidality in obsessive-compulsive disorder



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### ABSTRACT

**Background:** A growing body of evidence suggest individuals with obsessive-compulsive disorder (OCD) are at an increased risk for suicidal thoughts and behaviors (SITB). However, the literature on suicidality in OCD remains limited. Thus, the present study examined the prevalence and predictors of suicidality in a sample of adults seeking treatment for OCD.

**Methods:** A total of 687 patients seeking care through a network of intensive treatment centers consented to participate. Participants completed validated self-report questionnaires of depression and OCD symptom severity, as well as psychodiagnostic interviews.

**Results:** Almost half of the participants reported current suicidal ideation. The presence of a comorbid diagnosis was associated with increased likelihood of more severe SITB. Specifically, the presence of a co-occurring anxiety, depressive, or bipolar mood disorder predicted increased severity of SITB. In addition, obsession severity was positively associated with suicidality, while compulsion severity negatively predicted the severity of SITB.

**Conclusions:** SITB is a prevalent concern in treatment-seeking patients with OCD. Clinicians are encouraged to assess and consider the treatment implications of SITB, particularly among patients with co-occurring mood and anxiety disorders, or symptoms involving taboo thought content. Future directions and theoretical considerations are discussed.

Obsessive-compulsive disorder (OCD) is among the most impairing psychological conditions. It adversely impacts physical health, quality of life, and functioning, leading to considerable disability and costs (DuPont, Rice, Shiraki, & Rowland, 1995; Eisen et al., 2006; Hollander et al., 1997; Steketee, 1997). Longitudinal research suggests OCD is associated with increased risk of mortality, even after accounting for comorbid mood and substance use disorders (Meier et al., 2016). This increased risk is observed for both natural (e.g., medical condition) and unnatural causes (e.g., suicide), with the risk for death by suicide tripled among individuals with OCD compared to the general population. These findings call for increased research to understand the prevalence, correlates, and predictors of suicidal thoughts and behaviors (SITB) among individuals with OCD (e.g., Alonso et al., 2010; Torres, Ramos-Cerqueira, Ferrão, Fontenelle, do Rosário et al., 2011).

Increasing efforts to refine our understanding of SITB in OCD have challenged long-standing conceptualizations of low risk in this

population (Templer, 1972). Indeed, increased risk for suicide attempts and death by suicide has been shown across various populations (Bra-koulias et al., 2017; de La Cruz et al., 2017). Reviews of the literature suggest a consistent association between OCD and various forms of SITB, including suicidal ideation and suicide attempts (Albert, de Ronchi, Maina, & Pompili, 2018; Angelakis et al., 2015). Summarizing these findings, a recent systematic review and meta-analysis suggests more than 10% of patients with OCD attempt suicide, with nearly 50% of patients reporting suicidal thoughts (Pellegrini et al., 2020). Still, the literature remains relatively small, and the methodological quality of studies limited. There remains considerable room to improve our understanding of SITB risk in OCD.

The broad literature on suicidality highlights several factors that may be relevant to SITB risk in OCD. First, internalizing diagnoses (e.g., anxiety, depression), substance use, and posttraumatic stress have been implicated as general risk factors for suicidality (Bentley et al., 2016;

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Krysinska & Lester, 2010a; Schneider, 2009a). Psychiatric comorbidity is prevalent in OCD (Ruscio, Stein, Chiu, & Kessler, 2010), with anxiety and mood disorders emerging as the most prevalent comorbid conditions. Data have begun to support the idea that comorbidities such as anxiety and depression play an important role in the severity of suicidality in individuals with OCD (Khosravani, Kamali, Jamaati Ardakani, & Samimi Ardestani, 2017a; Torres, Ramos-Cerqueira, Ferrão, Fontenelle, Rosário, et al., 2011).

In addition, the nature and content of OCD symptoms may influence SITB risk. Specifically, obsessional thoughts provoke acute distress (e.g., fear, disgust, shame), which is regulated by compulsive rituals and avoidance behavior (Taylor, Abramowitz, & McKay, 2007). Thus, conceptually, the acute distress elicited by severe obsessions may confer risk for suicidality, while compulsions may actually buffer this risk by allowing individuals to regulate (at least in the short-term) unwanted intrusive thoughts related intense emotions. In line with this idea, the severity of obsessions, but not compulsions, has been correlated with SITB severity in a few previous studies (e.g., Alonso et al., 2010; Torres, Ramos-Cerqueira, Ferrão, Fontenelle, do Rosário et al., 2011). Building on these findings, meta-analytic results suggest the severity of obsessions consistently predicts increased suicidality, whereas compulsions may actually mitigate risk for suicidality by alleviating obsessional distress (Pellegrini et al., 2020).

