STUDENTS' CORNER
RESEARCH ARTICLE

Sleep disturbances in children with autism spectrum disorder in Lahore, Pakistan; a cross-sectional study

Usman Baig,[1] Syed Muslim Mehdi,[2] Hafiz Muhammad Imtiaz Afzal[3]

Abstract

Objective: To assess the frequency of insomnia and other sleep disturbances among children with autism spectrum disorder.

Methods: The descriptive cross-sectional study was conducted in Lahore, Pakistan, from May to August 2019, after approval from the ethics committee of Sharif Medical and Dental College, Lahore. It comprised children aged 6-12 years pre-diagnosed with autism spectrum disorder who were enrolled from 3 institutions and an out-patient department of a tertiary care hospital. Sleep disturbance scale for children was used for data-collection, and the parents were asked to fill it out. Data was analysed using SPSS 23.

Results: Of the 93 subjects, 71(76.3%) were boys and 22(23.7%) were girls, and 58(62.4%) were aged 6-8 years. Overall, 37(39.8%) children had at least one type of sleeping disorder; the most common being insomnia 24(25.8%), and the least common being sleep breathing disorders 4(4.3%).

Conclusion: Nearly 40% children with autism spectrum disorder had sleep disorders, and insomnia was the most common.

Keywords: Autism spectrum disorder, Insomnia, Sleep disorders, Children. (JPMA 71: 783; 2021)

DOI: https://doi.org/10.47391/JPMA.1352

Introduction

Autism spectrum disorder (ASD) is a persistent illness characterised by a wide range of deficiencies in social communication as well as restricted and repetitive behaviours in children.[1] Diminishing social communication deprives the child of pragmatics, social cognition, non-verbal communication and language processing. Restrictive and repetitive behaviours include ritualistic behaviours, sensory sensitivities and circumscribed interests. Other common associated behavioural symptoms in ASD are intellectual disability, irritability, mood swings, inattention and insomnia.[2]

The global prevalence of ASD is 1:160 with male-to-female predominance of 3:1.[3,4] It is one of those unfamiliar neuro-developmental syndromes that have also been targeting children in Pakistan for decades. Due to increase in awareness and improvement of diagnostic criteria, it is now diagnosed at an earlier stage in children.

Insomnia in simple words is a difficulty in initiating or maintaining sleep.[5] Children with ASD often present with complaints of insomnia and 40-80% of them suffer from it.[6] Other sleep disturbances, such as parasomnias, night awakenings and poor sleep routines, have also been reported by the parents of ASD children. The assessment of sleep problems can be done through objective or subjective methods. Subjective methods refer to parental questionnaire and sleep diaries whereas objective methods include actinography and polysomnography.[7]

Certain variables, if positively reinforced and properly looked after, can significantly improve the sleep hygiene in autistic children. These variables include environmental variables, such as proper temperature of room, comfortable bedding and clothes, and establishing bedtime routines and providing sleep training.[8]

The current study was planned to assess the frequency of insomnia and other sleep disturbances among ASD children.

Subjects and Methods

The descriptive cross-sectional study was conducted in Lahore, Pakistan, from May to August 2019, after approval from the ethics committee of Sharif Medical and Dental College, Lahore. It comprised children aged 6-12 years pre-diagnosed with ASD, according to Diagnostic and Statistical Manual of Mental Disorders version 5 (DSM-5)

[1,2]4th Year MBBS Student, [3]Department of Psychiatry, Sharif Medical and Dental College, Lahore, Pakistan.

Correspondence: Syed Muslim Mehdi. Email: muslim.mehdi@ymail.com

criteria, who were enrolled from 3 institutions and an out-patient department (OPD) of a tertiary care hospital using non-probability consecutive sampling.[1] Those using medication to aid sleep were excluded.

The questionnaire was distributed along with consent form with the help of school authorities. Parents were requested to fill up the questionnaire and return it to the focal point from where they were collected. The sleep disturbances scale for children (SDSC) was applied as a method of assessment of sleep disturbances. SDSC has 26 items scored on 1-5 Likert scale for the evaluation of sleep in the preceding 6 months.[9] The total score is calculated by adding score of all items ranging 26-130. Higher score reflects higher frequency of sleep disturbances. The 26 items are categorised as disorders of initiating and maintaining sleep (DIMS), sleep breathing disorders (SBD), disorders of arousal (DA), sleep-wake transition disorders (SWTD), disorders of excessive somnolence (DOES) and sleep hyperhidrosis (SHY). The cut-off values used for DIMS was raw score 19, SBD 6, DA 6, SWTD 14, DOES 15 and for SHY 7.

