

DO DYSFUNCTIONAL BELIEFS MODERATE THE NEGATIVE INFLUENCE OF COMORBID SEVERE DEPRESSION ON OUTCOME OF RESIDENTIAL TREATMENT FOR REFRACTORY OCD? A PILOT STUDY

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Abstract

Objective: Comorbid severe depressive symptomatology can predict negative treatment outcome for OCD. Dysfunctional beliefs could moderate this relationship, improving the understanding of mechanisms responsible for this poorer response. The aim of the current study was: a) to investigate differences in dysfunctional belief severity between inpatients with severe, refractory OCD with or without comorbid severe depressive symptoms; b) to evaluate whether a residential behavioural treatment could attenuate the negative influence of severe depressive symptoms on outcome of resistant OCD.

Method: Participants included 38 inpatients (mean age= 35.40, SD= 10.75) with a primary refractory OCD (Y-BOCS mean= 28.40, SD= 6.90), of which 17 (44.73%) had comorbid severe depressive symptoms (BDI-II > 30). Yale-Brown Obsessive Compulsive Scale, Obsessive Belief Questionnaire-87 and Beck Depression Inventory-II were administered at pre- and post-treatment. A residential behavioural treatment with daily and prolonged exposure and response prevention was delivered in combination with medications for 5 weeks.

Results: Inpatients with comorbid severe depressive symptoms had significantly higher OCD symptoms severity [$F(1, 36) = 12.80, p < .05$], Intolerance for uncertainty [$F(1, 36) = 8.41, p < .05$] and Overestimation of threat [$F(1, 36) = 5.99, p < .05$] than those less depressed or non-depressed.

Overestimation of threat was the unique significant predictor of a negative treatment response ($\beta = .11, p < .05$). Neither a main effect of comorbid severe depressive symptoms and no interaction effects of comorbid severe depressive symptoms with dysfunctional beliefs predicted outcome.

Conclusions: These results seem consistent with previous findings, in which Intolerance for uncertainty and Overestimation of threat could be maintaining transdiagnostic factors involved in diseases with chronic course, both psychological and physical. Future longitudinal studies are needed.

However, those cognitive factors do not seem to moderate the negative influence of comorbid severe depression on outcome of OCD. Residential behavioural treatment for OCD seems to improve the negative treatment response of severely depressed inpatients. These findings could be attributed to the behavioural activation components of the residential treatment format. Conversely, future research should evaluate additional treatment components for improving the negative impact of Overestimation of threat on outcome.

Key words: severe, refractory obsessive-compulsive disorder, obsessive beliefs, comorbid severe depression, residential treatment

Declaration of interest: none

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Introduction

Individuals who have OCD are at a higher risk for comorbid mood disorders, and Major Depressive Disorder (MDD) has been consistently found the most prevalent concurrent axis I condition (Hong et al. 2004, Millafranchi et al. 1995, Nestadt et al. 2001, Torres et al. 2006), with a life-time prevalence of approximately 50% (Crino and Andrews 1996).

Indeed, some research demonstrated that comorbid depressed mood is associated with more severe obsessions (Ricciardi and McNally 1995). The progression from OCD symptoms to depression is recognized as the most usual pattern for this comorbidity, since such progression can be found three times more often than the reverse pattern, and the incidence of OCD symptoms in primary mood disorders appears to be less common (Kendell and Discipio 1970).

Evidence on temporal order of this type of comorbidity consistently suggested that the persistent invalidating effects of OCD can lead to the development of a secondary depressive psychopathology (Bellodi et al. 1992, Demal et al. 1993, Rasmussen & Eisen, 1994). Relative to non-depressed OCD patients, individuals with OCD and comorbid MDD tend to show higher severity in OCD symptoms and other anxiety disorders, thus resulting in greater functional impairment (Kugler et al. 2013, Quarantini et al. 2001, Tükel et al. 2006).

Currently, Cognitive-Behavioural Therapy (CBT) that focuses on Exposure with Response Prevention (ERP) is the psychological treatment of choice for OCD (Olatunji et al. 2013).

However, not all OCD patients respond optimally to CBT. Approximately 25% of patients refuse or prematurely discontinue CBT (Keeley et al. 2008). Moreover, of those patients who complete treatment only 60% do experience full recovery (Fisher and Wells 2005).

Some research reported that comorbid depression can adversely affect outcome in OCD treatment (Abramowitz and Foa 2000, Foa et al. 1983, Keijsers et al. 1994, Steketee et al. 2001), and it can also be a risk factor for an early treatment discontinuation (Aderka et al 2011). As hypothesized by Foa and colleagues (1983), greater overreactivity of severely depressed OCD patients may hinder anxiety habituation which typically occurs during exposure sessions. An alternative explanation could be that individuals suffering from comorbid depression may lack the motivation to engage in a demanding treatment like ERP (Keeley et al. 2008).

However, not all studies found a significant relationship between comorbid depression and OCD treatment outcome (Anholt et al. 2011, Başoğlu et al. 1988, McLean et al. 2001, Storch et al. 2010). Further evidence also suggests that comorbid depression partially responds to treatment (Raffin et al. 2009).

An explanation for this inconsistency could be that depression was measured in some studies as a continuous predictor using depressive symptom measures and in other studies as a categorical variable, using diagnostic criteria for MDD (Anholt et al. 2011). Indeed, in a recent meta-analytic review (Olatunji et al. 2013), levels of depression measured as a continuous predictor were not found to be significantly related to outcome.