Finally, OCD is a thematically heterogeneous condition and some studies have shown an association between SITB and obsessions particularly involving aggressive, sexual, or religious themes (Cervin et al., 2021; Dell'Osso et al., 2012; Khosravani et al., 2017a; Velloso et al., 2016). Yet, it's important to note the association between unacceptable thoughts and suicidality is not consistent (e.g., Agne, Tisott, Ballester, Passos, & Ferrão, 2020); heterogeneity in suicidal thoughts and behaviors (Edwards et al., 2021) as well as in unacceptable thoughts symptom presentations (e.g., Wetterneck, Siev, Adams, Slimowicz, & Smith, 2015) may explain these inconsistencies. Notably, such obsessional intrusions are often experienced as highly distressing and, not surprisingly, are strongly associated with depression and with the tendency to subjectively resist such intrusions (i.e., experiential avoidance [EA]; Buchholz, Blakey, Abramowitz, Leonard, & Riemann, 2019; Reuman, Buchholz, & Abramowitz, 2018). In turn, both depression and EA have been shown to predict suicidality (e.g., Angelakis & Gooding, 2020, 2021). Scarce data has supported associations between suicidality and other obsessive-compulsive symptom dimensions (i.e., contamination, responsibility for harm, symmetry; Abramowitz et al., 2010). However, a few investigations have suggested a link between SITB and contamination (Gupta, Avasthi, Grover, & Singh, 2014) and symmetry-related OCD symptoms (Velloso et al., 2016). Taken together, data are limited, and findings mixed. Thus, further examination of the relationship between OCD symptom dimensions and suicidality is warranted.

The present study thus sought to examine the prevalence and correlates of SITB among individuals seeking treatment for OCD. Our primary aims were to: (a) extend findings regarding the prevalence and severity of SITB in OCD in a sample of 687 individuals seeking intensive OCD treatment, (b) examine the explanatory power of comorbid diagnoses in predicting SITB severity, and (c) examine the predictive power of OCD symptoms (i.e., obsessions, compulsions) and symptom themes (i.e., contamination, responsibility for harm, unacceptable thoughts, symmetry) in predicting SITB severity above and beyond diagnostic comorbidity. Our hypotheses were as follows: First, we predicted that SITB would be present among approximately half of the sample based on prior estimates in clinical samples. Second, we expected the presence of a comorbid diagnosis would increase SITB severity in an additive fashion (i.e., *more complex clinical presentations would be predictive of increased suicidality*). Finally, we expected that obsessions, but not compulsions, and specifically, OCD symptoms involving repugnant thoughts, would predict more severe suicidality. We elected to examine these relationships within a naturalistic

population of individuals seeking intensive treatment for OCD to maximize the clinical relevance of our results.

## 1. Methods

### 1.1. Participants

Individuals ( $N = 687$ ) were enrolled as part of a larger research study examining correlates of OCD and its treatment. Participants included in the present study analyses were: (a) diagnosed with primary OCD, (b) admitted for intensive outpatient, partial hospitalization, or residential care within a network of intensive treatment centers specializing in OCD, and (c) provided consent to participate. Participants were on average 30.93 years old ( $SD = 12.38$ , Range = 18–78), and the majority identified as white (93%) and single (69.4%). In terms of level of care, 226 (32.9%) were enrolled in an intensive outpatient program, 137 (19.9%) individuals in a partial hospitalization program, and 324 (47.2%) in a residential program. The sample was relatively equivalent in gender identity across men and women, and normally distributed across educational status, with the majority of participants (59.7%) having completed some college to a 4-year college degree. See Table 1 for an overview of sample demographics.

### 1.2. Procedure

Upon admission, all participants completed an in-person evaluation with a licensed psychiatrist specializing in OCD to determine the presence of primary OCD as well as any other co-occurring diagnoses as part of routine admission procedures. Prior to beginning treatment at the program, eligible participants provided informed consent and completed a packet of self-report questionnaires for research and clinical purposes, as described below. All study procedures were approved by both the Human Subjects Committee and the Rogers Center for Research and Training.

**Table 1**  
Sample characteristics.

	M	SD	Range
Age	30.93	12.38	18–78
Gender	N	%	
Male	324	47.2	
Female	363	52.8	
Race & Ethnicity			
White	639	93	
Hispanic	4	.6	
African American	10	1.5	
Indian	10	1.5	
Asian	10	1.5	
Native American	1	.1	
Other	9	1.3	
Marital Status			
Single	477	69.4	
Married	182	26.5	
Divorced	19	2.8	
Widowed	4	0.6	
Separated	5	0.7	
Education			
Some High School	33	4.8	
High School Graduate	107	15.6	
Some college	209	30.4	
Associate degree graduate	43	6.3	
College (4-year) graduate	158	23	
Some graduate school	30	4.4	
Graduate School (MS, MA)	54	7.9	
Graduate School (PHD, JD, MD)	8	1.2	
Not specified	45	6.4	

### 1.3. Measures

#### 1.3.1. Quick Inventory of depressive symptomology – self report (QIDS)

The QIDS is a 16-item, self-reported assessment of depression symptom severity (Rush et al., 2003). For the purpose of the present study, we were only interested in item 12, which assess current SITB severity. The item asks participants to rate “thoughts of death or suicide” in the past 7-days on a 4-point severity scale, including (0) “I do not think of suicide or death”, (1) “I feel that life is empty or wonder if it’s worth living”, (2) “I think of suicide or death several times a week for several minutes”, or (3) “I think of suicide or death several times a day in some detail, or I have made specific plans for suicide or have actually tried to take my life.” A one item assessment approach using the QIDS-SR has been used in other investigations of SITB (McNally, Mair, Mugno, & Riemann, 2017).

