ISSN: 3065-4483
Research Article
Science Set Journal of Pediatrics

Screening for Sleep Disorders in Children with Pediatric Sleep Questionnaire

Muhammet Furkan Korkmaz[1*], and Arzu Ekici[2]

[1]Department of Pediatrics, University of Health Sciences, Bursa Faculty of Medicine, City Training and Research Hospital, Bursa, Turkey
[2]Department of Pediatric Neurology, University of Health Sciences, Bursa Faculty of Medicine, Yuksek Ihtisas Training and Research Hospital, Bursa, Turkey

[*]Corresponding author: Muhammet Furkan Korkmaz, MD, Department of Pediatrics, University of Health Sciences, Bursa Faculty of Medicine, City Training and Research Hospital, Doğanköy Neighb., Gümüş Ave #10, 16110, Nilüfer, Bursa, Turkey.

Submitted: 17 May 2024 **Accepted:** 23 May 2024 **Published:** 31 May 2024

https://doi.org/10.63620/MKSSJP.2024.1014

Citation: *Muhammet Furkan Korkmaz, and Arzu Ekici (2024) Screening for Sleep Disorders in Children with Pediatric Sleep Questionnaire. Sci Set J of Pediatrics 2(2), 01-04.*

Abstract

Background: *Contrary to popular belief, sleep disorders are not uncommon in childhood. Sleep disturbances not only affect school performance, but may also be associated with other conditions, especially attention deficit hyperactivity disorder (ADHD). We sought to assess sleep disorders in children with sleep-related complaints in this study.*

Methods: *A total of 42 children who were admitted from 2019 to 2022 to the pediatric neurology department were included in a prospective observational study. The Pediatric Sleep Quastionnaire (PSQ) was used to detect sleep disorders.*

Result: *The median age of the study group was 7 years (2-17 years). The male to female ratio was 2.81. Nocturnal symptoms were found in 19.2%, daytime symptoms in 23.1%, and ADHD-related cognitive problems in 47.5%. The mean PSQ score was 0.32 ± 0.20. Sleep disorder was detected in 52.3% of the patients included in the study.*

Conclusion: *In our study, a significant amount of sleep problems were observed in youngsters. ADHD-related cognitive impairments were shown to be the primary sleep problem.*

Keywords: Attention Deficit Hyperactivity Disorder, Children, Pediatric Sleep Questionnaire, Scales, Sleep disorders

Abbreviations

ADHD: Attention Deficit Hyperactivity Disorder
CRSH: Children's Report of Sleep Habits
CSHQ: Children's Sleep Habits Questionnaire
PSQ: Pediatric Sleep Quastionnaire
SD: Standart Deviasion

Introduction

Sleep disorders are found in all age groups of childhood. Contrary to popular belief, it is not rare in children. Epidemiological studies have shown that 50% of children have a sleep problem and about 4% have a sleep disorder [1]. Sleep disorders can be both medically based (e.g. obstructive sleep apnea, restless legs syndrome, periodic limb movement disorder, and narcolepsy) and behaviorally based (e.g. behavioral insomnia in childhood). Common complaints include difficulty falling asleep, night waking, snoring, excessive daytime sleepiness, and impaired daytime functioning. These complaints are often symptoms of treatable sleep disorders [2]. Sleep disorders have also been associated with cardiovascular morbidity, attention deficit hyperactivity disorder (ADHD), and obesity [3].

Several questionnaires have been created to evaluate sleep problems in children. These include the Children's Report of Sleep Habits (CRSH), the Children's Sleep Habits Questionnaire (CSHQ), and the Pediatric Sleep Questionnaire (PSQ) [4-6]. Among these, PSQ has been reported to have 81% sensitivity and 87% specificity for sleep-related breathing disorders. It has been used in many situations to assess sleep disorders [3, 7-12]. In this study, we aimed to evaluate sleep disorders using the PSQ in children admitted to our center with symptoms of sleep problems.

Materials and Methods

This study was carried out as a single center and prospective study among 42 children aged 2 to 18 years. Patients were ad-

mitted from 2019 to 2022 to the pediatric neurology department of the University of Health Sciences, Yüksek İhtisas Training and Research Hospital, Bursa, Turkey (a tertiary care hospital with a total of 1600 beds including 200 for pediatric patients) with any sleep disorder symptoms were included the study.