In many outcome trials OCD patients with severe levels of concurrent depressive symptomatology were, however, excluded (Abramowitz et al 2000). It has been hypothesized that in those trials the range of depressive symptom severity on the continuous measures was restricted, thus hiding a potential relationship between more severe levels of depression and poorer treatment response (Abramowitz 2004). Despite not meeting all the criteria for a full MDD diagnosis, many patients with OCD present with severe levels of comorbid depression, which could significantly interfere with quality of life, thereby contributing to OCD exacerbation (Yap et al. 2012).

As suggested by Brown and Barlow (1992), using a dimensional approach for measuring concurrent depressive symptoms is an useful alternative way to examine the impact of such comorbidity. Such approach could facilitate the identification of symptom patterns which predict treatment response thereby helping to identify additional treatment components (Brown and Barlow 1992). This approach could allow not excluding from predictive analyses OCD patients which suffer from comorbid severe depression but do not actually meet all the criteria for a full MDD diagnosis. Moreover,

some studies showed that a valuable proportion of OCD patients have Beck Depression Inventory (BDI) group mean scores within the moderate to severe range and these scores do not differ substantially from the means observed in depressed outpatient samples (Calamari et al. 1999, Shafran et al. 1996).

Abramowitz and colleagues (2000) examined the relationship between severe levels of comorbid depression and outcome after ERP in large sample of OCD patients, grouping patients on the basis of their pre-treatment BDI score above or not 30 in accordance with the classification of depression severity proposed by Beck and colleagues (1996). Consistently, results showed that those patients having severe levels of comorbid depression had improved significantly less than those less depressed or non-depressed.

In a recent cross-sectional study Abramowitz and colleagues (2007) examined differences in obsessive beliefs between OCD patients with or without comorbid MDD through the administration of the Interpretations of Intrusions Inventory (III, Obsessive Compulsive Cognitions Working Group 2005). Results showed that patients with concurrent MDD had significantly more dysfunctional beliefs on intrusive thoughts than those without MDD (Abramowitz et al. 2007). However, no research has been currently conducted to test whether obsessive beliefs could moderate the negative influence of comorbid severe depressive symptoms in OCD treatment outcome.

Comorbid severe depressive symptoms are frequent in patients with severe OCD complaints (Sookman and Steketee 2010). According to the OCD cognitive-behavioural model, comorbid depressive symptoms occur in response to the distress associated with OCD (Taylor et al. 2007). The presence of comorbid depressive symptoms and obsessive beliefs could maintain OCD symptoms, thereby contributing to exacerbation and chronicization of compulsions (Taylor et al. 2007).

Moreover, the prognostic role of comorbid severe depression and obsessive beliefs seem to be a strongly relevant issue in refractory OCD (Wiegartz et al. 2002). Such variables could contribute to the preclusion of positive reinforcement by a vicious cycle, thus keeping chronic OCD symptoms and depressive mood. Nevertheless, the persistence of dysfunctional beliefs and a secondary depression within dysfunctional limits are recognized as factors which could be involved in resistance to change during and after a CBT course for OCD (Sookman and Steketee 2010). It has been noted that even when the patient could achieve a significant OCD symptom reduction, the persistence of comorbid depressive symptoms can limit the individual's functioning, thus increasing the risk of relapse (Sookman and Steketee 2010).

Investigating the relationship between such cognitive factors and comorbid severe depression in the outcome of OCD could help to identify augmentation treatment strategies to overcome resistance to change. The presence of stronger obsessive beliefs could explain why severely depressed OCD patients do not benefit from CBT.

In light of these considerations, the present study aimed to investigate differences in obsessive beliefs severity between severe, refractory OCD inpatients with or without comorbid severe depression. According to the levels of depressive symptom severity identified by Beck and colleagues (Beck et al. 1996), inpatients with comorbid severe depression were classified as having scores of 30 or more on the BDI-II.

A further aim was to evaluate whether a residential

behavioural treatment could attenuate the negative influence of severe depressive symptoms on outcome of refractory OCD. For patients with higher severity of OCD complaints rituals have become a central coping strategy with few, if any, perceived alternatives (Sookman and Steketee 2010). Residential treatment could be suitable for highly depressed OCD patients who due to severe levels of depressive symptoms could not seek help for OCD. Comorbid severe depression could impede the individual attending outpatient sessions thus limiting homework compliance and leading to drop out from treatment. Residential treatment involving daily and prolonged CBT sessions seems to be a valuable option for overcoming chronic resistance to change of severely depressed OCD patients. Thus, this strategy could maximise short-term gains providing an initial fast decline in OCD impairment with the aim to help inpatients attending subsequent outpatient sessions.

Method

Participants

Participants were recruited from referrals to the Casa di Cura Poggio Sereno, an inpatient specialty clinic for treatment-resistant OCD in Florence, Italy. Referrals were made by mental health professionals. Inpatients were included if they were assigned with a primary diagnosis of refractory OCD (in terms of severity), were 18-65 years old and had a score of at least 16 on the Yale-Brown Obsessive Compulsive Scale (Y-BOCS, Goodman et al. 1989). OCD diagnoses were made independently via an unstructured interview by a clinical psychologist and a psychiatrist according to the DSM-IV-TR (American Psychiatric Association, 2000). The clinical psychologist and the psychiatrist who conducted the interview were trained extensively in diagnosing OCD. Every diagnosis of OCD was further reviewed and confirmed by consensus staff in weekly meetings during the treatment delivery.

