

EFFECTS OF EXCESSIVE SCREEN TIME DURING COVID-19 PANDEMIC

S. A. Patel*, S. A. Singh, S. S. Ezhava, K. D. Rajpurohit, A.K. Pandya, S.S. Bhatt, K. Parmar, N. F. Christy

India.

*Corresponding Author: S. A. Patel

India.

Article Received on 23/03/2022

Article Revised on 13/04/2022

Article Accepted on 03/05/2022

ABSTRACT

The global health crisis in the form of COVID-19 has forced people to shift their routine activities into a remote environment with the help of technology. The outbreak of the COVID-19 has caused several organizations to be shut down and forced them to initiate work from home employing technology as well as kids have to stay at home and study from home which impact on their studies. Now more than ever, it's important for people and institutions to understand the impact of excessive use of mobile phone technology and electronic gadgets on human health, cognition, and behaviour for kids and adult. Multiple linear regression analyses estimated associations between mental health and resiliency factors and total screen use. Screen time is associated with obesity, hypertension, type 2 diabetes, myopia, depression, sleep disorders, and many other noncommunicable diseases. Hence, it is critical to assess the adverse health outcomes that may appear as long-term consequences of such behaviour. In this narrative literature review, we aimed to describe the epidemiological burden of prolonged screen time and associated problems in COVID-19 from available articles retrieved from Medline and Google Scholar using a non-systematic approach. The epidemiological burden is primarily described as the prevalence and the average duration of screen time of the individuals or population studied. Secondly, key factors associated with these problems are summarized to inform the risk and protective factors.

KEYWORDS: COVID-19, Excessive Use Gadgets, Mobile Phones, Wellbeing, Pandemic, Health Effects.**INTRODUCTION**

The coronavirus disease 2019 (COVID-19) pandemic has critically impacted physical and mental health globally. Many countries have adopted varying measures to minimize the transmission of the disease, including adopting shelter in place policies, staying at home, limiting access to nursing homes, and prohibiting gatherings at places where people can potentially come into closer contact. Populations with stricter preventive strategies, higher contact tracing, and faster clinical care may result in better public health outcomes during this pandemic. However, the closure or remote operations of schools, offices, and other organizations have resulted in higher use of digital media such as desktops, laptops, tablet computers, and mobile devices for interpersonal communications and other organizational activities. People staying at home or closed places spend higher hours watching television or using digital media for entertainment purposes. Previous research shows that screen time is associated with a wide range of non-communicable diseases among vulnerable individuals.

Recent empirical studies suggest a rapid increase in digital screen time in different populations from kids to adults during the COVID-19 pandemic. This necessitates a comprehensive understanding of the potential public

health impacts and how preventive strategies should be adopted to address these.^[1-7]

Rising trends of screen time during COVID-19: public health concerns

A growing body of literature concerns the rising trends of screen time and its associated health outcomes during the COVID-19 pandemic.^[8] Continuous use of gadgets leads to many reported health problems like eye strain, finger pain, backache, neck pain and sleep disturbances. Depending on the amount of time spent on gadgets (duration and frequency), there are adverse physiological, psychological, social and emotional effects. Excessive use of gadgets among youth during a time of stress is a growing threat as well. There has been an established relationship between excessive internet use and loneliness, antisocial values, lower emotional intelligence and depression. Social media, video calls and virtual meetings are being used extensively for various purposes during the lockdown. Headache, earache, neck pain, tinnitus, painful fingers, fatigue, eye symptoms, morning tiredness, restlessness and sleep disturbances are health issues found to develop due to mobile phone usage. Sañudo et al. found that students delayed their wake time by 12 minutes with an increase

of sleep time of 5 minutes per day during the lockdown. However, no change in sleep quality was observed.^[9-14]

Organizations like WHO and IEEE Committee on Man and Radiation (COMAR) have serious public safety concerns about the exposure of individuals to Radio Frequency (RF) and Microwave (MW) field from handheld, portable cell phones since these devices use electromagnetic radiation in the microwave range.^[15]

According to the survey conducted by Majumder *et al.*, among 203 Indian day job holders and university students, the use of electronic devices such as televisions, computers and cell phones has increased significantly during the lockdown phase.^[16] These studies provide early evidence on rising trends of screen time in diverse populations, which necessitate an investigation into how such trends may impact public health in the global scenario.

