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Original Research Article

Impact of Digital Media Exposure and Severity of Attention Deficit Hyperactivity Disorder on Caregiver Burden

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Abstract:

Background: Exposure to various screens, including mobiles, has increased significantly in the recent Covid times, and this exposure is seen in children of the preschool age group than the recommended guidelines, which may be associated with inattention and aggressive behaviours. Children with attention deficit hyperactivity disorder (ADHD) had more chances for increased screen time than normal children. The current study aims to assess screen time's impact and its association with caregiver burden in children with attention deficit hyperactivity disorder.

Methodology: This cross-sectional study includes 60 children in the age group of 2-6 years diagnosed with ADHD attending child guidance clinic, Government Hospital for mental care. Sociodemographic details were obtained from their caregiver. Digital Screen Exposure Questionnaire (DSEQ) assessed child screen time exposure. The severity of ADHD was assessed by using the ADHD-RS IV scale. The Burden Assessment scale evaluated caregiver burden in their caregivers.

Results: 60 children with ages 2-6 years diagnosed with ADHD were included in our study. Most Children with ADHD had severity scoresabove the 93rd percentile. 60% of children with ADHD had a frequency of watching smartphones more than 5 times a week. The average time spent watching television daily was about 1 and a half hours and 2.3 hours on smartphones. The mean Burden Assessment Scale (BAS) score was 74.58, and 58.3% of caregivers had moderate caregiver burden, 37.7% had severe caregiver burden, and 10% had minimal caregiver burden.

Conclusion: The results show significantly high screen time exposure in children with ADHD. Among digital media, most children were exposed to smartphones, followed by television. There is a considerably higher caregiver burden in parents of children with ADHD, with a positive correlation between the severity of ADHD and caregiver burden.

Keywords: Screen Time, Caregiver Burden, ADHD, Television, Mobile.

Introduction

Screen time is when a person uses electronic/digital media, such as a computer, Smartphone, tablet, or television [1]. The American Academy of Paediatrics (AAP) recommends that children older than 2 years limit their daily Screen use to less than one hour. The World Health Organisation (WHO) guidelines advise against exposing children younger than 2 years old to screens and against exposing children between the ages of 2-4 to screens for more than an hour at a time. Mobile devices are vital for preschoolers since they will be affected negatively, even though they are excellent for educational apps and activities that enhance cognitive ability compared to other screen time exposure types. Watching television for longer than 1.5 hours has been connected in studies with later

behavioral and emotional issues in toddlers and preschoolers. Lower language abilities are associated with more screen time (duration and background television). Overuse of screens has been linked to several detrimental effects, including slower cognitive development and worse academic performance [2].

The most common childhood neurodevelopmental illness affecting school-aged children is attention deficit hyperactivity disorder (ADHD). ADHD is linked to various impairments, including academic underachievement, social issues, substance misuse, and poor health outcomes. In India, 2 to 17% of people have ADHD [3]. Increased screen usage was also strongly linked to the emergence of behaviour disorders. Due to screen media's quick-paced and powerful audiovisual effects, which may be linked to inattention and aggressive behaviours, self-regulation techniques are hindered, and arousal levels are raised [4].

The carer is a family member who has lived with the patient for more than a year and has been directly involved in all of the patient's daily activities, conversations, and medical treatment. The obstacles that carers face daily in connection to their physical and emotional health, their relationships with their family members, and their employment and financial situation are known as carer load.

Especially in caregivers of children with ADHD because of hyperactivity and impulsivity, there will be a higher caregiver burden [5-8]. Children are more likely to develop the habit of spending too much time in front of a computer and leading a sedentary lifestyle, which indicates the effect on the carer burden as a result of internalizing and externalizing behaviours.

Secondary to the child, parental/caregiver-related variables typically expose preschool children to excessive screen time [9]. The present study aimed to assess the impact of screen time on children with ADHD and the caregiver burden on their caregivers.

Materials and Methods

Study design: It is a comparative cross-sectional study.

Study place: The study was done at a Child Guidance Clinic, Government hospital for mental care, in Visakhapatnam.

Study period: The study was conducted from May 2022 to May 2023.

Study population: A convenient sample of 60 children was selected for this study.

