

COLOSSAL BREED AND BACKLASH OF THE 'SESAME STREET': BRUNT OF COVID-19 PANDEMIC IN THE 'HIGH-TECH' ERA OF LEARNING ON CHILDREN AND ADOLESCENTS AND SUGGESTIONS

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SUMMARY

The COVID-19 pandemic necessitated the closure of various academic institutions, leaving online learning the only option for continuity of education and curricular activities among children and adolescents. It is unclear whether the adoption of online learning will persist in the post-pandemic period. However, enhanced exposure to gadgets impacts the socio-emotive-adaptive development of young children. It sprouts various short-term as well as long-term deleterious physical and mental health effects among children and adolescents. Research has focused mainly on the epidemiology, risks modeling, pathophysiology, and clinical features of SARS-CoV-2, but the impact of increased exposure to gadgets and technology due to online learning activity and the "digital new-norm" has largely been unnoticed. The enforced/self-quarantine leading to less outdoor activities during this pandemic, may have a cumulative poor health consequence. Early detection and management of those at risk and signs and symptoms of these adverse health effects are important. Awareness regarding these ill-effects on this vulnerable group is relevant for parents, guardians, teachers, mentors, health-care providers, and policy-makers.

Key words: online classes - digital learning environment - virtual learning - screen-time and hazards - exposure to internet content

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INTRODUCTION

COVID-19 pandemic has funneled the entire world to a virtual platform, including scholastic and non-scholastic learning. India's first lockdown evidenced a screen-time spike by 100% among children in the age-group of 5 to 15 year, spending an additional five hours online (Verma 2020). However, online-learning furtherance during post-pandemic era and its impact on socio-emotional-adaptive functioning and learning among children is unknown.

DELETERIOUS HEALTH-EFFECTS OF HIGH SCREEN-TIME

Increased screen-time is associated with wide-array of non-communicable diseases. The burden of screen-time varied from 21% to 98% in the middle-income, and 10% to 93.7% in the high-income countries (Kaur et al. 2019). Children spending over three hours/day on screen-time have heightened risk of weight gain, adiposity, insulin-resistance, and thus, type-2 diabetes, as compared to peers spending one hour or less of screen-time daily (Nightingale et al. 2017). The higher levels of physical activity do not compensate for the negative effects of screen-time (Domingues-Montanari 2017). Sedentary life-style, especially during COVID-19-pandemic, may elevate the risks for hypertension. Less sunlight exposure may aggravate existing vitamin-D deficiency among children (Bhargava

2020). The mobile phone radiation can alter the heart rate and its variability; ECG and EEG changes (Ahamed et al. 2008, Roggeveen et al. 2015). Among children, the mobile-phone usage owes to greater radio-frequency energy deposition in the brain (two folds) and bone marrow of the skull (ten folds). Microwave emissions may escalate the risk of brain tumors and melanoma (Hardell et al. 2009). Digital screen-time during COVID-19 pandemic may cause myopia boom (Wai Wong et al. 2020). Prolonged exposure to mobile-phone may increase the hearing threshold of the exposed ear (Das et al. 2017).

Childhood and adolescence are sensitive periods in which neurobiological systems (like hypothalamic-pituitary-adrenal (HPA) axis and dopaminergic circuitries) develop, making them vulnerable to insult. Excessive screen-time stimulates these circuitries disproportionately. Among preschoolers, it hampers the development of cognitive abilities (including attention, working memory, executive functions, intelligence, visuo-spatial-verbal development), social and emotional (self-regulation and prosocial behavior) abilities (Oswald et al. 2020). An increase in 30 minutes/day in mobile-media usage among toddlers is associated with a 2.3 folds greater risk expressive speech delays, communication delays (lie use of gestures, eye gaze, etc.). Excessive screen-time leads to developmental delays, rather than the other way around-negating the notion, that children with developmental delays might receive more screen-time to manage their problematic-behavior.