#### 1.3.2. Yale-Brown obsessive-compulsive scale – self report (YBOCS)

The YBOCS is a gold-standard assessment of OCD symptom severity, which consists of a symptom checklist and 10-items to assess current symptom severity (Goodman et al., 1989). Items can be summed to compute a total severity score, or subscale scores for obsession and compulsions severity. The self-report version was developed by Baer, Brown-Beasley, Sorce, and Henriques (1993), and demonstrates good internal consistency and strong convergent validity with the interview version (Federici et al., 2010). The internal consistency of the Y-BOCS in the present sample was excellent ( $\alpha = 0.90$ ) overall, and good within the obsessions and compulsions subscales ( $\alpha = 0.83 - 0.86$ ).

#### 1.3.3. Dimensional Obsessive-Compulsive Scale (DOCS)

The DOCS is a 20-item self-report measure developed to assess OCD severity across four empirically derived theme-based symptom dimensions: (a) contamination, (b) responsibility for harm (c) unacceptable thoughts, and (d) symmetry and ordering (Abramowitz et al., 2010). Participants read a brief description of the symptom dimension and rate five items to assess the severity of symptoms within each dimension. Items are rated from 0 to 4 and subscale scores range from 0 to 20, with higher scores indicated more severe OCD symptoms. The DOCS has evidenced excellent psychometric properties. In our sample, internal consistency was excellent ( $\alpha = 0.93 - 0.96$ ) across subscale scores.

### 1.4. Data analytic plan

Data were cleaned and participants with missing data on primary study measures excluded. Descriptive statistics were used to examine the distributional properties of clinical measures, and to characterize the sociodemographic and clinical characteristics of the sample (see Tables 1–3). To examine our first hypothesis regarding the prevalence and severity of SITB in the sample, we examined descriptive statistics for item 12 of the QIDS.

**Table 2**

Descriptive statistics across study measures.

Measures	M (SD)	Range	Skewness	Kurtosis
YBOCS Total	24.41 (7.02)	0–40	-.37	.19
YBOCS Obsessions	12.54 (3.69)	0–20	-.47	.23
YBOCS Compulsions	11.87 (4.01)	0–20	-.58	.34
DOCS Contamination	7.37 (6.34)	0–20	.37	-1.15
DOCS Harm	6.82 (5.68)	0–20	.39	-.91
DOCS Unacceptable Thoughts	8.92 (6.01)	0–20	-.01	-1.16
DOCS Symmetry	5.82 (5.32)	0–20	.70	-.46
QIDS Total	12.13 (5.65)	0–26	.08	-.66
QIDS – SI Item	0.63 (82)	0–3	1.21	.75

Notes: SI – Suicidal Ideation, YBOCS – Yale Brown Obsessive Compulsive Scale, DOCS – Dimensional Obsessive-Compulsive Scale, QIDS – Quick Inventory of Depressive Symptomatology.

**Table 3**

Overview of sample diagnostic characteristics.

Diagnosis	N	%
Obsessive Compulsive-Disorder <sup>a</sup>	687	100
Obsessive Compulsive Related Disorder	16	2.4
Hair Pulling Disorder	8	1.2
Body Dysmorphic Disorder	8	1.2
<b>Any Anxiety Disorder</b>	<b>117</b>	<b>17.1</b>
Panic	18	2.6
Social Anxiety	28	4.1
Generalized Anxiety	52	7.6
Anxiety Not Otherwise Specified	19	2.8
<b>Posttraumatic Stress Disorder</b>	<b>17</b>	<b>2.5</b>
<b>Any Depressive Disorder (Unipolar)</b>	<b>225</b>	<b>32.8</b>
Major Depression	209	30.4
Dysthymia	4	0.6
Depression Not Otherwise Specified	12.5	86
<b>Any Bipolar/Mood Disorder</b>	<b>98</b>	<b>14.2</b>
Bipolar I	10	1.5
Bipolar II	5	0.7
Bipolar Not Otherwise Specified	1	0.1
Other Mood Disorder	82	11.9
<b>Any Developmental Disorder</b>	<b>49</b>	<b>7.1</b>
Asperger's	8	1.2
Autism	5	0.7
Attention-Deficit/Hyperactivity Disorder	22	3.2
Tic Disorder	14	2.0
<b>Any Substance Use Disorder</b>	<b>41</b>	<b>6.0</b>
<b>Any Eating Disorder (ED)</b>	<b>17</b>	<b>2.5</b>
Anorexia	2	0.3
Bulimia	0	0.0
ED Not Otherwise Specified	15	2.2
<b>Other Disorder Not Listed</b>	<b>39</b>	<b>5.7</b>
Co-Occurring Diagnosis Count	N	%
0	209	30.4
1	299	43.5
2	146	21.3
3+	33	4.8

Notes.

