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Original Research Paper

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ASSOCIATION OF SCREEN TIME AND SLEEPIN CHILDREN WITH AUTISM SPECTRUM DISORDER IN URBAN POPULATION

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ABSTRACT The study evaluates the association of screen time and sleep in children with Autism Spectrum Disorder(ASD). A cross-sectional study was conducted in a tertiary care hospital in southern India on 2-5years aged children with ASD. Of the 63 participants, the median age is 3 years, the mean minutes per day of screen time exposure was 259.9 113.3 minutes and screen time over 60minutes per day was reported by 90.5% children. Children having screen time exposure >60 minutes were significantly associated with sleep disturbances (P <0.05). The disorder of initiating and maintaining sleep was significant (P<0.05).

KEYWORDS : Autism spectrum disorder, Sleep disturbances, Screen Time

INTRODUCTION

The incorporation of electronic media device use into people's daily lives has resulted in a major lifestyle change over the last few decades. [1] Parent media use is closely tied to children media habits, it has attracted attention as a potential area for intervention, both in terms of how parents model media use for kids and in terms of how it replaces parent-child interaction. [2].

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by persistent deficits in social communication and social interaction, along with restricted, repetitive patterns of behaviour, interests, or activities. [3] One of the comorbidities in ASD is sleep disturbance which is related to complex interactions among biological, psychological, social/environmental, and familial variables as well as child-raising techniques [4]. Bedtime resistance, insomnia, difficulty in initiation and maintenance of sleep, sleep-disordered breathing, morning rise problems, and daytime sleepiness were all reported by children with ASD[5].

Neurotransmitters like melatonin, GABA, and serotonin create a regular cycle of sleep and wakefulness. Sleep may be hampered by any problems with these neurotransmitters' synthesis. Autism may disrupt the migration and development of GABAergic interneurons [6,7].

Screen time has a big impact on normal children, as observed in prior systematic reviews and meta-analyses [6]. As screen time has had such a significant impact on normally developing children, the study was conducted to find the association of screen time and sleep in children with ASD.

MATERIALS AND METHODS

A cross-sectional study was conducted in the child development clinic of a tertiary care hospital in south India. 63children in the age between 2-5 years diagnosed with autism spectrum disorder by 'DSM-5 criteria' [3] and INCLEN Diagnostic Tool for Autism Spectrum Disorder [8] were included in the study. Children with neurological deficits and global developmental delay were excluded from the study. After obtaining clearance from institutional ethics committee and an informed consent from the caretakers of the participants, demographic details were recorded in the predesigned proforma. The Sleep Disturbance Score in Children (SDSC)[9] and the Digital Screen Exposure Questionnaire (DSEQ) [10] were recorded. SDSC total score of higher than 39 was used as a cut-off point for sleep disturbances. Six categories were used to represent the most common sleep difficulties affected: disorders of initiating and maintaining sleep, sleep breathing disorders, arousal/nightmare disorders, sleep-wake transition disorders, disorders of excessive somnolence and sleep hyperhidrosis. The amount of time spent on the screen was divided into two groups: less than 60 minutes on the screen and more than 60 minutes(considered increased screen time according to Indian Academy of Paediatrics Guidelines). [11]

The data was entered into a Microsoft Excel data sheet and analysed with SPSS 22 software. Frequencies and proportions were used to represent categorical data. As a measure of significance for qualitative data, the Chi-square test or Fischer's exact test (for 2x2 tables only) was utilised. The mean and standard deviation were used to describe continuous data. To determine the mean difference between two quantitative variables, the independent t-test was utilised as a measure of significance. P value of 0.05 was regarded as statistically significant.

RESULTS:

Mean age of presentation out of the 63 participants was 3 years. Gender distribution were 26 (41.3%) females and 37 (58.7%) males. Of 63 children, 57 children (90.5%) had screen time of more than 60. Of them 53 (84.1%) had sleep disturbances (Table 1)

Table 1: Demographic details and Primary outcome among children having screen time Below 60 nd above 60 minutes.

Demography and Primary Outcome		Below 60 minutes		Above 60 minutes		P value
		N	Percentage %	N	Percentage %	
Age (Years)	2	2	33.3	15	26.3	0.724
	3	3	50.0	20	35.1	
	4	1	16.7	16	28.1	
	5	0	0	6	10.5	
Gender	Female	2	33.3	24	42.1	0.678
	Male	4	66.7	33	57.9	
Sleep Disturbance	No	4	66.7	6	10.5	0.004
	Yes	2	33.3	51	89.5	