Based on criteria provided by Rasmussen and Eisen (1997), refractory OCD was defined by no change or worsening symptoms after an adequate trial of empirically-validated treatments [20 to 30 hours of ERP or 10 to 12 continuous weeks of serotonin reuptake inhibitor medication (SRIs)]. No change

or worsening symptoms after an adequate trial was defined according to the following criteria: a) OCD symptoms on gold-standard self-report measures were not resolved to within normal limits (post-treatment Y-BOCS scores are still above the clinical threshold); b) the patient had continued to meet diagnostic criteria for OCD; c) the patient had experienced little or no symptom improvement.

Exclusion criteria from the study were: current or past psychosis, alcohol or drug-addiction, neurological conditions and mental retardation problems. Concurrent psychological treatment for any other Axis I or II disorder was also a reason for exclusion. Participants with comorbid psychological diagnoses were included to increase the generalisability of the findings. All the participants were taking concomitant pharmacotherapy by SRIs, that were kept on a stable dosage for the entire treatment duration.

Fifty-one inpatients were referred to the clinic and screened for inclusion in the study. During the study enrollment one inpatient was excluded as she was assigned with a diagnosis of a psychotic disorder by consensus of the clinical psychologist and the psychiatrist who conducted the interviews. One inpatient was excluded as from the interview she did not fully meet criteria for a OCD diagnosis and she obtained a score lower than cut-off on the Y-BOCS.

Forty-nine inpatients were included in the study. Eleven inpatients (21.50% of the included participants) were considered as non-completers as they left prematurely the five-week treatment for a variety of reasons, including lack of insight and discontent with the therapists or the treatment rationale. The participant flow over the course of the study is presented in **figure 1**.

Thirty-eight inpatients (mean age= 35.40, SD= 10.75) completed the five-week residential treatment delivered in the clinic. Fifty-five percent (N= 21) of the completers were females. Fifteen percent (N= 6) of the completers had a concurrent axis I condition and fifty percent (N= 19) had a concurrent axis II disorder. Thirty-six percent (N= 14) had a Y-BOCS scores of 32 or more, which represents an extreme level of OCD symptom severity according to the classification of severity levels proposed by Steketee and Neziroglu (2003). Socio-demographic and clinical characteristics of the completers at baseline are reported in **table 1**.

Figure 1. Flowchart of participant progress through the phases of the study

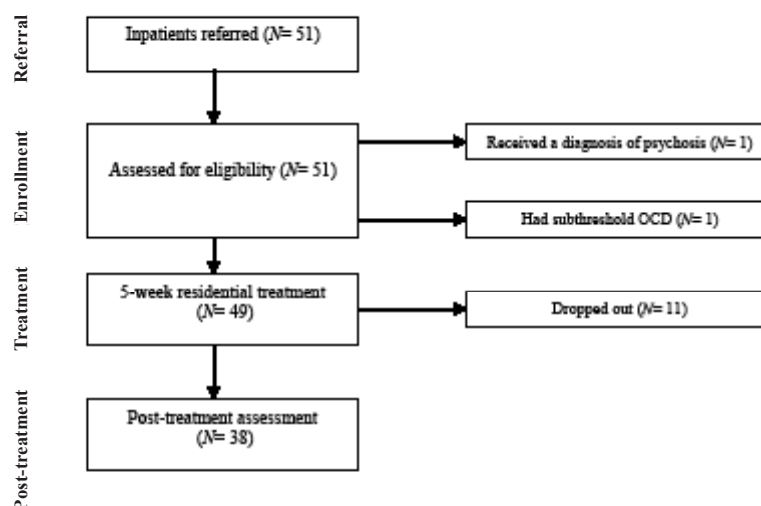


Table 1. Completer demographic profiles and clinical characteristics at baseline (N= 38)

	<i>M</i> (range)	<i>DS</i>
Age (years)	35.40 (19-60)	10.75
Y-BOCS total	28.40 (16-38)	6.90
BDI-II	26.60 (9-56)	12.30
	<i>N</i>	%
Females	21	55.30
Comorbid severe depression (BDI-II score>30)	17	44.73
Comorbid axis I conditions	6	15.80
Major depressive disorder	4	10.00
Eating disorder	2	5.80
Comorbid axis II conditions	19	50.00
Cluster A	0	0.00
Cluster B	2	5.30
Cluster C	17	44.70

Measures

OCD symptoms

Yale-Brown Obsessive-Compulsive Scale-Self-Report version (Y-BOCS-sr, Goodman et al. 1989) was used as outcome measure. The Y-BOCS-sr is a 10-item scale rating each item between 0 (lowest severity) and 4 (highest severity). Five items assess frequency, distress, interference, resistance and control of obsessions and 5 assess these dimensions of compulsions. Internal consistency is good with a Cronbach's alpha of 0.89 (Steketee et al. 1996). The Y-BOCS is considered the measure of choice for assessing treatment outcome in OCD (Fisher and Wells 2005). In the current study internal consistency was 0.93 at pre-treatment and 0.94 at post-treatment.

Comorbid depression

Beck Depression Inventory-II (BDI-II, Beck et al. 1996) was used as a measure of comorbid severe depressive symptoms and as a secondary outcome measure. In accordance with the levels of depressive symptom severity suggested by Beck and colleagues (Beck et al. 1996), inpatients with comorbid severe depression were classified as having scores of 30 or more on the BDI-II.