Informed consent: Informed written consent was taken from the parents of selected children.

Institutional Ethics Committee: The Institutional Ethics Committee approved the study, and all subjects provided written informed consent.

Inclusion criteria: Sixty children aged 2-6 years and diagnosed with ADHD according to DSM-5 (Diagnostic and Statistical Manual of Mental Disorders) criteria were included, without any co-morbid neurodevelopmental disorders attending both outpatient and inpatient.

Exclusion criteria:

- Comorbidities, such as epilepsy or a visual/hearing impairment and
- On medications, such as antipsychotics, anticonvulsants and stimulants

Methodology

A convenient sampling is used in a sample of 60 children diagnosed with ADHD according to DSM-5 Criteria, without any co-morbid neurodevelopmental disorders attending both outpatient and inpatient. The caregivers gave informed written consent. Caregivers with known psychiatric illnesses were excluded. A semi-structured proforma consisting of sociodemographic details were taken. A Digital screen exposure questionnaire (DSEQ) assessed screen time exposure in the selected children with ADHD which consists of 30 items to be rated on a 5-point Likert scale – Never, Rarely (once/week), Seldom (1-2 times/week), Sometimes (3-5 times/week) and often (>5 times/week). The questions in DSEQ are subdivided to assess screen time exposure and home media environment, level of physical activity and media behaviours of the child. It also has questions regarding parental perceptions to assess if the child is learning good things or developing problems from the digital screens.

The severity of ADHD was assessed by using the ADHD-RS IV scale (Attention Deficit Hyperactivity Disorder Rating Scale-Preschool version IV), which is an 18-item questionnaire, and α value ranged between 0.85 and 0.95 for the home and the school versions, indicating good to excellent internal consistency. Children with scores above 93rd percentile are considered to have ADHD. Higher percentiles indicate greater severity of ADHD. Burden Assessment Scale (BAS) is used to categorize caregiver burden into Mild (score 40 – 60), Moderate (score 61 – 80) and Severe burden (score 81 – 100).BAS was developed at The Schizophrenia Research Foundation (SCARF) with the support of Regional Office for South East Asia of WHO (SEARO). It consists of 40 items to be rated on a 3-point Likert scale. The inter-rater reliability is good (kappa 0.80). Ethical Committee clearance was taken before starting the study. Statistical analysis was done by SPSS version 21.

The chi-square test was used for p-value analysis and correlation, and Kendall's Tau and Pearson tests were used. This scale is reliable, with kappa values ranging from 0.52 to 1.0 and an intra-class coefficient of 0.62-0.99($p<0.05$).

Results

Table 1 depicts the Sociodemographic details of the study sample.Out of 60 children with ADHD aged 2-6 years, 48 were male, and 12 were female. For most children, the mother was the primary caregiver of 73.3%. Among the caregivers, nearly 51.7% belong to lower middle-class socioeconomic status, and 48.3% belong to the upper middle class (Table 2). 60% of the families were from urban domicile. About 45% of caregivers weregraduates, and 51.7% have education up to school level.

By applying the ADHD-RS IV scale to 60 ADHD children, the mean severity percentile is found to be 93.9 ± 3.68 (Table 2 and Table 3). The DSEQ showed that about 30% of ADHD children had a frequency of television watching more than 5 times a week (often), and the average duration of watching television per day was about 90 minutes. Figure 1 indicates that most of the children with ADHD used to watch television 3-5 times a week. Nearly 60% of children with ADHD had a frequency of watching smartphones more than 5 times a week, 20% of children had a frequency of 3-5 times a week, and the average duration of watching smartphones was about 2.3 hours. Almost 63.3% of children with ADHD were never exposed to a laptop/computer, and 28.3% children used it less than once per week. Nearly 81.7% of children with ADHD exposed to digital screens did not have supervision by caregivers. Around 5.3% of children with ADHD never played outside, 42.1% rarely played outside, 21.1% play edseldom, 26.3% had played outside sometimes, and 5.3% often played outside. Figure 2 shows media related behaviour of children.

