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ORIGINAL ARTICLE

Impact of Excessive Screen Use on Sleep Habits in Children during Covid-19 Pandemic

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ABSTRACT

Objective: To determine the impact of excessive screen use on sleep habits in children during COVID-19 pandemic using Children's Sleep Habits Questionnaire.

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Study Design: Cross-sectional descriptive survey.

Place & Duration of Study: Conducted from 1st July to 30th November 2020, in the Department of Pediatric Medicine Unit II, King Edward Medical University/Mayo Hospital, Lahore.

Material and Methods: A 22-item likert scaled online questionnaire, assessing children's sleep habits (Children's Sleep Habits Questionnaire) before and during the Covid-19 pandemic, was circulated among parents having a child from 2-10 years age. Responses were analyzed with SPSS V.26

Results: Out of 102 children, majority 46 (45.1%) were between 6 and 10 years, the type of screen used most was mobiles i.e. 28 (27.5%) followed by TV/mobile 21 (20.6%). There was marked increase in their screen time/per day from <2hrs before pandemic in 63 (61.8%) to >2 hours during pandemic in 81 (79.4%). As a result, sleep habits were significantly affected during the pandemic, especially in the domains of bed time, sleep behavior and morning wake up. During pandemic, children slept late at night 91 (89.3%), majority sleeping >8 hrs/day (p=0.000), could not wake up early in the morning (p=0.000), and remained tired (p=0.026) and sleepy (p=0.005) whole day.

Conclusion: Excessive screen use during the pandemic was associated with altered sleep habits in children.

Key Words: *Impact, COVID-19, Screen use, Pandemic*

INTRODUCTION

The outbreak of the Novel coronavirus (COVID-19) started in China and was declared a pandemic in March 2020 by WHO.¹ It has affected more than 200 countries with total number of cases around the world to be 7605113 with 425330 deaths as of 13th June, 2020. To this date, in Pakistan, 132400 cases have been confirmed with 2551 deaths.²

The COVID-19 outbreak has posed significant changes across the globe. People are required to stay home. During this, about 1.5 billion children have been away from school and as a result spending more time on screens to complete online activities, socializing with peers or playing video games. Total screen time/day in children 8-18 years has risen from 5 to approximately 8 hours since 1999,³ far exceeding the AAP recommendations of 2 hours or less.⁴

Children can be particularly vulnerable to the harms associated with excessive screen time or gaming including unhealthy sedentary lifestyle, exposure to harmful content, misinformation regarding COVID-19, or development of gaming disorder. Effect on eyes is also seen in the form of eyestrain, headaches, blurred vision, dry eyes and pain in the neck and shoulders.⁵

Many studies prove that higher screen time causes sleep disturbances due to environmental, psychosocial and biological causes,⁶ as well as arousal due to the content of media and effect of screen light. Studies have shown that higher levels of youth screen time were associated with higher levels of sleep disturbances, which in turn were related to higher levels of behavioral problems.⁷ Because of various concerns, expert groups have suggested controlling screen time for children. The American Academy of Pediatrics recommended in 2016 to limit screen time for children aged 2-5 years to 1hr/day.⁸

The purpose of this study was to compare the screen time use by children before and during the COVID-19 pandemic, and see its harmful effect on children's health especially sleep disorders. This study was expected to provide latest information to families during this pandemic so that they can review their children's routines, manage their screen time and prevent the subsequent problems.

MATERIAL AND METHODS

This was a cross-sectional study conducted at King Edward Medical University/Mayo Hospital, Lahore from 1st July, 2020 to 31st December, 2020. A questionnaire comprising 22 items (Child

TABLE 1: Bedtime habits (n=102)

Pair	Mean	SD	SEM	Sig(2-tailed)
1. Child goes to bed at the same time at night				
Before Pandemic	1.80	1.053	0.104	0.000
During Pandemic	2.66	1.459	0.144	
2. Child falls asleep within 20mins after going to bed				
Before Pandemic	1.83	1.006	0.100	0.000
During Pandemic	2.75	1.303	0.129	
3. Child falls asleep alone in own bed				
Before Pandemic	3.33	1.471	0.146	0.104
During Pandemic	3.48	1.501	0.149	
4. Child falls asleep in parent's/sibling's bed				
Before Pandemic	2.16	1.051	0.104	0.070
During Pandemic	2.31	1.134	0.112	

Sleep Habits Questionnaire)⁷ was distributed online among parents who had at least one child aged from 2-10years. Any child with underlying neuropsychiatric disorder was not included in the study. The questionnaire covered 4 domains related to sleep habits, i.e. bedtime, sleep behavior, waking up during the night and morning wake up. After receiving the responses, data was analyzed using SPSS version 26. Qualitative data like age, gender was analyzed using frequencies and percentages. Quantitative data was analyzed by mean and standard deviation. The responses from the participants were compared using chi-square test. A p-value of ≤ 0.05 was considered significant.

