



Original Article

Sleep problems in children with autism spectrum disorder and intellectual disability without autism spectrum disorder



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ABSTRACT

Objective: The objective of this study was to evaluate the sleep problems and their correlations in children with autism spectrum disorder (ASD), intellectual disability without ASD (ID), and typically developing children (TDC).

Methods: This study included 142 children (48 with ASD, 46 with ID, 48 with TDC) aged between 2 and 18 years old. Parents of the children completed the Childhood Sleep Habits Questionnaire (CSHQ) in order to evaluate sleep disturbances. The sociodemographic and clinical information were noted on a data form for each child.

Results: The mean total score of CSHQ was 41.56, 47.89 and 51.78 respectively in TDC, ASD and ID groups. While the total CSHQ score was significantly lower in TDC, there was no significant difference between ID and ASD groups ($p = 0.09$). It was revealed that children having a neurodevelopmental disorder had a 2.8-fold increased risk of sleep disturbance, history of sleep disorder in the parents had a 3.1-fold increased risk, psychiatric comorbidity in the child had a 3.3-fold increased risk, and co-sleeping with parents had 13.1-fold increased risk. However, in the binary regression analysis, co-sleeping with parents and family history of sleep problems significantly increased the risk of sleep disturbance.

Conclusion: Sleep disturbances are more frequent in children with ASD and ID than TDC. Co-sleeping with parents and family history of sleep problems increase the risk of sleep disturbances. Thus, behavioral techniques especially focusing on co-sleeping problems and focusing on parents' sleep habits may improve the sleep disturbances in children with ID and ASD.

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1. Introduction

Sleep is an intense, dynamic and cyclic brain activity that affects every aspect of a child's development [1,2]. Depending on their age, children spend 50–65% of their life in sleep, therefore the importance of sleep quality and quantity to the normal growth, healthy development, optimum daytime functioning, and family well-being of children is obvious [3–5].

The physiologic processes such as sleep duration, quality, patterns and architecture evolve especially during in the first 5 years of life, and maturation continues across childhood [4,6,7]. Galland et al. stated as practice points that; "sleep patterns show developmental trends for sleep duration (decrease 0–12 years), number of

night wakings (decrease from 0 to 2 years), longest sleep period (increase from 0 to 2 years), and number of daytime naps (decreasing up to age 2)" [7]. Although there are universal physiologic changes, developmental, environmental, cultural, social and behavioral factors also can influence the sleep pattern [4,7,8]. Furthermore, sleep has a critical impact on cognitive, emotional and social development and sleep problems may interfere with these aspects [2]. Astill et al. conducted a meta-analysis which summarized all relevant studies reporting on sleep, cognition and behavioral problems in healthy school-age children (5–12 years old) [9]. They reported that shorter sleep time was associated with poor educational performance, executive and multi-domain cognitive function (ie cognitive flexibility, thinking abstractly, attention, and memory) as well as with more internalizing (ie shyness/inhibition, anxiety/depression and separation anxiety) and externalizing (ie aggression, hyperactivity and opposition) behavioral problems [9]. In addition to this, Baum et al. examined the effect of sleep on affect and affect regulation among healthy adolescents (aged 14–17 years) [10]. They compared sleep restriction and sleep extension

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conditions through 2 weeks. Higher levels of anxiety, anger and emotional regulation difficulties were reported in the sleep-restricted condition by parents of these adolescents [10].

The prevalence of sleep problems among typically developing children (TDC) has been reported to extend from 25% to 50% in the preschool-aged group, 37% in the school-aged group and 40% in adolescents [1]. Mindell et al. stated that sleep problems were commonly reported across the ages [11], and LeBourgeois et al. reported that cross-cultural differences can affect sleep quality, especially the differences in sleep-hygiene practices [11,12]. However, children with neurodevelopmental disorders, or behavior problems may be exposed to a heightened risk of sleep problems in comparison with TDC [2,13–15]. Intellectual disability (ID), autism spectrum disorder (ASD) and attention deficit and hyperactivity disorder (ADHD) are the common neurodevelopmental disorders among children, and the prevalence of sleep disturbances is estimated to range from 44% to 83% [16–19], from 34% to 80% [20], and from 25% to 55% [21,22] in children with ASD, ID and ADHD, respectively. Sleep disorders not only worsen at night time, but also negatively affect the daily functioning and increase the burden and stress for the families of children with both ASD and ID. For children with ASD, sleeping problems lead to both behavioral problems and aggravation of core symptoms, social skill and communication deficits, higher rates of stereotypical behaviors, and stricter adherence to non-functional routines [23–25]. Tudor et al. found that sleep onset delay and sleep duration were positively correlated with autism symptoms [25]. They also reported that sleep onset delay was the strongest predictor of communication deficit, stereotyped behavior and autism severity. In addition, in mentally handicapped children, Quine et al. found an association between sleep problems and poor communication skills, poor academic skills, poor self-help skills, incontinence, daytime behavior and epilepsy in the children with ID [26].

