



Sleep problems and cognitive behavior therapy in pediatric obsessive-compulsive disorder have bidirectional effects



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ABSTRACT

Objectives: To investigate the presence of sleep problems and their reaction to CBT in pediatric obsessive compulsive disorder (OCD). Moreover, we investigated whether sleep problems predict the outcome of CBT on OCD-symptoms.

Methods: 269 children and adolescents, age 7–17 years, with DSM-IV primary OCD that took part in the first step of a stepwise treatment trial, were assessed with regard to both individual sleep problems and a sleep composite score (SCS) using the Child Behavior Checklist (CBCL). Their OCD symptoms were rated using the Children Yale-Brown Obsessive Compulsive Scale (CY-BOCS).

Results: We found elevated symptoms of sleep deprivation and nightmares before treatment. However most sleep problems (e.g. nightmares ($p = .03$), too little sleep ($p < .001$), trouble sleeping ($p < .001$) and parasomnias ($p = .03$)) as well as being over-tired ($p < .001$) reduced during CBT treatment. Co-morbidities had no effect on the reduction of SCS. Moreover, elevated levels of sleep problems using the SCS ($p < .001$), as well as any sleep problem at baseline ($p < .001$) predicted less effect of CBT on the OCD symptoms.

Conclusion: Sleep problems in paediatric OCD are frequent and interfere with treatment outcome. They need to be assessed using better methods in future trials. Moreover, lack of resolution of sleep problems need to be recognized and treated as it seems probable that continued sleep problems may have a negative impact on CBT efficacy.

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1. Introduction

Sleep problems are common in both children and adolescents and have been reported among young people in the range 10–75% (assessment methods have varied). Moreover, the difficulties seem to persist in many, although decreasing with age in many as well (Gregory, Rijsdijk, Dahl, McGuffin, & Eley, 2006; Zuckerman, Stevenson, & Bailey, 1987). However, childhood sleep problems may persist into adolescence (Gregory & O'Connor, 2002).

Abbreviations: OCD, obsessive-compulsive disorder; PDD NOS, pervasive developmental disorder not otherwise specified; ADHD, attention deficit hyperactivity disorder; CBT, cognitive behavior therapy; SRI, serotonin re-uptake inhibitor; SSRI, specific SRI; NordLOTS, Nordic Long-term OCD Treatment Study; KSADS, Kiddie schedule for affective disorders and schizophrenia; CY-BOCS, Children's Yale-Brown Obsessive Compulsive Scale; CBCL, Child Behavior Check List; CGI, Clinical Global Impression; LME, linear mixed effects model; POTS, Pediatric OCD Treatment Study.

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Continued sleep problems are associated with psychiatric disorders (Chorney, Detweiler, Morris, & Kuhn, 2008; Gregory & Sadeh, 2012; Ivanenko & Johnson, 2008). In anxiety disorders and depression, sleep problems are especially common (Alfano, Beidel, Turner, & Lewin, 2006; Alfano, Ginsburg, & Kingery, 2007; Charuvastra & Cloitre, 2009; Chase & Pincus, 2011; Hudson, Gradisar, Gamble, Schniering, & Rebelo, 2009; Ivanenko, Crabtree, & Gozal, 2004), less than 1 in 10 reported, for example, no problems (Chase & Pincus, 2011). Such problems are essential parts of the disorder in generalized anxiety and depression (American Psychiatric Association, 2013). However, other psychiatric disorder with high levels of anxiety, e.g. OCD, is also strongly associated with sleep problems (Dubitsky, 2005; Ivarsson & Larsson, 2009), as are ADHD (Cortese et al., 2013) and autism (Goldman, Richdale, Clemons, & Malow, 2012).

In paediatric anxiety disorders and OCD, studies using sleep assessment methods have clarified that sleep problems are both prevalent and specific (Alfano & Kim 2011; Alfano, Pina, Zerr, & Villalta, 2010; Alfano, Reynolds, Scott, Dahl, & Mellman, 2013; Alfano, Zakem, Costa, Taylor, & Weems, 2009; Forbes et al., 2008). That is, that the sleep problems are not a halo effect from the disorder, or due to a lack of specificity in assessment methods.

Clinical experience shows that obsessive ruminations with elevated levels of anxiety and arousal before bedtime as well as rituals that delay sleep onset are common in paediatric OCD, even though research did not show increased latency to sleep (Alfano & Kim, 2011). However, residual arousal leading to more shallow sleep, and difficulties in falling asleep again following awakening may cause the fragmented sleep pattern noted by Alfano and Kim (2011). Although, it is difficult to explain the link between too little sleep and more severe compulsive behaviours it is possible that different rituals (e.g. mental rituals bed) may be responsible. This relationship needs to be replicated. Few studies have examined sleep problems in paediatric OCD, two studies using large samples (Ivarsson & Larsson, 2009; Storch et al., 2008), showed that such problems were prevalent, in that, about a third had significant problems, and that less than 10% had none. However, the assessment methods used were unspecific (CBCL – depression and anxiety scales sleep items). The findings are substantiated by a study using sleep specific assessment methods in a smaller sample, showing that sleep problems are both common and severe (Alfano & Kim, 2011). She found that the patients' sleep patterns were fragmented, that the total sleep time was reduced and that patients spent longer wake periods after sleep onset as compared to controls. Moreover, the severity of compulsions but not obsessions was significantly related to total sleep time (TST), indicating less TST among children with elevated compulsions.

