Impact of Comorbidity on Cognitive-Behavioral Therapy Response in Pediatric Obsessive-Compulsive Disorder

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ABSTRACT

Objective: To examine the impact of psychiatric comorbidity on cognitive-behavioral therapy response in children and adolescents with obsessive-compulsive disorder. Method: Ninety-six youths with obsessive-compulsive disorder (range 7–19 years) received 14 sessions of weekly or intensive family-based cognitive-behavioral therapy. Assessments were conducted before and after treatment. Primary outcomes included scores on the Children's Yale-Brown Obsessive-Compulsive Scale, response rates, and remission status. Results: Seventy-four percent of participants met criteria for at least one comorbid diagnosis. In general, participants with one or more comorbid diagnoses had lower treatment response and remission rates relative to those without a comorbid diagnosis. The number of comorbid conditions was negatively related to outcome. The presence of attention-deficit/hyperactivity disorder and disruptive behavior disorders was related to lower treatment response rates, and the presence of disruptive behavior disorders and major depressive disorder were related to lower remission rates. Conclusions: The presence of a comorbid disorder, particularly disruptive behavior, major depressive, and attention-deficit/hyperactivity disorders, has a negative impact on treatment response. Assessing for psychiatric disorders before treatment entry and treating these comorbid conditions before or during cognitive-behavioral therapy may improve final outcome. Comorbid anxiety or tic disorders do not seem to negatively affect response. J. Am. Acad. Child Adolesc. Psychiatry, 2008;47(5):583–592. Key Words: obsessive-compulsive disorder, cognitive-behavioral therapy, comorbidity, children, treatment. Clinical trials registration information—URL: http://clinicaltrials.gov. Unique identifier: NCT00369642.

Obsessive-compulsive disorder (OCD) among children and adolescents is a debilitating and chronic psychiatric condition1 with prevalence rates ranging from 1% to 4%.2,3 Comorbid conditions such as depression, anxiety, disruptive behavior disorders (DBDs), and attention-deficit/hyperactivity disorder (ADHD), tend to be the rule rather than exception in pediatric OCD,4–7 often affecting functional impairment above and beyond the OCD diagnosis.8–12

Two treatment modalities have demonstrated efficacy in pediatric OCD patients, namely, pharmacotherapy with serotonin reuptake inhibitors (SRI) and cognitive-behavioral therapy (CBT) with exposure and response prevention.13 Pooled effects suggest that CBT may have some advantage over SRI treatment alone,14 leading to the suggestion that children receive CBT alone or together with SRI therapy.15 However, despite the fact that CBT is an effective intervention with some advantages over medications in terms of efficacy, durability after treatment withdrawal,16 and safety, not all youths respond to CBT and some are unable or unwilling to participate.

Clinical experience and limited data suggest that one factor that influences CBT outcome is psychiatric
comorbidity. However, the results of previous research have produced somewhat mixed findings. Among adults, several studies found that severely depressed OCD patients responded less frequently than those who were not severely depressed\(^{17-20}\) (see Orloff et al.\(^{21}\) for an exception). Among children, March et al.\(^{22}\) found that the presence of a tic disorder did not affect CBT outcome but negatively affected response to sertraline. Himle et al.\(^{23}\) also found that the presence of a comorbid tic disorder did not affect CBT response. Storch et al.\(^{24}\) found that anxiety comorbidity did not affect CBT response in a sample of 38 youths. However, the number of comorbid conditions in general was inversely related to outcome, such that those youths with more than one comorbidity exhibited worse response.

Additional evidence of the impact of comorbidity on treatment response is derived from pharmacological trials and studies of CBT in other psychiatric conditions. Most notably, Geller et al.\(^{25}\) examined the influence of comorbidity on treatment response in 193 youths treated with paroxetine. In contrast to the overall sample and those without any comorbidity (71% and 75% were responders, respectively), youths with ADHD, tics, and oppositional defiant disorder (ODD) exhibited significantly worse response (56%, 53%, and 39%, respectively). Others have also shown that the presence of a comorbid tic disorder negatively affects pharmacotherapy response\(^{22,26,27}\) (see March et al.\(^{28}\) for an exception). In CBT studies with other pediatric psychiatric populations, ADHD, anxiety, and DBDs have negatively affected CBT response in depression.\(^{29,30}\) It is unclear whether comorbidity affects CBT outcome in children with an anxiety disorder. Three studies\(^{31-33}\) have found that CBT response was not affected by the presence of comorbid internalizing or externalizing behaviors. Berman et al.\(^{34}\), however, found that comorbid depression, but not disruptive behavior, negatively affected CBT outcome.