<sup>a</sup> All individuals met criteria for primary OCD.

To address our second hypothesis regarding the relationship between co-occurring diagnoses and SITB, regression analyses were conducted. Given the ordinal outcome variable and inclusion of both categorical and continuous predictors, a Poisson regression model was estimated. Binary diagnostic variables were added as predictors of SITB (QIDS item 12). In addition, the YBOCS total score was added as covariate to control for the overall severity of OCD symptoms. Goodness of fit and assumptions were examined (e.g., equidispersion, multicollinearity). A chi-square test and ANOVA with post-hoc tests were conducted to probe differences in SITB based on overall diagnostic complexity (i.e., the number of co-occurring diagnoses).

Finally, to address our third hypothesis, the association among SITB (QIDS item 12) and OCD symptoms (YBOCS-Obsession, Compulsions) and symptom dimensions (DOCS-Contamination, Responsibility for Harm, Unacceptable Thoughts, Symmetry/Ordering) were examined with bivariate correlations. Kendall's Tau was used, given the ordinal SITB variable. Finally, the Poisson regression model predicting SITB described above was revised to include OCD symptoms. Specifically, the YBOCS total score was replaced with the YBOCS and DOCS subscale scores. Comorbid diagnoses were again included in the model.

## 2. Results

### 2.1. Prevalence and severity of SITB

While the mean score on the QIDS SITB item was low across the overall sample ( $M = 0.63$ ,  $SD = 0.83$ ), there was a wide range of scores reported (absent [0] to frequent daily ideation or active suicidal plans [3]). Out of the 687 total participants, 305 (44.4%) reported current

SITB. Specifically, 207 participants (30.1%) indicated passive SITB, 71 (10.3%) indicated moderate SITB, and 27 (3.9%) reported more severe levels of SITB involving daily ideation and/or active planning or suicide attempt. Finally, 382 participants (55.6%) reported no current SITB.

## 2.2. Associations between SITB and co-occurring diagnoses

As indicated in Table 3, 30.4% ( $n = 209$ ) met criteria for OCD only. The majority of participants thus met criteria for at least one co-occurring diagnosis. Specifically, 43.5% ( $n = 299$ ) had one co-occurring psychiatric diagnosis, 21.3% ( $n = 146$ ) had two co-occurring diagnoses, and 4.8% had three or more diagnoses in addition to OCD.

Table 4 presents the results of regression analyses predicting the severity of QIDS-SITB by co-occurring diagnoses. The Omnibus test indicated the overall model was significant ( $p < .001$ ). All diagnostic predictors were added to the overall model simultaneously. The significant individual predictors included YBOCS Total Score ( $\chi^2 = 23.56$ ,  $p < .001$ ) as well as the presence of any depressive disorder ( $\chi^2 = 31.67$ ,  $p < .001$ ), any anxiety disorder ( $\chi^2 = 6.16$ ,  $p = .01$ ), or any bipolar/other mood disorder (Chi-Square = 8.61,  $p = .003$ ). When examining effects in terms of exponentiated coefficient estimates, the presence of unipolar depression predicted a 47% increase in the SITB score, while the presence of any bipolar disorder predicted a 36% increase in the SITB score, and the presence of any anxiety disorder predicted a 27% increase in the SITB score.

To examine whether the number of co-occurring diagnoses was associated with suicidality, a chi-square test was conducted. This analysis indicated that the proportion of patients reporting higher SITB was larger among those with comorbid diagnoses ( $\chi^2(9, N = 687) = 33.9$ ,  $p < .05$ ; see Table 4). Post-hoc tests confirmed that the presence of any comorbid diagnoses was associated with increased SITB. However, the effect was not additive. That is, no differences were observed across groups with 1, 2, or 3+ comorbidities.

## 2.3. Association between SITB and OCD symptom severity

Non-parametric correlations among OCD symptoms and SITB were next examined. As shown in Table 5, the YBOCS-Obsessions and

**Table 4**  
Predicting SI from OCD symptom severity and co-occurring diagnoses.

Regression Model Summary	$\chi^2 = 67.32$ , $p < .001$			
	$\chi^2$	$P$	Exp(B)	
			Absent	Present
Any Anxiety Disorder	6.16	.001	.73	1.00
Any Unipolar Depressive Disorder	31.67	<.001	.53	1.00
Any Bipolar/Other Mood	8.61	.003	.64	1.00
Any Substance Use Disorder	.001	.98	1.01	1.00
Any Developmental Disorder	.02	.89	1.03	1.00
Any Obsessive-Compulsive Related Disorder (Non-OCD)	.27	.61	.86	1.00
Any Eating Disorder	.10	.75	1.10	1.00
Posttraumatic Stress Disorder	.05	.83	1.07	1.00
YBOCS Total Score	23.56	<.001	1.04	
<b>Chi Square Analyses</b>				
<b><math>\chi^2(9, N = 687) = 33.9</math>, <math>p &lt; .05</math></b>				
SI Severity (QIDS Item 12)	OCD Only	1 + Comorbidity		
Absent (0)	68.9% ( $n = 144$ )	49.8% ( $n = 238$ )		
Mild (1)	24.4% ( $n = 55$ )	32.6% ( $n = 156$ )		
Moderate (2)	5.7% ( $n = 12$ )	12.3% ( $n = 59$ )		
Severe (3)	1.0% ( $n = 2$ )	5.2% ( $n = 25$ )		

Notes: SI – Suicidal Ideation, OCD – Obsessive Compulsive Disorder, YBOCS – Yale Brown Obsessive Compulsive Scale, QIDS – Quick Inventory of Depressive Symptomatology.

