Parent-reported problematic sleep behaviors in children with comorbid autism spectrum disorder and attention-deficit/hyperactivity disorder

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ABSTRACT

Background: Sleep problems are frequent and well documented in children with Autism Spectrum Disorders (ASD), children with Attention Deficit/Hyperactivity Disorder (ADHD) and children with internalizing problems, however limited work has examined sleep problems in children presenting with comorbid ASD/ADHD. In healthy children, sleep problems negatively impact social, emotional, and academic functioning. The current study sought to examine diagnostic severity as predictors of sleep problems in children with comorbid ASD/ADHD. Additionally, the association between sleep and “real-life” functional domains (i.e., intellectual functioning, academic achievement, and executive functioning) were assessed.

Method: Sleep, internalizing difficulties, intellectual functioning, academic achievement and executive functioning were assessed in 85 children with who carried the dual diagnoses of ASD and ADHD.

Results: Internalizing difficulties, rather than ASD or ADHD symptom severity, was the most consistent predictor of problematic sleep behaviors (i.e., nightmares, overtiredness, sleeping less than other children, trouble sleeping, and Total Problematic Sleep Behaviors) in this sample. Further, parent report of problematic sleep behaviors was significantly associated with functional domains after controlling for ASD, ADHD, and internalizing symptoms.

Conclusions: Results suggest that internalizing symptoms are associated with problematic sleep behaviors in children with comorbid ASD/ADHD and may have implications for the “real-life” functioning among children with comorbid ASD/ADHD.

1. Introduction

Adequate sleep is essential for healthy child development (Dahl, 1996). By 2 years old, a child has spent approximately 14 months of life asleep (Anders, Sadeh, & Appareddy, 1995), their brain has reached 90% of its adult size (Chugani, Phelps, & Mazziotta, 1987), and several core developmental milestones have typically been achieved (e.g., walking, talking; Carruth, Ziegler, Gordon, & Hendricks, 2004; Raviv, Kessenich, & Morrison, 2004). The parallel between significant developmental changes and the
need for sleep in the first two years of life suggests that sleep plays an integral role in human development (Dahl, 1996). In fact, sleep problems in children are associated with impairments in academic or occupational achievement (Dewald, Meijer, Oort, Kerkhof, & Bögels, 2010), emotional and behavioral functioning (Pesonen et al., 2010), family cohesion (Bell & Belsky, 2008; Simard, Nielsen, Tremblay, Boivin, & Montplaisir, 2008), and neuropsychological abilities (Carskadon, Harvey, & Dement, 1981). As such, children with developmental and/or psychological disorders known to impact sleep, such as autism spectrum disorder (ASD), are at risk for further problems with “real-life” functioning (i.e., executive functioning, academic achievement, intellectual functioning) associated with sleep problems. Internalizing problems, defined here as inwardly focused negative thoughts or behaviors, such as fearfulness, social withdrawal and somatic complaints that are core problems with “real-life” functioning (i.e., executive functioning, academic achievement, intellectual functioning) associated with sleep problems. Internalizing problems, defined here as inwardly focused negative thoughts or behaviors, such as fearfulness, social withdrawal and somatic complaints that are core components in the development of anxiety and/or depressive symptoms, are also highly associated with sleep problems (Alfano, Ginsburg, & Kingery, 2007; Liu et al., 2006). Further, internalizing problems have been shown to impact functional outcomes in healthy children (Cabeza & Nyberg, 2000; Wolfson & Carskadon, 2003).