Despite these data, little information is available regarding the effect of varied comorbidities on CBT response in pediatric OCD. The authors’ clinical experience, together with the limited literature reviewed above, suggests the following diagnoses, in particular, may negatively affect outcome: depressive disorders, DBDs, and ADHD. Theoretically, comorbid conditions may affect CBT response by forcing the clinician to focus on both the primary and comorbid conditions, thus reducing the amount of time spent during treatment on OCD-related tasks. The presence of depressive disorders may be associated with decreased anxiety habituation during exposures\(^{35}\) as well as decreased hope that treatment may work or motivation/energy to engage in exposures. The presence of DBDs is often linked to patient resistance to engage in exposures and increased secondary gains from symptoms (i.e., missing school, decreased role expectations), which serve to maintain the OCD symptoms. Finally, the presence of ADHD may be associated with decreased ability to attend to concepts discussed within therapy,\(^{33}\) as well as deficits in executive functioning necessary to independently plan and implement exposures and other therapeutic tasks (e.g., engage in thought challenging).\(^{36}\)

The possible impact of comorbidity on CBT response has significant clinical implications for assessment and treatment planning. For example, if the presence of comorbid depression and/or ADHD is associated with attenuated response, pharmacotherapy may be beneficial before initiating CBT. Similarly, parent management training programs\(^{37}\) that teach parents adaptive child management skills may be warranted before conducting CBT. With this in mind, we had two goals. First, we sought to examine the influence of the patients’ number of comorbid diagnoses on response and remission rates. Based on work by Storch et al.\(^{24}\) and Geller et al.\(^{25}\), we expected that the number of comorbid conditions present would be negatively associated with outcome. Second, we were interested in studying the impact of a range of comorbid illnesses on CBT response and remission rates. Based on the above data and our clinical experiences, we expected that the presence of depressive disorders, DBDs, and ADHD would be negatively associated with CBT outcome.

**METHOD**

Participants

Ninety-six children and adolescents (43 female, 45%) ranging in age from 7 to 19 years (mean 13.5 ± 3.3 years) participated in this study. All of the participants had a principal diagnosis of OCD, according to DSM-IV-TR criteria, made by a clinical child psychologist or board-certified child and adolescent psychiatrist, based on clinical interview. Diagnoses were established through a clinical interview with the first or second author and administration of the Anxiety Disorders Interview Schedule for DSM-IV: Parent Version (ADIS-IV-P)\(^{38}\) and Children’s Yale-Brown Obsessive Compulsive Scale (CY-BOCS)\(^{39}\) by a separate trained evaluator. All of the diagnoses were then confirmed by a board-certified child

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TABLE 1
Baseline Clinical Characteristics of OCD Patients With and Without Comorbid Diagnoses

<table>
<thead>
<tr>
<th>Source</th>
<th>OCD (n = 25)</th>
<th>OCD + Comorbidity (n = 71)</th>
<th>χ²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (male), no. (%)</td>
<td>13 (52)</td>
<td>40 (56)</td>
<td>0.14</td>
<td>.71</td>
</tr>
<tr>
<td>Age, y</td>
<td>13.94 (3.07)</td>
<td>13.40 (3.43)</td>
<td>0.69</td>
<td>.49</td>
</tr>
<tr>
<td>Ethnicity (white), no. (%)</td>
<td>24 (96)</td>
<td>67 (94)</td>
<td>1.66</td>
<td>.44</td>
</tr>
<tr>
<td>Annual family income</td>
<td>$83,428</td>
<td>$85,716 ($48,047)</td>
<td>0.21</td>
<td>.84</td>
</tr>
<tr>
<td>ADIS-IV-P Severity Index</td>
<td>5.99 (1.28)</td>
<td>5.84 (1.25)</td>
<td>0.49</td>
<td>.62</td>
</tr>
<tr>
<td>CY-BOCS Total Score</td>
<td>23.40 (6.33)</td>
<td>28.75 (5.01)</td>
<td>4.27</td>
<td>.001</td>
</tr>
<tr>
<td>CY-BOCS Obsessions</td>
<td>11.56 (3.37)</td>
<td>14.15 (3.05)</td>
<td>3.56</td>
<td>.001</td>
</tr>
<tr>
<td>CY-BOCS Compulsions</td>
<td>11.84 (3.64)</td>
<td>14.53 (2.57)</td>
<td>4.03</td>
<td>.001</td>
</tr>
<tr>
<td>CGI-S</td>
<td>3.48 (8.7)</td>
<td>4.11 (.95)</td>
<td>2.93</td>
<td>.004</td>
</tr>
</tbody>
</table>