RESULTS

Out of 102 children included, majority 46(45.1%) belonged to age group 6-10 years, more being females 62(60.8%). The type of screen used most was mobiles in 28 cases (27.5%) followed by both mobiles and TV in 21 cases (20.6%). There was marked increase in their screen time/day from <2 hrs before pandemic in 63 cases (61.8%) to >2 hrs during pandemic in 81 cases (79.4%).

A validated CSHQ-abbreviated proforma was used which had Cronbach Alpha value of 0.71250, indicating its validity and reliability.

A drastic change in children's bedtime behaviour was observed. Before pandemic they slept during 8-10 pm in 62 cases (60.8%), shifting to >10pm during pandemic in 91 cases (89.3%), and maintained this routine daily. During pandemic, children tended to fall asleep within 20 minutes after going to bed ($p=0.000$) and lesser needed any object to fall asleep ($p=0.000$) table 1.

5.	Child falls asleep with rocking or rhythmic movements				
	Before Pandemic	3.99	1.361	0.135	0.348
	During Pandemic	4.06	1.225	0.121	
6.	Child needs special object to fall asleep				
	Before Pandemic	3.93	1.409	0.140	0.002
	During Pandemic	3.67	1.550	0.153	
7.	Child needs parent in the room to fall asleep				
	Before Pandemic	2.22	1.157	0.115	0.059
	During Pandemic	2.38	1.243	0.123	
8.	Child resists going to bed at bedtime				
	Before Pandemic	3.26	1.378	0.136	0.000
	During Pandemic	2.42	1.323	0.131	
9.	Child is afraid of sleeping in the dark				
	Before Pandemic	3.01	1.452	0.144	0.657
	During Pandemic	2.99	1.472	0.146	

Difference of other variables like falling asleep alone in bed ($p=0.104$), or in parents/sibling's bed ($p=0.070$), needing any rocking/rhythmic movements to sleep ($p=0.348$), needing a parent to sleep ($p=0.059$), or being afraid of sleeping in the dark ($p=0.657$), before and during pandemic, showed insignificant results.

TABLE 2: Sleep behaviour (n=102)

Pair	Mean	SD	SEM	Sig(2-tailed)	
1. Child sleeps about the same amount each day					
	Before Pandemic	1.43	0.653	0.065	0.000
	During Pandemic	2.03	1.238	0.123	
2. Child is restless and moves a lot during sleep					
	Before Pandemic	3.44	1.122	0.111	0.059
	During Pandemic	3.21	1.229	0.122	
3. Child moves to someone else's bed during the night					
	Before Pandemic	3.86	1.313	0.130	0.175
	During Pandemic	3.76	1.422	0.141	
4. Child grinds teeth during sleep					
	Before Pandemic	4.15	1.316	0.130	0.798
	During Pandemic	4.17	1.275	0.126	
5. Child snores loudly					
	Before Pandemic	4.23	1.281	0.127	0.158
	During Pandemic	4.28	1.189	0.118	
6. Child awakens during the night sweating, crying or screaming					
	Before Pandemic	4.54	.982	0.097	0.508
	During Pandemic	4.58	.872	0.086	
7. Child naps during the day					
	Before Pandemic	2.73	1.443	0.143	0.000
	During Pandemic	3.63	1.554	0.154	

Restlessness and moving during sleep ($p=0.059$) and moving to someone else's bed during night ($p=0.175$) was insignificantly seen lesser during pandemic. Children grinding teeth during sleep ($p=0.798$) or snoring during sleep (0.158) showed no difference before and during pandemic.

Before pandemic, their sleep behavior showed that 67 children (65.7%) slept for >8 hrs/day, while this increased to 80 children (78.4%) sleeping the same amount during pandemic. Daily amount of sleep/day remained same during pandemic ($p=0.000$), napping less in the day with 31.4% before and 62.7% during pandemic rarely/never napped (table 2).

Similarly habits of sweating, crying or screaming during the night had insignificant differences ($p=0.508$).

Children waking once or more during the night also showed insignificant difference ($p=0.062$ and $p=0.058$ respectively) table 3.

