

RISE IN MOBILE GADGETS USE FOR SCHOOL LEARNING AND HEALTH ISSUES OF CHILDREN- LONG-TERM SEQUELAE OF COVID-19 PANDEMIC

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ABSTRACT

COVID-19 pandemic has brought a paradigm shift in education with a trend of online learning and even schooling. During complete lockdown period schools were shifted to smartphones and computers. This study aimed to explore the pattern of smartphone use before and after the COVID-19 pandemic and the health issues of school-going children in post-COVID-19 period. There was a significant rise in the timings of mobile phone use from 2 hours to 7 hours per day. A total of 90% of student's mothers reported behavioral change where lack of socializing was the most commonly reported change. Irritation of eyes and dryness were the most commonly reported ocular disorders. The rise of mobile phones has brought several behavioral and ocular disorders due to long hours of use. There is a need to confirm health-related issues of smartphone use in large prospective studies and develop preventive strategies.

Key Words: Smartphone use, ocular disorders in children, behavioural disorders in children

INTRODUCTION

COVID-19 pandemic started in November 2019, caused by SAR-2 Virus, reported for the first time from Wuhan, China, followed by the devastating spread worldwide resulting in global pandemic. The pandemic has changed the world, business, economy, science, and education(1). Due to pandemic, the world was shut down for a long time, including schools. Given the indefinite closure period, the education system moved towards work from home and online education. All physical working hours were spent in front of computers and smart phones. The children were greatly hit by the virus, where their education was stopped until the start of online education.

All schools were shut for over a year during pandemic worldwide. The majority of students used laptops or mobile phones for online learning, a small proportion of children used desktops, where Italian study reported more than 97% of children getting distant learning by using smartphones(2). The online classes timings vary from four to six hours. This means the students remained in front of smart phone or laptop screens for this time. Followed by home work and sending it online further raised duration of exposure. A study from British Columbia suggested a significant rise from mean 6 hours to mean 8 hours per day of mobile phone use in pre-COVID to post-COVID, respectively(3). Another study focusing on University undergraduate students reported more than 65% of mobile phone addiction prevalence during COVID-19 Quarantine period(4). An Indian study including 122

individuals reported that young adults aged 15 to 30 were badly affected by the hype in the use of mobile phones and detrimental effects on health(5). The life of children in play group and older without an exception were badly affected(6). There is limited literature available on exploring the impact of longer duration of smart screen exposure and effects on health of the school children. Therefore, this study was conducted to evaluate the rise of the exposure hours and its association with ocular health and mental health.

METHODS

This was a prospective observational study including parents of school going children. The study was conducted population-based. Students studying in class four and above were included. Parents with at least one child attending school were requested to be part of the study. The parents were requested to respond to the questionnaire separately for each child if they had more than one child.

The questionnaire had three parts, first asking about age and gender, followed by average use of hours per day of smartphone screens before COVID-19 pandemic and online education. Then post COVID-19 use of mobile per day averagely. In the second part the parents were asked regarding eye symptoms or signs of recent onset in their children. Section three asked questions regarding behavioral change in the recent past (i.e. post-COVID-19). They were also asked about sleeping disturbances. The data was analyzed by using Statistical Package for the Social Sciences (SPSS), version 22.0 (IBM Corp., Armonk, New York). A p-value <0.05 was considered significant.

RESULTS

A total of 256 parents were included, with 300 children. The mean age of the children was 9.95 years (range 7 to 15 years). There was a significant rise in the use of mobile phone / smartphones or tablets per day ($p < 0.001$), which has risen from the mean of 2 hours per day to the mean of 7 hours per day (Figure 1). There was a change in the sleeping pattern of the children (Figure 2). Ocular symptoms were reported in 91% of children, which ranged from dryness, irritation to change in the vision and use of glasses. A summary of the ocular symptoms is presented in Table 1. Behavioural change was observed in 90% of children and lack of socialization was most commonly reported (i.e. 26%), a summary of behavioural change is presented in Table 1. There was a significant association of behavioural change with increased hours of mobile change ($p\text{-value} = 0.02$).