The Italian version of the BDI-II (Montano and Flebus 2006) has excellent internal consistency in clinical (Cronbach's alpha= 0.92) and student samples (Cronbach's alpha= 0.93). In the current study internal consistency was 0.91 at pre-treatment and 0.89 at post-treatment.

Obsessive beliefs

Obsessive Beliefs Questionnaire-87 (OBQ-87, Obsessive Compulsive Cognitions Working Group, 2005) is an 87-item self-report measure (using a seven-point Likert-type scale) which assesses belief and attitudes in the six domains underscored by the Obsessive Compulsive Cognitions Working Group as underlying the development and maintenance of OCD. The OBQ-87 yields subscores for each of the

six obsessive belief domains. Those domains are the following: Responsibility (e.g. a belief that one is personally responsible for any possible negative consequences that may derive from his/her obsessional thoughts), Control of Thoughts (e.g. a belief that complete control over one's thoughts is both possible and necessary), Importance of Thoughts (e.g. a belief that the mere presence of an intrusion makes that thought dangerous), Intolerance of Uncertainty (e.g. a belief that an absolute certainty is necessary for acting), Threat Estimation (e.g. an inflated belief about the probability of negative consequences), Perfectionism (e.g. a belief that one action must be perfect).

For the Italian version (Sica et al. 2004), internal consistency of each subscale is excellent with Cronbach's alpha ranging between 0.85 and 0.93. In the current study internal consistency ranged between 0.84 and 0.92 for the six obsessive domain subscales.

Concurrent axis II disorders

Axis II categorical diagnoses were assigned following administration of the Structured Clinical Interview for DSM-IV-TR Personality Disorders (SCID-II, First et al. 1997). The SCID-II was administered by an independent interviewer before the start of treatment. The interviewer was a clinical psychologist who had received training in conducting the SCID-II.

The SCID-II contains 140 questions to assess the 94 DSM-IV criteria, which are scored on a three-point scale (1 = absent, 2 = doubtful, 3 = present). Each of the ten DSM-IV personality disorders was represented by the sums of its raw item scores. Internal consistency of the personality disorder scales is good, with Alpha coefficients averaging 0.79. Inter-rater reliability is good (Maffei et al. 1997).

In the current study axis II diagnoses were established by a systematic evaluation of the criteria for each personality disorder after the examination of all available information (clinical interview, course of past treatments). Although the inter-rater reliability for the axis II diagnoses was not evaluated formally in the current study, each case was reviewed thoroughly in daily staff meetings and all the final diagnoses were assigned after having reached inter-rater consensus.

Residential treatment

All participants were offered a 5-week residential treatment for OCD delivered in an individual format. The treatment included three phases. In first week (phase I), psycho-education was offered every day for five days to help inpatients develop a scientific understanding of anxiety by providing education on vulnerability and maintenance factors of OCD. In the

last session of the first week case-formulation was provided and treatment goals were set shared between the inpatient and the therapists. From the second to the fourth week (phase II) daily and prolonged ERP sessions were conducted. In the last week (phase III) psycho-education on relapse and family meetings were provided.

A detailed description of CBT components over the treatment course is provided in **table 2**.

Figure 2. Description of CBT components over the residential treatment course

Week number	Treatment components	Details of components
I week	Psycho-education	The OCD appraisal model was provided highlighting the role of faulty appraisals for the persistence of OCD and related distress. The aim of this work was to normalize the experience of unwanted intrusions.
	Behavioural analysis	Identification of triggers for obsessions was conducted assigning to the inpatients obsession and compulsions diaries. The objective of this work was to monitor symptoms and to identify a list of different obsession-provoking situations which the inpatient found distressing in order to construct a tailored fear hierarchy. A list of compulsions and safety behaviours was developed in collaboration with the inpatient.
	Case-formulation and goal setting	The aim of this work was to help the inpatient to understand the connection between triggers, obsessions, appraisals and safety behaviours and how they maintain OCD. A further aim was to provide the inpatient with a rationale for the ERP therapy. A goal setting was also established to reach shared directions that could help inpatient engaging in ERP.
II-IV weeks	Daily and Prolonged ERP	Daily and prolonged individual ERP sessions were conducted for 2 hours in the morning and two hours in the afternoon. Inpatients were gradually and repeatedly exposed to anxiety-provoking situations and they were encouraged to remain in those situations until they experienced a significantly great decrease in their levels of discomfort (at least 50% decline in the Subjective Unit of Discomfort). A varied-stimuli exposure training was adopted, using several variants of situations eliciting obsessional thoughts.
	Homework assignment	Self-directed exposure exercises were assigned after the III week to be performed during the week-end. Exposure was assigned for those steps of the hierarchy that the inpatient had been habituated to.
	Symptom monitoring	Meetings were scheduled between inpatient and entire staff to review progress on goals made in the therapeutic contract. Staff provided support and positive feedback on therapeutic gains.
V week	Leisure skill planning	Inpatients were encouraged to engage in scheduled enjoyable activities during leisure time. Weekly group leisure activities were scheduled.
	Relapse Prevention	Meetings were scheduled between inpatient and entire staff to provide residents with education on the difference between relapse and slip. Information on how to identify triggers and relapse signals, to deal with negative emotions was also provided. Information on how to engage in homework for maintaining gains was provided. A self-help handbook was offered with bullet points on CBT model and case-examples.
	Family meetings	Meetings were scheduled between the entire staff, inpatient and relatives to provide education on how to not accommodate with OCD requests at home.

