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Original Article

Impact of Mobile Phone Use on Health, Behavior and Social Interactions among Children Aged 2 – 12 Years

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ABSTRACT

Children and teenagers are becoming increasingly dependent on their mobile devices, which they use for entertainment, education, and self-expression in addition to keeping in touch with friends and family. The prolonged use of mobile phones can have deleterious effects on children. **Objectives:** This study was conducted to evaluate these effects on specific areas of the children. **Methods:** It was a cross-sectional study conducted at the outpatient department during the study period from September 2019 to February 2020. Children below the age of 2 years or mentally challenged children were excluded. Informed consent was taken from parents who participated in the activity. The child and the parents are explained the research purpose and data collected in the pre-designed and pre-tested questionnaire. SPSS version 21.0 was used to enter and analyses the data. **Results:** A total of 399 participants of age 2 to 12 years were included in the study. In 50.3 % of children who were using mobile for more than 2 hours, 55.1% of children slept less than 6 hours a day with 68.9% of children having a disturbance in sleep pattern. 33.9% of children reported having been wearing glasses and 34.8% of children showed an increase in weight. Regarding social interaction and behavior, 39.9% of children showed rude behavior towards their parents.53.2% of children using mobiles were associated with behavioral issues like isolation thus avoiding gathering while 77.3% were addicted to mobiles and showed anger and frustration when mobiles were taken away from them. **Conclusion:** The use of the mobile phone negatively impacts the various aspects of a child's life.

INTRODUCTION

The 21st century is undoubtedly an era of mobile phone communications with billions of subscribers worldwide [1]. The increased dependency on mobile phones in children and adolescents is not only a source to keep in touch with friends and relatives but also for entertainment, educational purposes, and expressing one's identity [2]. Despite its advantages, it is still hazardous for the human being in the sense of physical & mental well-being with negative effects on social relationships, working capabilities, and day-to-day activities. The major health risk is associated with radiofrequency electromagnetic fields, as the main source of mobile phone communication is linked through the emission of radio signals [3]. The brain is the main target organ for radiofrequency (RF) radiation emitted during its use [4]. Brain tumors have been a major concern as it absorbs most of the radio frequency energy when the handset is held near to the head during talking and listening [5]. In students, physical fitness [6] and poor academic performance [7] have been related to excessive use of mobile phones. Due to its dependency, interpersonal relationships are being affected which can have an immense impact on our physical and psychological health [8]. By the definition of psychology, factors contributing to the poor-quality relationship are social anxiety and

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loneliness [9-10]. Many studies have shown the association between the behaviors of mobile phone users with psychological features like low personality, low self-esteem, impulsivity, and feeling unwell [11-12]. Studies have also shown a significant association between headache, tiredness, low energy, and insomnia in late-night cell phone users. Insomnia later will be affecting the learning process of an individual [13].The sleep quality and deprivation is another factor affecting the normal activity of a healthy individual that raises significant health concerns [14]. The aim of this study was (a) to study the effects of mobile phones on the health of children (b) to study the impact of mobile phones on the physical and social behavior of children and (c) to study the association of mobile phones used with poor social interactions and disturbed relationship among peers and family. There was a dire need to identify the factors associated with psychological and behavioral issues that are amenable to timely intervention in our population.

METHODS

A cross-sectional study was conducted at Pediatric OPD of tertiary care teaching hospital of Karachi. All children with their parents attending the pediatric OPD between 2 to 12 years were included during the study period from September 2019 to February 2020. A total of 399 children using mobile phones for any purpose participated in the study. Children below the age of 2 years or mentally challenged children were excluded. Informed consent was taken from parents who participated in the activity. The child and the parents are explained the research purpose and data collected in the pre-designed and pre-tested questionnaire. The institutional review board of the Darul Sehat Hospital, Liaquat College of Medicine and Dentistry approved the study with reference number DSH/IRB/2021/0031. It was estimated using an online sample size calculator open epi version 3.0 after inserting the frequency of outcome factor in population [2] as 38.1% with a 5% margin of error and 95% confidence interval we required at least n = 363 samples for this study. Data were stored and analyzed using IBM SPSS version 23.0, and counts with percentages were given for qualitative data. Pearson Chi-Square test of independence was used to check the association of mobile users with studied factors, p-values less than 0.05 were considered significant. A pie diagram is also used to give a graphical presentation of data.

RESULTS

Table 1 shows that 214 (53.6%) participants were male and 185 (46.4%) were females. While the children were < 5 years 138 (34.5%) and 261 (65.4%) belonged to > 5 years age group. 196 (49.1%) children used their mobile for less than 2 hours while 203 (50.3%) were using their mobile for more than 2 hours.

Gender (n=399)	n (%)
Male	214 (53.6)
Female	185(46.3)
Age Groups (n=399)	**n (%)**
<5 years	138(34.5)
> 5 years	261(65.4)
Amount of mobile use hours/day (n=399)	**n (%)**
< 2 hours	196 (49.1)
>2hours	203(50.8)

Table 1: Baseline Characteristics of studied sample (n= 399)

The majority of 261(58.5%) of the children were using their mobiles for cartoons, followed by 51 (11.4%) playing games, and 33 (7.4%) children were watching movies as shown in Figure 1.

