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Predicting Outcome of Treatment for Severe, Treatment Resistant OCD in Inpatient

and Community Settings.

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Abstract

Treatment of OCD is effective, even for the most chronic and severe cases. It has been difficult to identify predictors of treatment outcome, with little work aimed at predicting treatment outcome in severe OCD. We examined the ability of a range of demographic and psychopathology variables to predict treatment outcome in a cohort of 52 inpatients and a second group of 62 community outpatients with severe, treatment-refractory OCD. Despite both cohorts showing significant improvement in OCD symptoms, reliable predictors were difficult to identify, and were different in the two cohorts. In the inpatient group, marital status was a significant predictor, with those who were married or cohabiting showing better outcome that those not currently in a relationship. This relationship was not observed in the community treatment group. Initial symptom severity was also found to be a significant predictor, but only in the community treatment group, where higher initial severity was associated with greater reduction in symptoms during treatment. Further research examining a wider range of predictors may assist in identifying those factors which predict outcome in severe OCD.

KEYWORDS: Obsessive compulsive disorder; behaviour therapy, cognitive behaviour therapy, predicting outcome.

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1.0 Introduction

Obsessive compulsive disorder (OCD) is a chronic anxiety disorder

comprising a constellation of symptoms such as recurrent intrusive thoughts and

impulses (obsessions), and overt or covert behavioural acts aimed at reducing the

anxiety caused by these obsessions (compulsions; APA, 2000; World Health

Organization, 1992). The lifetime prevalence of OCD is estimated at 1.3%, with a

one-year prevalence of 0.54% (Somers, Goldner, Waraich, & Hsu, 2006). OCD

impacts significantly on the sufferer's social and occupational functioning (Leon,

Portera, & Weissman, 1995; Riggs, Hiss, & Foa, 1992), and leads to significant

impairment in quality of life (e.g., Norberg, Calamari, Cohen, & Riemann, 2008).

OCD continues to attract a growing amount of research (Boschen, 2008).

Cognitive behavioural interventions for OCD have accumulated a large

amount of evidence attesting to their efficacy. In recent meta-analyses of OCD

treatment, cognitive and behavioural interventions (including exposure with response

prevention) have yielded effect sizes from 0.99 to 1.54 (Eddy, Dutra, Bradley, &

Westen, 2004; Rosa-Alcázar, Sánchez-Meca, Gómez-Conesa, & Marín-Martínez,

2008). Cognitive behavioural therapy (CBT) can even be effective in the most severe,

treatment resistant cases (Boschen, Drummond, & Pillay, 2008; Drummond, 1993).

Despite the efficacy of cognitive and behavioural interventions, they are only

effective in 50-60% of cases, with as few as 25% experiencing full recovery (Fisher &

Wells, 2005).

The most severe, treatment-resistant cases of OCD may require inpatient

admission and/or intensive, specialist cognitive behavioural interventions to gain the

greatest chance of successful outcome (Drummond, 1993; Boschen, Drummond, & Pillay, 2008). Such intensive interventions and inpatient admissions are, however, expensive and labour-intensive. Many individuals who may benefit from such intensive treatments may not be able to gain access due to overburdened treatment services. Clearly, there is an advantage in being able to identify those who are most likely to benefit from such treatment to assist in the effective deployment of limited treatment resources.

A recent review article by Keeley, Storch, Merlo, and Geffken (2008) attempted to draw together the previously published empirical work on the prediction of response to cognitive behavioural interventions that included exposure with response prevention for OCD. A major finding of this review was that there was a large amount of inconsistency between previously reported predictors, with many studies failing to replicate the findings of earlier authors. Keeley and colleagues did, however, highlight some predictors that appeared to demonstrate greater consistency across different studies. Several demographic variables such as age and sex showed no reliable relationship with treatment outcome, while marital status was found to predict treatment success in recent research. Symptoms such as hoarding compulsions, and obsessions focused on sexual or religious themes were predictive of poorer outcome. Age of onset and duration of illness were not reliable predictors. Severity of illness was shown to be an effective predictor in more recent studies using the Yale-Brown Obsessive Compulsive Scale (Y-BOCS) as the outcome measure. The presence of severe depression symptoms was also associated with poorer treatment outcome. Other studies have generally concurred with these findings. In a large group of patients with OCD treated using CBT, Rufer et al. (2006) found patients with hoarding symptoms were significantly less likely to become treatment

responders as compared to patients without these symptoms. Patients with sexual and religious obsessions tended to respond less frequently, although this failed to reach statistical significance. Regression analyses revealed that higher scores on the hoarding dimension were predictive of non-response, even after controlling for possible confounding variables. In a 1997 study de Haan et al found that evidence of personality disorder and initial severe symptoms predicted poorer outcome.

There have also been many studies of factors which predict response to psychopharmacological treatments. Storch et al. (2006) reported on outcome with drug treatment for patients with OCD and found that longer illness duration, older age, and greater symptom severity were associated with nonresponse. In another study of drug treatment, Shetti et al. (2007) found that baseline severity of OCD, comorbid major depressive disorder, presence of sexual obsessions, washing, and miscellaneous compulsions were identified as predictors of nonresponse to serotonergic medication. Early age at onset showed a trend toward prediction of nonresponse. In the univariate analysis, mixed OCD and poor insight were associated with nonresponse. Hollander et al (2005) concentrated on a sub-group of patients with OCD and examined them for neurological soft signs and their response to treatment. They found that left-sided visuospatial soft signs were significantly increased in treatment nonresponders compared to responders. These workers went on to suggest that these subtle neurological abnormalities may implicate a potential subgroup of OCD patients with poorer treatment response.

