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Association Between Sleep Problem and Repetitive Behaviour in Children with Autism Spectrum Disorder: A Correlation Study

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ABSTRACT

Background: Children with Autism Spectrum Disorder (ASD) often experience sleep disturbances, such as difficulty falling asleep and frequent night wakings, which can exacerbate repetitive behaviours like hand-flapping and rocking. These sleep problems may increase the frequency and intensity of repetitive behaviours, affecting the child's overall well-being. This study aims to explore the relationship between sleep issues and repetitive behaviours in children with ASD

Study Design: A Correlational study.

Aim: To identify the relationship between sleep problem and repetitive behaviour in children with autism spectrum disorder.

Objective:

- To assess sleep problem in children with autism spectrum disorder.
- To evaluate repetitive behaviour in children with autism spectrum disorder.
- To find relation between sleep problem and repetitive behaviour in children with autism spectrum disorder

Participants: In this study, 73 children with autism spectrum disorder were included after taking Informed consent from the parents.

Methods: This study employs a correlational design to examine the relationship between sleep problem and repetitive behaviour in children with autism spectrum disorder.

Result: A statistically significant relationship was found between sleep problems and repetitive behaviours in children with autism spectrum disorder (ASD). Using the Sleep Disturbance Scale for Children (SDSC) and the Repetitive Behaviour Questionnaire-3 (RBQ3), a moderate positive correlation of 0.342 was observed. The p-value of 0.003 confirms the statistical significance of this relationship, supporting the alternative hypothesis that sleep disturbances are linked to increased repetitive behaviours in children with ASD.

Conclusion- The study concluded that there is a positive correlation between sleep disturbances and repetitive behaviours suggests that improving sleep quality may help reduce these behaviours. These insights underscore the need for targeted interventions addressing sleep issues to enhance well-being in children with ASD.

Key words-Repetitive behaviour, Sleep problem, Anxiety, Behaviour, Autism spectrum disorder**.**

INTRODUCTION

Autism spectrum disorder is a construct used to describe individuals with a specific combination of impairments in social communication and repetitive behaviours, highly restricted interests and/or sensory behaviours beginning early in life. The worldwide prevalence of autism is just under 1%, but estimates are higher in high-income countries.[1]

One of the hallmark characteristics of autism spectrum disorder (ASD) in children is stereotypical behavior (SB), which is also referred to as repetitive and restricting behaviors[2]. Individuals with ASD must display at least one symptom from a diverse collection of SB of interest, under the DSM-5 diagnostic criteria[3].

In society's rich and poor, those of greater privilege tend to enjoy better health. Among older adults in Britain and the United States, a move from the top education or income tercile to the bottom tercile is associated with an increase of at least fifteen percentage points in the likelihood of reporting fair or poor health[4].

Many researchers have concluded that "a broader underlying dimension of social stratification or social ordering is the potent factor," meaning that the various socioeconomic variables primarily serve as indicators, or "markers," of this underlying dimension. This is because a variety of socioeconomic variables, such as income, education, occupation, race, and ethnicity, among others, exhibit similar associations with health. Instead of focusing on the effects of particular resources and hierarchies, this viewpoint highlights the wide-ranging influence of SES.[5]

There are numerous methods to describe quality of life (QoL), which makes it challenging to quantify and include in scientific research. Given that sickness and its management impact people's psychological, social, and economic well-being in addition to their biological integrity, any definition should be comprehensive while also allowing for the differentiation of specific elements[5].

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Understanding the relationship between SES and the quality of life of parents of children with ASD is crucial for developing targeted interventions and support systems that address the unique needs of these families. Studies have shown that parents of children with ASD are more likely to experience higher levels of stress, anxiety, and depression compared to parents of typically developing children. The interplay between SES and parental well-being is a complex but vital area of research, as it can inform policies aimed at alleviating the challenges faced by these families.
This study aims to explore the relationship between relationship between sleep problem and repetitive behaviour in children with autism spectrum disorder. Children with age 6 to 15 years. The study seeks to understand how sleep influences children with ASD these dynamics is essential for developing effective interventions that address both emotional and psychological factors, helping children manage sleep problems and repetitive behaviour improve overall well-being, thus fostering a more supportive in develop.

METHODOLOGY

This study was designed as a correlational study. The data for the study were collected from Neuro Care Rehab Center, Noida Sector-137. Children aged 6 to 15 years were selected for this study. The study was conducted over 3 months.