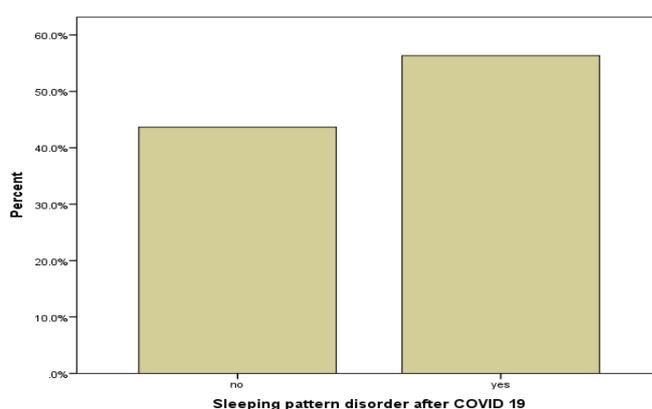
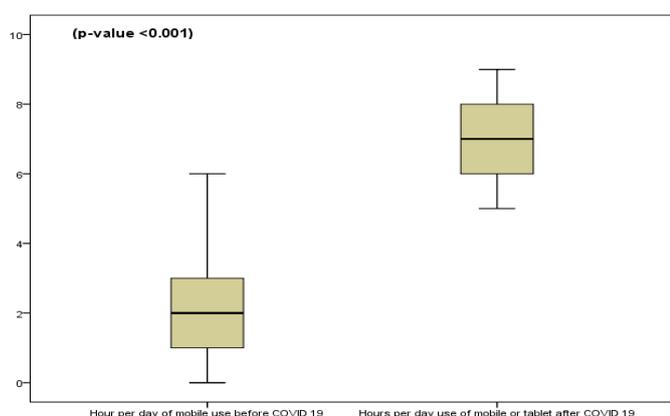


Figure 1. Hours of mobile phone use per day in school going children pre and post COVID-19

Figure 2. Reported change in sleeping pattern of children in post-COVID-19 period

Table 1. Pattern of ocular and behavioural disorders in children using smartphone

Ocular disorders		Behavioural disorders	
Disorder	N (%)	Disorder	N (%)
Dry eyes	106 (35.3)	Lack of interest in socialization	78 (26)
Irritation	79(26.3)	Lack of interest in real life	52 (17.3)
Change in vision	54 (18)	Irritability	52 (17.3)
Spectacular use	34 (11.3)	Tiredness	47 (15.7)
No change	27 (9.0)	Anger	39 (13.0)
		No change	32 (10.7)

DISCUSSION

The study showed a significant rise in the mobile use after COVID-19 pandemic among school going children, which has badly affected their sleeping pattern, ocular health and behaviour. There are studies available reported on longer hours of mobile phone use in children and adults, where there is significant rise in post-COVID 19 period(3). In one study the use of smart phones during quarantine period was the source of satisfaction and alleviation of loneliness(7). The use of smartphones increased not only for education but also for the awareness of masses regarding the disease. During the period of quarantine public awareness and also communication with patients was easier through health application on mobile phones, in such ways mobile phone use made considerable contribution(8).

Telemedicine became the most important part of the health care delivery system during COVID-19 pandemic(9). The use of telemedicine, even after COVID-19 continue to benefit the deprived population. Thus, it has a great potential to strengthen healthcare system further. On one hand, it was helpful during the pandemic, but the use of smartphones in most places has remained an addiction. Children of school-going age are particularly vulnerable in this situation. It was also feared at the beginning of the pandemic(10). Since it is known that the mobile phones emit radiation that gets absorbed in the human tissues. The absorption of the radiation is directly proportional to the time used on mobile phone. International Agency for Research on Cancer (IACR) in 2011 raised suspicion of mobile radiation to be carcinogenic(11). However, it is long term effect and post- pandemic rise in particular cancers especially brain tumours and correlating with the mobile use will take time to be proven. In addition to these long term risks, prolonged smartphone use has been reportedly associated with cognitive disorders, issues in socializing, shyness, disorders of eating habits and musculoskeletal issues due to particular posture and lack of physical activity(12).

Our study has also confirmed short-term complications related to smartphone use, includingg reduced socializing and lack of interest in real life. These can probably lead to cognitive disorders in long term. The study has included young children and their parents were asked about the disorders, thus there is a chance of information bias. Also parents themselves encourage use of mobile phones when the child gets irritated. Thus information regarding social behaviour is difficult to assess. Therefore we consider it as a limitation of our study. A long term prospective study with evaluation

of academic performance at school and at the same time evaluation from parents and teachers is suggested.

CONCLUSION

The study concludes that there has been a significant rise in the use of mobile phones in school-going children post-COVID-19 pandemic. There have been health implications on the ocular health as well as on the behaviour of the children.

ETHICAL CONSIDERATION

All recruited parents provided informed consent. The identity of the participants was coded.

CONFLICT OF INTEREST

Authors declare no conflict of interest

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