Additionally, children with lesser screen time and increased physical activity had a reduced number of conflicts with their parents.^[17] The available evidence confirms that the early impacts of screen time on different age groups can range from physical to psychosocial conditions with varying risks, which may require longitudinal studies focusing on the relationships between screen time and the multiple variables that may explain the causality, as well as the long-term consequences of screen time. Syntheses of primary studies summarized in numerous systematic reviews and meta-analyses may provide a more substantial evidence base on a health problem of interest.^[8,18-19] Multiple studies have shown adverse ophthalmological impacts associated with screen time. A meta-analytic review of 15 studies found a pooled odds ratio (OR) for myopia of 1.02 (95% confidence interval [CI]: 0.96 – 1.08) in a sample of 49789 children.^[20] A significant proportion of evidence-based reviews report higher risks of non-communicable diseases associated with screen time.

A study from the UK found that the participants had an average of 7.2 hours of screen time, which was higher in younger adults aged below 34 years compared to those aged 65 years or above.^[21] This study reported a positive association between screen time and poor mental health among the participants (OR=1.07, 95% CI=1.02–1.13), which was more significant in women (OR=1.07, 95% CI=1.01–1.14) and adults aged 35–64 years (OR=1.13, 95% CI=1.05–1.22). Study also reported that each added hour of television viewing increased the risks of hypertension and type 2 diabetes by 6% and 8%, respectively.^[22] Moreover, the risks of non-communicable diseases associated with sedentary activities that increase screen time may provide critical insights into how screen time can be prevalent alongside other health behaviour and yield poor health outcomes across population groups. A large hospital-based cohort study confirmed a direct deleterious relationship between screen time and cardiovascular disease (CVD) events and

all-cause mortality. It indicated individuals who engaged in screen-based entertainment for more than 4 hours per day were at 1.5 times higher risk of all-cause mortality and 2.3 times increased risk of clinically confirmed CVD events compared to those with less than 2 hours of screen time per day.^[23]

Global evidence on the association between screen time and health outcomes

Global evidence suggests that screen time is associated with multiple health outcomes in different population groups. A study of 254 Canadian families with young children reported increased screen time in mothers, fathers, and children during COVID-19 at 74%, 61%, and 87%, respectively.^[25] Moreover, a study conducted in China found that about 70% of 1033 participants spent more time looking at screens after the COVID-19 outbreak.^[24] Furthermore, a study conducted in Poland reported that 49% of the participants experienced an elevated screen time during the COVID-19 pandemic.^[26] Additionally, a study conducted in Turkey during the final days of the long-standing lockdown found that nearly 72% of the children studied had a higher screen time compared to the previous years.

The current evidence on adverse health outcomes associated with increased screen time may require an ecological evaluation by expanding the focus on correlated factors such as dietary practices and physical activities among the affected population. For example, Pišot and colleagues reported an increased body mass that could be explained by meal sizes, unhealthy food consumption, sports time, and screen time.^[27] Similarly, Górnicka found that 43% of respondents had experienced a reduction in physical activity, and 34% had increased food consumption in a sample where 49% of individuals reported an increased screen time.^[26] A study from China assessed the physical and psychosocial health impacts of the nationwide lockdown and found that more than half of Chinese adults had a sedentary lifestyle with inadequate physical activity, increased screen time, and poor emotional state.^[24]

Screen time alone or in combination with other sedentary behaviours may have detrimental effects on populations affected by COVID-19, which should be examined in the context of global evidence from previous research on screen time and associated health outcomes.

Controlling the screen time

Many studies have identified that setting house rules can be effective in limiting screen time for children. For example, a randomized control trial by Barr-Anderson *et al.*, reported that a change in a parent's total screen time and parental rules limiting TV watching were associated with reduced screen time among the children in the study.^[26]

Parents can be instrumental in reducing screen time for children by ameliorating the overall environment of the

house, improving family bonding, and regulating screen time. Although parents' role has become more critical during this COVID-19 pandemic, many are struggling to achieve a work-life balance as they must navigate working from home.^[27,28]

The government can mobilize resources to train and support parents to guide their children. Teachers and paediatricians can increase awareness among parents regarding screen time through social media campaigns, webinars, and other online forums. Training modules can be developed for parents to improve household regulation regarding screen time and better guide their children.