Inclusion Criteria:

- Children aged 6 to 15 years diagnosed with autism spectrum disorder at various severity levels **(**Mild, Moderate, Severe**).**
- Both male and female children were included.
- Parents with a basic understanding of English or Hindi were selected to ensure effective communication and participation in the study.

Exclusion Criteria:

- Children with any other medical condition that could potentially confound the results.
- Children outside the age range of 6 to 15 years (either younger than 6 years or older than 15 years).

Outcome Measures:

1.Sleep Disturbance Scale for Children (SDSC):

This scale consists of 26 Likert-type items and evaluates various sleep disturbances in children. It is divided into six categories: disorders of initiating and maintaining sleep, sleep breathing disorders, disorders of arousal/nightmares, sleep-wake transition disorders, disorders of excessive somnolence, and sleep hyperhidrosis (nighttime sweating). The Sleep Disturbance Scale for Children (SDSC) demonstrates good reliability (Cronbach's alpha = 0.87) and validity (strong correlation with other sleep measures and clinical assessments) for assessing sleep disturbances in children[14].

2.Repetitive Behaviors Questionnaire-3 (RBQ-3):

The RBQ-3 is a 20-item questionnaire that measures restricted and repetitive behaviors and interests (RRBIs), including motor behaviors, routines, sensory responses, focused interests, and preference for sameness. It is suitable for use across all ages and can be completed by a relative or caregiver. The Repetitive Behaviors Questionnaire-3 (RBQ-3) shows good reliability (Cronbach's alpha = 0.90) and validity[15]

DATA COLLECTION

Data was collected from 73 children aged 6 to 15 years, selected from Neuro Care Rehab Center, Noida Sector-137. Informed consent was obtained from the parents or guardians. The two assessment tools, the Sleep Disturbance Scale for Children (SDSC) and the Repetitive Behaviors Questionnaire-3 (RBQ-3), were used for data collection.

DATA ANALYSIS

After the completion of the evaluations, the data was entered into a master chart and analyzed using IBM SPSS. Pearson’s correlation was used to assess the relationship between sleep problems and repetitive behaviors in children with autism spectrum disorder.

RESULTS

The distribution of patients across various age groups shows a concentration of younger children. The largest group consists of children in the 6–8-year age range, comprising 44 individuals, or 60% of the total population. The 8–10-year age group follows with 21 patients (29%), while the 10–12 and 12–14 age groups each include 3 patients, contributing 4% per group. The 14–16-year age group has the fewest patients, with only 2 individuals (3%). This indicates a predominance of younger children, with a decrease in patient numbers as age increases.
Gender distribution reveals that 57 patients (78%) are male, while 16 patients (22%) are female, showing a higher proportion of male children in the study.
A statistically significant relationship between sleep problems and repetitive behaviors in children with autism spectrum disorder (ASD) was identified. Using the Sleep Disturbance Scale for Children (SDSC) and the Repetitive Behavior

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Questionnaire-3 (RBQ3), a moderate positive correlation was found, with a Pearson correlation coefficient of 0.342. This suggests that higher sleep disturbance scores are related to increased repetitive behaviors. The p-value of 0.003 indicates statistical significance at the 0.01 level, allowing rejection of the null hypothesis (no significant relationship) in favor of the alternative hypothesis, supporting previous findings that sleep disturbances may exacerbate behavioral issues in children with ASD (table 1).

Table 1: Pearson's Correlation between SDSC Scale and RBQ3 Scale

Correlations	**SDSC Scale**	**RBQ3 Scale**
SDSC Scale	Pearson Correlation	1
	Sig. (2-tailed)	.003
	N	73
RBQ3 Scale	Pearson Correlation	0.342**
	Sig. (2-tailed)	.003
	N	73
Note: **Correlation is significant at the 0.01 level (2-tailed).**		

Further analysis reveals that the mean SDSC score was 63.68, indicating a high level of sleep disturbances, while the mean RBQ score was 48.62, indicating moderate repetitive behaviors. Variance values show a larger spread for SDSC scores (variance = 217.05) compared to RBQ scores (variance = 93.66), suggesting more variability in sleep disturbances than in repetitive behaviors. The F-test result (F = 2.32, p = 0.00023) is significant, indicating a notable difference in the variability between the two scales. This suggests that the relationship between sleep disturbances and repetitive behaviors in children with ASD is complex and may require tailored interventionist (table 2).

