**Summary table of major findings on screen time and relationship with mental health**

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| **Sr. No** | **Authors** | **Year** | **Country** | **Methodology** | **Target Group** | **Findings** |
| 1. | Nagata et al. | 2020 | USA | Review | Children & Adolescents  | Excessive screen time is associated with cardiovascular disease risk factors such as obesity, high blood pressure, and insulin resistance. Excessive screen time is associated with poor sleep Increased screen time may also further exacerbate risk for depression, anxiety, suicide,and inattention among children and adolescents |
| 2. | Lanca & Saw | 2020 | Singapore | Systematic review | Children & Adolescents | A pooled OR of 1.02 (95% CI: 0.96-1.08; p = 0.48) suggests that screen time is not associated with prevalent and incident myopia in this group of five studies. |
| 3. | Bahkir & Garndee | 2020 | India | Original Research | Mixed | The study highlighted the drastic increase in use of digital devices after the initiation of the COVID-19 lockdown, and along with it, the slow deterioration of ocular health across all age groups. |
| 4.  | King et al. | 2020 | Australia | Letter to Editor | Children & Adolescents | Stay-at-home mandates and quarantines related to the coronavirus (COVID-19) pandemic have led to greatly increased participation in online gaming |
| 5. | Ko & Yen | 2020 | Taiwan | Review | Mixed | Rather than playing mainstream video games, educational video games (such as PaGamO, popular in Taiwan) or active games that emphasize exercise or real-world social interaction can be played; such games may be better for the player's mental and physical health than mainstream video game genres such as massively multiplayer online role-playing games, and shooter games. |
| 6. | Moore et al. | 2020 | Canada | Original article | Mixed | Only 4.8% (2.8% girls, 6.5% boys) of children and 0.6% (0.8% girls, 0.5% boys) of youth were meeting combined movement behaviour guidelines during COVID-19 restrictions. Children and youth had lower physical activity levels, less outside time, higher screen time and more sleep during the outbreak. |
| 7.  | Wiederhold et al | 2020 | USA | Editorial | Children  | Work on attentive listening skills by encouraging children to be aware of their real-life surroundings while they are interacting virtually;foster respect for devices by setting limits on when and where devices are used and what oversight is required; set time limits & screen breaks; talk to children about privacy and tone.  |
| 8.  | Smith et al. | 2020 | UK | Original research: Cross sectional design | Mixed | The mean (standard deviation) number of hours of screen time per day was 7.2 (3.8) in the overall population, and this was higher in younger adults [8.8 (3.7) hours in adults aged 18–34 years versus 5.2 (2.9) hours in those aged ≥65 years].A positive association between screen time per day in hours and poor mental health in the overall sample (OR=1.07, 95% CI=1.02–1.13) was noted. |
| 9.  | Qin et al. | 2020 | China | Original research: Cross sectional design | Adults | During the initial phase of the COVID-19 outbreak, nearly 60% of Chinese adults had inadequate physical activity (95% CI 56.6%-58.3%). Their mean screen time was more than 4 hours per day while staying at home (261.3 ± 189.8 min per day), and the longest screen time was found in young adults (305.6 ± 217.5 min per day). There was a positive and significant correlation between provincial proportions of confirmed COVID-19 cases and negative affect scores (r = 0.501, p = 0.004). Individuals with vigorous physical activity appeared to have a better emotional state and less screen time than those with light physical activity. |
| 10.  | Rolland et al. | 2020 | France | Original research: web based survey | Adults | Overall, the respondents reported more increases in addiction-related habits than decreases, specifically 28.4% (caloric/salty food intake), 64.6% (screen use), 35.6% (tobacco use), 24.8% (alcohol use), and 31.2% (cannabis use). Reduced well-being scores and increased stress scores were general factors of increase in addiction-related habits (P<.001 for all habits). |
| 11. | Vanderloo et al. | 2020 | USA | Commentary | Children  | Increased screen time is associated with increased risk of negative physical, behavioral, and cognitive outcomes, althoughsome studies have identified modest benefits from high quality and interactive screen time. Many families have expressed feelings of guilt and inadequacy related totheir inability to meet the current screen time guidelines. In an age of virtual connectivity, physical distancing, and social isolation during the COVID-19 pandemic, a new approach is needed. |
| 12. | UNICEF | 2020 | Global | Expert Perspective | Mixed | UNICEF recommends that in times such as that of COVID-19, it is important for children to stay connected with friends and parents should have an active engagement with children while maintaining oversight. UNICEF and WHO promote the practice of physical activities in front of the screen from time to time to maintain physical health and entertain oneself for overall better health. |
| 13. | Colley et al. | 2020 | Canada | Cross sectional design survey | Adults | More men and women reported very good or excellent mental and general health if they increased none or one type of screen and/or were exercising outdoors compared with those who increased 2 or 3 types of screens and who were not exercising outdoors, with the exception of general health among men. |