Note: Data include mean (SD) unless otherwise specified. OCD = obsessive-compulsive disorder; ADIS-IV-P = Anxiety Disorders Interview Schedule for DSM-IV; Parent Version; CY-BOCS = Children's Yale-Brown Obsessive-Compulsive Scale; CGI-S = Clinical Global Impressions–Severity scale.

ADIS-IV-P. The ADIS-IV-P is a clinician-administered, structured interview that assesses for the presence and severity of DSM-IV anxiety and related disorders (i.e., DBDs, depressive disorders, ADHD). Diagnoses are made as a function of symptom endorsement with an associated distress/impairment severity rating of ≥4 (on a scale of 0–8). The ADIS-IV-P has strong psychometric properties in assessing both anxiety disorder diagnoses and related comorbid disorders. For example, Silverman et al. found good stability over 7 to 14 days for ADHD and ODD diagnoses (κ = 1.0 and 0.78, respectively) and Lynham et al. found good interrater agreement for ADHD and ODD diagnoses (κ = .77 and .73, respectively).

CY-BOCS. The CY-BOCS is a 10-item, clinician-rated measure of OCD severity. Items assess the frequency, impairment, distress, resistance, and control associated with obsessions and compulsions. The following scores were calculated: an Obsession Severity score (five items), Compulsion Severity score (five items), and Total Score (sum of all items). Considered the gold standard in pediatric OCD symptom severity assessment, the CY-BOCS has sound reliability and construct validity properties as well as treatment sensitivity.

Clinical Global Impressions–Improvement (CGI-I) Scale. The CGI-I scale is a widely used clinician-rated measure of treatment response. Ratings of treatment outcome on this 7-point scale range from 1 (very much improved) to 7 (very much worse). Ratings of very much improved or much improved were defined a priori as treatment responders.

Procedures

Assessments. Assessments were conducted immediately before beginning treatment (either 14 weekly sessions or 14 sessions in 3 weeks) and 1 to 3 days after treatment completion. Clinical psychology doctoral candidates who were trained in measurement administration by the first author conducted assessments. Training included attending an instructional meeting led by the first author,
obscuring three administrations of study measures, administering clinician-rated measures three times with in vivo observation and supervision. Inter-rater reliability for the CY-BOCS in a subsample of 20 participants was excellent ($k = .96$). Inter-rater reliability was not collected on the ADIS-IV-P. However, all of the diagnoses generated by the ADIS-IV-P were reviewed by the first author and confirmed by the fourth or seventh authors. Oden have found high inter-rater reliability ($k = .91$) for parental endorsements of an OCD diagnosis in their child. Inter-rater reliability for other disorders assessed by the ADIS-IV-P ranging from 0.82 to 0.96 for the principal diagnosis and 0.78 to 0.96 for other diagnoses being included in the overall diagnostic profile.

At each assessment, assessors administered the ADIS-IV-P and CY-BOCS to parents and children jointly. Per Sechill et al.,$^{39}$ CY-BOCS ratings were based on both parent and child responses, as well as clinician judgment and behavioral observation. After the collection of all of the information (e.g., ADIS-IV-P, CY-BOCS, unstructured clinical interview), the first or second author confirmed diagnoses with a licensed psychologist otherwise not involved in participants' treatment.