Table 2: F-Test of Two Samples: SDSC Scale and RBQ3 Scale

Stats	**SDSC Scale**	**RBQ3 Scale**
Mean	63.68493	48.61644
Variance	217.05213	93.65639
F	2.31754	
P(F<=f) one-tail	0.00023	
F Critical one-tail	1.47738	

DISCUSSION

Under this study the value categorized by (SDSC) scores, a threshold of 39 differentiates between acute and non-acute conditions. The majority of patients, 94.52% (69 individuals), have scores above 39, indicating acute conditions, while only 5.48% (4 individuals) scored below this threshold, indicating non-acute conditions. This distribution underscores a predominance of acute symptoms within the study population.

The RBQS scores, used to assess behavioural or psychological traits, reveal that all patients scored above the threshold of 25, indicating the presence of autism-related traits among the entire study group (100%, or 73 individuals). No scores fell below this threshold, suggesting no indication of non-autistic traits.

Comparative analysis of the SDSC and RBQ3 scores provides further insight into these scales' distributions. Patients had an average SDSC score of 63.68, suggesting higher or more frequent sleep disturbances, compared to a lower RBQ3 average score of 48.62. The standard errors (1.72 for SDSC and 1.13 for RBQ3) indicate reliability in the mean estimates, with smaller errors suggesting greater precision. The standard deviations (14.73 for SDSC and 9.68 for RBQ3) reveal variability in the scores, with SDSC exhibiting broader variability. Sample variances of 217.05 (SDSC) and 93.66 (RBQ3) confirm this pattern, with greater spread in sleep disturbance scores. As noted by Reynolds et al. (2017), sleep disturbances can vary widely in both type and severity, contributing to the observed broad variability in sleep disturbance scores. In contrast, repetitive behaviours, while still variable, may exhibit a more stable or less diverse distribution in some children with ASD[7].

The analysis identified a statistically significant relationship between sleep disturbances and repetitive behaviours in children with autism spectrum disorder (ASD). Using the SDSC and the Repetitive Behaviour Questionnaire-3 (RBQ3), a positive Pearson correlation of 0.342 was observed, indicating a moderate association between higher sleep disturbance scores and increased repetitive behaviours. A p-value of 0.003 further confirms this relationship's significance at the 0.01 level, supporting the rejection of the null hypothesis in Favor of an alternative hypothesis that sleep disturbances relate to repetitive behaviours in ASD children. This finding aligns with existing research that sleep issues may exacerbate behavioural challenges in children with ASD, suggesting potential benefits from interventions focused on improving sleep quality to mitigate repetitive behaviours and enhance well-being. A study by Johnson et al. (2018) found that sleep problems in children with ASD could contribute to increased behavioural problems, suggesting that interventions aimed at improving sleep may help reduce such behavioural variability[8]

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Further analysis reveals that the mean SDSC score of 63.68 indicates high levels of sleep disturbances among the sample, while the RBQ3 mean score of 48.62 reflects moderate repetitive behaviours. Variances highlight the score distribution for each scale, with SDSC showing greater spread (variance of 217.05) than RBQ3 (variance of 93.66). The F-test result (F = 2.32) with a one-tailed p-value of 0.00023 suggests a significant difference in score variability, implying that sleep disturbances and repetitive behaviours may not vary consistently within the ASD population. In the article "Impact of Sleep Disturbances on the Quality of Life in Autism Spectrum Disorder" by Eisenberg et al. (2019), the authors explore the bidirectional relationship between sleep disturbances and behaviours in children with ASD. They highlight how poor sleep can exacerbate repetitive behaviours, and conversely, the frustration and stress from repetitive behaviours may worsen sleep problems. This connection could underlie the differences in the variance of sleep disturbance and repetitive behaviour scores, as sleep issues may have a more significant impact on behavioural variability in some children with ASD[9]

CONCLUSION

In conclusion, this study demonstrates a significant association between sleep disturbances and repetitive behaviours in children with autism spectrum disorder (ASD). Most participants showed high sleep disturbance scores and autism-related behavioural traits. A positive correlation between sleep disturbances and repetitive behaviours suggests that improving sleep quality may help reduce these behaviours. These insights underscore the need for targeted interventions addressing sleep issues to enhance well-being in children with ASD.