**Table 5**  
Correlations across among OCD symptom scales and SI severity.

	QIDS SI	
	R	P
YBOCS Obsessions	.22	<.001
YBOCS Compulsions	.09	.004
YBOCS Total Score	.16	<.001
DOCS Contamination	-.02	.62
DOCS Responsibility for Harm	.07	.02
DOCS Unacceptable Thoughts	.19	<.001
DOCS Symmetry	.11	<.001

Notes: OCD – Obsessive Compulsive Disorder, SI – Suicidal Ideation, YBOCS – Yale Brown Obsessive Compulsive Scale, DOCS – Dimensional Obsessive-Compulsive Scale, QIDS – Quick Inventory of Depressive Symptomatology.

Compulsions subscales were both significantly associated with SITB severity. The association with YBOCS-Obsessions was moderate, while the association with YBOCS-Compulsions was weak. In addition, DOCS-Unacceptable Thoughts was moderately and positively associated with SITB. DOCS-Responsibility for Harm and Symmetry were both weakly and positively correlated with SITB severity. DOCS-Contamination, on the other hand, was not significantly associated with the SITB item.

Finally, we examined whether obsessions, compulsions, or OCD symptom dimensions predicted SITB severity, above and beyond comorbid diagnoses. Goodness of fit was adequate. The overall Omnibus test was significant ( $\chi^2 = 119.16$ ,  $p < .001$ ). As seen in Table 6, the presence of any anxiety disorder, unipolar depressive disorder, or bipolar/mood disorder were each again significantly (positively) associated with SITB scores, after accounting for OCD symptom severity. In addition, YBOCS-Obsessions ( $\chi^2 = 24.43$ ,  $p < .001$ ), YBOCS-Compulsions ( $\chi^2 = 6.24$ ,  $p = .01$ ), and DOCS-Unacceptable Thoughts ( $\chi^2 = 11.83$ ,  $p < .001$ ) each emerged as significant independent predictors of SITB severity. YBOCS Obsessions positively predicted SITB severity ( $B = 0.11$ ), while YBOCS Compulsions emerged as a negative predictor ( $B = -0.04$ ). Finally, DOCS-Unacceptable Thoughts positively predicted SITB severity ( $B = 0.04$ ).

## 3. Discussion

The current investigation aimed to extend the literature on SITB in

**Table 6**  
Predicting SI by OCD symptom dimensions, controlling for comorbidity.

Regression Model Summary	$\chi^2 = 119.16$ , $p < .001$			
	$\chi^2$	$P$	B	Exp(B)
OCD Symptoms				
YBOCS Obsessions	28.43	<.001	0.11	1.12
YBOCS Compulsions	6.24	0.01	-0.04	0.96
OCD Symptom Dimensions				
DOCS Contamination	0.70	0.40	-0.01	0.99
DOCS Responsibility for Harm	0.04	0.84	0.00	1.00
DOCS Unacceptable Thoughts	11.83	<.001	0.04	1.04
DOCS Symmetry	0.71	0.40	0.01	1.01
Co-Occurring Diagnoses	$\chi^2$	$P$	Exp(B)	
			Absent	Present
Any Anxiety Disorder	6.48	.01	.72	1.00
Any Unipolar Depressive Disorder	24.73	<.001	.56	1.00
Any Bipolar/Other Mood	8.10	.00	.64	1.00
Any Substance Use Disorder	0.02	.89	1.03	1.00
Any Developmental Disorder	0.00	.99	1.00	1.00
Any Obsessive-Compulsive Related Disorder (Non-OCD)	0.01	.93	.97	1.00
Any Eating Disorder	0.18	.67	1.14	1.00
Posttraumatic Stress Disorder	0.00	.99	1.00	1.00

Notes: SI – Suicidal Ideation, OCD – Obsessive Compulsive Disorder, YBOCS – Yale Brown Obsessive Compulsive Scale, DOCS – Dimensional Obsessive-Compulsive Scale.

OCD. Our findings suggest SITB is indeed prevalent among individuals seeking care for OCD. Approximately half of our sample indicated current suicidality, with nearly 15% reporting moderate to severe concerns. In addition, the majority of individuals (69.6%) presented with at least one co-occurring diagnosis. The presence of a comorbid diagnosis predicted more severe SITB, even after controlling for OCD severity. There was not a significant association between the number of comorbid diagnoses present and the severity of suicidality. Diagnosis-specific effects, however, were observed, with the presence of any anxiety disorder, unipolar depression, or bipolar/mood disorder predicting SITB severity. Unipolar depression emerged as the strongest predictor of SITB. No other diagnoses assessed were predictive of SITB, despite anticipated effects for posttraumatic stress, substance use, and eating disorders.