| 14. | AACAP | 2020 | USA | Guidelines | Children & Adolescents | Developmentally-appropriate screen activities in moderation can be a part of a healthy, balanced lifestyle. Parents should guide youth towards age appropriate, positive, creative, and educational screen media choices. |
| 15. | WHO | 2020 | Global | Programme / Guidelines | Mixed | Excessive screen time or gaming is associated with reduced sleep or day-night reversal, malnutrition, headaches, neck pain, gaming disorder and also encourages gambling like elements through gaming. |
| 16.  | Kiraly et al. | 2020 | Hungary | Guidelines | Adults | The risk of problematic internet use (PIU) is increased during the pandemic. Excessive engagement in specific online activities such as gambling, viewing of pornography, video gaming, social media use, shopping may lead to severe problems and elevate the risk of disordered or addictive use. Disordered use of the internet generates marked distress and/or significant impairment in personal, family, social, educational, occupational, or other important areas of functioning. |
| 17. | Xiang et al | 2020 | China | Natural experiment longitudinal study | Adolescents | Of note, during the pandemic, prevalence of physically inactive students extensively increased from 21.3% to 65.6%. Screen time considerably increased during the pandemic in total (+1730 min [or approximately 30 h] per week on average). Screen time during leisure was also prolonged, indicating that nearly a quarter of students engaged in long screen time for leisure. |
| 18.  | Verma P | 2020 | USA | Editorial | Adults | As interest in and use of telehealth during the COVID-19 global pandemic increases, the potential of digital health to increase access and quality of mental health is becoming clear. |
| 19. | Vizcaino et al. | 2020 | USA | Original article: survey | Adults | Aggregate screen time across all devices totaled 17.5 h per day for heavy users. Heavy users reported the least healthful dietary patterns and the poorest health-related characteristics – including self-rated health – compared to moderate and light users. |
| 20. | Meyer et al. | 2020 | USA | Original article | Adults | Participants in this study who were in self-isolation reported that their screen time and sitting time increased by 20 to 30 percent on average. It’s not clear if activity time was completely replaced by screen time, it is certainly possible. Many people have replaced socializing with staying indoors during the coronavirus pandemic to help slow the spread, which likely means increased screen time. Increased screen time was associated with worse depression, loneliness, stress, and PMH (p < 0.001). |
| 21. | Oberle et al. | 2020 | Canada | Population based survey | Adolescents | Extracurricular participation was associated with better mental health in boys and girls. Two or more hours of screen use after school was linked to poorer mental health, especially for girls. |
| 22. | Balhara et al. | 2020 | India | Cohort study | Adolescents | About half (50.8%) of the participants reported that their gaming behavior had increased, whereas 14.6% reported a decrease in their gaming during the lockdown period. In the lockdown period following COVID-19 pandemic, the increase in gaming behavior was associated with examination-related stress and the belief that gaming helps combat stress. |
| 23. | Amin et al. | 2020 | India | Original article: cohort study | Adolescents | As lockdowns are eased in India and elsewhere, the minority who have used gaming as an unhealthy coping mechanism (where there is an over-dependence on gaming as a means of escapism from reality) may suffer from mental health issues. For some, the impact of the pandemic may lead to the persistence of excessive gaming and result in negative consequences.  |
| 24. | Wong et al. | 2020 | Singapore | Descriptive review | Children | Increased screen time associated with Myopia and potentially be aggravated during COVID-19 pandemic. Many digital technologies, including Internet of Things (IoT), are currently heavily used in various domains, including digital virtual learning for the children. There is a possibility that a prolonged battle against the COVID-19 virus may lead to an increase in the incidence of myopia by shaping long term behavioural changes conducive for the onset and progression of myopia. |
| 25. | Sultana et al. | 2021 | NA | Narrative Literature Review  | Mixed | Multiple studies have shown adverse ophthalmological impacts (especially, myopia) associated with screen time. A significant proportion of evidence-based reviews report higher risks of non-communicable diseases (like obesity, type-2 diabetes and hypertension) associated with screen time. 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. A review of 31 studies reported that screen time was associated with poorer sleep outcomes in infants, toddlers, and preschoolers. These evidence-based reviews may enable reflection on how the pattern of screen time in the current pandemic may be associated with multiple health outcomes globally.  |
| 26. | Wunsch et al. | 2021 | Germany | Path prediction model | Children | Reduced physical activity (PA) and prolonged screen time (ST) negatively influence health-related quality of life (HRQoL), a protective factor against illness and mortality. Studies addressing the relationship between PA, ST, and mental health in youth are scarce, especially in times with high mental health burdens like the COVID-19 pandemic. |