Studies on sleep are frequently from western countries. To our knowledge there is only one recent study from the Turkish population, reporting that children with ASD had more sleep problems than TDC, consistent with previous studies [27]. In their study Mutluer et al. found that difficulty in falling asleep (73.4%), difficulty in sleeping after waking up in the night (79.7%), frequent changes in falling asleep (76.6%) and tiredness after sleeping (75%) were the most reported problems in the ASD group, along with bedtime rituals (65.6%), restless sleep (51.6%), daytime sleepiness (45.3%), bedwetting (45.3%), body, and/or head shaking while falling asleep (31.3%), and frequent waking (28.1%) [27]. In this study, we aimed to evaluate and compare the sleep disturbances in children with ASD, ID without ASD and TDC from Turkey, the bridge between eastern and western cultures. We also aimed to investigate the sociodemographic and clinical correlated factors of sleep disturbances in these groups.

2. Material and methods

2.1. Participants and assessment

Children aged between 2 and 18 years old who attended the Ege University Medical Faculty Child and Adolescent Psychiatry Department Neurodevelopmental Disorders Polyclinic with the diagnosis of ID ($N = 46$) and ASD ($N = 48$) according to the Diagnostic and Statistical Manual of Mental Disorders 5 (DSM-5) [28] were included in the study. The TDC group ($N = 48$) were recruited from the hospital staffs' children who did not have any psychiatric complaint or history. These children were evaluated through a semi-structured interview, and the ones who did not have behavioral and emotional problems were included in the study. TDC do not have a history of developmental delay or

academic failure, and have clinically normal intellectual levels. Patients were verbally informed, and written informed consent was obtained from parents. Ege University Clinical Researches Ethical Committee approved the study.

The diagnostic evaluation and interview of the ASD cases were completed according to a form that was developed based on DSM-5 criteria, and included an observation of the children via DSM-5 and an observation of the children in the playroom. Their diagnoses were confirmed via a two-stage evaluation. In the first stage, the cases were evaluated during their routine polyclinic examination. The diagnosis of ASD was made based on DSM-5 criteria. In the second stage, diagnoses of the cases were re-evaluated by the senior members of child and adolescent psychiatry, experienced in the field of ASD, and the diagnoses were confirmed through consensus decision-making. Children with ASD were also assessed with the Childhood Autism Rating Scale (CARS) in order to determine the severity of ASD [29,30]. ASD children completed the Wechsler Intelligence Scale for Children-Revised (WISC-R) [31,32] for evaluating the intellectual level if possible. For children between 2 and 6 years old, or the ones who could not complete or cooperate with WISC-R, Ankara Developmental Screening Inventory (ADSI) was applied in order to evaluate the developmental level [33].

The ID cases were evaluated during routine polyclinic examination in terms of academic, social and practical adaptive skills. We excluded the ASD diagnosis in the ID group during the psychiatric interview. The ID cases included in the study did not have the social interaction, eye contact and shared attention deficits and repetitive interest/behaviors. Their communication and relation skills were appropriate to their developmental levels. Diagnosis of ID was confirmed with the WISC-R [31,32]. However, for children between 2 and 6 years old, ADSI was applied in order to evaluate the developmental level and verify the diagnosis of ID [33]. According to WISC-R and ADSI, 63.4% of the ID cases had mild, 29.3% had moderate and 7.3% had severe ID. Psychiatric comorbidity was evaluated with the Schedule for Affective Disorders and Schizophrenia for School Aged Children (K-SADS) [34,35] according to DSM-IV-TR [36], conducted with either only the mothers or both mothers and their child if applicable, for all groups. While including the cases, we asked the mothers whether their child had been diagnosed with a genetic disorder or not. Based on the given anamnesis information and file records, we excluded the defined/known genetic causes in both ASD and ID groups.

Parents of the children filled the Childhood Sleep Habits Questionnaire (CSHQ) in order to evaluate sleep disturbances [37,38].

2.2. Materials

2.2.1. Sociodemographic data form

Characteristics of children (age, gender, drug utilization, comorbid medical disorder, co-sleeping), sociodemographic characteristics of the family (parental marriage status, number of family members, education level of parent who the child was interviewed with) and existence of sleeping problems or psychiatric disorder history in the family were assessed by a sociodemographic form that was developed by the authors. We appended an additional co-sleeping (bed or room-sharing) related open-ended screening question to this data form, as this practice has been reported to be associated with increased sleep disturbances [16,17] and also it is also known that in our cultural sphere parents tend to sleep with the child according to our clinical experience.

2.2.2. CARS

The CARS is an autism diagnostic schedule covering 14 functional areas that may be compromised in autism, and a final general

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