Predictors Associated With Improved Cognitive-Behavioral Therapy Outcome in Pediatric Obsessive-Compulsive Disorder

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Objective: To identify predictors of treatment response in a large sample of pediatric participants with obsessive-compulsive disorder (OCD). The Nordic Long-term Obsessive compulsive disorder (OCD) Treatment Study (NordLOTS) included 269 children and adolescents, 7 to 17 years of age, with a *DSM-IV* diagnosis of OCD. Outcomes were evaluated after 14 weekly sessions of exposure-based cognitive-behavioral therapy (CBT).

Method: The association of 20 potential predictors, identified by literature review, along with their outcomes, was evaluated using the Children's Yale–Brown Obsessive-Compulsive Scale (CY-BOCS) posttreatment. A CY-BOCS total score of ≤15 was the primary outcome measure.

Results: The univariate analyses showed that children and adolescents who were older had more severe OCD, greater functional impairment, higher rates of internalizing and externalizing symptoms, and higher levels of anxiety and depression symptoms before treatment had significantly poorer outcomes after 14 weeks of treatment. However, only age was a significant predictor in the multivariate model.

Conclusion: In the multivariate analysis, only age predicted better treatment outcome. Using univariate analysis, a variety of predictors of poorer treatment outcome after CBT was identified. The high impact of comorbid symptoms on outcome in pediatric OCD suggests that treatment should address comorbidity issues. The lack of a family predictor may be related to high family involvement in this study. Future research strategies should focus on optimizing intervention in the presence of these characteristics to achieve greater benefits for patients with OCD.

Clinical trial registration information—Nordic Long-term Obsessive compulsive disorder (OCD) Treatment Study; www.controlled-trials.com; ISRCTN66385119.

Key Words: pediatric OCD, cognitive-behavioral therapy, predictors

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Pediatric obsessive-compulsive disorder (OCD) is a severe mental illness that causes significant distress and impaired functioning in a wide range of domains in children and adolescents.[1,2] Epidemiological studies suggested that OCD affects between 0.5% and 2% of youth in the general population.[3,4] Based on more than 2 decades of high-quality clinical trials, there is now strong evidence supporting the efficacy of 2 first-line interventions for the treatment of pediatric OCD: namely, exposure-based cognitive-behavioral therapy (CBT), and psychopharmacological treatment, specifically with serotonin reuptake inhibitor (SRI) compounds.[5-9] When treated with 1 or both of these therapies, more than 50% of pediatric patients with OCD will likely experience a clinically meaningful reduction in their OCD symptoms.[8] However, despite these encouraging results, a substantial number of patients may experience little to no benefit or show only partial treatment response to these first-line treatments.[10] The heterogeneity in treatment response underscores the need for a better understanding of factors related to treatment outcomes. This is particularly important, given ongoing policy debates regarding how best to allocate and distribute limited medical resources.

One method that can be used to inform decisions is to assess predictors of treatment outcome. Predictors are baseline characteristics of patients that are associated with posttreatment outcomes and that do not vary by treatment assignment.[11] Baseline characteristics that vary by treatment received (i.e., moderators) are not the focus of this article, as such analyses can be undertaken only in trials with 2 or more treatment conditions.

Very few published randomized controlled trials (RCTs) in pediatric OCD have evaluated predictors of treatment response because most studies are powered to detect the effects of treatments on primary outcomes.[12]

Ginsburg *et al.*[12] summarized 21 RCTs published between 1985 and 2007. Among these studies, only 6 (28.6%) performed a predictor analysis. In these 6 studies, 9 candidate

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predictors (gender, age, duration of illness, baseline severity, and different types of OCD symptoms, comorbid disorders, psychophysiological factors, neuropsychological factors, and family factors) were evaluated. A brief summary of this literature suggests that higher OCD symptom severity and higher levels of family dysfunction were associated with poorer response to treatment. Other participant characteristics, such as age, gender, and duration of illness were not found to be consistently associated with treatment response. None of the previous CBT trials and only 1 SRI study found gender as a predictor.[13] The first large comparative treatment study in pediatric OCD, the Pediatric OCD Treatment Study (POTS),[14] found that baseline OCD symptom severity, OCD-related functional impairment, comorbid externalizing symptoms, poor insight into OCD symptoms, and family accommodation were predictors of treatment response.[14] Since the review by Ginsburg *et al*,[12] several additional studies have evaluated predictors of treatment response in pediatric OCD; results from these studies are also mixed.[15-18] However, in studies of non-OCD pediatric anxiety disorders, higher baseline symptom severity and poorer family function have consistently been shown to predict poorer outcomes.[19]

In this article, we present results of a systematic analysis of predictors of treatment response using data from the Nordic Long-term Obsessive compulsive disorder (OCD) Treatment Study (NordLOTS). NordLOTS is a multinational, multi-site treatment trial evaluating a stepped-care treatment model in pediatric OCD. In the first step, all of the participants were offered a full course of exposure-based CBT. Analyses presented are limited to outcomes after this first step of treatment.