1.1. Sleep in children with autism spectrum disorders

Children with ASD have difficulties with social interaction and communication, and demonstrate restricted and repetitive behaviors and interests (DSM-5; American Psychiatric Association, 2013). Due to the pervasive nature of ASD, families of children with ASD experience greater stress than parents of typically-developing children (Eisenhower, Baker, & Blacher, 2005). This increased stress, however, is magnified when a child with ASD experiences sleep problems (Lopez-Wagner, Hoffman, Sweeney, Hodge, & Gilliam, 2008). Sleep problems are one of the most prevalent difficulties affecting children with ASD (Ming, Gordon, Kang, & Wagner, 2008), occurring in up to 80% of children with the disorder (Liu, Hubbard, Fabes, & Adam, 2006; Wiggs & Stores, 2004). Furthermore, sleep problems are consistently associated with greater ASD symptom severity (Cortesi, Giannotti, Ivanenko, & Johnson, 2010; Mayes & Calhoun, 2009). For example, behavioral and emotional difficulties common to children with ASD, including oppositional behavior, aggression, explosiveness, attention deficit, impulsivity, hyperactivity, anxiety and depression, and mood variability are linked with greater sleep problems (Mayes & Calhoun, 2009). Prior research has suggested that the high prevalence of internalizing comorbidities among children with ASD further complicate observed sleep problems within this population (Cortesi, Giannotti, Ivanenko, & Johnson, 2010). Within specific internalizing symptoms domains, findings suggest there are links between sensory problems, sleep, and anxiety in children with ASD (Mazurek & Petroski, 2015), while research examining mood has revealed similar associations between insomnia and mood among young adults with high functioning ASD (Tani et al., 2003).

1.2. Internalizing problems in children with ASD

Children with ASD often present with comorbid internalizing problems (Joshi et al., 2010; Simonoff et al., 2008). Among children with ASD, current prevalence estimates of anxiety range from 11% to 84% (White, Oswald, Ollendick, & Scahill, 2009), while rates of depressive disorders fall around 56% (Joshi et al., 2010). ASD severity and internalizing symptom severity are positively correlated (Mayes, Calhoun, Murray, & Zahid, 2011) and increased levels of internalizing psychopathology in young adults with ASD are associated with greater prevalence of sleep problems (Tani et al., 2003; Tani et al., 2004). It is unclear, however, to what extent internalizing psychopathology accounts for sleep disruptions observed in children with ASD. The interplay between oversensitivity to the environment due to sensory issues, emotional dysregulation and elevated internalizing symptoms may be further compounded by the inattention and hyper arousal symptoms of ADHD among children with comorbid ASD and ADHD.

1.3. ADHD in Children with ASD

In addition to more frequent sleep problems, up to 75% of individuals with ASD also exhibit ADHD symptoms (Frazier et al., 2001; Goldstein & Schwebach, 2004; Mayes, Calhoun, Mayes, & Molitoris, 2012; Pearson et al., 2006). Until recently, the dual-diagnoses of ASD and ADHD was not acknowledged by DSM diagnostic criteria, but changes in the DSM-5 (American Psychiatric Association, 2013) recognize an ASD/ADHD comorbid clinical presentation. Similar to children with ASD, sleep complaints are common among children with ADHD (Sung, Hiscock, Sciberras, & Efron, 2008). Notably, problems with sustained attention, distractibility, and impulsivity, core symptoms of ADHD (American Psychiatric Association, 2013) overlap with functional impairments observed in sleep deprived children (van der Heijden, Smits, & Gunning, 2005). Common pharmacological treatments for ADHD (e.g., psychostimulants) can give rise to or exacerbate sleep problems (van der Heijden et al., 2005) including greater difficulty falling asleep and greater tiredness upon waking (Kaplan, McNicol, Conte, & Moghadam, 1987). Although subjective parent reports vary, objective data (using polysomnography [PSG] and actigraphy) reveal increased motor movements as the only consistent difference between the sleep of children with ADHD compared to healthy controls (Corkum, Tannock, Moldofsky, Hogg-Johnson, & Humphries, 2001; Okada et al., 2013). These mixed findings may be due to bedtime problems, including bedtime resistance and “curtain calls” (i.e., calling the parent back for one more kiss/hug/goodnight/etc.; Corkum et al., 2001), as well as individual differences in physiological arousal (Okada et al., 2013).
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