When one study specifically examined the ability of different variables to predict treatment outcome in severe, treatment-resistant OCD, few predictors emerged (Drummond, 1993). In this group of 49 patients admitted for intensive behavioural treatment of OCD, the presence of checking rituals, and being female were the only

variables associated with better prognosis. A more recent investigation of inpatient treatment of severe OCD (although not as severe as in the current study) was conducted by Stewart, Yen, Stack, & Jenike (2006). In this work, the authors reported a number of demographic variables such as age and employment that failed to predict treatment response. In this cohort, final OCD severity was predicted by variables such as initial severity, being female, and better pre-treatment functioning. Unfortunately, the authors presented results from predictive models of post-treatment severity, rather than change in severity over the course of treatment.

Our study is envisioned as a follow-up to that of Drummond (1993), examining predictors of outcome in two populations of individuals with chronic, severe, treatment-resistant OCD. Data was gathered from the treatment records of individuals who received treatment in an inpatient, and in a community treatment mode. Demographic and psychopathology variables were then examined for their ability to predict treatment outcome in each sample. Our study extends on that of Drummond (1993) by utilizing the current gold-standard outcome assessment measure for OCD, the Y-BOCS (Taylor, 1998). It also extends this earlier work by examining treatment outcome predictors in both an inpatient and community samples of individuals with severe, treatment resistant illness.

2.0 Method

2.1 Participants

Participants were all referred for treatment of severe, treatment-resistant OCD to either the inpatient residential unit of the National Service for the Treatment of Severe, Chronic Refractory Obsessive-Compulsive and Body Dysmorphic Disorders in the Behavioural and Cognitive Psychotherapy Unit (BCPU) of South West London

and St George's Mental Health Trust, or the Community treatment services of the

Trustwide tertiary referral service of South West London & St George's Mental

Health NHS Trust. The inpatient group consisted of 52 individuals with severe OCD

and a Yale-Brown Obsessive Compulsive Scale score equal to or above 30 out of 40

despite trials of treatment with two trials of SSRIs and one trial of augmentation of

this with either dopamine blocking agents or mood stabilisers as recommended by

Pallanti et al. (2002). In addition they had already received at least two previous trials

of cognitive-behavioural therapy (including home-based interventions). Inpatients

were also required to have at least one other feature than meant that outpatient

treatment was not suitable (e.g., being a danger to self/others, inability to get out of

bed for three hours of more due to OCD symptoms, or delayed sleep phase shift).

 The community cohort consisted of 62 individuals, also with severe,

treatment-resistant OCD who had not experienced significant response to previous

pharmacological or cognitive behavioural intervention.

2.2 Materials

Several measures were used to examine treatment outcome, and predictors of

treatment response.

2.2.1 Yale-Brown Obsessive Compulsive Scale (Y-BOCS; Goodman et al.,
1989a, 1989b). The treatment outcome measure was the Y-BOCS, a 10-item

clinician-rated measure of severity of obsessive compulsive symptoms, based on a

semi-structured clinical interview. The Y-BOCS is recognised as the gold standard in

outcome assessment for OCD, with strong psychometric properties (Taylor, 1998),

and is also well-suited for use in evaluating treatment outcome (Fisher & Wells,

2005).

2.2.2 Padua Inventory (PI; Sanavio, 1988). The PI is a 60-item self-report measure of obsessions and compulsions. It has sound reliability, and validity for use in clinical populations.

2.2.3 Beck Depression Inventory (BDI; Beck, 1993). The BDI is a widely used self-report measure of severity of depressive symptoms. It has seen widespread use as an outcome measure in inpatient and outpatient studies since its original publication in 1961 (Beck, Ward, Mendelson, Mock, & Erlbaugh, 1961). The BDI has strong psychometric properties (Beck, Steer, & Garbin, 1998). We used both the total BDI score to quantify depression symptoms, as well as a cutoff of 30 or more points to identify substantial depressive symptoms, in accordance with the recommendations of Abramowitz (2004).

2.3 Procedure

For both cohorts, treatment consisted primarily of cognitive behavioural interventions involving exposure and response prevention as the primary component. Although some patients also had their medication regime revised, this occurred in a minority of cases. Treatment in the inpatient unit is for a maximum of 6 months ($M = 135.51$ days, $SD = 59.62$). Details of the clinical services under which treatment was delivered has been provided elsewhere (Drummond, Fineberg, et al.,2008; Drummond, Pillay, et al.,2008; Drummond, Pillay, Rani, & Kolb, 2007). Only data collected at the pre-treatment and post-treatment timepoints were available for analyses, although some patients may have been evaluated using the Y-BOCS during treatment as part of routine clinical care.

3.0 Results

The inpatient group consisted of 29 (55.8%) men and 23 (44.2%) women.

Ages ranged from 18 to 63 years, with a mean age at admission of 35.17 years ($SD =$

11.52). The majority were unmarried (38, 73.1%), while 10 (19.2%) were married or

cohabiting, 3 (5.8%) were divorced or separated, and 1 participant did not have their

marital status recorded. Of the 34 patients for whom employment status was

recorded, 28 (82.4%) were unemployed, 1 (2.9%) had been in full-time work (and

was on extended sick-leave), 3 (8.8%) were in part-time or volunteer employment,

while 2 (5.9%) were students who had had their studies deferred due to ill-health.

Comorbid diagnoses were not available for analysis.

The community sample comprised 29 (46.8%) males and 33 (53.2%) females.

Community patients ranged from 19 to 73 years old ($M = 39.95$, $SD = 11.94$).

Similarly to the inpatient sample, the majority of community patients were unmarried

(52, 83.9%), while 6 (9.7%) were married or cohabiting, and 4 (6.5%) were separated

or divorced. In the community cohort 32 (51.6%) were unemployed, and 30 (48.4%)

were in full-time work. A second comorbid anxiety disorder was present in 35

(56.5%), while a comorbid depressive disorder was diagnosed in 34 (54.8%).