CBT: Participants received individually tailored weekly or intensive family-based CBT. For 40 youths, the treatment format was based on their participation in a randomized trial of weekly and intensive CBT$^{41}$; for the others, the choice of intensive or weekly treatment was based on clinical appropriateness. No difference in overall efficacy was found between intensive or weekly conditions: thus, groups were combined. The first author assigned a treatment fidelity rating that has been used by others$^{46}$ ($0 = \text{poor fidelity}$, $5 = \text{excellent fidelity}$) based on a comparison to the treatment manual. No differences existed in treatment fidelity between those who participated in the CBT trial$^{41}$ (mean $4.67$, SD $0.52$, range $3–5$) relative to those treated through the normal clinical flow (mean $4.67$, SD $0.51$, range $3–5$). Based on the Pediatric Obsessive-Compulsive Disorder Treatment Study$^{15}$ treatment protocol, psychotherapy for those in the clinical trial$^{41}$ and those recruited as part of normal clinical care consisted of 14 individual 90-minute CBT sessions in either a weekly (once per week) or intensive (14 sessions over 3 weeks) format. As described in Storch et al.$^{41}$ sessions were family oriented, with at least one parent participating in all of the sessions. Sessions 1 to 3 were devoted to psychoeducation, treatment discussion, and hierarchy development, and sessions 4 to 14 involved graduated exposure and response prevention exercises (both imaginal and in vivo) specific to each youth. Early exposures were to moderately distressing situations with progression toward more anxiety-provoking ones. Homework was assigned after each session that consisted of exposures similar to those focused on in session (≥60 minutes daily). The nature of treatment did not differ as a function of their point of entry (e.g., study versus standard clinical care).

Data Analyses

All of the statistical procedures were performed using SPSS 14.0. Given that only seven of 96 participants dropped out of treatment and the primary reason for dropout was lack of improvement, we used last observation carried forward analyses to account for missing data at the posttreatment assessment. Initial analyses examined descriptive information for pediatric OCD patients with and without comorbid diagnoses. Independent samples $t$ tests were performed on continuous variables, and Pearson’s $\chi^2$ analyses were performed on categorical variables. Chi-square analysis was used to compare treatment response in patients with and without comorbid diagnoses; the Fisher exact test was used to examine treatment response as a function of specific comorbid conditions. Treatment response was defined a priori as a CGI-I scale score of very much improved or much improved and a decrease in the CY-BOCS score $>30\%$. Studies of CBT typically use the stringent criterion of a $50\%$ decrease, which fails to capture meaningful change in some patients who do not meet this threshold. In acute medication trials, definitions of response have generally included a $25\%$ or $35\%$ decrease in Y-BOCS/CY-BOCS scores from baseline. However, the $25\%$ cutoff has resulted in a high number of false positives,$^{47}$ whereas higher cutoff scores resulted in a high number of false negatives. Through signal detection analyses, Tolin et al.$^{48}$ determined that a Y-BOCS decrease criterion of $30\%$ was optimal for determining clinical improvement and corresponded to clinically meaningful improvement. Pearson’s correlations were used to examine the number of comorbid conditions and two measures of treatment response, percentage of change on the CY-BOCS and the CGI-Improvement scale. Given the preliminary nature of this work, no statistical correction was used for type I error.

Remission was classified as having a severity rating on the ADIS-IV-P $\leq 3$ and CY-BOCS Total Score $\leq 10$. Consistent with analyses of treatment response variables, $\chi^2$ analysis was used to compare remission rates in patients with and without comorbid diagnoses as well as to compare remission rates as a function of current medication status (no medication, single SRI, or SRI plus an augmenting agent, either another SRI or an antipsychotic medication). The Fisher exact test was used to examine remission rate as a function of each specific comorbid condition. Patients only taking stimulant medication for ADHD and no medication for OCD were excluded from analyses of the impact of medication on treatment response. It is worth noting that response and remission rates represent separate but related constructs that may be differentially affected across comorbid conditions.

