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Sleep problems in children with autism, attention-deficit hyperactivity disorder, and epilepsy

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ABSTRACT

This study aimed to examine sleep problems in children with autism spectrum disorders (ASD), attention-deficit/hyperactivity disorder (ADHD), and epilepsy in clinical settings. We assessed 64 children with ASD, 64 with ADHD, 64 with epilepsy, and 64 typically developing children without any neuropsychiatric disorders by using a sex- and age-matched case-control study design. The parents reported their children's sleep problems. Parents of children with ASD and ADHD reported more current and lifetime sleep problems of their children than parents of children with epilepsy, especially in snoring and restless legs syndrome. Current or lifetime sleep problems did not differ between children with ASD and children with ADHD, or between children with epilepsy and typically developing children. Demographic characteristics and medication status could not fully explain the increased risk of sleep problems in children with ASD and ADHD. Our findings lend evidence to support more sleep problems in children with ASD and ADHD than typically developing children. Our study adds that children with epilepsy do not. These findings emphasize the importance to assess sleep problems in children with neurodevelopmental disorders highly comorbid with ASD or ADHD in clinical practice.

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1. Introduction

Autism spectrum disorders (ASD), attention-deficit/hyperactivity disorder (ADHD), and epilepsy are three common neurodevelopmental disorders which are frequently seen in pediatric or psychiatric clinics (Friedman & Shariëff, 2006; In-Albon, Zumsteg, Muller, & Schneider, 2010; Levy, Mandell, & Schultz, 2009). Children with ASD are also more likely to have sleep problems including (1) dyssomnias: sleep onset delay (Giannotti, Cortesi, Cerquiglini, Vagnoni, & Valente, 2011; Goldman, Richdale, Clemons, & Malow, 2011), night awakenings (Giannotti et al., 2011; Goldman, McGrew, et al., 2011; Souders et al., 2009), early morning waking (Wiggs & Stores, 2004), shortened sleep duration (Cotton & Richdale, 2010;

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Goldman, McGrew, et al., 2011; Richdale & Prior, 1995), sleep–wake cycle disturbance (Wiggs & Stores, 2004) and periodic limb movements (PLMS) (Godbout, Bergeron, Limoges, Stip, & Mottron, 2000); (2) parasomnias: sleep talking, sleep walking, sleep terrors, and nightmares (Paavonen et al., 2008). SDB is not consistently found to be associated with ASD (Couturier et al., 2005). Sleep problems may exacerbate symptoms of autism, and correlate with behavior problems (Goldman, McGrew, et al., 2011), autistic symptom severity (Mayes & Calhoun, 2009), social skills deficits and stereotyped behaviors (Schreck, Mulick, & Smith, 2004). Therefore, treating sleep problems may improve the behavior problems of children with ASD (Malow, McGrew, Harvey, Henderson, & Stone, 2006). Besides, both parents of children with autism suffered from more psychopathology and less dyadic consensus than parents of typically developing children (Gau, Chou, et al., 2011). Manage sleep problems in children with autism might decrease their behavior problems. Then it might help parents of children with autism to have psychological well-being and benefit children with autism in their family.

Sleep problems are also common in children with ADHD including (1) dyssomnias: problems in initiating and maintaining sleep (Gau & Chiang, 2009) and PLMS during sleep (Sadeh, Pergamin, & Bar-Haim, 2006); (2) sleep-disordered breathing (SDB): snoring (Chiang et al., 2010; Gau & Chiang, 2009) and obstructive sleep apnea (OSA) (Chervin et al., 2002); and (3) parasomnias: sleep terrors, and bruxism (Chiang et al., 2010; Gau & Chiang, 2009). A comorbid condition between ADHD and sleep problems, symptoms of ADHD and the consequences of sleep problems frequently overlap (Chervin et al., 2002). Some primary sleep disorders are found to be associated with daytime inattention and hyperactivity, which often can be mistaken for the symptoms of ADHD (Chervin et al., 2002). Other comorbid psychiatric disorders with ADHD and/or the effects of psychostimulants on sleep may also confound the diagnosis of a primary sleep problem or may contribute to the development of a sleep problem (Gau & Chiang, 2009). When we need to make the diagnosis of a primary sleep problem in children with ADHD, we need to exclude the effects of other psychiatric comorbid conditions and/or psychostimulants on sleep problems.

Several sleep problems that have been frequently reported in children with epilepsy with prevalence ranged from 0.4 to 1.0% (Ong, Yang, Wong, Alsiddiq, & Khu, 2010). These sleep problems are initiating and maintaining sleep disorders, longer sleep latency to rapid eye movement (REM), some parasomnias, sleep–wake transition disorders, SDB, and excessive sleepiness (Byars et al., 2008; Maganti et al., 2006; Ong et al., 2010). The manifestations of parasomnia and nocturnal frontal lobe epilepsy are similar, and polysomnographic study is needed to make differential diagnosis (Derry, Harvey, Walker, Duncan, & Berkovic, 2009). Sleep problems significantly relate to impaired neuropsychological functioning (Byars et al., 2008), result in increased distress for the parents and their children, and are associated with greater psychological dysfunction (Stores, Wiggs, & Campling, 1998).

Sleep problems are more prevalent in children with neuropsychiatric disorders than in healthy children. Although abundant studies have investigated the association between sleep problems and ADHD in western countries (Sadeh et al., 2006) and Taiwan (Gau & Chiang, 2009), the evidence for sleep problems in ASD and epilepsy are relatively lacking and inconsistent. Therefore, whether sleep problems are common features of neurodevelopmental disorders or only associated with a specific neurodevelopmental disorder is still unknown. Previous studies have been limited by only including children with one disorder as compared with typically developing children without comparing several neurodevelopmental disorders in one study. Since the prevalence of various sleep problems vary by gender and age (Gau, 2006), we conducted a matched case control study (age- and gender-matched) to further elucidate the prevalence and types of sleep problems in children with these neurodevelopmental disorders. Our aims were to compare the rates and types of sleep problems in children with ASD, ADHD, epilepsy and in typically developing children. We hypothesized that children with ASD, ADHD and epilepsy suffered from more sleep problems than typically developing children, and that the types of sleep problems would be different across the four groups.

2. Method

2.1. Participants

The participants consisted of 64 children (39 boys, 60.9%), aged 6–17, who were clinically diagnosed with ASD according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria for autistic disorder or Asperger's disorder; 64 children (39 boys, 60.9%), aged 6–16, who met the International League Against Epilepsy (ILAE) criteria for epilepsy; 64 children (39 boys, 60.9%), aged 6–16, who were clinically diagnosed with ADHD according to the DSM-IV criteria; and 64 age-, gender-, and parental educational level-matched typically developing children (Table 1). The participants were recruited from pediatric neurological and child and adolescent psychiatric outpatient departments. Because the estimated sample size for each group was sixty participants, the broad age range was necessary to recruit enough participants. Therefore, we used a matched case–control study design to eliminate the confounding effects of age and gender as well. These participants were recruited consecutively from a university hospital in northern Taiwan with similar age and sex distributions from January 2008 to December 2008.

2.2. Clinical participants with ASD, ADHD, and epilepsy

The clinical diagnoses of ASD and ADHD were made by board-certificated child psychiatrists. The Autism Diagnostic Interview-Revised (ADI-R) (Chien et al., 2010) and the Chinese versions of the Kiddie epidemiologic version of the Schedule

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