TABLE 3: Waking during the night (n=102)

Pair	Mean	SD	SEM	Sig(2-tailed)
1. Child wakes up once during the night				
Before Pandemic	3.62	1.313	0.130	0.062
During Pandemic	3.47	1.391	0.138	
2. Child wakes up more than once during the night				0.058
Before Pandemic	4.27	1.026	0.102	
During Pandemic	4.18	1.085	0.107	

Regarding morning wake up behavior, before pandemic 80 children (78.4%) had a routine of waking up before 8am, while during pandemic, 93(91.1%) children were seen to wake up after 8am, with 61(59.8%) rarely/never waking up early in the morning(p=0.000) during pandemic. They

TABLE 4: Morning wake up habits (n=102)

Pair	Mean	SD	SEM	Sig(2-tailed)
1. Child wakes up by him/herself				
Before Pandemic	2.77	1.356	0.134	0.090
During Pandemic	2.53	1.256	0.124	
2. Child wakes up very early in the morning				0.000
Before Pandemic	2.95	1.285	0.127	
During Pandemic	3.55	1.256	0.124	
3. Child seems tired during the daytime				0.026
Before Pandemic	3.20	1.407	0.139	
During Pandemic	3.54	1.287	0.127	
4. Child falls asleep while involved in activities				0.005
Before Pandemic	3.95	1.146	0.114	
During Pandemic	4.14	1.044	0.103	

DISCUSSION

Present study showed that there was a definite increase in screen time among children which affected their sleep habits adversely. This is supported by multiple other studies as well.^{6,7} This was mainly due to children being confined to homes secondary to closure of schools, recreational parks, shopping malls, etc.⁹This may also be due to parenting practices.¹⁰ Initial reports from China's pandemic-stricken areas indicated that media entertainment was the most popular tool used by parents to address their children's problems and mitigate the effects.¹¹

In current study, females were slightly more in number, falling in 6-10 years age range. This gender difference may be due to boys somewhat still being more active in outdoor activities as well. The study showed that among the routinely used electronic devices, mobile phones were maximally being used, followed by use of combined mobile phones and television. This can be because of

remained more tired and sleepy whole day during pandemic (p=0.026; p=0.005 respectively). Waking up by him/herself was similar before and during pandemic (p=0.090) table 4.

majority people in a house keeping mobiles, which are an easy and handy source of entertainment. Nowadays online education also plays a part in extra use of these devices.

As results showed, using excessive screen during the day led to delay in children's bedtime habits. This association with delayed sleep time can be due to 3 underlying mechanisms: 1) time displacement (i.e. time spent on screen replaces time spent on sleeping and other activities); 2) psychological stimulation based on media content; and 3) the effects of light emitted from devices on circadian timings, sleep physiology and alertness.¹² But once in bed, after tiring themselves with excessive screen use, children tended to fall asleep immediately, without any resistance/assistance. This indicated how exhausted they were after watching TV or using mobiles. With schools being closed and sleeping late at night, they were unable to wake up early in the mornings, remained significantly sleepy and tired whole day.

Multiple studies have shown association of excessive screen use with adverse health outcomes including headaches, neck pains, computer vision syndrome,^{5,13} other eye disorders like myopia,¹⁴ sleep disorders,^{6,7} lower psychological well-being, decreased physical activity,¹⁵ unhealthy diet, obesity, depression, and many more.^{16,17} WHO and many others already advise no screen time for 1 year olds; and up to 1 hour/day for 2-4 years old kids.^{18,19} Moreover, televisions are not recommended to be placed in bedrooms.⁴

As the pandemic continues with a fiercer second wave, it is obvious that home confinement will also continue. With this, use of screen will further increase. This, in turn, leads to behavioral problems, often following into adulthood.

Limitations: Although there is considerable evidence that excessive screen use is associated with multiple health hazards esp. sleep disorders, our study having same findings had certain limitations. First, the sample size was small so it may not have represented the general population characteristics. Second, this was an observational online survey and may have been biased by parents' observations. Third, as this study was conducted during the peak time of the pandemic, observations regarding screen use may have been exaggerated as compared to normal routine life.

CONCLUSION

Excessive screen use was associated with sleep disorders in children. Thus effective interventions to reduce screen time are needed to be developed and enforced to maintain sleep hygiene, and finally overall health. Measures should be timely and strictly taken by parents as well as pediatricians to set a limit to children's screen time, increase their physical activity, make proper sleep habits a priority and encourage bedtime routine. All these should be strictly followed to prevent immediate as well as long term health hazards.

Conflict of interest: Nil

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