Similar approaches can be adopted for special population groups such as working professionals who may have similar patterns of screen use. Identifying such trends and the underlying psychosocial reasons associated with screen use may enable the development and adoption of common strategies addressing elevated screen time and associated health outcomes. In this regard, guidelines provided by the World Health Organization (WHO) and other institutions may offer some strategic directions regarding how existing guidelines should be revisited and used to develop future guidelines and recommendations. However, such efforts must consider COVID-related psychosocial factors and age-specific behavioural constructs for achieving optimal appropriateness.

Both digitally and traditionally delivered interventions should aim not only to make people aware of the adverse consequences of screen time but also enable them to engage in active lifestyles, improved dietary practices, and healthier behaviours that promote individual health and wellbeing. It would be necessary to create enabling environments at home or communities that may allow off-screen in-person physical and psychosocial activities that do not compromise safety measures related to

COVID-19 while protecting individuals from an unhealthy lifestyle. Nonetheless, psychosocial interventions during COVID-19 should aim for improving social capital and community-level determinants of health that facilitate sustainable health and wellbeing.^[29,30]

RESULTS

Figure 1 depicts the difference in the percentage of participants experiencing various health complaints before and during the lockdown.

Figure 2 presents the association between health complaints and gadget use before and during the lockdown. Before the lockdown, health complaints like blurring and backache are only associated with gadget use ($p=0.012$ and $p=0.021$). However, during the lockdown, all the health complaints considered in the present study are associated with gadget use³¹. Time spent on gadgets during lockdown is associated with health complaints like redness of eyes, blurring, backache, restlessness, and shoulder pain at $p<0.001$.

35% of the study participants preferred to monitor screen as well as gadget usage time and alter them to appropriate levels. 25% of participants chose to use screen time controls. In contrast, 17% preferred using productivity apps, 15% preferred increasing the handsfree length and 8% preferred to decrease the talking duration. Only 71% of the present study respondents practiced measures to reduce gadget usage, while 29% did not practice them. Out of the 29% who did not practice the control measure did so dominantly because they could not identify an alternative to gadget use (62%). 21% did not practice them because they could not maintain restraint, 11% because they felt obsessed with overusing gadgets and 6% did not prefer using them.^[32,3]

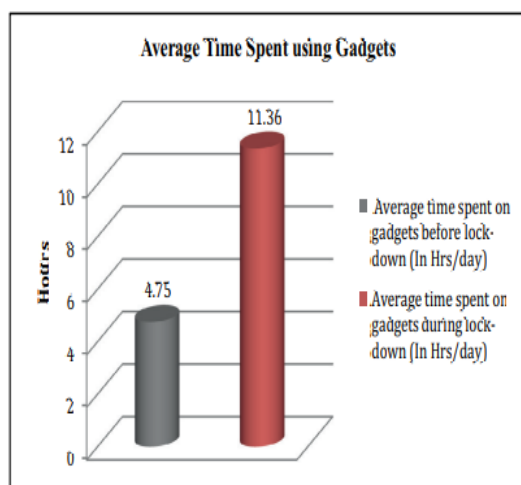


Figure 1. Average time spent using gadgets before and during lockdown by respondents.

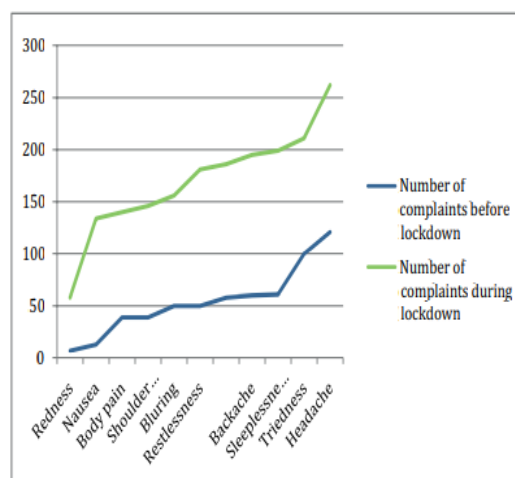


Figure 2. The number of each health complaint experienced by respondents before and during the lockdown

CONCLUSION

COVID-19 has affected many aspects of human lives, including the patterns of digital screen use. Previous literature describes the varying levels of health impacts associated with screen time, whereas a growing number of recent studies have shown a rising trend of screen time in different populations with possible health impacts. Prospective research may provide further insights into how different types and amounts of screen time may influence health outcomes across populations.