Treatment integrity

ERP sessions were conducted by clinical psychologists according to a manual for therapist-directed individual ERP for OCD (Kozak and Foa 1997). In order to maximise treatment fidelity, the clinical psychologists delivered ERP therapy following a checklist provided by two therapists extensively experienced in the treatment of severe, resistant OCD

(D.D. and D.C.), which specified the content of each session. ERP sessions were conducted by at least two clinical psychologists to decrease the influence of a therapist's personality and competence. The clinical psychologists who delivered the treatment were daily supervised through staff meetings by the two supervisors. Daily supervisory meetings also aimed to monitor the effects of potential adverse events.

The clinical psychologists who delivered the

treatment had received training including observation of experts who conducted ERP therapy in the inpatient specialty clinic for OCD.

Overview of statistical analyses

One-way Analyses of Variance (ANOVA) were run to test baseline differences between completers and non-completers on age, Y-BOCS and OBQ-87 domain scores. Chi squared tests were conducted to examine differences completers and non-completers on gender and baseline levels of comorbid depressive symptom severity, grouping participants on the basis of their baseline BDI-II scores of 30 or more.

One-way Analyses of Variance (ANOVA) were conducted to examine differences between OCD inpatients with or without comorbid severe depression on age, pre-treatment Y-BOCS and OBQ-87 subscale scores.

Paired sample *t*-tests were run in order to examine changes on the Y-BOCS scores from baseline to post-treatment. To evaluate treatment effects Effect Size was calculated dividing the difference between baseline and post-treatment Y-BOCS mean scores by the pooled standard deviation according to Cohen's *d* statistic (Cohen 1988). The clinical significance of treatment effects was examined using the procedures outlined by Jacobson and Truax (1991). According to this standardized methodology, patients are required to meet a two-fold criterion to be defined as achieving clinically significant change (i.e. recovery). Clinically significant change is achieved if a) a symptom score is in the non-dysfunctional range at post-treatment and b) a symptom score has shown a decline by a reliable amount exceeding the measurement error (reliable change index). With regard to the Y-BOCS, Fisher and Wells (2005) have determined a cut-off score of 14 or below for establishing the non-dysfunctional range. To be defined as having made clinically significant change in the current study, inpatients were required to show a post-treatment result of 14 points or less on the Y-BOCS and at least a 10-point change.

To test whether obsessive beliefs had a moderator effect of the negative influence of comorbid severe depression on outcome, a multinomial logistic regression analysis was conducted. In the model the OBQ-87 subscale scores were entered as continuous

predictors and the presence of comorbid severe depression as a categorical variable. Treatment response was entered as categorical dependent variable and was defined as having achieved an improvement of at least 40% on the Y-BOCS from baseline to post-treatment. Using signal detection analysis, Tolin and colleagues (2005) recommended a 40-50% Y-BOCS reduction as an optimal criterion for predicting mild impairment at post-treatment.

For all analyses Alpha was set to 0.05, two-tailed. Analyses were run with SPSS version 21.00.

Results

Attrition

ANOVAs showed no significant baseline differences between non-completers and completers on age, Y-BOCS and OBQ-87 subscale scores [$F_{(1, 48)} = 0.01$ to 3.20 , $p = 0.08-0.98$]. No significant differences were found between completers and non-completers as a function of gender [$\chi^2 = 0.21$, $p = 0.90$] and of the presence of comorbid severe depression [$\chi^2 = 3.44$, $p = 0.07$].

Comparison between completers with and without comorbid severe depression on baseline OCD symptoms and obsessive beliefs

Results of one-way ANOVAs showed that completers with comorbid severe depression had significantly higher scores on baseline Y-BOCS scores [$F = 10.61$, $p = 0.01$], on OBQ-87 Intolerance of Uncertainty [$F = 7.36$, $p = 0.01$] and OBQ-87 Threat Overestimation subscale scores [$F = 4.67$, $p = 0.03$]. Comparisons of completers with or without comorbid severe depression on baseline Y-BOCS and OBQ-87 domain scores are reported in **table 2**.

Treatment effects and clinically significant change

Results of paired sample *t*-tests indicated that treatment was associated with significant changes from baseline to post-treatment on Y-BOCS [$t_{(37)} = 7.58$, $p =$

Table 2. Means (standard deviations) of the completers without and with comorbid severe depression on baseline OCD symptom and obsessive belief domain scores (N= 38)

	Inpatients without comorbid severe depression (N= 21)	Inpatients with comorbid severe depression (N= 17)	<i>F</i>	<i>p</i>	ES
Y-BOCS Total	26.69 (6.05)	32.91 (3.82)	12.80	0.01	0.30
OBQ-87 Intolerance for Uncertainty	53.41 (18.53)	64.91 (12.33)	8.41	0.01	0.20
OBQ-87 Threat Overestimation	50.20 (20.50)	65.91 (22.48)	5.99	0.03	0.12
OBQ-87 Importance of Thoughts	52.83 (18.70)	59.75 (24.28)	1.22	0.30	0.04
OBQ-87 Control of Thoughts	54.51 (18.02)	62.76 (22.25)	0.89	0.35	0.03
OBQ-87 Inflated Responsibility	56.50 (20.70)	62.91 (23.79)	0.69	0.41	0.02
OBQ-87 Perfectionism	60.04 (23.64)	73.58 (22.34)	2.72	0.11	0.11

Note: Y-BOCS= Yale-Brown Obsessive Compulsive Scale; OBQ= Obsessive Belief Questionnaire-87.