Most of the children used digital media to watch random things for enjoyment like music, movies, and cartoon shows, recreational (TikTok, Instagram reels) videos on various social media available in caregiver smartphones.43% of children in the study sample often used to watch movies and recreational videos on social media.56.7% of children often used to watch cartoon shows, music, and YouTube videos. Results suggest that children rarely use digital media gadgets for learning purposes. Of them, 53.3% never used digital gadgets for any learning purpose, and 33.7% used them once or twice a week to learn the alphabets or numbers.The mean BAS score was 74.58 found in this study. Table 2 shows that around 58.3% of caregivers had moderate caregiver burden, 37.7% had severe caregiver burden, and 10% had minimal caregiver burden. There is a significant positive correlation between the ADHD-RS scores and caregiver Burden with a p-value of less than $p<0.0001$ (Table 3).By using Kendall's Taub test, there was no significant association between caregiver burden and screen time (Table 4).

Table 1: Sociodemographic details of the study

Demographic variable		Count	N%
Child's Gender	Female	12	20.0%
	Male	48	80.0%
Primary Caregiver	Father	16	26.7%
	Mother	44	73.3%
Caregiver's Education	Graduate	27	45.0%
	School	31	51.7%
	Illiterate	2	3.3%
Socioeconomic status	Lower middle	31	51.7%
	Upper middle	29	48.3%
Religion	Hindu	57	95.0%
	Muslim	3	5.0%
Domicile	Rural	24	40.0%
	Urban	36	60.0%

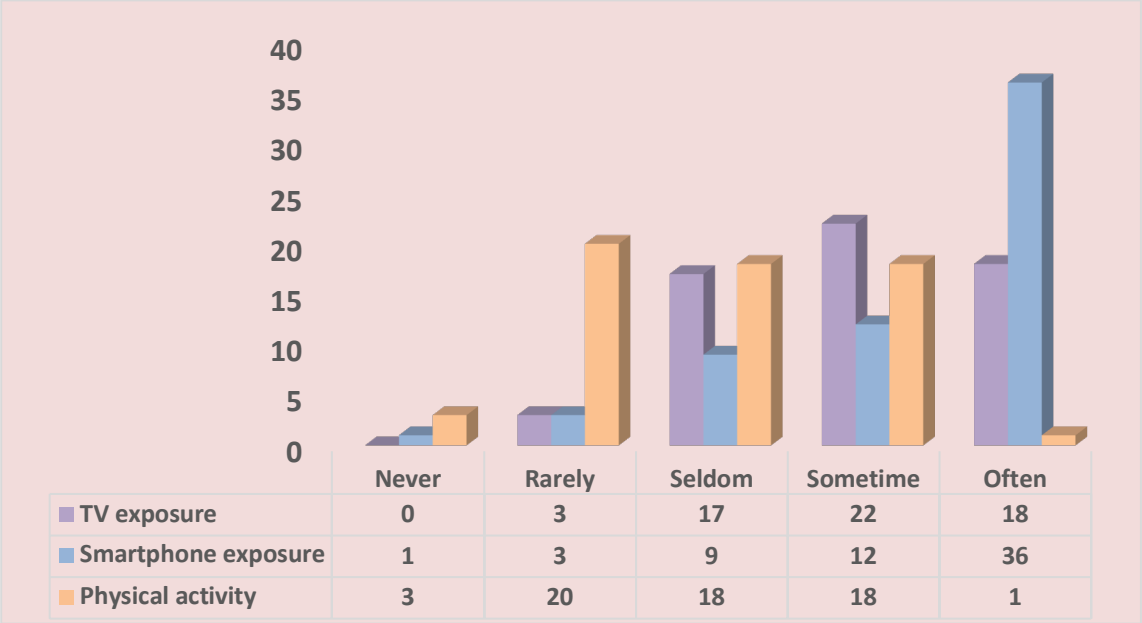

Figure 1: Frequency of TV exposure, smartphone exposure, physical activity in children with ADHD