We also found that the nature of OCD symptoms themselves was associated with the severity of suicidality. Interestingly, compulsion severity emerged as a negative predictor of SITB, after controlling for the positive effect of obsession severity. Additionally, OCD symptoms involving repugnant themes were most strongly associated SITB. Weak associations between SITB and OCD symptoms involving responsibility for harm or symmetry-related themes were observed, and no significant association was seen for contamination. These unique effects across symptom dimensions underscore the importance of considering the heterogeneity of OCD when examining SITB risk.

It is necessary to consider these findings in light of the extant literature on SITB in OCD. The prevalence rates of SITB in our sample fall at the higher end of those observed across prior studies (i.e., 10%–63.5%; Angelakis et al., 2015), but were consistent with recent meta-analytic findings (Pellegrini et al., 2020). The variability of prevalence rates is likely due to heterogeneity across prior study samples, including both community participants and individuals for whom OCD is not the primary diagnosis. The prevalence rate observed here may thus best generalize to individuals seeking treatment for OCD, as rates are comparable to those previously observed in outpatient samples (e.g., Torres et al., 2007).

Consistent with prior data, a high prevalence of comorbidity was observed among patients in the present sample (Ruscio et al., 2010; Torres et al., 2006)—nearly 70% reported a comorbid diagnosis and the presence of any comorbidity predicted SITB severity. These results align with prior findings suggesting comorbidity is important to consider in assessing SITB risk in OCD (Angelakis, Gooding, Tarrier, & Panagioti, 2015). Notably, comorbidity may serve as a proxy for clinical complexity and has been associated with more severe OCD symptoms (e.g., Ruscio et al., 2010). However, our findings suggest that even after accounting for influence of OCD severity on SITB severity, the predictive utility of depressive, bipolar, and anxiety disorders persists. While mood disorders have received considerable attention in the literature, only a few studies have examined the relevance of anxiety to SITB risk in OCD (e.g., Angelakis et al., 2015). Thus, our study reaffirms the importance of mood disorders to SITB risk in OCD, while also extending broader evidence that anxiety disorders predict SITB severity (Bentley et al., 2016) in the context of OCD.

Notably, comorbidity has also been associated with increased functional impairment, decreased quality of life, and reduced clinical outcomes in OCD (e.g., Huppert, Simpson, Nissenson, Liebowitz, & Foa, 2009; Keeley, Storch, Merlo, & Geffken, 2008). As a result, it is possible individuals with complex clinical presentations are at increased vulnerability for stress, perceived burdensomeness, or hopelessness. Indeed, greater symptom severity and reduced treatment response have been associated with increased burden among caregivers of individuals with OCD (Grover & Dutt, 2011). Notably, these factors are implicated broadly in the risk for suicidality (e.g., Millner, Robinaugh, & Nock, 2020), with emerging evidence suggesting hopelessness predicts suicidality in OCD (Nagy, El-serafi, Elrassas, Abdeen, & Mohamed, 2020). In addition, EA is considered important to the etiology and severity of depressive and anxiety disorders (Spinhoven, Drost, de Rooij, van Hemert, & Penninx, 2014), as well as OCD (Angelakis & Pseftogianni,

2021). EA may thus serve as a transdiagnostic factor, conferring risk for co-occurring OCD, anxiety, and depressive disorders. Importantly, EA has also been linked to individual risk for self-harm and suicidality (Angelakis & Gooding, 2021), with emerging data suggesting EA is an important mediator of risk for SITB in OCD (Angelakis & Gooding, 2020). While these constructs were outside the scope of the present work, further studies to identify mechanisms of the association between comorbidity and SITB in OCD are warranted.

The null findings regarding other comorbid disorders assessed were surprising, especially in light of prior research suggesting substance use (Schneider, 2009b), posttraumatic stress (Krysinska & Lester, 2010b), eating disorders (Kostro, Lerman, & Attia, 2014), and body dysmorphia (Angelakis, Gooding, & Panagioti, 2016) are associated with suicidality. However, our findings should be interpreted in light of our sample characteristics and clinical setting. A low incidence of these comorbidities was observed in our sample, particularly for eating disorders, body dysmorphia, and PTSD. This may have underpowered the detection of unique effects for these conditions. Further study of the prevalence and predictors of SITB across clinical presentations and treatment settings is indicated to understand distinctions in risk across clinical contexts (Angelakis et al., 2015).