0.001] and on BDI-II scores [$t_{(37)} = 8.12, p = 0.001$]. ESs were 1.50 and 1.46 for changes from pre- to post-treatment on the Y-BOCS and the BDI-II respectively.

Forty-two percent of the completers ($N = 16$) achieved clinically significant improvement at the end of treatment according to the criteria provided by Jacobson and Truax (1991).

Effects of comorbid severe depression and obsessive beliefs on outcome

Results of polynomial logistic regression analysis showed no significant interaction effects on treatment response between obsessive beliefs and comorbid severe depression. Further analyses indicated that comorbid severe depression had no significant main effect on treatment response.

Conversely, results showed that only Overestimation of threat subscale had a significant main effect on treatment response, indicating that higher scores on that subscale were significantly related to non-response ($\beta = .11, p = 0.03$). Goodness of fit indices suggested a satisfactory data fit to the model [Nagelkerke $R^2 = 0.35$, Cox-Snell $R^2 = 0.30$, $-2\log$ Likelihood = 39.40, $p = 0.13$]

Discussion

Comorbid severe depression seems to play a role as a predictor of a poorer outcome in OCD treatment (Abramowitz et al. 2000, Abramowitz 2004). However, this issue was not sufficiently examined as many trials excluded OCD patients with more severe levels of depression (Olatunji et al. 2013). Investigating moderators for the influence of comorbid severe depression on outcome could help to identify augmentation treatments for refractory OCD cases (Wiegartz et al. 2002).

The principal aim of the current study was to explore whether dysfunctional beliefs could moderate the negative influence of comorbid severe depression on outcome of residential treatment for severe, refractory OCD. To our knowledge, no trial was yet conducted to examine this potential moderator effect.

Overall, our findings suggested that residential treatment in combination with medication was either acceptable and effective for inpatients with severe, refractory OCD symptomatology. Indeed, the attrition rate was comparable with that observed in previous trials on CBT for outpatient OCD samples (e.g. van Balkom et al. 1998). The treatment seemed to enhance compliance even for more severely impaired inpatients as those inpatients who did not complete treatment were not significantly more severely depressed than those who completed. Moreover, compared to those who completed, inpatients who prematurely dropped out had not more severe OCD symptoms neither showed more dysfunctional obsessive beliefs.

We conducted some analyses to examine differences in obsessive belief severity between completers with or without comorbid severe depression. Results suggested that treatment-completers with severe levels of comorbid depression had significantly higher OCD symptom severity than those less-depressed or non-depressed. These findings appear partially consistent with results reported by some studies (Besiroglu et al. 2007, Tükel et al. 2006), showing that more severe comorbid depressive symptoms could occur in response to a more debilitating OCD symptomatology. In line with the OCD cognitive-behavioural model (Taylor et al. 2007),

OCD-related impairment, such as comorbid severe depression could exacerbate OCD severity. Consistent with these assumptions, negative mood states have been shown to increase susceptibility to intrusive thoughts (Sutherland et al 1982), and depression would foster obsessions by a self-perpetuating cycle (Reynolds and Salkovskis 1991).

The current study provides some preliminary indications on the role of obsessive beliefs in OCD inpatients with comorbid severe depression. Between-group analyses indicated that OCD inpatients with comorbid severe depression had significantly more dysfunctional obsessive beliefs compared to those less-depressed or non-depressed. Specifically, Intolerance for uncertainty and Overestimation of threat were found to be specific markers for a strong severity of comorbid depression.

It seems reasonable that intolerance for uncertainty could be a vulnerability and maintaining factor for the development of more severe levels of comorbid depression and a more debilitating OCD-related impairment. Despite cognitive models of OCD assume that obsessive beliefs are OCD-specific mechanisms involved in the aetiology and maintenance of the disorder (Rachman 1997), more recent findings showed that intolerance for uncertainty could be a non-specific diathesis for many anxiety problems and also for depression (Gentes and Ruscio 2011, Holaway et al. 2006, McEvoy and Mahoney 2011).

A further explanation could be that Intolerance for uncertainty and Threat overestimation serve as transdiagnostic epiphenomena involved in several problems with chronic course. Such cognitive biases could be consequent to the effects of living with a chronic condition. Interestingly, in a recent study Baptista and colleagues (2011) found no significant differences on obsessive belief severity between OCD patients and patients with chronic medical diseases, highlighting that such dysfunctional beliefs could play a role also in chronic health problems. As prior research has suggested that stressful life events may exacerbate obsessional thinking (Fyer and Brown 2009), it could be hypothesized that the consequences of health problems, such as increased attention to internal and external cues related to the problem, as well as a state of alertness, precipitate the intensity of obsessive beliefs (Baptista et al. 2011).

Intolerance for uncertainty could serve as a maintaining factor in several anxiety disorders as it tends to be associated with maladaptive coping strategies, like a poorer problem orientation (Dugas et al. 1997). Such strategies include the tendency to see the problem as a threat to be avoided rather than a challenge to be met (Dugas et al. 1995). In a longitudinal study on non-clinical subjects, Miranda and colleagues (2008) found that intolerance for uncertainty predicted the development of a hopelessness status. This result was attributed to the fact that as they could not prevent all potential future negative daily events, individuals with stronger intolerance for uncertainty would develop a more certainty that such events will occur (Miranda et al. 2008).

