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

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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)

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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, inattentiveness 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 actigraphy 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)
criteria, who were enrolled from 3 institutions and an outpatient department (OPD) of a tertiary care hospital using non-probability consecutive sampling. 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. 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.

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.

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

**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. It has been proposed that these sleep problems result from imbalance of certain neurotransmitters, such as serotonin, gamma-aminobutyric acid (GABA) and melatonin.

Mean scores and percentages for insomnia/DIMS, SWTD and DOES were close to those of earlier studies. The results, however, were lower compared to some other studies. It was due to differences in questionnaires and
cut-off values used. The questionnaire used in the current study was SDSC, while the questionnaire used in the other studies\textsuperscript{19,20} was children’s sleep habit questionnaire (CSHQ). A longer sleep latency was observed in the current study which also correlates with literature\textsuperscript{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\textsuperscript{18,19}. This can be due to the fact that parasomnias often present as night-wakings\textsuperscript{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.

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References