**RESULTS**

Preliminary Analyses

Of the 96 patients enrolled, 71 (74%) met criteria for a comorbid psychiatric disorder. Comorbid diagnoses included generalized anxiety disorder ($n = 32$; $33\%$), major depressive disorder ($MDD; n = 25$; $26\%$), ADHD ($n = 25$; $26\%$), DBDs (includes ODD, conduct disorder, and DBD not otherwise specified: $n = 21$; $22\%$), social phobia ($n = 15$; $16\%$), Tourette syndrome and chronic tic disorder ($n = 9$; $9\%$), panic disorder ($n = 7$; $7\%$), and Asperger syndrome ($n = 2$; $2\%$). Given its low frequency, Asperger syndrome was not included in analyses of individual comorbidities. Descriptive clinical and demographic information for the OCD and OCD plus comorbid diagnosis groups is presented in Table 1. Groups did not differ on the demographic variables of age, sex ratio, ethnicity ratio, or average yearly family income. Comorbidity groups differed on all measures of baseline OCD severity, with OCD patients with comorbid diagnoses exhibiting more severe OCD symptoms.
TABLE 2
Posttreatment Clinical Characteristics and Treatment Response of OCD Patients With and Without Comorbid Diagnoses

<table>
<thead>
<tr>
<th>Source</th>
<th>OCD</th>
<th>OCD + Comorbidity</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADIS-IV-P Severity Index</td>
<td>0.92 (0.91)</td>
<td>2.97 (2.17)</td>
<td>6.48</td>
<td>.001</td>
</tr>
<tr>
<td>CY-BOCS Total Score</td>
<td>5.92 (4.42)</td>
<td>13.89 (9.40)</td>
<td>4.07</td>
<td>.001</td>
</tr>
<tr>
<td>CY-BOCS Percentage of Change</td>
<td>74 (20)</td>
<td>51 (32)</td>
<td>3.31</td>
<td>.001</td>
</tr>
<tr>
<td>CY-BOCS Obsessions Compulsions</td>
<td>3.24 (2.33)</td>
<td>7.32 (4.61)</td>
<td>4.23</td>
<td>.001</td>
</tr>
<tr>
<td>CGI-S</td>
<td>1.16 (0.75)</td>
<td>2.21 (1.36)</td>
<td>3.66</td>
<td>.001</td>
</tr>
<tr>
<td>CGI-I</td>
<td>1.32 (0.63)</td>
<td>2.04 (1.14)</td>
<td>3.00</td>
<td>.003</td>
</tr>
</tbody>
</table>

Note: Data include mean (SD) unless otherwise specified. OCD = obsessive-compulsive disorder; ADIS-IV-P = Anxiety Disorders Interview Schedule for DSM-IV; Parent Version; CY-BOCS = Children’s Yale-Brown Obsessive-Compulsive Scale; CGI-S = Clinical Global Impressions-Severity scale; CGI-I = Clinical Global Impressions-Improvement scale.

CBT Response

Treatment Response by Comorbidity.Collapsed across comorbidity groups, 72 of 96 patients (75%) were considered treatment responders with a mean (SD) decrease of 19.60 (5.81) points on the CY-BOCS Total Score for the treatment responders and 3.38 (4.76) for the youths not considered treatment responders. Twenty-three of 25 (92%) patients with no comorbid diagnoses were considered treatment responders, which represented a significantly greater percentage than the 49 of 71 (69%) of patients with one or more comorbid diagnoses who were considered treatment responders ($\chi^2 = 5.21; p < .02$). Treatment response for patients who met criteria for two or more (31 of 46; 67%) or three or more comorbid psychiatric disorders (13 of 20; 65%) did not significantly differ from those with one or more comorbid disorder ($\chi^2 < 1.35; p > .25$), but was significantly decreased relative to those with no comorbid disorders ($\chi^2 = 5.06; p < .02$). Pearson’s correlation analysis (two-tailed) indicated that the more comorbid diagnoses that a patient met criteria for, the lower his or her CY-BOCS percentage of decrease ($r(95) = -0.27; p < .008$) and CGI-Improvement scale score ($r(95) = 0.26; p < .01$) were after treatment. We should note that comorbidity groups were not mutually exclusive. Thus, the patient group with one or more comorbid conditions subsumes the patient group with two or more comorbid conditions and so on.

Posttreatment means for OCD severity and improvement, t values, and significance levels as a function of comorbidity group are included in Table 2. Groups differed significantly on all posttreatment measures of OCD severity, including the ADIS-IV-P Severity Index, CY-BOCS Total Score and, most important, CY-BOCS Total Score percentage of decrease. Patients in the OCD plus comorbidity group showed significantly higher CY-BOCS Total Scores and lower percentage of changes than the no comorbidity group.

