The link between ADHD-like inattention and obsessions and compulsions during treatment of youth with OCD

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\textbf{ABSTRACT}

Attention-deficit/hyperactivity disorder (ADHD) has been found to be highly comorbid in children and adolescents with obsessive-compulsive disorder (OCD). Some have proposed, however, that obsessive anxiety may cause inattention and executive dysfunction, leading to inappropriate ADHD diagnoses in those with OCD. If this were the case, these symptoms would be expected to decrease following successful OCD treatment. The present study tested this hypothesis and evaluated whether ADHD symptoms at baseline predicted OCD treatment response. Obsessive-compulsive and ADHD symptoms were assessed in 50 youth enrolled in a randomized controlled trial investigating selective serotonin reuptake inhibitor and cognitive behavioral treatment. Repeated-measures analysis of variance (RMANOVA) revealed that ADHD symptoms at baseline do not significantly predict treatment outcome. A multivariate RMANOVA found that OCD treatment response moderated change in inattention; participants who showed greater reduction in OCD severity experienced greater reduction in ADHD-inattentive symptoms, while those with less substantial reduction in obsessions and compulsions showed less change. These findings suggest that children and adolescents with OCD and inattention may experience meaningful improvements in attention problems following OCD treatment. Thus, in many youth with OCD, inattention may be inherently tied to obsessions and compulsions. Clinicians may consider addressing OCD in treatment before targeting inattentive-type ADHD.

1. Introduction

Attention-deficit/hyperactivity disorder (ADHD) has been reported to be highly comorbid in children and adolescents with obsessive-compulsive disorder (OCD), with a pooled prevalence estimate of 19% across 42 studies of youth with a primary diagnosis of OCD (Abramovitch, Dar, Mittelman, & Wilhelm, 2015). The high risk for ADHD in children with OCD is of particular concern when considering the detrimental effects of co-occurring ADHD and OCD. Specifically, children with both OCD and ADHD often have an earlier age of onset compared to those with OCD only, are more functionally impaired (Masi et al., 2006), perform worse in school (Geller et al., 2003), have higher rates of other comorbid conditions like major depression, tic disorders, and disruptive behavior disorders (Masi et al., 2006), and may experience poorer treatment outcomes (Storch et al., 2008; Walitza et al., 2008).

1.1. Diagnosis of ADHD in individuals with OCD

Although the number, types, and severity of ADHD symptoms are...
similar when individuals with OCD and ADHD are compared with those who only have ADHD (Geller et al., 2002), evidence from familial, clinical, and neuropsychological studies is beginning to indicate that the reported comorbidity rate may be an overestimation of the true prevalence of ADHD in OCD (Abramovitch, Dar, Hermesh, & Schweiger, 2012).

While there is evidence for shared genetic risk factors between OCD, ADHD, and tic disorders (Mathews & Grados, 2011; Pinto et al., 2016), there is also support for independent familial risk for OCD and ADHD in the absence of tics. Indeed, studies that have investigated ADHD prevalence in people with a primary diagnosis of OCD have generally found a higher prevalence when they included children with co-occurring tic disorders (Sheppard et al., 2010). First-degree family members of children with ADHD only and healthy children are equally unlikely to have OCD when compared to relatives of children with both OCD and ADHD (Geller et al., 2007a). Similar results were found in a study investigating children with OCD and ADHD, children with OCD only, and healthy controls; first-degree relatives of children with ADHD and OCD were significantly more likely to have ADHD than relatives of healthy controls and children with OCD only, while there was no significant difference in the rate of ADHD between the OCD only and healthy control groups (Geller et al., 2007b). Together, these two studies indicate that there are independent familial risk factors for developing ADHD and OCD.