An alternative explanation for these findings could be that the completers with comorbid severe depression could have stronger intolerance for uncertainty during daily activities because they feel depressed and helpless. Consequently, these inpatients could engage in full-time safety behaviours to cope with the distress associated with such perceived uncertainty. This could, on the other hand, increase comorbid depression by exacerbating psycho-physical fatigue due to the

pervasive engagement in rituals. Such mechanism could also produce the loss of positive reinforces as the individual subtracts more and more time to pleasant activities for performing rituals. As most of safety behaviour aimed to reduce uncertainty in daily living tend to be futile, this could exacerbate the feelings of helplessness.

Our findings were in contrast with those observed by Abramowitz and colleagues (2007), who reported that OCD patients with MDD had higher scores on Importance of Thoughts, Control of Thoughts and Responsibility domains. An explanation for this inconsistency could be that all inpatients in our sample had severe OCD symptomatology. Some research has found that importance and control of thoughts are associated with poorer outcome in OCD (Kozak and Foa 1994). As a more severe overvalued ideation is frequently associated with OCD severity, it could be hypothesized that in our study most of the inpatients had poorer insight and this could preclude to detect significant differences in these belief domains. This hypothesis could also explain why severely depressed OCD inpatients did not have more dysfunctional scores on Importance and Control of thoughts than those less-depressed or non-depressed, as those obsessive beliefs are related to insight and overvalued ideation.

However, in their cross-sectional study Abramowitz and colleagues (2007) grouped OCD patients on the basis of fulfilling criteria for MDD, the current study grouped participants on the basis of having a severe level of comorbid depression. Such difference could account for the divergent findings observed in our study and in that of Abramowitz and colleagues (2007). Although they do not fully meet all the criteria for an overt diagnosis of MDD, several OCD patients suffer from comorbid depressive symptoms due to the chronic invalidating effects of OCD (Sookman and Steketee 2010). Indeed, some research demonstrated that OCD with comorbid depression patients have Beck Depression Inventory (BDI) mean scores comparable with those observed in depressed outpatient samples (e.g. Calamari et al. 1999). Moreover, contrary to the study of Abramowitz and colleagues (2007) that included outpatients with mild OCD severity, the current investigation included inpatients with severe, refractory OCD.

Further findings in the current study were that severe levels of comorbid depression were not related to a poorer treatment response. This result appears in contrast with prior research suggesting that highly depressed OCD patients do not adequately respond to CBT (Abramowitz et al. 2000). According to Foa and colleagues (1983), severely depressed individuals could be also highly reactive to fear-evoking situations. Although emotional processing theory posits that activation of fear is necessary for anxiety habituation, high reactivity could hinder habituation and thereby impede treatment progress (Foa et al. 1983). Another explanation proposed for these results was related to the lack of motivation of highly depressed OCD patients, which could impede compliance with treatment regimen (Keeley et al. 2008). However, the current findings do not seem to support any of these hypotheses. An explanation for this inconsistency could be linked with some components of the residential treatment delivered in the present study. First, daily CBT sessions may facilitate progress monitoring allowing a timely identification of poor compliance. Moreover, residential treatment typically involves daily contacts with therapists and this characteristic could enhance a more collaborative therapeutic relationship to increase motivation of the inpatients.

Therefore, severely depressed OCD inpatients with lack of motivation could benefit from this additional non-specific ingredient. Contrary to standard outpatient treatments, mainly based on ERP exercises assigned as homework, residential treatment involves daily ERP sessions administered by the therapist. The daily presence of the therapist could facilitate treatment progress of less motivated inpatients also by positively reinforcing initial small gains and disconfirming helplessness beliefs of such chronic inpatients.

An explanation for the non-significant relationship between comorbid severe depression and outcome could be also related to the role of daily psycho-education provided during the first phase of the treatment. Psycho-education has been found to be a central active component for improving the working alliance by socializing the patient to the treatment rationale (Daniels and Wearden 2011). Information on vulnerability and maintenance factors could be fundamental for severely depressed inpatients with chronic OCD. According to the cognitive-behavioural models of chronic conditions (Barlow et al. 2002), daily education on the CBT model of OCD could promote in inpatients specific self-management skills and consequently enhance perceived self-efficacy for symptom-monitoring. This mechanism could reduce feelings of helplessness that typically occur because of the chronic course of OCD. Moreover, in the residential treatment clinical psychologists who delivered treatment received daily supervisions for monitoring treatment progress and adverse events; this could have increased the effectiveness of ERP sessions for more complex cases of OCD.

Abramowitz (2004) hypothesized that treatment outcome for severely depressed OCD patients could be improved by augmenting ERP therapy with additional Beckian cognitive therapy in order to challenge dysfunctional beliefs on intrusions. Our study did not provide support for this reasoning as in the present trial no formal cognitive intervention was applied, yet the residential resulted effective also for severely depressed inpatients.

Consistent with another suggestion provided by Abramowitz (2004), our results could be better attributed to the behavioural activation component of the residential treatment. Residential treatment involves a scheduling of ERP exercises conducted in the morning and in the afternoon and also includes planning of leisure activities that could work as behavioural experiments for testing hopelessness beliefs. Consistently, the inpatient could gradually leave full-time rituals for devoting more and more time to functional activities and this could positively affect depressed mood.