However, there is still little data as to whether sleep problems associated with OCD reduce from treatment, and whether it is common with residual significant sleep problems in responders or non-responders to treatment. Storch et al. (2008) found a significant reduction of sleep problems following cognitive behaviour therapy (CBT) for OCD. However, we are not aware of any studies showing whether serotonin re-uptake-inhibiting (SRI) agents for OCD reduce sleep problems as well. Moreover, we as well lack data on whether sleep problems may compromise treatment with CBT.

2. Aims

To investigate the presence of sleep problems in the Nordic Long-Term OCD Treatment Study (NordLOTS) (Torp et al., 2015) and to what extent sleep was affected by CBT for the OCD-symptoms. Furthermore, to investigate whether sleep problems at baseline were associated with poorer response of CBT.

3. Methods

The data are part of the NordLOTS, a stepwise treatment study aiming at evaluating whether CBT or drug treatment with sertraline is best for children and adolescents with OCD who do not respond to CBT. The rationale, design and methods of the NordLOTS are described elsewhere (Ivarsson et al., 2010; Thomsen et al., 2013). In short, it started in September 2008 and finished inclusion in June 2012, when a large cohort of patients with OCD ($n = 269$) their first treatment step with 14 weeks of CBT in three countries, and five sites using 19 clinics.

3.1. Participants

We assessed and treated 269 pediatric patients in the study, with patients recruited through community mental health centres, general practitioners, child mental health specialists and parents/relatives. Inclusion criteria into step 1 of the study were: (1) a primary diagnosis of OCD in accordance with the criteria in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV), Text Revision (American Psychiatric Association, 2000); (2) moderate to severe OCD (CY-BOCS entry score ≥ 16); (3)

being from 7 to 17 years of age. Exclusion criteria were kept to a minimum, in order to ensure a representative sample of paediatric patients seeking treatment for OCD. These included: (1) the presence of a DSM-IV psychiatric disorder with a higher treatment priority (i.e. psychosis and severe depression); (2) mental retardation and/or autism spectrum disorders (a diagnosis of PDD NOS was allowed as long as OCD was judged to be the principle disorder based on the respective Clinical Global Impression-Severity (CGI) scores); (3) a previous failed trial of E/RP for OCD within less than 6 months prior to inclusion; (4) medication treatment with SRI less than 6 months prior to inclusion; and (5) inadequate language proficiency by the patient or the parent.

3.2. Measures

The OCD and co-morbidity diagnosis was made using the Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime version (K-SADS-PL) (Kaufman et al., 1997). It is a semi-structured diagnostic interview that assesses a range of child psychopathology, and has good psychometric properties e.g. an inter-rater reliability of 98% and a 1–5 week test-retest kappa of .80 for any anxiety disorder diagnosis. Good convergent and divergent validity have been shown in a Nordic sample of adolescents (Lauth et al., 2010). In this report, we use only diagnoses at a group level, e.g. any depressive disorder, any anxiety disorder, any ADHD, and any tic disorder. Data on the co-morbidity can be found in a previous paper from our group (Torp et al., 2015).

The Children Yale-Brown Obsessive Compulsive Scale (CY-BOCS) (Goodman et al., 1989) is a clinician-rated, semi-structured interview assessing the character and severity of OCD symptomatology. It uses ten severity items across five dimensions (time occupied by symptoms, interference, distress, resistance and degree of control over symptoms for obsessions and compulsions separately, yielding a total severity score from 0 to 40. The CY-BOCS shows reasonable reliability and validity (Gallant et al., 2008; Scahill, Riddle, McSwiggin-Hardin, & Ort 1997; Storch et al., 2004).

The Child Behavior Checklist (CBCL) (Achenbach & Rescorla, 2001) is a wide spectrum symptom assessment tool which allows parents to rate their children's psychological and psychiatric symptoms. It also contains six items assessing sleep problems: "experiences nightmares," "sleeps less than most children," "sleeps more than most children," "talks or walks in sleep," "trouble sleeping," and "overtired". A "sleep problem scale" has been used that adds scores on these six items. This general sleep problem scale has been used in previous research (e.g. (Alfano, Ginsburg, & Kingery, 2007; Gregory & O'Connor, 2002; Stoleru, Nottelmann, Belmont, & Ronsaville, 1997) and it yields a score from 0 to 12. The internal consistency of the scale was higher than in the previous study of Gregory (2002), or $\alpha = .64$. However, no specific sleep scale was included in the assessments so that, for example, the assessment of the circadian rhythm, sleep latency or total sleep time was not examined.

3.3. Treatment

All participants were treated with exposure-based CBT based on a published manual used in previous treatment outcome studies (March & Mulle, 1998; POTS Treatment Study Team, 2004). The manual was modified by adding more extensive family participation based on the work of Piacentini et al. (2011). All details can be found in Torp et al. (2015) and Thomsen et al. (2013). Briefly, the treatment consisted of 75 min weekly sessions for 14 weeks. Parents were expected to accompany their children to all sessions. The children were seen together with their parents in 6 of the 14 sessions (sessions 1–3, 5, 11, and 14). In the remaining sessions, the child was treated individually for 45 min and then the parents were

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