Missing data was handled by carrying the last observation forward where such

data was available, and by allowing it to remain missing if there were no previous

observations. This provided a conservative measure of efficacy of treatment,

assuming that no change had occurred where final data was unavailable. Treatment

was effective for both the inpatient ($M_{Pre} = 34.74$, $SD_{Pre} = 4.18$, $M_{Post} = 24.37$, $SD_{Post} =$

10.62, 95% $CI_{Diff} = 11.78$ to 16.96, $t = 11.29$, $df = 34$, $p < .001$) and community

groups ($M_{Pre} = 27.81$, $SD_{Pre} = 5.87$, $M_{Post} = 19.27$, $SD_{Post} = 7.96$, 95% $CI_{Diff} = 6.65$ to

10.42, $t = 9.05$, $df = 61$, $p < .001$) as measured by the Y-BOCS. In the inpatient

sample, treatment duration was uncorrelated with initial symptom severity ($r = .00$, p

> .05), but was positively correlated with fall in Y-BOCS scores for the inpatient

group ($r = .46$, $p < .01$). Meaningful data on the duration of treatment in the

community cohort was not available. Treatment was also effective for both the

inpatient ($M_{Pre} = 88.66$, $SD_{Pre} = 34.57$, $M_{Post} = 60.69$, $SD_{Post} = 33.00$, 95% $CI_{Diff} =$

15.68 to 40.27, $t = 4.60$, $df = 41$, $p < .001$) and community groups ($M_{Pre} = 77.07$, SD_{Pre}

$= 38.38$, $M_{Post} = 59.97$, $SD_{Post} = 39.87$, 95% $CI_{Diff} = 10.06$ to 22.45, $t = 5.26$, $df = 57$, p

$< .001$) as measured by the self-report Padua Inventory.

A range of demographic and symptom measures were used to attempt to

predict change in Y-BOCS and Pauda Inventory scores during treatment. The results

for the inpatient cohort are shown in Table 1, while those for the community groups

are detailed in Table 2. The tables show the results for each entire sample, as well as

just those who completed therapy (i.e., those who continued treatment until a

mutually agreed termination of treatment). The only predictor identified in the

inpatient sample was marital status. This relationship between marital status and

outcome was different for the two cohorts ($F_{(1,103)} = 6.79$, $p < .05$). For the inpatient

cohort, those who were married performed better than the group whose members were

single, separated or divorced. In the outpatient cohort, initial Y-BOCS severity scores

were associated with reduction in symptoms when measured by the clinician rated Y-

BOCS (see Figure 2). This relationship was not observed in the inpatient sample,

with cohort acting as a moderating variable for the effect of initial severity on change

in symptoms during treatment (R^2 change $= .05$, $F_{(3,104)} = 3.06$, $p < .05$). When

measured by the Padua Inventory, symptom reduction was correlated only with

depressive symptoms in the subsample of those community patients who completed

treatment. No other relationships between demographics or psychopathology

variables were significant.

4.0 Discussion

The findings in our two cohorts generally accord with previous research, but also include some unexpected results. We found that while variables such as age, sex, age of onset, duration of illness, and depression symptoms do not reliably predict treatment outcome, there was evidence that marital status could predict treatment outcome in the inpatient sample, while severity of illness was an effective predictor in community samples but not an inpatient cohort. There were also differences in the community cohort when symptom reduction according to the Padua Inventory was used as the outcome measure. In the community cohort, higher levels of depression symptoms were associated with lower reductions in symptoms as measured by the Padua.

Our two cohorts revealed some similar results to those of previous researchers. Demographic variables such as age and sex have previously shown no relationship to treatment outcome in OCD (Drummond, 1993; Keeley et al., 2008), and this was replicated in both our inpatient and community treatment samples. Similarly to other recent research, we found a relationship between marital status and change in symptom severity. This relationship was seen only in the inpatient cohort, with inpatients who were married or cohabiting doing significantly better than those who were single. Although our data do not provide information that allows conclusive explanation of this finding, there may be one body of research that allows some speculation as to the mechanism of this effect. It may be possible that when a married individual with OCD is admitted as an inpatient, accommodation of symptoms is less likely to occur than when at home. Family accommodation of OCD symptoms has been shown to be common positively correlated with symptom severity in OCD

patients (Ramos-Cerqueria, Torres, Torresan, Negreiros, & Vitorino, 2008), including those who are treatment refractory (Farrão et al., 2006). It has also been demonstrated to be associated with outpatient treatment outcome in childhood OCD studies (e.g., Merlo, Lehmkuhl, Geffken, & Storch, 2009). In our study, it is possible that through an inpatient admission of married patients, additional gains were made due to reduced family accommodation. For patients who were unmarried, prior family accommodation was less extensive, and the low level of accommodation as an inpatient was not significantly different to their outpatient lives. As a result the removal of family accommodation was not a significant contributor to treatment outcome for outpatients. This idea, while consistent with our data, would require additional research to evaluate it further.