Disorder of initiating and maintaining sleep	No	2	33.3	14	24.6	0.029
	Yes	4	66.7	43	75.4	
Sleep breathing disorder	No	6	100	56	98.2	1
	Yes	0	0	1	1.8	
Disorder of Arousal	No	5	83.3	43	75.4	1
	Yes	1	16.7	14	24.6	
Sleep-wake Transition disorder	No	5	83.3	21	36.8	0.073
	Yes	1	16.7	36	63.2	
Sleep Hyperhydrosis	No	5	83.3	55	96.5	0.263
	Yes	1	16.7	2	3.5	

Primary Outcome

Sleep disturbances were maximum among 51 (89.5%) children with screen time of more than 60 min which was significant with a p-value of 0.004 (Fig-1)

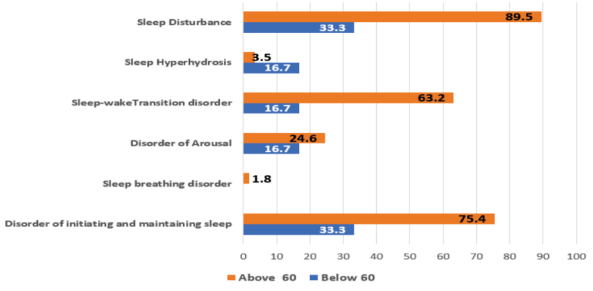

Fig-1:- Comparison of Sleep Disturbance Scale for Children according to screen time.

Secondary Outcome

Among electronic media use, mobile use was the maximum in 37 (64.9%) children and least was television 6 (10.5%). Among these, YouTube was most watched by 35 (61.4%) children and least watching cartoons by 7 (12.3%). (Table 2)

Table 2:- Secondary outcome including the type of electronic media and Content among children having screen time Below 60 and above 60.

Secondary Outcome		Below 60 minutes		Above 60 minutes		P value
		N	Percentage %	N	Percentage %	
Type of the Electronic Media	Mobile	6	100	37	64.9	0.214
	Tablet	0	0	14	24.6	
	Television	0	0	6	10.5	
Content	Cartoon	1	16.7	7	12.3	
	Games	0	0	15	26.3	0.355
	Youtube	5	83.3	35	61.4	

Screen time exposure was maximum on weekends in children with sleep disturbances. They were statistically significant differences found between Sleep Disturbance and Weekday screen exposure time (p=0.037). (Fig-2)

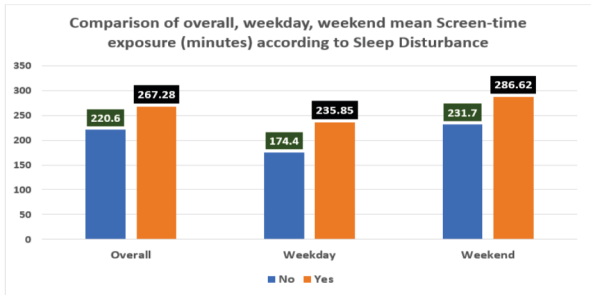

Fig 2:- Comparison of overall, weekday and weekend mean Screen-time exposure (in minutes) according to sleep disturbance.

DISCUSSION

Sleep disturbances are the most frequent behavioural problem in children with ASD. As they are the prominent characteristic of ASD and are associated with complicated interactions among biological, psychological, social/ environmental, family, and biological factors as well as parenting practices which don't promote good sleep. [6,12]

A significant relationship was found between screen time and sleep disturbances who were diagnosed with ASD. Study by Tyagi et al[13] on the correlation between sleep problems and children with ASD, showed that 60.2% of the children experienced sleep disturbances as measured by the SDSC score, 57.5% of those children had disturbances in initiating and maintenance of sleep and disruptions in the sleep-wake transition at their peak (61.6%)[15]. Our study on 63 children with ASD showed sleep disturbances in 53 children (84.1%).

Children with autism are exposed to screens at younger age to keep them engaged and are hence prone to screen addiction[16]. A study done by Kushima M et al. [17] found that children with ASD had substantially longer sleep onset delays when electronic media was used as part of night-time routine. When children with ASD incorporated television or video games in their bedtime rituals, they suffered sleep onset delays of roughly 40 minutes compared to 16 minutes for typical children [18, 19].. Our study revealed that children with ASD used electronic media, with mobile phones being the most often used device in children who spent more than 60 minutes of screentime and YouTube being the most frequently used domain.

A cohort study conducted has also shown that increased screen time at 1 year of age has a positive association with the development of autism featured in children by 3 years [17]. Sleep disorders were associated with developmental or cognitive delay, and emotional and behavioural problems (such as anxiety problems and aggressive behaviours)[20].

CONCLUSION

The present study adds the fact that in children with ASD, increasing screen time substantially is associated with sleep difficulties. Introducing and maintaining sleep hygiene and limiting screen time, may aid children with ASD in initiating and maintaining sleep. More research with a larger sample size, and a randomized, multi-centric study is needed to correlate screen time and sleep disturbances among children with ASD.

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