Treatment Response by Comorbid Condition. Relative to those without a comorbard disorder, response rates were significantly lower for patients with comorbid ADHD (60%; $p < .04$) and DBDs (57%; $p < .03$) (Fig. 1). The ratio of treatment response rates did not significantly differ (all $p > .50$) between patients with and without a comorbard diagnosis of generalized anxiety disorder (72%), MDD (73%), social phobia (66%), Tourette syndrome (66%), or panic disorder (71%). Response rates did not differ between youths with comorbid ADHD who were and were not on ADHD-focused medication ($\chi^2 = 0.24$, not significant).

OCD Remission Rates

Remission by Comorbidity. Remission rates as a function of comorbard condition are presented in Figure 2. In total, 58% of patients (56 of 96) did not meet criteria for OCD after treatment. Ninety-two percent (23 of 25) of patients with no comorbid conditions met criteria for remission compared to 46% (33 of 71) of those with at least one comorbard condition. Consistent with treatment response rates, patients who met criteria for two or more (21 of 46; 45%), or three or more comorbid psychiatric disorders (7 of 20; 35%) showed decreased remission rates relative to those with no comorbid disorders ($\chi^2 = 5.84; p < .02$), but did not significantly differ from those with one or more comorbid disorders ($\chi^2 < 1.62; p > .20$).

Remission by Comorbid Condition. Consistent with treatment response rates, remission rates were significantly lower for patients who met criteria for comorbid DBDs relative to those without a comorbard diagnosis (24%; $p < .001$). In contrast to response rates, remission rates in participants with comorbid MDD were also
significantly lower than those without a comorbid condition (42%; \( p < .05 \)), whereas participants with comorbid ADHD did not significantly differ on this variable from those without a comorbidity (44%, \( p > .09 \)). Interestingly, those youths with comorbid ADHD not taking an ADHD-focused medication had a higher remission rate than those taking relevant medication (\( \chi^2 = 5.31; \ p = .02 \)). Relative to those without a comorbid condition, remission rates did not significantly differ for patients with comorbid generalized anxiety disorder (47%; \( p > .11 \)), social phobia (40%; \( p > .12 \)), Tourette syndrome (55%; \( p > .90 \)), or panic disorder (43%; \( p > .39 \)).

**Impact of Concomitant Medication**

*Response and Remission Rates by Medication Status.*

Twenty-two of 26 patients (85%) taking no medication during CBT were treatment responders. This response rate was not significantly different from the 29 of 38 (76%) patients taking a single SRI (\( \chi^2 = 3.22; \ p = .073 \)) and the 19 of 30 (63%) patients taking an SRI
augmented by either another SRI or an antipsychotic medication \( (\chi^2 = 0.66; \ p = .42) \). The proportion of patients who responded to treatment did not differ between those taking a single SRI and those taking an SRI augmented by an additional medication \( (\chi^2 = 1.36; \ p = .24) \).

Symptom remission rate for those not taking any medication was 73% (19 of 26 patients). This remission rate was not significantly greater than the 23 of 38 (61%) patients taking only one SRI \( (\chi^2 = 1.08; \ p = .30) \), but was significantly greater than the 13 of 30 (43%) patients taking an SRI and an augmenting agent \( (\chi^2 = 5.03; \ p = .03) \). Remission rates for those taking a single SRI did not differ from those taking an SRI augmented with an additional medication \( (\chi^2 = 1.99; \ p = .16) \).

**Medication Status by Comorbidity.** A significantly greater proportion of patients with a comorbid diagnosis were treated with medication (55 of 69; 80%) than those without comorbid diagnosis (14 of 25; 56%) \( (\chi^2 = 5.28; \ p = .02) \). When examining only those patients with a comorbid condition as a function of concomitant medication group (no medication, single SRI, or SRI plus an augmenting agent), no group differences were seen in the proportion of treatment responders \( (\chi^2 < .58; \ p > .74) \) or the proportion of patients whose OCD symptoms remitted \( (\chi^2 < 1.57; \ p > .45) \). Similarly, medication groups did not differ in treatment response \( (\chi^2 < 3.59; \ p > .17) \) or proportion with symptom remission \( (\chi^2 < 2.76; \ p > .25) \) when only data from patients without comorbid conditions were analyzed.