One finding that ran counter to that in previous OCD outcome research was the relationship of symptom severity with treatment outcome. Previous research conducted using controlled, time-limited interventions has reported that increased symptom severity is associated with a poorer treatment response (Franklin, Abramowitz, Kozak, Levitt, & Foa, 2000; Keijsers, Hoogduin, & Schaap, 1994; Mataix-Cols, Marks, Greist, Kobak, & Baer, 2002). In our community treatment cohort, however, we found that increased symptom severity was associated with a greater response to treatment. Such a result may have emerged due to nature and duration of the treatment provided for our outpatient group. Most outcome research attempts to maximise internal validity through the utilization of strategies such as strict exclusion criteria, carefully controlled 'doses' of treatment provided over a time-limited intervention period, and careful isolation of treatments (Chambless & Hollon, 1998; Borkovec & Castonguay, 1998). Both of the cohorts examined in the current research, however, have been treated in routine clinical practice, with varying

durations, doses and combinations of treatment. In a routine clinical setting such as that used in the current study, treatment generally continues until the patient has shown an adequate response, in contrast with efficacy studies where the treatment is provided for a limited time regardless of response. It is possible that this accounts for the discrepancy between our findings and those of earlier efficacy research, although our results do not conclusively demonstrate this. Specifically, those patients with higher Y-BOCS scores pre-treatment had the greater potential to reduce these high scores over extended periods of treatment. If two patients were treated to the point that their severity fell to within the mild-to-moderate range, for example, the patient with more severe initial symptoms would show a greater fall in Y-BOCS scores. The lack of specific, meaningful data on the duration and amount of treatment provided to the community cohort prevents examination of this possibility in our study.

It could also be suggested that this finding is consistent with spontaneous recovery from OCD symptoms or regression to the mean. We believe that this is unlikely for two primary reasons. Firstly, our cohort was one which had a long history of chronic OCD that had not responded to previous intervention. Eligibility for admission to either cohort required a history of several inadequate responses to different types of therapy. Such chronic, severe, treatment-resistant patients are unlikely to demonstrate spontaneous recovery of OCD symptoms. Secondly, OCD is known to have a chronic course that shows low spontaneous remission rates (Mataix-Cols et al., 2002; Stewart et al., 2004).

Severe depressive symptoms prior to treatment have been reported to be associated with poor treatment response. In our cohorts, the association between treatment response (measured by the Y-BOCS) and initial depression symptoms was weak. Only in those completing community treatment, was higher levels of

depression seen to be associated with less reduction in symptoms during treatment. Furthermore, there was no significant difference in response between those classified as severely depressed and those with less severe symptoms, when a cutoff of more than 30 points on the BDI was used in accordance with the recommendations of Abramowitz (2004).

4.1 Implications, Limitations and Future Directions

We believe that our results carry several important implications for the study of outcome predictors in severe, treatment resistant OCD. Firstly, the starkest finding across our two samples is the difficulty in predicting treatment response in the most severe cases of OCD. Our range of variables proved to be poor predictors, making it difficult for clinicians working with this group to identify those most likely to respond to treatment. If it is accepted that potential responders may be difficult to identify, this suggests that treatment should be offered to all those with severe OCD, without favour to any particular individuals. Secondly, it may be the case that predictors of response are different for inpatient and outpatient community-based treatment cohorts. Our findings showed some difference across these two groups, suggesting that some variables that predict outcome in one treatment group may be invalid in predicting response in the other. Researchers and clinicians attempting to evaluate likely treatment outcome should, therefore, be mindful of the mode in which treatment is delivered, as this may exert influence on the ability of variables to predict outcome. Thirdly, it appears to be the case that predictors which are effective in less-severe cases may not be effective in predicting treatment outcomes in the most severe, chronic, treatment resistant individuals. Only one previous study (Drummond, 1993) has presented treatment outcome and outcome predictors in a group with similarly profound symptoms. Other studies examining less severe cohorts have found

predictive relationships not observed in the current study. This suggests that predictive relationships may be different when examined in severe patient groups. It may thus be useful for clinicians and future researchers to be aware that different prognostic indicators may be important with the most handicapped individuals. Fourthly, the fact that our results did not accord with those of Stewart et al. (2006) suggest that readers should be careful in assessing outcome prediction studies – specifically to ensure that they are aware of the outcome variable used. While Stewart et al. (2006) attempted to predict final Y-BOCS scores, we adopted the approach of attempting to predict overall change in Y-BOCS scores. We believe this approach enables a better investigation of the effects of treatment, taking into account the initial severity of the condition.

We are, however, aware of several limitations in the current study. Firstly, this is a naturalistic study taking place with patients attending a clinical service and receiving treatments tailored to their individual presentations. Secondly, although our study consisted of both inpatient and community treatment cohorts, each group was relatively small, which may have limited our ability to detect small effects. This limitation is particularly important with the analysis of marital status information in which the number of married individuals forced the use of nonparametric statistical methods, or prevented inferential statistics entirely. Thirdly, our study was also limited by the small number of variables that were used to predict treatment outcome, and the restricted range of these to demographic and a small number of psychopathology variables. Previous research (Keeley et al., 2008) has highlighted the potential for other variables such as cognitive variables and family factors in predicting outcome, and as our dataset was limited to those variables which had been collected in routine clinical practice within our treatment unit, we were not able to

assess the potential for these other variables to predict OCD treatment outcome. Fourthly, our dataset was limited in its coverage of the 'dose' of treatment given to the Community cohort. Data on the amount of treatment provided to this cohort did not allow meaningful analysis of the impact of treatment dose on outcome. Finally, our data only provide information about outcome up to the time when treatment was concluded, and do not have follow-up data available for analysis of predictors of longer-term treatment outcome.

We believe that there remains considerable scope for future research into predictors of outcome in OCD generally, and severe treatment-resistant OCD specifically. We believe that future research would benefit from expanding the range of predictor variables used, including other constructs such as specific OCD symptom subtypes, cognitive variables such as memory confidence and responsibility perceptions (Boschen & Vuksanovic, 2007), quality of life measures, and assessments of adaptive functioning. Constructs such as quality of life, and daily functioning may also be worthwhile dependent variables in future studies. Future research should also be alert to potential differences in the effectiveness of predictors when examining different methods of treatment, and treatment cohorts of different severity.