The short version of the Pediatric Sleep Questinnaire (PSQ) was used to assess sleep-related breathing disorders [6]. This scale is a questionnaire that can be given to parents of children aged 2 to 18 years old. It consists of 22 items that ask about the frequency and severity of snoring during sleep, apnea at night, breathing difficulty during sleep, daytime sleepiness, attention deficit, hyperactivity, and other pediatric obstructive sleep apnea symptoms. The symptoms are categorized into three categories: nocturnal, daytime, and cognitive. The score was computed by dividing the number of symptoms present by the total number of symptoms present or absent. Unanswered questions (unknown) were excluded from the computation. The score can range from 0 to 1. PSQ total score is the mean of all item scores (excluding missing items). The recommended cut-off value for pediatric obstructive sleep apnea is 0.33. This scale was adapted into Turkish by Yüksel et al. and shown to be valid [13].

Statistical Analysis

Characteristic data are presented as n (%) for categorical variables, and as mean ± SD or median (minimum-maximum values) for continuous variables, as appropriate.

Statistical analyses were performed by using SPSS version 22.0 (SPSS Inc., Chicago, IL, USA).

Results

Median ages were 7 years (2-17 years) in the study group, respectively. The male/female ratio was 2.81 (31/11). Comorbid diseases were present in 14 (33.3%) of the patients included in our study. Among these, epilepsy in five patients and attention deficit and hyperactivity disorder in four patients were the most common comorbidities. Detailed demographic characteristics are summarized in Table 1.

Table 1: Demographics of the patients.

Characteristics	n=42
Male sex, n (%)	31 (54.4)
Age (months), median (min-max)	7 (2-17)
Height, median (min-max)	136 (88-182)
Weight, median (min-max)	30.5 (13-90)
BMI, median (min-max)	18.1 (13.3-29.4)
Reported comorbidities, n (%)	14 (33.3)
PSQ, mean ± SD	0.32 ± 0.20

Abbreviation: BMI: body mass index; PSQ: pediatric sleep questionnaire; SD: standard deviasion

The mean PSQ score was 0.32 ± 0.20 in our study. It was observed that 22 (52.3%) of the children included in our study exceeded the PSQ score of 0.33, which is the optimal cut-off recommended for sleep disorders. When the distribution of symptom groups was analyzed, nocturnal symptoms were observed in 19.2%, daytime symptoms in 23.1%, and cognitive symptoms in 47.5%. The most common of all symptoms was uncrushed in the morning (61.9%). Among the cognitive symptoms, fidgets (54.7%) were the most common. The prevalence of various sleep symptoms of study patients is detailed in Table 2.

Table 2: Prevalence of various sleep symptoms of study patients.

Symptom category	Item	Prevalence (%) n=42
Snoring Frequency	A2: usually snores	11.9
	A3: always snores	7.1
Snoring Quality	A4: snores loudly	14.2
	A5: heavy breathing	16.6
Breathing problems	A6: trouble breathing	26.1
	A7: observed apneas	9.5
Mouth breathing	A24: mouth open during day	38.1
	A25: dry mouth on awakening	35.7
Daytime sleepiness	B1: unfreshed in morning	61.9
	B2: problem with sleepiness	33.3
	B4: sleepy per teacher	7.1
	B6: hard to wake up	28.5

Inattention/hyperactivity	C3: does not listen	47.6
	C5: difficulty organizing	42.8
	C8: easily distracted	52.3
	C10: fidgets	54.7
	C14: on to go	35.7
	C18: interrupts	52.3
Other symptoms	A32: nocturnal enuresis	14.2
	B7: morning headache	16.6
	B9: delayed growth	11.9
	B22: obesity	2.3

Discussion

In patients admitted to our pediatric neurology department with sleep problems, 52% of the PSQ results showed sleep disorders. Within the main symptom groups, cognitive symptoms were the most common, while when symptoms were evaluated individually, unfreshed in the morning was the most common symptom.

Sleep is considered essential not only for normal physical development in childhood, but also for normal emotional development, attention, and cognitive functioning. Although it is known that regular and adequate sleep is necessary to maintain a healthy life, studies showing the relationship between sleep problems and many other disorders are increasing [14]. Previous studies report that contrary to popular belief, sleep disorders are not uncommon in childhood. In one study, sleep disorders were found in 17% of 4-year-old children, and insomnia was reported as the most common sleep disorder in 19% of these children [15]. Another study found that insomnia and nightmares were the most common sleep disorders in school-age children with a frequency of 15% and 14%, respectively [16]. In a study conducted in Turkey, sleep disturbance was reported as 59% in school children aged 6-14 years [17]. In our study, 52% of children admitted to our center with any sleep problem were found to have sleep disorders.