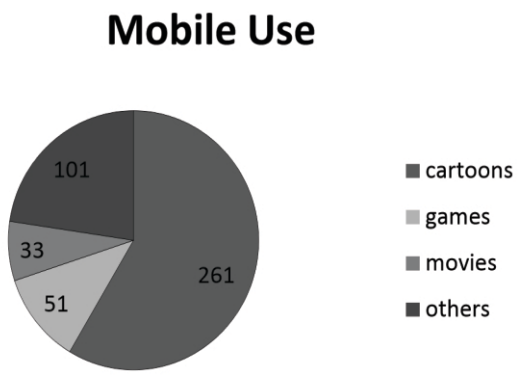

Figure 1: Purpose of mobile use n=399

Table 2 shows the amount of use of mobile phones in relation to health and education problems. In children with mobile usage of more than 2 hours, 55.1% of children had less than 6 hours of sleep as compared to children with less than 2 hours of usage of a mobile phone where 27.0 % had less than 6 hours of sleep with a P-value of 0.0001. In response to Abnormal sleep timings, 75 (36.5%) parents identified a decrease in nighttime sleep with 66 (32.5%) children showed an increase in daytime sleep with a p-value of 0.0001.

Amount of use per day (hours)	Duration of sleep n (%)				p-value
	< 3hours 44(11.0)	3-6 hour 121(30.3)	>6 hours 234(58.6)	Total 399	
<2 hours	07(3.5)	46(23.5)	143(72.9)	196	0.0001
>2 hours	37(18.2)	75(36.9)	91(44.8)	203	
Amount of use per day (hours)	**Effects on Vision after Mobile use n (%)**				**p-value**
	Normal vision 298(74.6)	**Wearing glass 101(25.3)**		**Total 399**	
<2 hours	164(83.6)	32(16.3)		196	0.0001
>2 hours	134(66.0)	69(33.9)		203	
Amount of use per day (hours)	**Sleep Disturbance/Abnormal sleep timings n (%)**				**p-value**
	Increase day time 88(22.0)	**decrease night time 111(27.8)**	**Normal 200 (50.1)**	**Total 399**	
<2 hours	22(11.2)	37(18.8)	137(69.8)	196	0.0001
>2 hours	66(32.5)	74(36.5)	63(31.0)	203	

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Amount of use per day (hours)	Weight for age/ Gain /Loss of weight n (%)					p-value
	Increase waist 105(26.3)	Decrease waist 95(23.8)	Bangle tightening 34(8.5)	No change 165(41.3)	Total 399	
<2 hours	53(27.0)	31(15.8)	14(7.1)	98(50.0)	196	0.0001
>2 hours	52(25.6)	64(31.5)	20(9.8)	67(33.0)	203	

	Impact on Education n=(%)						p-value
	Excellent 134(33.5)	Good 162(40.6)	Bad 19(4.7)	Very bad 22(5.5)	Not attended 62(1.5)	Total 399	
<2 hours	61(31.1)	76(39.3)	4(2.0)	6(3.1)	49(25.4)	196	0.0001
>2 hours	73(35.9)	86(42.3)	15(7.3)	16(7.8)	13(6.4)	203	

Table 2: Chi-Square association of Mobile phone use with health and education n=399

The various behavioral and social problems observed in the present study are shown in Table 3. More hours with mobile phones were associated with social problems like rude behavior with parents in 81 (39.9%) children, unfriendly behavior with friends in 70 (34.4%) children, disobedience with teachers in 43 (21.1%), unfriendly with siblings in 91 (44.8%) children, rude relationship with other family members in 65 (32.0%) children and prefer isolation and avoid gatherings in 108(53.2%) children with a significant p-value. One thing that did not differ was whether more or fewer hours with a mobile phone was addictive nature which was seen in 77.3% of children with a p-value of 0.943.

Time of mobile use per day (hours)	Relationship with parents n (%)				p-value
	Obedience 147 (36.8)	Friendly 128(32.0)	Rude 124(31.1)	Total 399	
<2 hours	90(45.9)	63(32.1)	43(21.9)	196	0.0001
>2 hours	57(28.1)	65(32.0)	81(39.9)	203	

Time of mobile use per day (hours)	Relationship with teachers n (%)			p-value
	Obedient 335(83.9)	Disobedient 64(16.0)	Total 399	
<2 hours	175(89.2)	21(10.7)	196	0.005
>2 hours	160(78.8)	43(21.1)	203	

Time of mobile use per day (hours)	Relationship with Friends n (%)						p-value
	Friendly 194 (48.6)	Cooperative 92(23.1)	Quarrel Some 44(11.0)	Bullying 20(5.1)	Fighting 49	Total 399	
<2 hours	117(59.6)	36(18.3)	15(7.6)	5(2.5)	23(11.7)	196	0.0001
>2 hours	77(37.9)	56(27.6)	29(14.3)	15(7.3)	26(12.8)	203	