**DISCUSSION**

CBT is a first-line treatment for pediatric OCD, yet few data exist on how comorbidity may affect response. Although others have investigated the impact of a range of comorbid disorders on CBT outcome in adults with OCD, only the relationship between comorbid tic status and anxiety and CBT response has been reported in pediatric samples. Consistent with previous research, the presence of a comorbid disorder among patients in our sample was high, with 74% of our sample having at least one comorbidity. Comorbid illnesses present in at least 20% of the sample included generalized anxiety disorder, MDD, ADHD, and DBDs. Consistent with others, rates of symptom severity were higher in those with a comorbid condition relative to those without. As noted by Geller et al., many pharmacological studies in pediatric OCD have strict criteria resulting in the exclusion of patients with comorbidities; thus, given that our findings suggest that the clear majority of patients have at least one comorbid condition, the generalizability of these studies to naturalistic clinical samples may be limited.

Consistent with our expectations and the limited available data, the presence of a comorbid disorder negatively affected treatment response. Overall, it is worth noting that the level of symptom decrease seen in this study is above what is typically seen in SRI monotherapy trials. Almost all of the patients (92%) without a comorbid diagnosis were treatment responders and achieved clinical remission of symptoms. In contrast, of those with one or more comorbid diagnoses, only 69% met criteria for treatment response and only 46% met remission criteria. One way to understand this finding is that in patients without a comorbid condition, clinicians are able to direct optimal attention to OCD symptoms rather than concurrently attempting to manage comorbid symptoms. In other words, the mechanism of action may be that the presence of a comorbidity may decrease the amount of time spent during a CBT session on OCD-related tasks. In light of the observed differences in efficacy found between those with and without a comorbidity, the question is raised regarding whether studies with strict exclusionary criteria may present an artificially high response rate. As discussed further below, features of comorbid conditions may uniquely affect the successful implementation of CBT.

With this point in mind, our hypotheses were generally confirmed when examining the impact of specific disorders on CBT outcome. DBDs, ADHD, and MDD negatively affected response and/or remission rates. Thematically, each disorder affects the integrity with which CBT is provided, albeit in somewhat different manners. With DBDs, patients are often resistant to engage in therapy-related tasks and may be unwilling to relinquish secondary gains. Similarly, they may present with limited motivation to confront feared stimuli and increased willingness to defy the therapist’s requests. Depending on the severity of the DBD, more session time may be spent responding to tantrums and attempting to convince the child to engage in exposures than is spent providing psychoeducation or actually performing exposures. The presence of ADHD may be
associated with decreased ability to stay focused during the therapy session or attend to the anxiety-producing stimuli. Patients may become restless during exposures, thereby decreasing experience of habituation. ADHD symptoms may interfere with children's ability to engage in cognitive restructuring exercises, thereby reducing the benefit of such interventions. In addition, deficits in executive functioning associated with ADHD may make it more difficult for patients to independently plan and implement exposures and other therapeutic tasks. Depressive disorders may be associated with decreased anxiety habituation during exposures as well as diminished hope for a positive treatment response and decreased motivation to engage in therapy. Children with comorbid depression may also have more difficulty imagining the benefits of getting better and may be more discouraged by typical challenges and setbacks during the course of therapy.

Interestingly, we found that youths whose ADHD was not being treated pharmacologically had higher remission rates. This may be because youths with more severe symptoms, both ADHD and overall, receive additional pharmacological treatment to manage their overall clinical presentation. Supporting this and consistent with adult data suggesting attenuated CBT outcome for those who have an incomplete response to two or more psychotropic medications targeting OCD, our results indicate that those patients taking an SRI and an augmenting agent had a lower remission rate than those not taking medication. Despite being recommended as a first-line treatment, few youths had received an adequate CBT trial before initial presentation. It is interesting to consider whether those youths on multiple medications would have had a positive CBT response if they had received it earlier in their illness course or, alternatively, those youths on multiple medications represent a refractory subset who have limited response to available treatments.