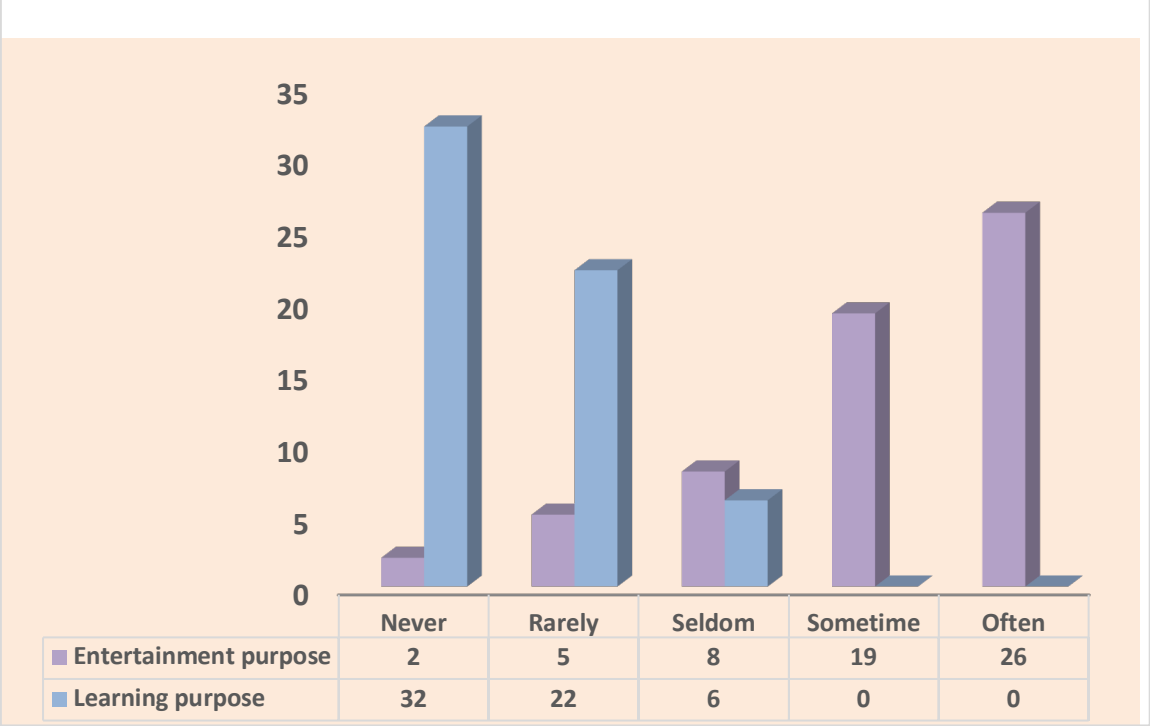

Figure 2: Frequency of children with ADHD using digital media for entertainment, learning purpose

Table 2: Caregiver burden assessed by BAS

BAS	Count	Percentage
Mild (Score 40 – 60)	6	10%
Moderate (Score 61 – 80)	35	58.3%
Severe (Score 81 – 100)	19	31.7%

Table 3: Correlation between caregiver burden and severity of ADHD:

		ADHD RS percentile		
		Mean	Standard deviation	P-value
BAS categories	Mild	89.21	1.55	
	Moderate	95.04	0.81	
	Severe	98.43	0.51	<0.0001

Table 4: Correlation between Caregiver burden and Screen time

Question	Correlation Coefficient	P-value
1	-0.065	0.518
2	-0.033	0.745
3	-0.033	0.973
4	-.207	0.041
5	-0.022	0.827
6	-0.009	0.926
7	-0.002	0.982
8	-0.030	0.773
9	-0.054	0.609
10	-0.123	0.254
11	-0.004	0.972
12	-0.006	0.955
13	-0.065	0.515
14	-0.008	0.939
15	-0.032	0.752
16	-0.008	0.937
17	-0.094	0.387
18	-0.004	0.972
19	-.194	0.046
20	- 0.100	0.340
21	-0.041	0.696
22	-0.008	0.942
23	-0.006	0.956
24	-0.042	0.681
25	-0.161	0.103
26	-0.035	0.724
27	-0.123	0.229
28	-0.124	0.218
29	-0.064	0.552
30	-0.152	0.152

Discussion

In this study, majority of the children were male (48 were male and 12 were female), suggesting that ADHD is more common in males compared to females. As the study was done in a government institution, majority of the families belonged to lower socioeconomic status, where is a social custom for the mother to be home maker while father provides financial support. Consequently, the mother was the primary caregiver for most of the children with ADHD. DSEQ analysis showed that the screen time exposure and home media environment exposure were above the recommended guidelines. Among digital media, smartphone and television usage was the most common in the study sample than computer and laptop.