| 27. | Singh & Balhara | 2021 | India | Review | Children & Adolescents | The concerns about the excessive screen time among children and adolescents pertain to two main health domains. First, impact on physical health- related to reduction in physical activity & digital eye strain- increasing risk for poor sleep, myopia and obesity.Second, excessive screen time can also lead to adverse psychological consequences. Use of screens while engaging in gaming, accessing social media, and watching online streaming services can be associated with behavioral addictions (gaming disorder) and incidence of certain psychiatric conditions. However, a critical appraisal of the literature suggests that the relationship between psychological well-being and screen time among children and adolescents is at best inconsistent.  |
| 28.  | Nguyen et al. | 2021 | Switzerland | Original article: survey | Adults | Engaging in digital media that offer lower social presence (e.g. email, social media, and online games) relates negatively to a sense of social connectedness, while the same finding does not hold for digital communication methods with higher social presence (e.g. voice and video calls). Moreover, decreases in higher social presence media (i.e. voice calls) relate to lower perceived social connectedness. |
| 29. | Tibetts et al. | 2021 | USA | Original article: power analysis | Adults | Consistent with past research, in-person interactions predicted higher well-being outcomes across both positive and negative indicators. But while digitally mediated interactions predicted greater positive affect, they simultaneously predicted more negative affect and stress.  |
| **Newspaper articles** |
| 30. | Kulkarni T | 2020 | India | Magazine article: NIMHANS study | Mixed | Despite the anxiety however, 57% have not taken any tangible online safety measures to protect their kids from being vulnerable online. Parents of teens seem more casual in their approach to putting in any safety guardrails. 75% of parents with teenagers admit to not having any online safeguards while a lesser number, 50% of parents with kids in the age group of 5-10 years have not done so. |
| 31. | Joseph, K | 2020 | India | Magazine article | Mixed | Set a screen time; fix a total number of hours of screen time and consciously try to reduce this by cutting down half-an-hour each day; track the time you spend online, and the activities you indulge in, as well as your feelings after a few hours of screen time. |
| 32. | Verma, P | 2020 | India | News article: OLX India study | Mixed | 54% of parents state that their kids are spending upto 5 additional hours on an average online in front of a screen. The biggest concern a majority - 57% of parents have is that the kids may unknowingly access inappropriate information online and use studying as an excuse to access non-educational content. |
| 33. | Gupta, A | 2020 | India | News article | Mixed | Lockdown has led to increased screen time. Increased screen time has led to physical and mental health issues across ages. |
| 34. | Harvard PilgrimHealth Care | 2020 | USA | Blog article | Mixed | Three ways to measure screen use. The amount of time spent using a screen is just one of three ways to measure the health of technology use. The quality of the content and being there to help your child process what’s on screen are two important factors that can help create meaningful interactions. Intermittent social fasting. Avoid social media during working hours to help you keep a better work-life balance. With increased focus, you’ll lower your chances of having to work late. Find your personal pump-ups. Many companies are stepping up with virtual opportunities for some self-care. Harvard Pilgrim is offering free weekly exercise classes, mindfulness training, and healthy webinars (open to everyone), and many fitness brands are offering free online or in-app classes, including family-friendly workouts. Set limits on scrolling. Social media has the ability to connect us across cultures, causes, and continents—but healthy connections aren’t made through passive scrolling. Set a limit to how long you’ll let yourself scroll, and use the rest of the time to call a family member or friend. If you depend on social media to help you stay connected, look for more active ways to harness it for good. Walk to unlock productivity. Studies show that getting a quick hit of nature can boost performance, and just five minutes of walking outside can help improve your mood and self-esteem.  |
| 35. | Orlando | 2020 | Australia | Perspective | Children | Children under 18 months should get no screen time except for video calls such as Skyping a grandparent. Children aged two to five should limit their use to an hour, ideally watching a screen with an adult. Guidelines for school-aged children and adolescents are less definitive. There are no recommended minutes or hours per day. The guidelines depend on the lifestyle of the child, and it’s left to the parent to manage. The benefits of technology on children’s health, well-being, social and emotional outcomes, and school achievement, depends less on time and more on the type of content they engage with when using a screen. |
| 36. | Government of Victoria | 2020 | Australia | Magazine article | Children | Time spent using digital devices for learning should be broken up with physical exercise and offline learning tasks often. It’s also important that during this time of remote learning we maintain safe and responsible use of information and communication technologies. |