Certain comorbid conditions, such as a tic disorder or generalized anxiety disorder, did not negatively affect outcome. March et al. suggested that skills learned in CBT for OCD may actually generalize to help treat such related conditions. For example, learning adaptive ways to restructure OCD cognitions or confront anxiety-provoking situations may generalize to non-OCD anxiety symptoms. Similarly, response-prevention strategies for rituals in those with non-tic OCD symptoms may generalize to tic-like OCD symptoms as well. An important consideration when conducting research on comorbid diagnoses with any psychiatric condition is that of the categorical or dimensional nature of comorbid symptoms. We examined comorbid conditions from both a categorical ("Did a patient meet criteria for a comorbid disorder?"), and a dimensional ("How many comorbid conditions were present?") perspective to demonstrate the relative contributions of specific comorbid conditions to OCD treatment response as well as the detrimental effects of multiple comorbid conditions on treatment response. Current results indicate both specific categories (DBD, ADHD, and MDD) and increased number of conditions detrimentally affect CBT for pediatric OCD. This may be due to increased case complexity or, as noted above, the specific qualities of the comorbid symptoms. Research examining comorbid symptom severity dimensionally and the contribution of increased comorbid symptom severity as a predictor of treatment response is a logical follow-up to the present study.

This study has several limitations. First, raters were aware that participants were receiving treatment and interrater reliability data on the CY-BOCS after assessment were not collected. Similarly, because the same rater evaluated each participant before and after treatment, it was not possible to maintain blinding to treatment type given the differences in the length of therapy (e.g., 3 versus 14 weeks). On balance, given the post hoc nature of these analyses, raters were blinded to the hypotheses in the present study. Second, our sample was demographically homogeneous (e.g., largely white) and were members of families with a higher income than the U.S. median. Third, given the absence of any statistical correction, the possibility of committing a type I error is increased. Fourth, due to inclusion/exclusion criteria and low rates in our sample, the impact of several diagnoses was not assessed (e.g., Asperger syndrome, separation anxiety disorder, bipolar disorder). Fifth, patients with comorbid diagnoses had higher CY-BOCS scores at baseline. Thus, analyses of remission rates that used a score of ≤10 on the CY-BOCS may have been biased toward increased remission rates in the patients with no comorbid conditions; however, remission rates also included ADIS-IV-P Severity scores, which did not differ between patients with and without comorbid diagnoses before treatment. Sixth, our use of the ADIS-IV-P was based on the competency of the research team in the

590 www.jaacap.com J. AM. ACAD. CHILD ADOLESC. PSYCHIATRY, 47:5, MAY 2008
administration of this measure, as well as our hope to minimize participant burden. However, the use of more comprehensive measures such as the Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version may have allowed us to assess a wider range of DSM-IV diagnoses. Seventh, although we were able to analyze response rates as a function of medication regimen, we did not have comprehensive information on the number of previous medication trials that participants had received. There is some evidence that the number of medication trials may be associated with attenuated CBT outcomes. Finally, given that many subjects participated in a time-limited treatment, it is difficult to objectively evaluate whether comorbid diagnoses changed after CBT participation, and, thus, these data are not considered.

Our findings highlight the importance of comorbidity in the assessment and treatment of pediatric OCD patients. Before treatment, a comprehensive assessment of comorbid conditions, particularly those uniquely linked to attenuated response, should be conducted. In addition to a clinical interview, quantitative measures may be informative in assessing the presence and severity of comorbid symptoms. In studies of pediatric OCD, it seems reasonable to include a broad range of comorbid illnesses, similar to that in the Pediatric Obsessive-Compulsive Disorder Treatment Study, to ensure the generalizability of results. Treatment of comorbid conditions before CBT may enhance outcome. For example, conducting parent management training for comorbid DBDs may decrease resistance to exposure participation and improve family involvement in treatment. Pharmacotherapy for ADHD may decrease attention deficits and allow youths to better attend to and retain concepts discussed in session. In addition to pre-CBT pharmacological treatment for depression, recent data have identified depression-focused CBT as an effective treatment modality. Therapy for the depressed OCD patient could initially target depressive symptoms either with medication or CBT before addressing OCD symptoms. Future studies should examine which depressive symptoms will remit with OCD treatment and which would benefit from preliminary treatment before participation in OCD-focused CBT. Studies examining methods of treating pediatric OCD patients with comorbid conditions are needed to effectively transport clinic-based interventions into the community.

**REFERENCES**


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