4.2 Conclusion

The current study is only the second to examine outcome predictors in a sample of the most severe, chronic, treatment resistant OCD patients. Although predictors of treatment response were difficult to identify, it highlights the need to interpret this and other studies in the context of the mode of treatment, as well as the severity of the individuals in the treatment cohort.

References

Abramowitz, J.S. (2004). Treatment of obsessive-compulsive disorder in patients who have comorbid depression. *Journal of Clinical Psychology, 60,* 1133-1141.

American Psychiatric Association (2000). Diagnostic and Statistical Manual of Mental Disorders (4th ed. Text Revision). Washington DC: American Psychiatric Press.

Beck, A.T. (1993). *Beck Depression Inventory Manual.* San Antonio: The Psychological Corporation.

Beck, A.T., Steer, R.A., & Garbin, M.G. (1998). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8,* 77-100.

Beck, A.T., Ward, C.H., Mendelson, M., Mock, J., & Erlbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4,* 53-61.

Borkovec, T.D., & Castonguay, L.G. (1998). What is the scientific meaning of empirically supported therapy? *Journal of Consulting and Clinical Psychology, 66,* 136-142.

Boschen, M.J. (2008). Publication trends in individual anxiety disorders: 1980-2015. *Journal of Anxiety Disorders, 22,* 570-575.

Boschen, M.J., Drummond, L.M., & Pillay, A. (2008). Treatment of severe, treatment-refractory obsessive compulsive disorder: A study of inpatient and community treatment. *CNS Spectrums, 13,* 1056-1065.

Boschen, M.J., & Vuksanovic, D. (2007). Deteriorating memory confidence, responsibility perceptions and repeated checking: Comparisons in OCD and control samples. *Behaviour Research and Therapy, 45,* 2098-2109.

Chambless, D.L., & Hollon, S.D. (1998). Defining empirically supported therapies.

   Journal of Consulting and Clinical Psychology, 66, 7-18.

de Haan, E., van Oppen, P., van Balkom, A.J., Spinhoven, P., Hoogduin, K.A., & van

   Dyck, R. (1997). Prediction of outcome and early vs. late improvement in

   OCD patients treated with cognitive behaviour therapy and pharmacotherapy.

   Acta Psychiatrica Scandinavica, 96, 354-361.

Drummond, L.M. (1993). The treatment of severe, chronic, resistant obsessive-

   compulsive disorder: An evaluation of an in-patient program using

   behavioural psychotherapy in combination with other treatments. *British*

   Journal of Psychiatry, 163, 223-229.

Drummond, L.M., Fineberg, N.A., Heyman,I., Kolb, P., Pillay, A., Rani, R.S.,

   Salkovskis, P., & Veale, D. (2008). Description of progress in the

   development of a national service for adolescents and adults with the most

   severe, refractory obsessive-compulsive disorder and body dysmorphic

   disorder. *Psychiatric Bulletin, 32,* 333-336.

Drummond, L.M., Pillay, A., Kolb, P., Benson, S., Fogg, R., Jones-Thomas, E., &

   Rani, S. (2008). The introduction of a community model for the treatment of

   obsessive-compulsive and body dysmorphic disorders. *Psychiatric Bulletin,*

   32, 336-341.

Drummond, L.M., Pillay, A., Rani, R.S., & Kolb, P. (2007). Specialised inpatient

   treatment for severe, chronic, resistant obsessive-compulsive disorder (OCD):

   A naturalistic study of clinical outcomes. *Psychiatric Bulletin, 31,* 49-52.

Eddy, K.T., Dutra, L., Bradley, R., & Westen, D. (2004). A multidimensional meta-

   analysis of psychotherapy and pharmacotherapy for obsessive-compulsive

   disorder. *Clinical Psychology Review, 24,* 1011-1030.

Ferrão, Y.A., Shavitt, R.G., Bedin, N.R., de Mathis, M.E., Carlos Lopes, A.,

Fontenelle, L.F., et al. (2006). Clinical features associated to refractory

obsessive-compulsive disorder. *Journal of Affective Disorders, 94,* 199-209.

Fisher, P.J., & Wells, A. (2005). How effective and cognitive and behavioral

treatments for obsessive-compulsive disorder? A clinical significance

analysis. *Behaviour Research and Therapy, 43,* 1543-1558.

Franklin, M.E., Abramowitz, J.S., Kozak, M.J., Levitt, J.T., & Foa, E.B. (2000).

Effectiveness of exposure and ritual prevention for obsessive-compulsive

disorder: Randomized compared with nonrandomized samples. *Journal of

Consulting and Clinical Psychology, 68,* 594−602.

Goodman, W.K., Price, L.H., Ramussen, S.A., Mazure, C., Delgado, P., Heninger,

G.R., & Charney, D.S. (1989a). The Yale–Brown Obsessive Compulsive

Scale: II. Validity. *Archives of General Psychiatry, 46,* 1012–1016.

Goodman, W.K., Price, L.H., Ramussen, S.A., Mazure, C., Fleischmann, R.L., Hill,

C.L., Heninger, G.R., & Charney, D.S. (1989b). The Yale–Brown Obsessive–

Compulsive Scale: I. Development, use and reliability. *Archives of General

Psychiatry, 46,* 1006–1011.

Hollander, E., Kaplan, A., Schmeidler, J., Yang, H., Li, D., Koran, L.M., & Barbato,

L.M. (2005). Neurological soft signs as predictors of treatment response to

selective serotonin reuptake inhibitors in obsessive-compulsive disorder.

Neuropsychiatry and Clinical Neuroscience, 17, 472-477.

Keeley, M.K., Storch, E.A., Merlo, L.J., Geffken, G.R. (2008). Clinical predictors of

response to cognitive-behavioural therapy for obsessive-compulsive disorder.