Sleep disorders include insomnia, oversleeping, narcolepsy, respiratory problems, circadian rhythm problems, parasomnias, and other types [18]. Family observation with simple methods and sometimes the child's own observation are important in identifying sleep disorders that vary. However, studies indicate that sleep disorders are inadequately screened in children, families do not have sufficient knowledge on this issue and as a result, sleep disorders are often missed [19]. Nowadays, it is recommended to perform an initial evaluation with sleep scales for easy applicability before proceeding to more advanced tests such as polysomnography in the evaluation of sleep problems. For this purpose, it is generally accepted and widely used to determine sleep problems in children with screening scales using these observations [20]. PSQ was developed by Dr. Chervin and colleagues specifically to assess sleep-related respiratory problems. the scale which consists of 3 main sections, includes questions about nighttime and bedtime behaviors in section A, behaviors and possible problems during the day in section B, and questions about ADHD in section C [6]. Among these three groups, ADHD-related cognitive symptoms were observed most frequently in the children included in our study (47.5%).

Attention deficit hyperactivity disorder is one of the most common neurodevelopmental conditions in children today. Over the years, its prevalence has remained stable at 5.3% worldwide, based on strict diagnostic procedures. However, in recent years there has been a significant increase and now one in ten children in the United States is diagnosed with ADHD [21]. It is also argued that the higher rates of diagnosis over time in clinical samples are also due to children being misdiagnosed. For example, some children may be misdiagnosed with ADHD when they have symptoms of other disorders that overlap with ADHD symptoms [22]. Sleep disorders and poor sleep are also known to affect academic performance and produce ADHD-like symptoms [23]. In our study, approximately 10% of the patients who presented with sleep problems were children diagnosed with ADHD before. Among the symptoms, ADHD-related cognitive symptoms were quite dominant.

Another important problem associated with sleep disorders in childhood is obesity. Although many studies have shown that sleep disorder increases obesity, there are also studies showing that sleep duration is longer in obese children and adolescents [24]. In a study conducted in our country, the prevalence of sleep disorders in obese children aged 6-14 years was reported to be 62% [17]. In our study, obesity was present in two children. Sleep disturbance was observed in one of them, but not in the other. Sleep is an important factor to consider in the prevention of childhood obesity. The prevalence of childhood obesity can be reduced by prolonging sleep duration. Therefore, sleep interventions may be potential preventive measures for childhood obesity, which has become a global health problem.

Conclusions

In our study, a considerable level of sleep disorders were found in children who presented to our pediatric neurology outpatient clinic with the slightest sleep problem during a four-year period. Among these problems, ADHD-related cognitive problems were seen to be the leading ones. Larger scale studies on children diagnosed with ADHD may help to clarify the relationship between ADHD and sleep disorders, which may lead to the implementation of interventions to prevent sleep disorders.

Ethics Statement

The studies involving human participants were reviewed and approved by the Ethics Committee of the University of Health Sciences, Bursa Faculty of Medicine, City Training and Research

Hospital (2011-KAEK-25 2019/04-07). Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author Contributions

All authors have substantial contributions to conception and design, or acquisition of data, analysis and interpretation of data; drafting the article or revising it critically for important intellectual content; final approval of the version to be published.

Financial & Competing İnterests Disclosure

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

No writing assistance was utilized in the production of this manuscript.

Data Availability Statement

The data generated and analyzed in this study are included in this article Further inquiries can be directed to the corresponding author upon reasonable request.