The conclusions of the research show that the containment measures adopted during Covid-19 had a major impact on the habits of this demographic group. Especially on their levels of physical activity which decreased significantly, but also on their sedentary lifestyle, increasing the time they remained seated (approximately 6h/day on average before the lockdown and about 10h/day during).

Previous literature describes the varying levels of health impacts associated with screen time, whereas a growing number of recent studies have shown a rising trend of screen time in different populations with possible health impacts. As different populations may have varying screen use behaviour, and associated health outcomes, healthcare providers and decision-makers should emphasize on empowering those populations to adopt healthier lifestyles and behaviours.

Studies such as these highlights the need to take measures that encourage people to avoid a sedentary lifestyle, contributing to increasing physical activity levels and reducing the use of mobile phones.

Therefore, eliminating gadgets might not be the solution, whereas controlling it to appropriate levels would be. Individuals need to be aware of the adverse effects of excessive use of gadgets. It is also essential to be informed about ways to control adverse effects of gadget use like increasing blinking frequency, screen time controls and proper seating arrangements.

In this paper, we have outlined what we see as some key trends and research issues that need to be examined urgently. They will have substantial consequences in the future.

REFERENCES

1. Aruna Tyagi, Anoop Kumar Prasad, Dinesh Bhatia: "Effects of excessive use of mobile phone technology in India on human health during COVID-19 lockdown" *PMCID: PMC8456111*, Epub, 2021 Sep 22.
2. Nishu Mahajan, "Increased screen time during pandemic has long term health and psychological impact". *The Pioneer*, 17 August 2020.
3. Chee Wai Wong, Andrew Tsai, Jost B. Jonas: "Digital Screen Time During the COVID-19 Pandemic: Risk for a Further Myopia Boom". *Elsevier Inc*, pub on, 2020 Jul 30.
4. Apurva Kumar Pandya, Pragya Lodha: "Social Connectedness, Excessive Screen Time During COVID-19 and Mental Health: A Review of Current Evidence" *Front. Hum. Dyn* pub on, 22 July 2021.
5. Jason M. Nagata, Catherine A. Cortez, Chloe J. Cattle: "Screen Time Use Among US Adolescents During the COVID-19 Pandemic". *JAMA Pediatr*, 2022.
6. Abida Sultana, Samia Tasnim, Sudip Bhattacharya, Neetu Purohit: "Digital screen time during COVID-19 pandemic: A public health concern". *SocArXiv Papers*. September 01, 2020.
7. Abida Sultana, Samia Tasnim, Md Mahbub Hossain, Sudip Bhattacharya, Neetu Purohit: "Digital screen time during the COVID-19 pandemic: a public health concern" *Journal: F1000Research* pub on, February 8 2021.
8. Hossain MM, Khan N, Sultana A, et al.: "Prevalence of comorbid psychiatric disorders among people with autism spectrum disorder: An umbrella review of systematic reviews and meta-analyses". *Psychiatry Res.*, 2020; 287: 112922.
9. Lee DH. "Women's creation of camera phone culture". *Fibreculture J.*, 2005.
10. Revathi KS, Nair S, Achuthan A. "Influence of technological gadgets on health and lifestyle of medico". *Natl J Physiol Pharm Pharmacol*, 2020.
11. Esen BK, Gundogdu M. "The relationship between internet addiction, peer pressure and perceived social support among adolescents". *Int J Educ Res.*, 2010.
12. Simuforosa M. "The impact of modern technology on the educational attainment of adolescents". *Int J Educ Res.*, 2013.
13. Stalin P, Abraham SB, Kanimozhy K, Prasad RV, Singh Z, Purty AJ. "Mobile phone usage and its health effects among adults in a semi-urban area of Southern India". *J Clin Diagn Res JCDR*, 2016; 10(1): LC14. PMID: 26894095 PMCID:PMC4740623. <https://doi.org/10.7860/JCDR/2016/16576.7074>.
14. Sanudo B, Fennell C, Sanchez-Oliver AJ. "Objectively assessed physical activity, sedentary behavior, smartphone use, and sleep patterns pre-and during COVID-19 quarantine in young adults from Spain". *Sustainability*, 2020; 12(15): 5890. <https://doi.org/10.3390/su12155890>.
15. Khan AR, Zaman N, Muzafar S. "Health hazards linked to using mobile cellular phones". *J Inf Commun Technol JICT*, 2008.
16. Majumdar P, Biswas A, Sahu S: "COVID-19 pandemic and lockdown: cause of sleep disruption, depression, somatic pain, and increased screen exposure of office workers and students of India". *Chronobiol Int*, 2020; 37(8): 1191–1200.
17. Xiao S, Yan Z, Zhao L: "Physical Activity, Screen Time, and Mood Disturbance Among Chinese