Clinical Psychology Review, 28, 118-130.

Keijsers, G.P., Hoogduin, C.A., & Schaap, C.P. (1994). Predictors of treatment

    outcome in the behavioural treatment of obsessive-compulsive disorder.

    British Journal of Psychiatry, 165, 781−786.

Leon, A.C., Portera, L., & Weissman, M.M. (1995). The social costs of anxiety

    disorders. *British Journal of Psychiatry Supplemental, 27,* 19-22.

Mataix-Cols, D., Marks, I.M., Greist, J.H., Kobak, K.A., & Baer, L. (2002).

    Obsessive-compulsive symptom dimensions as predictors of compliance with

    and response to behaviour therapy: Results from a controlled trial.

    Psychotherapy and Psychosomatics, 71, 255−262.

Mataix-Cols, D., Rauch, S.L., Baer, L., Eisen, J.L., Shera, D.M., Goodman, W.K., et

    al. (2002). Symptom stability in adult obsessive-compulsive disorders: Data

    from a naturalistic two-year follow-up study. American Journal of Psychiatry,

    159, 263-268.

Merlo, L.J., Lehmkuhl, H.D., Geffken, G.R., & Storch, E.A. (2009). Decreased

    family accommodation associated with improved therapy outcome in pediatric

    obsessive-compulsive disorder. *Journal of Consulting and Clinical

    Psychology, 77,* 355-360.

Norberg, M.M., Calamari, J.E., Cohen, R.J., & Riemann, B.C. (2008). Quality of life

    in obsessive-compulsive disorder: An evaluation of impairment and a

    preliminary analysis of the ameliorating effects of treatment. *Depression and

    Anxiety, 25,* 248-259.

Pallanti, S., Hollander, F., Bienstock, C., Koran, L., Leckman, J., Marazziti, D., et al.

    (2002). Treatment non-response in OCD: Methodological issues and

    operational definitions. *International Journal of Neuropsychopharmacology,

    5,* 181-191.

Ramos-Cerqueria, A.T., Torres, A.R., Torresan, R.C., Negreiros, A.P., & Vitorino, C.N. (2008). Emotional burden in caregivers of patients with obsessive-compulsive disorder. *Depression and Anxiety, 25,* 1020-1027.

Riggs, D.S., Hiss, H., & Foa, E.B. (1992). Marital distress and the treatment of obsessive-compulsive disorder. *Behavior Therapy, 23,* 585-597.

Rosa-Alcázar, A.I., Sánchez-Meca, J., Gómez-Conesa, A., & Marín-Martínez, F. (2008). Psychological treatment of obsessive-compulsive disorder: A meta-analysis. *Clinical Psychology Review, 28,* 1310-1325.

Rufer, M., Fricke, S., Moritz, S., Kloss, M., & Hand, I. (2006). Symptom dimensions in obsessive-compulsive disorder: Prediction of cognitive behavior therapy outcome. *Acta Psychiatrica Scandinavica, 113,* 440-446.

Sanavio, S. (1988). Obsessions and compulsions: The Padua Inventory. *Behaviour Research and Therapy, 26,* 169-177.

Shetti, C.N., Reddy, Y.C., Kandavel, T., Kashyap, K., Singisetti, S., Hiremath, A.S., Siddequehusen, M.U., & Raghunandanan, S. (2007). Clinical predictors of drug nonresponse in obsessive-compulsive disorder. *Journal of Clinical Psychiatry, 66,* 1517-1523.

Somers, J.M., Goldner, E.M., Waraich, P., & Hsu, L. (2006). Prevalence and incidence studies of anxiety disorders: A systematic review of the literature. *Canadian Journal of Psychiatry, 51,* 100-113.

Stewart, S.E., Geller, D.A., Jenike, M., Pauls, D., Shaw, D., Mullin, B, et al. (2004). Long-term outcome of pediatric obsessive-compulsive disorder: A meta-analysis and qualitative review of the literature. *Acta Psychiatrica Scandinavica, 110,* 4-13.

Stewart, S.E., Yen, C., Stack, D.E., & Jenike, M.A. (2006). Outcome predictors for

severe obsessive-compulsive patients in intensive residential treatment.

Journal of Psychiatric Research, 40, 511-519.

Storch, E.A., Larson, M.J., Shapira, N.A., Ward, H.E., Murphy, T.K., Geffken, G.R.,

Valerio, H., & Goodman, W.K. (2006). Clinical predictors of early fluoxetine

treatment response in obsessive-compulsive disorder. *Depression and*

Anxiety, 23, 429-433.

Taylor, S. (1998). Assessment of obsessive–compulsive disorder. In R.P. Swinson,

M.M. Antony, S. Rachman, & M.A. Richter (Eds.), *Obsessive–Compulsive*

Disorder: Theory, Research and Treatment. New York: Guildford Press.

World Health Organization (1992). *ICD-10: The ICD-10 Classification of Mental*

and Behavioural Disorders: Clinical Descriptions and Diagnostic Guidelines.

Geneva: World Health Organization.