Prior literature has supported a strong link between obsession severity and SITB (Alonso et al., 2010; Torres, Ramos-Cerqueira, Ferrão, Fontenelle, Rosário, et al., 2011). The relationship between compulsion severity and SITB, however, has been mixed, with meta-analytic findings suggesting an overall small, positive, and insignificant effect (Angelakis et al., 2015) or a potential protective effect (Pellegrini et al., 2020). In this regard, our results suggested that, after controlling for the positive effect of obsession severity, compulsion severity indeed emerged as a negative predictor of SITB. To our knowledge, this study was the first to examine these effects simultaneously. To understand these findings, it may be useful to consider the functional roles of obsessions and compulsions within cognitive-behavioral conceptualizations of OCD (Salakovskis, 1999; Starcevic et al., 2011). Within the cognitive-behavioral model, unwanted, intrusive thoughts elicit acute affective distress (e.g., anxiety, disgust), which is managed in the short-term by rituals and avoidance. As such, increased compulsion severity may actually be protective against SI, given frequent compulsion use may assist individuals in (at least temporarily) regulating unwanted thoughts and associated distress. In parallel, reduced compulsion use alongside severe obsessions may result in (short-term) acute distress. Moreover, this pattern may reflect increased perceptions of defeat and entrapment regarding intrusions (e.g., *perceiving obsessions as uncontrollable or inescapable, and thus not engaging in as frequent compulsions*), which is associated with SITB risk (Siddaway, Taylor, Wood, & Schulz, 2015).

As we have noted, prior findings regarding the role of OCD symptom dimensions in SITB risk has been inconsistent. Our findings add to a growing literature suggesting symptoms involving repugnant themes, such as sex, violence, and religion, warrant particular attention (Khosravani et al., 2017a, 2021; Rajabi Khamesi, Najafi, & Khosravani, 2021). These findings may be due to increased distress associated with unacceptable thoughts (Brakoulias et al., 2013; Moulding, Aardema, & O'Connor, 2014) and the close association between these symptoms and depression severity (Hasler et al., 2005; Moritz, Meier, Hand, Schick, & Jahn, 2004). However, OCD symptoms related to repugnant themes are also consistently associated with more severe EA, compared to other OCD symptom dimensions. As discussed previously, EA has been shown to confer risk for suicidality and with emerging support in the context of OCD (Angelakis & Gooding, 2020, 2021). In addition, while thwarted belongingness has received limited attention in the OCD literature, it is a critical component of models of suicidality (Hapenny & Fergus, 2017; Roush, Brown, Mitchell, & Cukrowicz, 2017). Given the taboo, socially unacceptable nature of repugnant intrusions, individuals may be particularly vulnerable to feelings of shame and stigma, which increase social withdrawal and feelings of ostracization or exclusion (e.g., Weingarden & Renshaw, 2015). Unfortunately, research suggests these

perceptions of social rejection and threat are likely to be reinforced, with friends, partners, and even mental health professionals reporting stigmatizing attitudes and behaviors in response to disclosure of repugnant or taboo obsessions (e.g., Cathey & Wetterneck, 2013; Steinberg & Wetterneck, 2017). Thus, these social factors warrant careful consideration in future research in order to better understand the consistent link between repugnant obsessions and SITB.

Finally, it is important to consider that individuals with intrusive thoughts regarding violence and death may also endorse frequent suicidal ideation, even if these thoughts are ego-dystonic (e.g., Wetterneck, Siev, et al., 2015). As a result, further attention to the operationalization of suicidality, with distinctions among ideation, urges, plans, intent, and attempts, is needed to better characterize this relationship. Individuals with frequent, repugnant thoughts regarding suicide may not be at elevated risk for suicidal behavior; still, a subset of individuals with OCD are at elevated risk for death by suicide. More precise measurement approaches are needed to disentangle these populations. Moreover, additional studies that integrate theoretically meaningful mediators (e.g., EA, defeat and entrapment, thwarted belongingness) are clearly needed.

Taken together, our findings have important implications for the identification of individuals at high risk for SITB, and for the assessment and treatment of OCD. Our findings add to a growing body of literature demonstrating a high prevalence of SITB amongst individuals with OCD, challenging previous conceptualizations of low SITB risk in this population. Increased awareness of subsets of individuals vulnerable to SITB and identification of relevant risk factors, such as comorbidity, is critical to understanding and preventing suicide risk. Clinicians should be mindful of assessing and monitoring suicide risk among individuals with complex presentations (e.g., comorbidity) and more severe obsessional symptoms, particularly when they include unacceptable, unwanted themes around sex, aggression, and religion. Moreover, findings suggest that further consideration of risk early in response prevention may be critical, given findings that decreased compulsion engagement in the face of more severe obsessional distress may be associated within increased suicidality. This aligns with clinical practice guidelines elevated suicidality be monitored and addressed during exposure therapy (i.e., for posttraumatic stress disorder), given short-term elevations in distress during the initial phases of treatment may trigger acute suicidal crises. While limited guidance exists for the treatment of OCD in the context of elevated suicidal risk, based on broader guidelines and evidence, practitioners may consider supplementing effective treatments for OCD (e.g., exposure with response prevention) with interventions that can target depression and hopelessness (e.g., behavioral activation, acceptance, and commitment therapy), as well as active and collaborative management of suicidal risk (e.g., Jobes, 2012). The use of adjunctive interventions that promote adaptive skills for regulating intense distress and suicidality (e.g., dialectical behavioral therapy) may also be indicated to address SITB among individuals with severe obsessions and related distress (e.g., Harned, Korslund, Foa, & Linehan, 2012; Stanley, Brodsky, Nelson, & Dulit, 2007).

