

Digital screen time during COVID-19 pandemic: A public health concern

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Abstract

The use of digital screens, including television, computers, mobile phones, and smart devices, can be associated with a wide range of health outcomes. During the COVID-19 pandemic, different population groups may have been adapted to varying levels of screen time, which may have profound implications on their health and wellbeing. The available evidence suggests that screen time is associated with obesity, hypertension, type 2 diabetes, myopia, depression, sleep disorders, and many other noncommunicable diseases. This elevated burden of diseases is prevalent among individuals who have sedentary lifestyles and other unhealthy behaviors that are likely to increase during quarantine or isolation due to COVID-19. As several empirical studies have reported a rising trend of screen time during this pandemic, it is critical to assess the adverse health outcomes that may appear as its long-term consequences globally. Researchers and practitioners need to revisit the available guidelines and incorporate evidence-based interventions for preventing unhealthy screen time among the affected individuals. Such interventions may address not only unhealthy screen use behavior but also promote active lifestyles that may improve health across populations during and after this pandemic.

Keywords: Screen time; Screen use; COVID-19; Coronavirus; Health promotion.

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Introduction

The coronavirus disease (COVID-19) pandemic has critically impacted physical and mental health globally (Acter et al., 2020; M. Hossain et al., 2020; WHO, 2020). Many countries have adopted varying measures to minimize the transmission of the disease, which include adopting shelter in place policies, staying at home, limiting access to nursing homes, prohibiting gatherings at places where people can potentially come to closer contacts (Altmann, Douek, & Boyton, 2020; “Government Response To Recommendations,” n.d.). Populations with stricter preventive strategies, higher contact tracing, and faster clinical care may result in better public health outcomes during this pandemic (Esposito, Principi, Leung, & Migliori, 2020; Kuguyo, Kengne, & Dandara, 2020; McKee, 2020). 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 (Robbins et al., 2020; Ting, Carin, Dzau, & Wong, 2020). Nonetheless, people staying at home or closed places spend higher hours on watching television or using digital media for entertainment purposes (AACAP, 2020; Király et al., 2020; UNICEF, 2020). Previous research shows screen time is associated with a wide range of noncommunicable diseases among the vulnerable individuals (Janssen et al., 2020; Kuss & Griffiths, 2012; Lanca & Saw, 2020; Wang, Li, & Fan, 2019). Recent empirical studies suggest a rapid increase of digital screen time in different populations during the COVID-19 pandemic (Carroll et al., 2020; Górnicka, Drywień, Zielinska, & Hamułka, 2020; Hu, Lin, Chiwanda Kaminga, & Xu, 2020; Keel et al., 2020). which necessitates a comprehensive understanding of potential public health impacts and how preventive strategies should be adopted addressing the same.

COVID-19 and rising trends of screen time: public health concerns

A growing body of literature informs the rising trends of screen time and associated health outcomes during the COVID-19 pandemic. A study of 254 Canadian families with young children reported an increase of screen time in mothers, fathers, and children during COVID-19 as 74%, 61%, and 87%, respectively (Carroll et al., 2020). Moreover, a study

conducted in China found that about 70% of 1033 participants spent more time looking at screens after the COVID-19 outbreak (Hu et al., 2020). Another study used a longitudinal design to evaluate health behavior changes during COVID-19 and found a perceived increase in screen time among the participants (Keel et al., 2020). Furthermore, a study conducted in Poland reported that 49% of the participants experienced an elevated screen time during the COVID-19 pandemic (Górnicka et al., 2020). Another study recruited 4108 participants from nine European countries and found a 65% increased screen time among the participants during this pandemic (Pišot et al., 2020). These studies provide early evidence on rising trends of screen time in diverse populations, which necessitates investigating how such trends may impact public health in the global scenario.

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 (Smith et al., 2020). 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). A study from Canada reported that men and women had better general and mental health status if they had an active lifestyle with lesser screen time compared to those who had a sedentary lifestyle with higher screen time (Colley, Bushnik, & Langlois, 2020). A review by Wong and colleagues suggested that digital screen time can be associated with myopia, which can be viewed as a collateral impact of COVID-19. The available evidence informs 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 multiple variables that may explain the causality as well as long term consequences of screen time.

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 (Pišot et al., 2020).

Similarly, Górnicka found that 43% of respondents had a reduction in physical activity, and 34% had increased food consumption in a sample where 49% of individuals reported an increased screen time (Górnicka et al., 2020). A study from China assessed the physical and psychosocial health impacts during 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 (Hu et al., 2020). These studies suggest that a synergistic effect may exist between these co-occurring health behaviors, which can be prevalent among individuals affected by this pandemic. Screen time alone or in combination with other sedentary behaviors 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.

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. Syntheses of primary studies as summarized in multiple systematic reviews and meta-analyses may provide a stronger evidence base on a health problem of interest (M. M. Hossain, 2020b; M. M. Hossain, Khan, et al., 2020; M. M. Hossain, Sultana, et al., 2020). Multiple studies have shown adverse ophthalmological impacts associated with screen time. A meta-analytic review of 15 studies found a pooled odds ratio (OR) of myopia was 1.02 (95% confidence interval [CI]: 0.96 – 1.08) in a sample of 49789 children (Lanca & Saw, 2020). A major proportion of evidence-based reviews report higher risks of noncommunicable diseases associated with screen time. For example, a meta-analysis of 16 studies found that the odds of overweight or obesity was 1.67 (95% CI: 1.48 – 1.88, $P < .0001$) in children who had screen time ≥ 2 hours per day (Fang, Mu, Liu, & He, 2019). A dose-response meta-analysis found linear associations between television viewing and type 2 diabetes and hypertension, and a non-linear association with overweight or obesity among adult participants (Guo et al., 2020). This study also reported that each added hour of television viewing increased the risks of hypertension and type 2 diabetes by 6% and 8%, respectively.