Moreover, in their living context many patients with chronic OCD have support by relatives who can unintentionally accommodate the OCD requests thereby maintaining OCD symptoms or can reinforce hopelessness beliefs by frequent expressed emotion and perceived criticism (Sookman and Steketee 2010). Highly depressed individuals with severe OCD could particularly benefit from a residential treatment format because during this period of time such maintaining factors could not hinder treatment progress. Some evidence actually showed that relative's critical comments tend to be related to patients compulsive behaviours (Amir et al. 2000). In addition, a noticeable body of research suggested that higher expressed emotion and perceived criticism are associated with a poorer treatment response (Emmelkamp et al. 1992, Steketee 1993). However, an alternative explanation could be related to the fact that in the Italian context there are very few specialty inpatient clinics for OCD.

Undergoing a residential treatment provided by mental health professionals extensively trained in OCD could have also a placebo effect for patients with a chronic history of OCD who have not responded to previous standard treatments. Such effect could foster the effectiveness of residential treatment.

Despite obsessive beliefs are hallmarks of OCD, and are associated with symptom severity (Taylor et al. 2007), only Overestimation of threat significantly predicted outcome. An explanation for this result could be that OCD inpatients who overestimate future negative events may have less willingness to engage in risky decision-making across a variety of contexts. This belief, therefore, could lead such inpatients to prefer to get short-term advantages from performing rituals (relief from distress related to obsessions) instead of choosing to get greater long-term benefits by not performing rituals. This explanation seems also to be consistent with previous results showing that risk-avoidant decision-making is a basic decision bias related to higher avoidance behaviours across all anxiety disorders (e.g. Maner and Schmid 2006). Consequently, such bias could lead inpatients to comply less with ERP exercises.

Finally, it could be also hypothesized that inpatients with higher Overestimation of threat are characterized by more cognitive illusions, so relevant in maintaining OCD (Dettore and O'Connor 2013), which could contribute to increase Overestimation of threat itself, so worsening the outcome of treatment.

As with any preliminary investigation, the current work should be considered in the context of limitations that also provide some directions for future research.

First, differences in obsessive beliefs as a function of comorbid severe depression were tested by a cross-sectional design. Such limitation precluded unequivocal causal inferences on the relationship between OCD severity, obsessive beliefs (Intolerance for uncertainty and Overestimation of Threat specifically) and comorbid severe depression. Indeed, it could be argued that more dysfunctional beliefs are consequent to OCD severity or depressed mood instead of being vulnerability factors for OCD-related impairment. Future longitudinal studies on clinical samples are required to investigate whether such obsessive beliefs do work as vulnerability factors for more severe OCD-related impairment and depressed mood.

A further direction for research could be the investigation of such cognitive variables in non-OCD populations with chronic conditions. Consistently, future studies should examine differences in obsessive beliefs between OCD patients with or without MDD and patients with a primary MDD diagnosis without OCD. As some preliminary cross-sectional research tested for differences in beliefs between OCD patients and patients with chronic medical illness (Baptista et al 2011), future longitudinal studies could investigate whether obsessive beliefs are a general consequence of living with chronic conditions, both psychological and physical.

The current findings provided some preliminary support on the importance of a daily, scheduled residential treatment for overcoming the negative influence of comorbid severe depression. A major limitation was that we did not examine whether the residential treatment attenuated the negative influence of full MDD diagnosis because of the too small proportion of inpatients with a comorbid MDD diagnosis.

We did not compare the residential treatment with a weekly CBT arm. We, therefore, cannot exclude the possibility that weekly sessions could be as effective

as the residential treatment. Moreover, it should be considered that our study included a small sample of inpatients. This limitation could have reduced the power of the investigation, thus decreasing the capability to detect small significant differences and consequently increasing the type II error probability. This limitation could have precluded to find a small difference on treatment response between inpatients with or without comorbid severe depression. Moreover, the open trial design did not allow to exclude the role of non-specific factors, like maturation, in the treatment gains of OCD inpatients.

Furthermore, the present investigation did not use process measures to examine which changes could lead severely OCD inpatients to improvement. Despite the behavioural activation treatment component of the residential seemed to have enhanced treatment progress for severely depressed inpatients, we did not evaluate which components of the residential treatment were responsible for symptom changes observed also in severely depressed OCD inpatients. We also did not use formal compliance measures for leisure activities assignment. Further research by dismantling studies is required to address such issues.

Despite residential treatment seems to effectively work as a first-line approach to provide some rapid improvement, in the current study we did not examine which treatments could be implemented after the discharge from the clinic to foster maintenance of such initial gains or to booster them.

Moreover, we hypothesized that the residential treatment was effective also for severely depressed OCD inpatients as the therapists were daily and thoroughly supervised during treatment course. However, we did not use measures of therapist competence for evaluating this aspect.

As Overestimation of threat was the only predictor of a poorer outcome, future studies should evaluate the role of augmentation treatments for patients who overestimate risk of negative events. Future studies could consequently evaluate whether Acceptance and Commitment Therapies (ACT) do attenuate the negative prognostic role of this type of dysfunctional beliefs by increasing the willingness to experience intrusive thoughts. Some initial data suggests that ACT treatments are promising for OCD (Twohig et al. 2010).

In conclusion, our results shed some light for clinical practice, challenging the contention that severely depressed OCD inpatients benefit less from CBT. These findings, suggest that a residential treatment with daily sessions could be a tailored approach for this type of clients. Future research should evaluate novel therapeutic adjuncts to existing CBT protocols which target durable diatheses for OCD, like overestimation of threat.

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