Several limitations should be considered when interpreting our findings. Importantly, the present study was cross-sectional and, as such, represents a snapshot of suicidal prevalence and risk in a sample of individuals admitted for OCD treatment. In addition, participants in the sample were drawn from a convenience sample of individuals interested in and able to access intensive treatment for OCD and related concerns. Thus, findings from this sample may not generalize beyond more severe clinical settings and populations. Moreover, consistent with prior work in treatment-seeking samples of individuals with OCD, findings were highly limited in terms of sociodemographic diversity. This issue warrants critical attention, given the persistent structural barriers to treatment and research inclusion that continue to limit recruit of individuals of marginalized identities in clinical research (e.g., Scharff et al., 2010; Williams, Tellawi, Wetterneck, & Chapman, 2013). Moreover, due to assessment constraints, our study focused exclusively on SITB using a

one-item self-report measure. As suggested by Franklin et al. (2017), longitudinal and intensive data collection paradigms will support far more nuanced investigations of both prevalence and risk for SITB. Specifically, the authors highlight the need for repeated assessment of constructs related to suicidality (e.g., hopelessness), the identification of novel risk factors, and more complex analyses of multiple risk factors. These improvements would strengthen the conclusions than can be derived from research on SITB in OCD and given the increased suicide risk among individuals with OCD, investigators should consider routinely including multiple assessments of SITB in clinical studies.

In addition, in considering future directions, it is critical that researchers consider mechanisms omitted from the present study. Specifically, emerging work in this area has indicated that EA (e.g., Angelakis & Gooding, 2020, 2021; Angelakis & Pseftogianni, 2021), perceptions of defeat and entrapment (Siddaway et al., 2015), childhood maltreatment and traumatic stress (e.g., Khosravani, Kamali, Jamaati Ardakani, & Samimi Ardestani, 2017b; Rajabi Khamesi et al., 2021), alexithymia (de Berardis et al., 2015; Kim et al., 2016), and hopelessness (e.g., Nagy et al., 2020) may play important roles in linking SITB and OCD. Moreover, impulsivity, externalizing distress, and personality disorders, such as borderline personality disorder, may also contribute to this relationship and were not captured within the present study (Breet, Kidd, McGregor, Stein, & Lochner, 2019; la; Buissonnière Ariza et al., 2021; Nagy et al., 2020). Further attention to the unique and interactive effects of these predictors, and consideration of factors from the broader literature on suicidal risk is needed (Franklin et al., 2017).

Despite these limitations, the current study extends previous research by examining the prevalence, severity, and predictors of SI among individuals with OCD. Our findings can inform both theoretical and practical considerations to risk in this population. Overall, our findings reaffirm the prevalence of suicidality among treatment-seeking individuals with OCD, and underscore the need for comprehensive, evidence-based SITB assessment in this population. Importantly, our findings also indicate potential functional relationships among OCD symptoms and SITB, not fully accounted for by the presence of co-occurring disorders. Further theoretically informed examinations into this relationship may assist in clarifying these results.

Researchers are encouraged to draw on the broader literature and theories of suicidality in this line of work. Few state and trait factors implicated by the broader literature have been examined in the context of SITB in OCD, despite their potential relevance. Attention to factors such as EA and cognitive fusion is indicated by recent work and may help us better understand the link between OCD symptoms and suicidality. Moreover, interpersonal, and social factors have received scarce attention, such as social withdrawal, perceived stigma, and social rejection, have received scarce attention and may be particularly relevant to strong link between repugnant and taboo obsessional fears, and suicidality. Importantly, when compulsions fail to effectively mitigate distress (Tolin, Abramowitz, Hamlin, Foa, & Synodi, 2002), individuals over time may reduce compulsion use and experience more hopelessness and defeat regarding their obsessions, in turn exacerbating SITB. In this regard, defeat and entrapment, behavioral inactivation, and hopelessness also warrant further attention as potential risk factors, which may explain the links among depression, obsession severity, and repugnant thoughts with suicidality (Kamath, Reddy, & Kandavel, 2007). Taken together, methodologically rigorous and conceptually informed research on the moderators and mediators of suicidality in OCD is critically needed in order to optimize our identification of those most at risk, refine our interventional strategies, and ultimately, address the elevated risks for suicide among patients.

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## CRediT authorship contribution statement

**Samantha N. Hellberg:** Conceptualization, Methodology, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Jennifer L. Buchholz:** Methodology, Writing – original draft, Writing – review & editing. **Heidi J. Ojalehto:** Writing – review & editing. **Megan W. Butcher:** Writing – review & editing. **Bradley C. Riemann:** Investigation, Resources, Writing – review & editing, Project administration. **Jonathan S. Abramowitz:** Conceptualization, Methodology, Formal analysis, Resources, Writing – review & editing, Supervision.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

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