- Adolescents During COVID-19". *J Psychosoc Nurs Ment Health Serv*, 2020.
18. Hossain MM, Sultana A, Tasnim S, et al.: "Prevalence of mental disorders among people who are homeless: An umbrella review". *Int J Soc Psychiatry*, 2020; 66(6).
 19. Hossain MM: "Umbrella Review as an Emerging Approach of Evidence Synthesis in Health Sciences: A Bibliometric Analysis". *SSRN Electron J.*, 2020.
 20. Lanca C, Saw SM: "The association between digital screen time and myopia: A systematic review". *Ophthalmic Physiol Opt.*, 2020; 40(2):
 21. Smith L, Jacob L, Trott M, et al.: "The association between screen time and mental health during COVID-19": A cross sectional study. *Psychiatry Res.*, 2020.
 22. Guo C, Zhou Q, Zhang D, et al.: "Association of total sedentary behaviour and television viewing with risk of overweight/obesity, type 2 diabetes and hypertension: A dose-response + meta-analysis". *Diabetes Obes Metab*, 2020; 22(1):
 23. Stamatakis E, Hamer M, Dunstan DW: "Screen-based entertainment time, allcause mortality, and cardiovascular events: population-based study with ongoing mortality and hospital events follow-up". *J Am Coll Cardiol*, 2011; 57(3):
 24. Hu Z, Lin X, Kaminga AC, et al.: "Impact of the COVID-19 Epidemic on Lifestyle Behaviors and Their Association With Subjective Well-Being Among the General Population in Mainland China": Cross-Sectional Study. *J Med Internet Res*, 2020; 22(8):
 25. Carroll N, Sadowski A, Laila A, et al.: "The Impact of COVID-19 on Health Behavior, Stress, Financial and Food Security among Middle to High Income Canadian Families with Young Children". *Nutrients*, 2020; 12(8): 2352.
 26. Barr-Anderson DJ, Fulkerson JA, Smyth M, et al.: "Associations of American Indian children's screen-time behavior with parental television behavior, parental perceptions of children's screen time, and media-related resources in the home". *Prev Chronic Dis.*, 2011; 8(5): A105.
 27. Davis CR, Grooms J, Ortega A, et al.: "Distance Learning and Parental Mental Health During COVID-19". *Educ Res.*, 2020; 50(1).
 28. Garbe A, ogurlu U, Logan N, et al.: "Parents' Experiences with Remote Education during COVID-19 School Closures". *Am J Qual Res.*, 2020; 4(3).
 29. Sarbadhikari S, Sarbadhikari SN: "The global experience of digital health interventions in COVID-19 management". *Indian J Public Health*, 2020; 64(Supplement).
 30. Duan L, Zhu G: "Psychological interventions for people affected by the COVID-19 epidemic". *Lancet Psychiatry*, 2020; 7(4).
 31. Ganganahalli P, Tondare MB, Durgawale PM. "Use of electronic gadgets among medical students in Western Maharashtra, India". *Int J Health Sci.*, 2014; (9).
 32. Kumar LR, Chii KD, Way LC, Jetly Y, Rajendaran V. "Awareness of mobilephone hazards among university students in a Malaysian Medical School". *Health (NY)*, 2011; 3(07): 406. <https://doi.org/10.4236/health.2011.37068>.
 33. Kraut R, Patterson M, Lundmark V, Kiesler S, Mukophadhyay T, Scherlis W. "Internet paradox: A social technology that reduces social involvement and psychological well-being?" *Am Psychol*, 1998; 53(9): 1017. PMID:9841579. <https://doi.org/10.1037/0003-066X.53.9.1017>.