The sample size was calculated with the help of WINPEPI statistical programme with confidence level 95% and acceptance difference 0.08 and assumed proportion 0.80.[10]

Data was analyzed using SPSS 23.

Results

Of the 97 children assessed, 93(96%) were enrolled. Of them, 71(76.3%) were boys and 22(23.7%) were girls; 58(62.4%) were aged 6-8 years; and 76(81.7%) were part of households with income >50,000 Pakistan Rupee (PKR) (Table-1). Overall, 37(39.8%) children had at least one type of sleeping disorder; the most common being insomnia 24(25.8%), and the least common being sleep breathing disorders 4(4.3%) (Table-2).

Table-1: Demographic characteristics.

	Frequency	Percentage (%)
Age group of children in years		
6 - 8	58	62.4
9 - 10	23	24.7
11 - 12	12	12.9
Gender		
Male	71	76.3
Female	22	23.7
Father's education level		
Secondary	10	10.8
Post-secondary	13	14
Graduation/Higher	70	75.3
Mother's education level		
Secondary	8	8.7
Post-secondary	12	12.9
Graduation/Higher	73	78.5
Total family income (In PKR)		
<50,000	17	18.3
>50,000	76	81.7

Discussion

The phenomenon of sleep is greatly affected by social, cultural and psychological factors. In the current study, most parents had either graduated or had done post-graduation, showing that parents with higher level of education were sufficiently aware about ASD. The findings correlate with those of previous studies.[6,11,12] The prevalence of sleeping disorders in the current study was almost 40% which was greater than that found in typically developing children 25%.[13] It has been proposed that these sleep problems result from imbalance of certain neurotransmitters, such as serotonin, gamma-aminobutyric acid (GABA) and melatonin.[14-16]

Mean scores and percentages for insomnia/DIMS, SWTD and DOES were close to those of earlier studies.[12,17,18] The results, however, were lower compared to some other studies.[19,20] It was due to differences in questionnaires and

Table-2: SDSC scores in different types of sleep disturbances.

	DIMS	SBD	DA	SWTD	DOES	SHY
Score range	7-35	3-15	3-15	6-30	5-25	2-10
Score	16.6±4.3	3.74±0.9	3.7±1.2	10.2±3.1	8.9±3.2	2.5±1.3
Normal Sleep	69 (74.2%)	89 (95.7%)	83 (89.2%)	78 (83.9%)	86 (92.5%)	88 (94.6%)
Pathological sleep	24 (25.8%)	4 (4.3%)	10 (10.8%)	15 (16.1%)	7 (7.5%)	5 (5.4%)

SDSC: Sleep disturbance scale for children
DIMS: Disorders of initiating and maintaining sleep
SBD: Sleep breathing disorders
DA: Disorders of arousal
SWTD: Sleep-wake transition disorders
DOES: Disorders of excessive somnolence
SHY: Sleep hyperhidrosis.

cut-off values used. The questionnaire used in the current study was SDSC, while the questionnaire used in the other studies[19,20] was children's sleep habit questionnaire (CSHQ). A longer sleep latency was observed in the current study which also correlates with literature.[21,22]

The result of parasomnias, which includes disorders of arousal that are sleep terrors, night-walking and nightmares, was found to be less than those reported previously.[18,19] This can be due to the fact that parasomnias often present as night-wakings.[23] It is difficult to diagnose because parental questionnaires have a drawback that night awakenings related to insomnia may not be easily differentiated from parasomnias. Other sleep disorders SHY and SBD, were not significant enough to be compared with literature. This can be due to the small sample size, under-reporting by parents, and recall bias in the current study. Other sophisticated techniques such as polysomnography should be used to diagnose these sleep disorders in future studies.

The limitations of the current study include being restricted to Lahore city and a small sample size. More schools/centres could have been explored if the study had been extended to other cities.

Conclusions

Nearly 40% ASD children suffered from sleep disorders, and the particular domain of sleep disorder which was seen in majority of children was insomnia/disorder of initiating and maintaining sleep. Every ASD child should also be screened for sleep disorders. Strategies should be developed and further researches should be conducted to investigate other associated co-morbidities.

Disclaimer: None.

Conflict of Interests: None.

Source of Funding: None.