Table 1

Predictors of OCD Symptom Change for the Inpatient Sample

Predictor	Statistical Test	*p* Value	Statistical Test	*p* Value
	Y-BOCS Change Inpatient Full Sample ($N = 52$)		Padua Change Inpatient Full Sample ($N = 52$)	
Age	$r = .11$	$p = .46$	$r = -.01$	$p = .97$
Sex	$t = 0.47$, $df = 44$, 95% $CI_{Diff} = -6.72$ to 4.19	$p = .64$	$t = 0.77$, $df = 40$, 95% $CI_{Diff} = -15.41$ to 34.56	$p = .44$
Marital Status	$\mathbf{t = 2.74}$, $\mathbf{df = 43}$, $\mathbf{95\%\ CI_{Diff} = -14.38}$ **to -2.19**	$\mathbf{p < .01}$	$\mathbf{t = 2.01}$, $\mathbf{df = 39}$, $\mathbf{95\%\ CI_{Diff} = -0.24}$ **to -56.14**	$\mathbf{p < .05}$
OCD Severity	$r = .19$	$p = .22$	$r = .13$	$p = .45$
OCD Onset Age	$r = .07$	$p = .78$	$r = .09$	$p = .74$
OCD Duration	$r = .09$	$p = .71$	$r = -.01$	$p = .97$
Depressive Symp.	$r = .11$	$p = .49$	$r = .10$	$p = .54$
BDI > 30	$t = 0.48$, $df = 39$, 95% $CI_{Diff} = -4.50$ to 7.33	$p = .63$	$t = 0.97$, $df = 39$, 95% $CI_{Diff} = -41.89$ to 14.75	$p = .44$
	Y-BOCS Change Inpatient Completers Only ($n = 35$)		Padua Change Inpatient Completers Only ($n = 35$)	
Age	$r = .03$	$p = .88$	$r = -.09$	$p = .62$
Sex	$t = 0.14$, $df = 33$, 95% $CI_{Diff} = -5.63$ to 4.92	$p = .89$	$t = 1.11$, $df = 30$, 95% $CI_{Diff} = -14.09$ to 47.87	$p = .27$
Marital Status	$\mathbf{t = 2.40}$, $\mathbf{df = 32}$, $\mathbf{95\%\ CI_{Diff} = -12.26}$ **to -1.01**	$\mathbf{p < .05}$	$t = 1.79$, $df = 29$, 95% $CI_{Diff} = -4.19$ to 63.42	$p = .08$
OCD Severity	$r = .03$	$p = .87$	$r = .10$	$p = .57$
OCD Onset Age	$r = .17$	$p = .56$	$r = .10$	$p = .74$
OCD Duration	$r = .21$	$p = .48$	$r = -.14$	$p = .66$
Depressive Symp.	$r = .05$	$p = .80$	$r = .16$	$p = .38$
BDI > 30	$t = 0.46$, $df = 31$, 95% $CI_{Diff} = -4.21$ to 6.67	$p = .65$	$t = 1.32$, $df = 30$, 95% $CI_{Diff} = -54.13$ to 11.66	$p = .20$

Table 2
Predictors of OCD Symptom Change for the Community Sample

Predictor	Statistical Test	*p* Value	Statistical Test	*p* Value
	Y-BOCS Change Community Full Sample ($N = 62$)		Padua Change Community Full Sample ($N = 62$)	
Age	$r = .07$	$p = .58$	$r = -.05$	$p = .69$
Sex	$t = 0.95$, *df* = 60, *95% CI*$_{\text{Diff}}$ = -2.00 to 5.57	$p = .35$	$t = 1.33$, *df* = 56, *95% CI*$_{\text{Diff}}$ = -4.16 to 20.52	$p = .19$
Marital Status	$U = 114.50$*	$p = .21$	$U = 71.00$*	$p = .09$
OCD Severity	**$r = .30$**	**$p < .05$**	$r = -.15$	$p = .25$
OCD Onset Age	$r = .09$	$p = .51$	$r = -.01$	$p = .95$
OCD Duration	$r = .01$	$p = .95$	$r = -.05$	$p = .71$
Depressive Symp.	$r = .05$	$p = .72$	$r = -.19$	$p = .16$
BDI > 30	$t = 0.49$, *df* = 59, *95% CI*$_{\text{Diff}}$ = -4.81 to 2.92	$p = .63$	$t = 1.60$, *df* = 56, *95% CI*$_{\text{Diff}}$ = -8.79 to 16.28	$p = .55$
Comorbid Anxiety	$t = 0.71$, *df* = 60, *95% CI*$_{\text{Diff}}$ = -2.46 to 5.17	$p = .48$	$t = 0.16$, *df* = 56, *95% CI*$_{\text{Diff}}$ = -13.59 to 11.54	$p = .87$
Comorbid Depress.	$t = 1.13$, *df* = 60, *95% CI*$_{\text{Diff}}$ = -5.92 to 1.64	$p = .26$	$t = 0.53$, *df* = 56, *95% CI*$_{\text{Diff}}$ = -15.87 to 9.21	$p = .58$
	Y-BOCS Change Community Completers Only ($n = 40$)		Padua Change Community Completers Only ($n = 40$)	
Age	$r = .01$	$p = .97$	$r = -.01$	$p = .95$
Sex	$t = 1.07$, *df* = 38, *95% CI*$_{\text{Diff}}$ = -7.43 to 2.29	$p = .29$	$t = 1.10$, *df* = 35, *95% CI*$_{\text{Diff}}$ = -7.90 to 2.29	$p = .28$
Marital Status	*Insufficient married participants to compute*		*Insufficient married participants to compute*	
OCD Severity	**$r = .46$**	**$p < .005$**	$r = -.25$	$p = .14$
OCD Onset Age	$r = .05$	$p = .75$	$r = .11$	$p = .52$
OCD Duration	$r = -.04$	$p = .83$	$r = -.10$	$p = .54$
Depressive Symp.	$r = .07$	$p = .66$	**$r = -.39$**	**$p < .05$**
BDI > 30	$t = 0.77$, *df* = 38, *95% CI*$_{\text{Diff}}$ = -6.72 to 3.01	$p = .44$	$t = 1.44$, *df* = 35, *95% CI*$_{\text{Diff}}$ = -4.90 to 28.77	$p = .16$
Comorbid Anxiety	$t = 1.20$, *df* = 38, *95% CI*$_{\text{Diff}}$ = -2.01 to 7.88	$p = .24$	$t = 0.38$, *df* = 35, *95% CI*$_{\text{Diff}}$ = -14.44 to 21.10	$p = .71$
Comorbid Depress.	$t = 1.49$, *df* = 38, *95% CI*$_{\text{Diff}}$ = -8.40 to 1.28	$p = .15$	$t = 0.01$, *df* = 35, *95% CI*$_{\text{Diff}}$ = -17.69 to 17.92	$p = .99$