Using data from the NordLOTS trial, candidate predictors were organized into the following 4 categories: demographic characteristics, illness severity, co-morbid disorders/symptoms, and family factors. Based on the current literature, we predicted that poor treatment response would be associated with the following: higher levels of OCD symptom severity; higher levels of OCD-related functional impairment; comorbid internalizing and externalizing symptoms; and higher levels of family accommodation.

METHOD

Participants

A total of 269 participants between the ages of 7 and 17 years were recruited between September 2008 and May 2012. The average age of the NordLOTS sample was 12.8 years (SD = 2.7 years), with roughly equal numbers of male and female participants (51.3% and 48.7%). The majority of the participants (97%) were of Scandinavian ethnicity, and close to half (40.5%) met *DSM-IV* [20] criteria for a comorbid psychiatric disorder. A detailed description of the demographic and clinical characteristics of the NordLOTS study sample has been reported elsewhere.[21] To be eligible to participate in the study, participants had to be between 7 and 17 years of age, to receive a primary *DSM-IV* diagnosis of OCD, and to have a baseline CY-BOCS score of ≥16. Exclusion criteria were the presence of psychiatric disorder(s) with a higher treatment priority (e.g., psychosis or major depression disorder), or a pervasive developmental disorder (i.e., PDD, Asperger's disorder, or autism spectrum disorder). However, participants who met diagnostic criteria for PDD-NOS were eligible for the study entry as long as their symptoms of OCD were more impairing.

The first step of stepped-care treatment protocol consisted of 14 weekly treatment sessions of open-label exposure-based CBT. Each weekly treatment session lasted approximately 75 minutes. Children and adolescents were seen together with their parents in 6 of the 14 sessions (sessions 1–3, 5, 11, and 14). In the remaining sessions, children and adolescents were treated individually for 45 minutes, and then the parents were seen with or without the child for the remaining 30 minutes.[21]

Assessments were conducted at baseline, midtreatment (week 7), and posttreatment (week 14) by certified independent evaluators (IEs). At the end of the 14 weeks of treatment, participants were rated as either responders or nonresponders, based on the CY-BOCS total score. Participants with a CY-BOCS score of ≤15 were rated as treatment responders. For assessments, IEs were trained in the use of the Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime version (K-SADS-PL) via formalized training procedures from a doctoral-level psychiatrist (the NordLOTS principal investigator). The IEs' training involved observing and coding both taped and live K-SADS-PL interviews. The interviews were recorded, but interrater agreement has not been assessed for the K-SADS-PL.

Measures

K-SADS-PL. The K-SADS-PL[22] is a semi-structured diagnostic interview that assesses a range of child psychopathology. It demonstrated favorable psychometric properties, with interrater reliability of 98% agreement, and a 1- to 5-week test–retest κ value of 0.80 for any anxiety disorder diagnosis.[22]

CY-BOCS. The CY-BOCS[23] is a widely used clinician-administered, semi-structured interview assessing the severity of OCD symptomatology. The CY-BOCS has shown reasonable reliability and validity,[24,25] high internal consistency for the total score ($\alpha = 0.87$),[24] and good-to-excellent interrater agreement (with intraclass correlation coefficients [ICCs] of 0.84, 0.91, and 0.68 for the total score, obsessions, and compulsions, respectively).

Socioeconomic Status. Hollingshead's 2-factor index of social position was used to classify the socioeconomic status (SES)[26] of each family. This index combines ratings of parental occupation (on a 1–9 scale) and parental education level (on a 1–7 scale). Occupation is given a weight of 5 and education a weight of 3. These 2 weighted factors are then summed to generate a total score, which is transformed into a scale between 1 and 5. For analyses, the SES score was further dichotomized into high SES (scores 4 and 5; 46.6%) and low SES (scores 1–3; 53.4%).

Child Behavior Checklist. The Child Behavior Checklist (CBCL)[27] is a widely used 113-item parent report, with well-established

TABLE 1 Children's Yale–Brown Obsessive Compulsive Scale (CY-BOCS) Pre- and Posttreatment Scores (Scalar Variables)

CY-BOCS Baseline Scores, Mean (SD)	
Total baseline scores	24.6 (5.1)
Baseline compulsions scores	12.3 (2.7)
Baseline obsessions scores	12.3 (2.8)
CY-BOCS Posttreatment Scores	
Total posttreatment scores	11.4 (6.7)
Posttreatment compulsions scores	5.6 (3.9)
Posttreatment obsessions scores	5.8 (3.6)