References

1. Akçay, D., Akçay, B. D., & Hekim Bozkurt, Ö. (2020). Reliability and validity of Turkish Sleep Disturbance Scale for Children. Anatolian Journal of Psychiatry, 21, 70–77.
2. Meltzer, L. J., Johnson, C., Crosette, J., Ramos, M., & Mindell, J. A. (2010). Prevalence of diagnosed sleep disorders in pediatric primary care practices. Pediatrics, 125, e1410–e1418.
3. Gupta, R., Ali, R., Verma, S., Joshi, K., Dhyani, M., Bhasin, K., et al. (2017). Study of sleep disorders among young children using Hindi translated and validated version of Pediatric Sleep Questionnaire. Journal of Neurosciences in Rural Practice, 8, 165–169.
4. Meltzer, L. J., Avis, K. T., Biggs, S., Reynolds, A. C., Crabtree, V. M., & Bevans, K. B. (2013). The Children's Report of Sleep Patterns (CRSP): A self-report measure of sleep for school-aged children. Journal of Clinical Sleep Medicine, 9, 235–245.
5. Owens, J. A., Spirito, A., & McGuinn, M. (2000). The Children's Sleep Habits Questionnaire (CSHQ): Psychometric properties of a survey instrument for school-aged children. Sleep, 23, 1043–1051.
6. Chervin, R. D., Hedger, K., Dillon, J. E., & Pituch, K. J. (2000). Pediatric Sleep Questionnaire (PSQ): Validity and reliability of scales for sleep-disordered breathing, snoring, sleepiness, and behavioral problems. Sleep Medicine, 1, 21–32.
7. Desager, K. N., Nelen, V., Weyler, J. J., & De Backer, W. A. (2005). Sleep disturbance and daytime symptoms in wheezing school-aged children. Journal of Sleep Research, 14, 77–82.
8. Chervin, R. D., Weatherly, R. A., Ruzicka, D. L., Burns, J. W., Giordani, B. J., et al. (2006). Subjective sleepiness and polysomnographic correlates in children scheduled for adenotonsillectomy vs other surgical care. Sleep, 29, 495–503.
9. Chervin, R. D., Weatherly, R. A., Garetz, S. L., Ruzicka, D. L., Giordani, B. J., et al. (2007). Pediatric Sleep Questionnaire: Prediction of sleep apnea and outcomes. Archives of Otolaryngology–Head & Neck Surgery, 133, 216–222.
10. Pabary, R., Goubau, C., Russo, K., Laverty, A., Abel, F., et al. (2019). Screening for sleep-disordered breathing with Pediatric Sleep Questionnaire in children with underlying conditions. Journal of Sleep Research, 28, e12826.
11. Ferry, A. M., Wright, A. E., Ohlstein, J. F., Khoo, K., & Pine, H. S. (2020). Efficacy of a Pediatric Sleep Questionnaire for the diagnosis of obstructive sleep apnea in children. Cureus, 12, e12244.
12. Dooley, A. A., Jackson, J. H., Gatti, M. L., Fanous, H., Martinez, C., et al. (2021). Pediatric Sleep Questionnaire predicts more severe sleep apnea in children with uncontrolled asthma. Journal of Asthma, 58, 1589–1596.
13. Yüksel, H., Söğüt, A., Yılmaz, Ö., & Kutluay, E. (2011). Reliability and validity of the Turkish version of the Pediatric Sleep Questionnaire: A tool for prediction of sleep-related breathing disorder. Tuberculosis and Thorax, 59, 236–241.
14. Liu, X., Liu, L., Owens, J. A., & Kaplan, D. L. (2005). Sleep patterns and sleep problems among schoolchildren in the United States and China. Pediatrics, 115, 241–249.
15. Steinsbekk, S., Berg-Nielsen, T. S., & Wichstrøm, L. (2013). Sleep disorders in preschoolers: Prevalence and comorbidity with psychiatric symptoms. Journal of Developmental & Behavioral Pediatrics, 34, 633–641.
16. Kraenz, S., Fricke, L., Wiater, A., Mitschke, A., Breuer, U., et al. (2004). Prevalence and stress factors of sleep disorders in children starting school. Prax Kinderpsychol Kinderpsychiatr, 53, 3–18.
17. Durmuş, H., Solak, Y., Kaya, E., & Canbolat, H. (2021). Prevalence of sleep disorders in primary school children and its relationship with obesity. Journal of Current Pediatrics, 19, 303–310.
18. American Psychiatric Association. (2013). American Psychiatric Association. https://www.psychiatry.org/psychiatrists/practice/dsm
19. Chervin, R. D., Archbold, K. H., Panahi, P., & Pituch, K. J. (2001). Sleep problems seldom addressed at two general pediatric clinics. Pediatrics, 107, 1375–1380.
20. Short, M. A., Gradisar, M., Gill, J., & Camfferman, D. (2013). Identifying adolescent sleep problems. PLOS ONE, 8, e75301.
21. Peterson, B. S., Trampush, J., Brown, M., Maglione, M., Bolshakova, M., et al. (2024). Tools for the diagnosis of ADHD in children and adolescents: A systematic review. Pediatrics, 153, e2024065854.
22. Hong, S. B., Dwyer, D., Kim, J. W., Park, E. J., Shin, M. S., et al. (2014). Subthreshold attention-deficit/hyperactivity disorder is associated with functional impairments across domains: A comprehensive analysis in a large-scale community study. European Child & Adolescent Psychiatry, 23, 627–636.
23. Ren, Z., & Qiu, A. (2014). Sleep-related breathing disorder is associated with hyperactivity in preschoolers. Singapore Medical Journal, 55, 257–260.
24. Hui, L. L., Nelson, E. A., Yu, L. M., Li, A. M., Fok, T. F., et al. (2003). Risk factors for childhood overweight in 6- to 7-y-old Hong Kong children. International Journal of Obesity and Related Metabolic Disorders, 27, 1411–1418.