*Mann-Whitney *U* used due to violation of normality assumption.
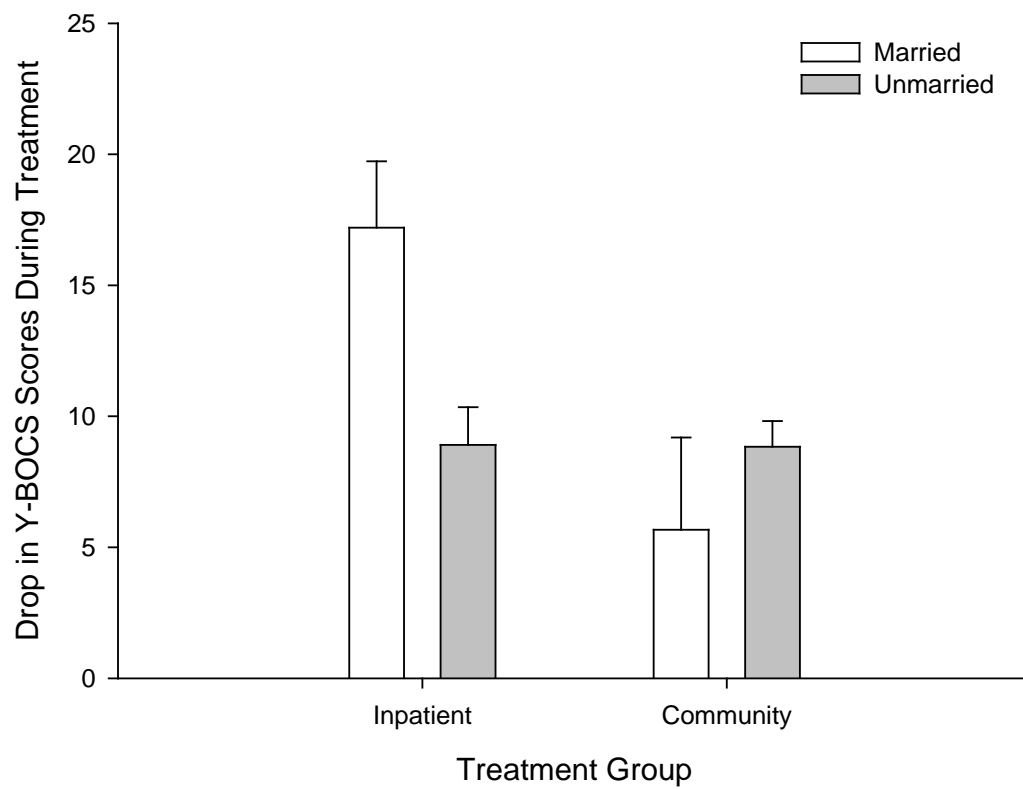
Figure 1. Change in Y-BOCS scores during treatment for inpatient and community

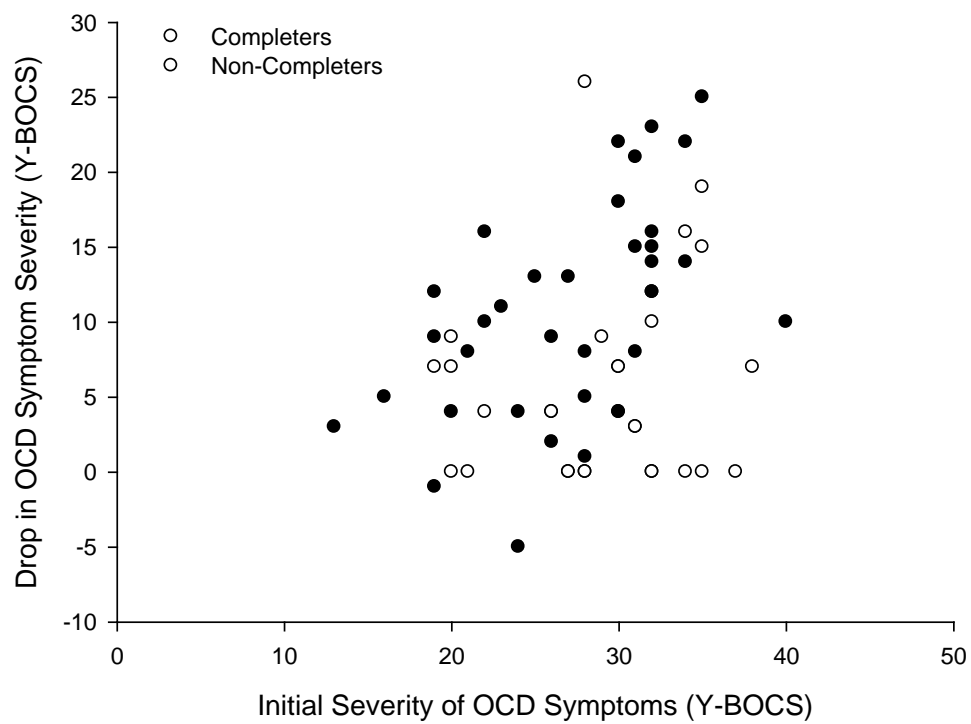cohorts, separated by marital status. Error bars represent standard error of the mean.

Figure 2. Scatterplot showing relationship between initial severity and treatment

effect for those in community treatment.