Studies comparing cognition and self-reported ADHD symptoms in individuals with ADHD, with OCD, and healthy controls are beginning to suggest that ADHD-like inattention may be caused by obsessive-compulsive symptoms in those with OCD. For instance, while ADHD and OCD are both characterized by frontostriatal dysfunction compared with healthy controls, the proposed neurological pathways to these deficits are antithetical. Obsessive-compulsive disorder is linked with frontostriatal hyperactivity, whereas the desire for high control over planning and certainty; ADHD is characterized by a lower activity in these regions, as inattention and executive dysfunction may be related to a lack of planning or inhibitory control (Abramovitch et al., 2012; Norman et al., in press). These findings support a recently proposed “executive overload” model of OCD, which posits that deficits in frontal functions are a consequence of repeated attempts to control thoughts, leading to exhaustion of the executive system (Abramovitch et al., 2012). Executive functioning deficits are also prevalent in youth with OCD (Abramovitch et al., 2015), and deficits across multiple domains of parent-reported executive functioning have been associated with increased obsessive-compulsive symptom severity in children with the disorder (McNamara et al., 2014). Exhaustion of the executive system caused by obsessive thinking could result in behaviors that are phenomenologically similar to symptoms of ADHD (e.g., distractibility, forgetfulness), but instead are related OCD. Indeed, Abramovitch et al. (2012) (Abramovitch, Dar, Mittelman, & Schweiger, 2013) found that while obsessions and compulsions may be linked with ADHD symptoms and executive dysfunction among individuals with OCD, the two constructs seem to be unrelated in people with subclinical levels of obsessive-compulsive symptoms. Finally, numerous studies have demonstrated that adults with OCD are less behaviorally impaired than healthy controls (Abramovitch & McKay, 2016), though these results have not been replicated with children and adolescents. The frequency of hyperactive-impulsive symptoms in children with OCD may be different; obsessive-compulsive symptom severity has been linked with other externalizing behaviors like oppositionality and defiance (Lebowitz, Omer, & Leckman, 2011) and emotional dysregulation (McGuire et al., 2013; McNamara et al., 2014), which may in turn be associated with impulsive, hyperactive behavior.

These findings beg the question of whether diagnosed ADHD in children with OCD always represents true underlying ADHD pathology. It may be the case that obsessive-compulsive symptoms exacerbate inattention in many people with OCD, leading to inappropriate ADHD diagnoses (see Abramovitch, Dar et al., 2015 for a recent review). In childhood OCD, this may manifest as externalizing symptoms exacerbated by the presence of OCD. For instance, children with OCD may have difficulty staying in their seat during class or paying attention to their parents due to having repeated intrusive thoughts, rather than having underlying inattentive, hyperactive dispositions. To our knowledge, this hypothesis has never been tested in children with the disorder. Frontostriatal dysfunction tends to normalize following successful treatment of children and adolescents with OCD, and thus attentional abilities may improve as well (Freyer et al., 2011). If this is the case, ADHD-like symptoms may decrease following treatment that targets obsessive-compulsive symptoms, and that reduction would be expected to correspond with reductions in OCD severity.

1.2. ADHD and OCD treatment outcome

Previous research has also found that comorbid ADHD may interfere with success in OCD treatment (Geller et al., 2003; Storch et al., 2008). The first-line treatment recommended for children with OCD is cognitive behavioral therapy with exposure and response prevention (CBT-E/RP) in mild to moderate cases and in combination with selective serotonin reuptake inhibitors (SSRIs) in severe cases (Freeman et al., 2014; Geller & March, 2012). Children and adolescents with OCD and ADHD have been shown to have relatively poorer treatment outcomes in CBT-E/RP. Though the mechanisms have not been studied directly, children with elevated ADHD symptoms may experience poorer treatment outcomes because impulsive, hyperactive children may be more resistant to participating in challenging exposure exercises or resist engaging in compulsions. Further, inattentive children may not encode corrective information following exposures (Storch et al., 2008). Following successful inpatient treatment, those with both OCD and ADHD are more likely to experience a relapse of symptoms compared to patients with OCD without ADHD (Walitza et al., 2008). There have been mixed results with respect to whether children with both conditions respond poorly to SSRI treatment, with one study finding poorer treatment outcomes among those with ADHD and OCD (Geller et al., 2003), and another finding non-significant results (Masi et al., 2006). In the largest randomized controlled trial of combined CBT-SSRI treatment of children and adolescents with OCD to date, externalizing symptoms (an aggregate of ADHD, oppositional defiant disorder, and conduct disorder symptoms) predicted poorer treatment outcome (Garcia et al., 2010).

No study to date, however, has evaluated ADHD symptoms specifically as a predictor of combined CBT-ERP and SSRI treatment. Though measuring comorbid ADHD symptoms as a continuous variable is common in psychiatric research and there is mounting evidence that the disorder can be appropriately classified on a “spectrum” (Asherson & Trzaskowski, 2015), OCD treatment outcome studies have typically examined ADHD or externalizing problems as a dichotomous diagnostic predictor or moderator. Measuring ADHD as a continuous variable may also capture subclinical symptoms that may also interfere with treatment.

1.3. The present study

If OCD truly contributes to ADHD-like inattention, these symptoms should be expected to decrease as obsessions and compulsions decline. In the present study, we test the hypothesis that attention problems will decrease following successful OCD treatment. We also examine whether other ADHD symptoms like impulsivity and hyperactivity decrease following OCD treatment. The second study aim is to evaluate whether baseline ADHD symptoms predict multimodal treatment outcome, measuring ADHD symptoms as continuous variable. It is hypothesized that fewer parent-rated ADHD symptoms at baseline predict superior treatment outcome.
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