In our study, we also noted that almost 63.3% of children with ADHD were never exposed to a laptop/computer and 28.3% children used it less than once per week. It could be due to the easy availability and accessibility of smartphones along with lack of availability of laptop/ computer due to financial constraints as majority of families included are from lower middle socio-economic status. Especially during period of covid pandemic, the children were in restricted environments and smartphones became the primary mode of communication and entertainment. It also could be due to parent-related factors like using the digital media themselves for recreation in front of children, spending less quality time with the child and the child seeking pleasure from screen use. The recent escalation in the availability of smartphones in the Indian subcontinent makes a significant impact on the behaviour of children and parenting styles. Almost 81.7% of caregivers did not supervise when children used digital screens. Consequently, most of the children used digital media to watch random things for enjoyment like music, movies, and cartoon shows, recreational (TikTok, Instagram reels, YouTube) videos on various social media available in caregiver smartphones. Children rarely used screens for academic or learning purposes. Caregivers need to exercise proper supervision while allowing children to watch digital media. Despite less supervision, most of the of caregivers responded that there are more negative than positive effects on their children due to the use of digital media.86.7% responded that there are adverse effects like behaviour change and vision problems on their children due to screen exposure. A previous South

Indian cross-sectional study on screen time exposure in preschool children with ADHD had similar results that preschool children with ADHD had more screen exposure than the recommended duration [10]. Our study also showed a significant decline in outdoor play. Majority, around 68%, of children played outside only less than 2 times a week which could be consequence of Covid pandemic when children were not allowed to play outside and were more involved with indoor games. A decline in outdoor play can itself lead to increasing screen time. Few studies have showed increased screen time with a more sedentary lifestyle [11-13].A recent study showed that increasing screentime is associated with emotional and behavioral changes, sleep disturbances [14]. A cross-sectional study on the quality of life and burden of caregivers of children and adolescents with disabilities concludes that most caregivers have a higher caregiver burden and significant impact on quality of life [15-16]. Another Indian study on caregiver needs in parents of children suffering from neurodevelopmental disorders concluded that a significant caregiver burden is observed. Our study results are also similar to the above findings. About 58.3% of parents of children with ADHD have a moderate caregiver burden, followed by 31.7% who have a severe caregiver burden. There is a positive correlation between severity and caregiver burden, and this could be due to impulsive symptoms leading to disruptive behaviour as the disorder progresses. There are chances of ADHD progressing to ODD and CD (Oppositional Defiant Disorder and Conduct Disorder), which may further increase the caregiver burden [17]. If added to parenting issues, the increase in hyperactivity and impulsivity may further aggravate the caregiver burden. Coping strategies have to be practiced to alleviate the caregiver's burden. Parental management training should be advised to parents with children having ADHD to manage their child's defiant behaviour. In our study, we did not find significant correlation between screen time exposure and caregiver burden. Irrespective of the severity of the caregiver burden, screen time exposure was present in most of the study population. This would indicate that screen time is not an independent risk factor for care giver burden. However, there have been earlier studies suggesting that screen exposure produced negative developmental outcomes [14]. So, increasing screen time exposure might have an indirect effect on care burden by increasing the ADHD severity. While interpreting the results of our study, it should be noted the design is cross-section and the scales used in the study had results rated into 5-point Likert scale. This limitation may be ignored aswe focused on various aspects of screen time exposure, like frequency, modalities of digital screens, physical activity, and media behaviours of children with ADHD and its impact on caregivers. We hope that the results of our study would pave the way for future research with longitudinal, prospective design susing a larger sample size and tools involving interval scale.

Conclusion

Children with ADHD have significantly high screen time exposure, mainly smartphones and television, than the recommended guidelines and low levels of outdoor play. There is a positive correlation between the severity of ADHD and caregiver burden. Irrespective of the severity of the caregiver burden, most children with ADHD had high exposure to digital screens. Hence, parents are required to restructure the leisure time for children, thereby decreasing screen time exposure.

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