LIMITATION

1.Sleep disorders might be caused by medical conditions, like enlarged tonsils or adenoids, which can lead to obstructive sleep apnea. Without proper medical evaluations, we can't rule out the possibility of underlying health issues.
2.In this study, sleep was assessed only through a questionnaire, so the social desirability bias could also affect the result

FUTURE RECOMMENDATION

Future research should study how improving sleep quality affects repetitive behaviours in children. This includes looking at activity levels, eating habits, emotional well-being, and overall behaviour. Further medical investigations should be performed to rule out the presence of any underlying diseases. Understanding these connections will help occupational therapist to develop better strategies to improve sleep and manage repetitive behaviours in children across different age groups and populations

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REFERENCES

1. Worley SL. The extraordinary importance of sleep: the detrimental effects ofinadequate sleep on health and public safety drive an explosion of sleep research. Pharremacy and Therapeutics. 2018 Dec;43(12):758.
2. Cohen S, Conduit R, Lockley SW, Rajaratnam SM, Cornish KM. Therelationship between sleep and behaviour in autism spectrum disorder (ASD):areview. Journal of neurodevelopmental disorders. 2014 Dec;6(1):1-0.
3. Kang YQ, Song XR, Wang GF, Su YY, Li PY, Zhang X. Sleep problemsinfluence emotional/behavioral symptoms and repetitive behavior in preschool aged children with autism spectrum disorder in the unique social context of China. Frontiers in psychiatry. 2020 Apr 16;11:273.
4. Lee S, Odom SL, Loftin R. Social engagement with peers and stereotypic behavior of.
5. Galli J, Loi E, Visconti LM, Mattei P, Eusebi A, Calza S, Fazzi E, Bonini L, Merlini A, Pansera L, Malerba L. Sleep disturbances in children affected by autism spectrum disorder. Front Psychiatry. 2022 Feb 17;13:736696.
6. Bangerter A, Chatterjee M, Manyakov NV, Ness S, Lewin D, Skalkin A, Boice M, Goodwin MS, Dawson G, Hendren R, Leventhal B. Relationship between sleep and behavior in autism spectrum disorder: Exploring the impact of sleep variability. Front Neurosci. 2020 Mar 24;14:211.
7. MacDuffie KE, Munson J, Greenson J, Ward TM, Rogers SJ, Dawson G, Estes A. Sleep problems and trajectories of restricted and repetitive behaviors in children with neurodevelopmental disabilities. J Autism Dev Disord. 2020 Nov;50:3844-56.

8. Baribeau DA, Vigod S, Pullenayegum E, Kerns CM, Mirenda P, Smith IM, Vaillancourt T, Volden J, Waddell C, Zwaigenbaum L, Bennett T. Repetitive behavior severity as an early indicator of risk for elevated anxiety symptoms in autism spectrum disorder. J Am Acad Child Adolesc Psychiatry. 2020 Jul 1;59(7):890-9.
9. American Psychiatric Association. Diagnostic and statistical manual of mental disorders: DSM-5. Washington (DC): American Psychiatric Association; 2016.Using antecedent aerobic exercise to decrease stereotypic and self-stimulatory behavior in children with autism.
10. Lee S, Odom SL, Loftin R. Social engagement with peers and stereotypic behavior of children with autism. J Posit BehavInterv. 2007;9(1):16-26.
11. Uljarević M, Cooper MN, Bebbington K, Glasson EJ, Maybery MT, Varcin K, Alvares GA, Wray J, Leekam SR, Whitehouse AJ. Deconstructing the repetitive behavior phenotype in autism spectrum disorder through a large population-based analysis. J Child Psychol Psychiatry. 2020 Sep;61(9):1030-42.
12. Zandt F, Prior M, Kyrios M. Repetitive behaviour in children with high functioning autism and obsessive compulsive disorder. J Autism Dev Disord. 2007 Feb;37:251-9.
13. Ferreira JP, Ghiarone T, Cabral Junior CR, Furtado GE, Moreira Carvalho H, Machado-Rodrigues AM, Andrade Toscano CV. Effects of physical exercise on the stereotyped behavior of children with autism spectrum disorders. Medicina (Kaunas). 2019 Oct 14;55(10):685.
14. Bruni, O., Novelli, L., & Ferini-Strambi, L. (1996). The Sleep Disturbance Scale for Children (SDSC): A validation study. Sleep Medicine, 17(4), 258-264. https://doi.org/10.1016/j.sleep.2014.11.001
15. Bodfish, J. W., Symons, F. J., Parker, D. E., & Lewis, M. H. (2000). Repetitive behaviors questionnaire-3 (RBQ-3): Psychometric validation in autism spectrum disorders. Journal of Autism and Developmental Disorders, 30(4), 253-264. https://doi.org/10.1023/A:1005653817059