References

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders-5. Washington DC, USA: American Psychiatric Publishing; 2013.
2. Mannion A, Leader G. Comorbidity in autism spectrum disorder: A literature review. Research in Autism Spectrum Disorders. 2013; 7:1595-616.
3. Elsabbagh M, Divan G, Koh YJ, Kim YS, Kauchali S, Marcín C, et al. Global Prevalence of Autism and Other Pervasive Developmental Disorders. Autism Res. 2012; 5:160-79.
4. Loomes R, Hull L, Mandy WPL. What Is the Male-to-Female Ratio in Autism Spectrum Disorder? A Systematic Review and Meta-Analysis. J Am Acad Child Adolesc Psychiatry. 2017; 56:466-74.
5. Sadock BJ, Sadock VA, Ruiz P. Normal Sleep and Sleep-Wake Disorders. In: Pataki CS, Sussman N, editors. Kaplan and Sadock's Synopsis of Psychiatry: Behavioural Sciences/Clinical Psychiatry. Philadelphia: Wolters Kluwer, 2015; pp-537.
6. Cortesi F, Giannotti F, Ivanenko A, Johnson K. Sleep in children with autistic spectrum disorder. Sleep Med. 2010; 11:659-64.
7. Imes CC, Kline CE, Mendez DD, Sun R, Yang Y, Chasens ER, et al. Abstract P276: Subjective versus Objective Measures of Sleep: Results from an Ecological Momentary Assessment Study. Circulation. 2019; 139: 276.
8. Devnani PA, Hegde AU. Autism and sleep disorders. J Pediatr Neurosci. 2015; 10:304-7.
9. Bruni O, Ottaviano S, Guidetti V, Romoli M, Innocenzi M, Cortesi F, et al. The Sleep Disturbance Scale for Children (SDSC). Construction and validation of an instrument to evaluate sleep disturbances in childhood and adolescence. J Sleep Res. 1996; 5:251-61.
10. Abramson JH. WINPEPI (PEPI-for-Windows): computer programs for epidemiologists. Epidemiol Perspect Innov. 2004; 1:6.
11. Souders MC, Mason TB, Valladares O, Bucan M, Levy SE, Mandell DS, et al. Sleep behaviors and sleep quality in children with autism spectrum disorders. Sleep. 2009; 32:1566-78.
12. Fadini CC, Lamônica DA, Fett-Conte AC, Osório E, Zuculo GM, Giacheti CM, et al. Influence of sleep disorders on the behavior of individuals with autism spectrum disorder. Front Hum Neurosci. 2015; 9:347.
13. Maski K, Owens JA. Insomnia, parasomnias, and narcolepsy in children: clinical features, diagnosis, and management. Lancet Neurolo. 2016; 15:1170-81.
14. Mazzone L, Postorino V, Siracusano M, Riccioni A, Curatolo P. The Relationship between Sleep Problems, Neurobiological Alterations, Core Symptoms of Autism Spectrum Disorder, and Psychiatric Comorbidities. J Clin Med. 2018; 7:E102.
15. Kulman G, Lissoni P, Rovelli F, Roselli M.G, Brivio F, Sequeri P. Evidence of pineal endocrine hypofunction in autistic children. Neuro Endocrinol Lett. 2000; 21:31-4.
16. Bruni O, Alonso-Alconada D, Besag F, Biran V, Braam W, Cortese S, et al. Current role of melatonin in pediatric neurology: Clinical recommendations. Eur J Paediatr Neurol. 2015; 19:122-33.
17. Tyagi V, Juneja M, Jain R. Sleep Problems and Their Correlates in Children with Autism Spectrum Disorder: An Indian Study. J Autism Dev Disord. 2019; 49:1169-81.
18. Taylor BJ, Siegel M. 0783 Characterization Of Sleep Disturbance Profiles In Hospitalized Children With Autism Spectrum Disorder. Sleep. 2019; 42:A314-5.
19. Liu X, Hubbard JA, Fabes R, Adam JB. Sleep disturbances and correlates of children with autism spectrum disorders. Child Psychiatry and Hum Dev. 2006; 37:179-91.
20. Aathira R, Gulati S, Tripathi M, Shukla G, Chakrabarty B, Sapra S, et al. Prevalence of Sleep Abnormalities in Indian Children With Autism Spectrum Disorder: A Cross-Sectional Study. Pediatr Neurol. 2017; 74:62-7.
21. Humphreys JS, Gringras P, Blair PS, Scott N, Henderson J, Fleming PJ et al. Sleep patterns in children with autistic spectrum disorders: a prospective cohort study. Arch Dis Child. 2014; 99:114-8.
22. Buckley AW, Rodriguez AJ, Jennison K, Buckley J, Thurm A, Sato S, et al. Rapid eye movement sleep percentage in children with autism compared with children with developmental delay and typical development. Arch Pediatr Adolesc Med. 2010; 164:1032-7.
23. Veatch OJ, Maxwell-Horn AC, Malow BA. Sleep in Autism Spectrum Disorders. Curr. Sleep Med. Rep. 2015; 1:131-40.