	Relationship with Siblings n (%)						p-value
	Friendly 194 (48.6)	Cooperative 92(23.1)	Quarrel Some 44(11.0)	Bullying 20(5.1)	Fighting 49	Total 399	
<2 hours	121(61.7)	25(12.7)	16(8.1)	8(4.0)	26(13.2)	196	0.0001
>2 hours	68(33.4)	44(21.6)	29(14.3)	14(6.8)	48(23.6)	203	

	Relationship with other family members n (%)				p-value
	Obedient 335(83.9)	Friendly 143(35.8)	Rude 112(28.0)	Total 399	
<2 hours	85(43.3)	64(32.6)	47(23.9)	196	0.011
>2 hours	49(24.1)	79(38.9)	65(32.0)	203	

Amount of use per day (hours	Social Isolation - prefer to be alone and avoid gatherings n (%)			p-value
	Yes 180	No 219	Total 399	
<2 hours	85(43.3)	64(32.6)	196	0.011
>2 hours	49(24.1)	79(38.9)	203	

Table 3: Chi-square association of Mobile phone use with behavioral and social problems n=399

DISCUSSION

Our study describes the significant and increasing use of mobile devices in children between the age of 2 to 12 years, raising apprehension about the harmful impact on the health, wellbeing, behavior, and social interactions of children. Our study shows that 50 % of children use mobile phones for more than 2 hours which is against the recommendation of AAP which says screen time should be limited to not more than 2 hours [15]. This shows that the parents are not restricting the use of mobile phones which is also seen in the study done by Shaiza et al., where children have given the view that their parents allow them to use mobile phones for longer hours [16]. This highlights that parents are less attentive and vigilant. The reason could be being busy in their life makes it difficult to control their children's activities at home. The commonest use of the mobile phone was watching cartoons in our study which is a non-educational tool that might be the reason for distraction from their studies and less interaction with parents and friends. These findings were also shared in the study from Lahore which describes mobile usage causing interference with face-to-face communication and interaction with family members at home [17]. Constant visualization of cartoons and other non-educational stuff also makes them prone to develop eyesight issues later in life. Being busy with their mobile, these children have chances of developing behavioral disorders and inattention as described in the study that children under 5 years of age are more prone to develop behavioral problems when using screen time for more than 2 hours. Interacting less time with family members and decreasing sharing of problems will lead to emotional and behavioral issues. Constantly focusing on the screen makes them unable to focus on multiple tasks leading to inefficiency and decrease attention [18]. Parent's insecurities and wish to upgrade child's educational methods, use as a distracter for children, and a way to handle children's behavior are all different ways to start indulging children in the use of mobile /smartphones which later becomes a habit and an addiction which affects not only physical wellbeing but also social and emotional behavior [19]. Having less interaction with family members, less time for casual family get together and sporadic chances of family meals are all different risk factors in children developing speech delays. This has been reported by parents with children spending more than 30 min on mobile screens were associated with more risk of developing expressive speech delays [20]. In our study, 32.0 % of children showed rude behavior towards their family members, 53.2% of children wanted to be alone with less social interaction and 77.3 % of children were addicted to mobile use although the p-value was not significant as this behavior was noticed in both groups.

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When their mobile was taken away from them, these children showed anger, frustration, and irritability. This finding was supported by studies where children showed addiction to its use and anger when their mobile is taken away from them [21] on the contrary our children did not show a significant effect on their academic performance. Maybe parental influence and interest in their academic performance were much more monitored than social and behavior issues. This has been also been observed that children with immoderate screen time at a younger age tend to have developmental delays and show worse performance on tests done for developmental screening [22]. It has been observed that children with screen time of more than 2 hours tend to have more chances of gaining weight [23]. Being a sedentary lifestyle and eating junk food while watching cartoons or movies makes them more prone to develop overweight now and obesity later in life. There has been a negative and positive association between screen time and weight gain. Two studies support the notion that social media exposure of more than 2 hrs is associated with more sedentary behavior and obesity [24-25] on the contrary other studies show no association between screen time and obesity [26-27] still more work is needed to show a significant association between screen time and obesity. Other possible effects on physical health with the prolonged use of mobile phones especially eye problems, sleep disturbances, headache, and muscle pain notably neck pain have become a matter of worry for physicians [28]. Our data support the decrease in sleep time to less than 6 hours in 55 % and the use of glasses in 33% of children. There seems to be an inverse correlation between sleep time and the use of the mobile phone at night time [29]. With the disturbance in sleep time, these children are more likely to have daytime sleepiness which makes them inattentive in school eventually affecting their school performance [21]. There are different studies some showing a positive association between screen time and sleep and some having no association. Still, more data is needed to confirm this association [30].

CONCLUSION

The study has signified the high level of engagement and nonproductive use of time on mobile, especially in children above 5 years of age. The use of mobile phones has a significant impact not only on education and health but has influenced the psychological aspect of their lives. The negative association between mobile use and psychological well-being has been seen in a range from rude attitude with parents and family members, disobedience with teachers, quarreling and fighting among friends and siblings to frustration, anger, and social isolation.

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