Moreover, the risks of noncommunicable diseases associated with sedentary activities that increase screen time may provide critical insights on how screen time can be prevalent alongside other health behavior and yield poor health outcomes across population groups. A meta-analysis of 20 studies analyzed 32 effect sizes on the relationship between non-active video gaming and body mass (Marker, Gnambs, & Appel, 2019). This study found a positive relationship between these two constructs, whereas moderator analyses revealed that the relationship was pronounced among adults compared to children or adolescents.

Several evidence-based reviews have reported the mental health impacts of elevated screen time. For example, another meta-analytic review of 12 cross-sectional and seven longitudinal studies found that individuals with higher screen time had significantly elevated risks of depression (OR: 1.28, 95% CI: 1.17 – 1.39, $p < .01$) (Wang et al., 2019). Another review of 31 studies reported that screen time was associated with poorer sleep outcomes in infants, toddlers, and preschoolers (Janssen et al., 2020). Such psychosocial health outcomes associated with screen time may not depend on the quantity of using the screen only as the quality and contents of screen use may critically impact individuals. A meta-analytic review of 43 studies with a sample of 31162 participants found that mass trauma television coverage was associated with acute stress reactions and posttraumatic stress outcomes, which highlight the psychosocial implications of television contents on the users who use those media (Pfefferbaum, Nitiéma, & Newman, 2019). These evidence-based reviews may enable reflecting on how the pattern of screen time in the current pandemic may be associated with multiple health outcomes globally.

Mitigating adverse health outcomes associated with screen time during COVID-19

Contemporary evidence suggests a rapid increase in digital screen time during the COVID-19 pandemic, whereas syntheses of pre-pandemic research inform that such incremental use of screen-based media may result in adverse physical and mental health consequences in the affected populations. Such challenges may impose an added burden of noncommunicable diseases globally in the post-pandemic world. It is critical to

acknowledge this upcoming public health crisis and adopt mitigations strategies that may prevent the health hazards associated with increased screen time.

It is necessary to strengthen the knowledge base to make informed policies, guidelines, and treatment for reducing the adverse health impacts of screen time. Although digital screen time is a global issue, there is a lack of research on this domain from low- and middle-income countries. Therefore, strengthening collaborative research engaging global nations to combat common public health challenges associated with COVID-19 can improve global evidence and future practices (M. M. Hossain, 2020a). Such collaborative research on-screen time on diverse population groups would need multi-specialty research teams to better understand the epidemiological variances across populations. Moreover, leveraging digital technologies to assess behavioral dimensions and psychosocial correlates can be useful for generating user-level insights that may guide the development of future interventions (Ahasan & Hossain, 2020; M. M. Hossain, McKyer, & Ma, 2020; Sarbadhikari & Sarbadhikari, 2020). Particularly, assessing dose-response relationships between screen time and health outcomes in different COVID-affected population groups may facilitate informed development of practice guidelines.

Many studies during COVID-19 as well as the pre-pandemic era assessed screen time in children and young population (Janssen et al., 2020; Stiglic & Viner, 2019), which can be a research trend attributable to the fact that this population are more vulnerable to increased screen time with lesser self-control and likely to have long-term consequences. It is essential to further specify the safe levels of screen time for age-specific groups through assessing available evidence and ensuring consensus among pediatricians, general practitioners, parents, teachers, social workers, and other stakeholders. 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 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 provide some strategic directions on how existing guidelines should be revisited and used to develop future guidelines and recommendations (WHO,

2019). However, such efforts must consider COVID-related psychosocial factors and age-specific behavioral constructs for achieving optimal appropriateness.

The prevention of unhealthy screen use and associated health outcomes may require specific interventions that acknowledge the unique variances of the quantity and quality of different types of screen. For instance, individuals watching television may have different screen use levels compared to those using social media in smart devices. Targeted interventions should emphasize on delivering mass media and online-based health communications focusing on diverse populations with varying screen time. Such segments of individuals with specific digital behavior may require personalized interventions for preventing unhealthy screen use. Additionally, place and population-specific limitations and opportunities for digital health technologies should be explored for optimal implementation of such interventions (Ahasan, Alam, Chakraborty, & Hossain, 2020; M. M. Hossain et al., 2019). Strategies such as setting limits for screen-based educational or institutional activities complemented by planned exercises that involve offline communications and activities can be useful for people staying at home and attending online sessions (Wiederhold, 2020).

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 behaviors that promote individual health and wellbeing (Duan & Zhu, 2020; Sarbadhikari & Sarbadhikari, 2020). 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 (Rodela, Sultana, McKyer, Bhattacharya, & Hossain, 2020). Such interventions should be evidence-based and culturally appropriate, incorporating the perspectives of the primary users, healthcare providers, and communities. Local, national, and global healthcare organizations and scientific societies may play critical roles by providing updated evidence and recommendations that should be widely communicated for developing multilevel strategies that promote healthier

screen use choices for individuals and populations (Nagata, Abdel Magid, & Pettee Gabriel, 2020; Wiederhold, 2020).

Conclusions

COVID-19 has affected many aspects of human lives, including the patterns of digital screen use. Previous literature informs 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. As different populations may have varying screen use behavior and associated health outcomes, healthcare providers and decision-makers should emphasize on empowering those populations to adopt healthier lifestyles and behaviors. It is critical to use the available evidence and adopt multilevel measures for preventing unhealthy screen time and other behaviors that may impact health and wellbeing among individuals at risk.

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