Graphical abstract

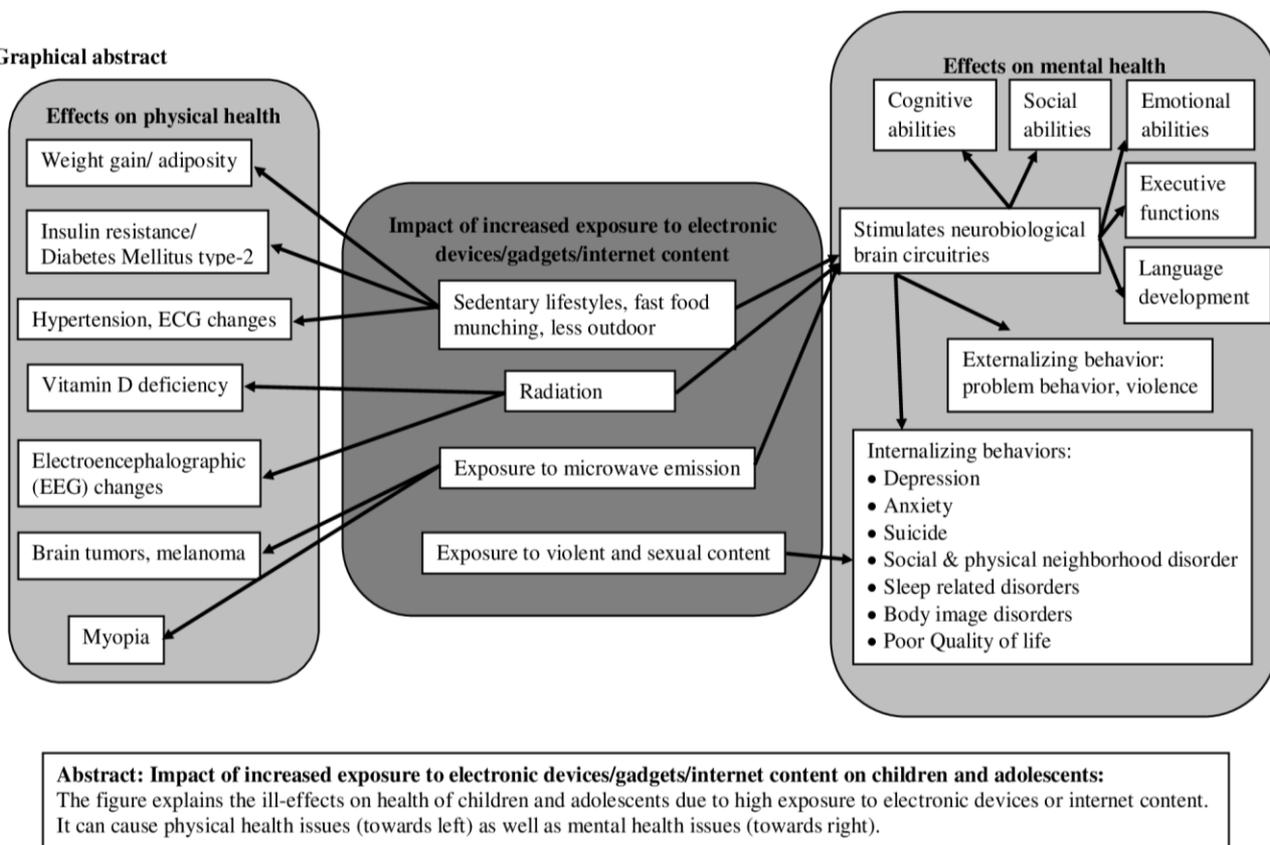


Figure 1. Health effects

Screen-time corresponds to higher externalizing and internalizing psychopathology. A link between heightened screen-activities with higher levels of depressive symptoms/anxiety/suicide-related outcomes has been found. Children, especially girls, using devices for over five hours/day, nearly half (48%) might have at least one suicide-related outcome in comparison to approximately one-third (29%) who has spent an hour/day might have had at least one suicide-related outcome (Twenge et al. 2018). High social and physical neighborhood disorder (neighbors taking advantage, drugs/ drinking in public, crime, etc.) is associated with 40-60% increased likelihood of electronic-device usage. Those watching television are at greater risk for violent behaviors including physical fight, victim and bully, lowered self-esteem, and addictions, slowed learning, and higher risk of premature cognitive decline (Carson & Janssen 2012). Internet usage, particularly pornography websites, video gaming (behavioral addiction) has surged during lockdown (Király et al. 2020). Viewing pornography is increasingly seen as a normal stage of development and is linked to poorer attachment to peers and family (Jassogne & Zdanowicz 2020). Mass-media effect body-image and disordered eating, too (Holland & Tiggemann 2016). Screen-time is adversely associated with sleep-health, disrupted circadian-rhythm, tiredness, and poorer quality of life (Oswald et al. 2020) (Figure 1).

Screen-time consequents decline in overall academic performance (especially mathematics). Students with

learning difficulties and ADHD symptoms are more distractive during the online classes vis-à-vis classroom classes, due to lack of supervision.

The socio-economically disadvantaged groups, like rural inhabitants, low-family-income, with poor network connection, technologically-challenged, are deprived from the online-learning. This may widen the urban-rural/rich-poor gap, reduce self-esteem and consequently, marginalization.

SUGGESTIONS AND STRATEGIES FOR HEALTHY SCREEN-HABITS

COVID-19-pandemic 'high-tech' era, however, may result in some propitious evolution. Accepting the "digital new-norm" by students, teachers and parents may enhance productivity and bring adaptive changes. Motivation to learn new technology may grow among the reluctant ones. The policies should be directed to widen the coverage of internet.

However, current scenario is unclear about the continuation of online learning with the help of gadgets in near future. This has made the situation further, dicey. Safety measures to protect children from being vulnerable online, actively monitoring the content watched or co-viewing or family-viewing may help the guardians. Some parents believe that the increase in online-learning is beneficial for children. So, appropriate

parental guidance programs and policies with an aim to enhance awareness regarding risks and benefits of screen-time, guidance to maintain a balance to scaffold children's screen-time is the call of hour. Awareness programs should target understanding the child, their maturity level, age-appropriate watching, impulsivity, risk factors making them more vulnerable for problem-use, setting family-rules for screen-time, modelling judicious and optimal use of technology, and healthy screen habits and, make them understand health-hazards of screen-time and encouraging digital literacy (Lynch 2017, The Australian Parenting Website 2020). Managing child's expectations about the screen time, framing daily routine, involving their choices for screen-time and planning transitions for comfortably finishing screen-time may help in implementing strategies to control screen-time (The Australian Parenting Website 2020). Promotion of outdoor activities by maintaining the COVID precautionary measures may decrease inclination of children for video-games and significant exposure to social media. Parental control apps to block or filter internet content may be fruitful (Mayo Clinic. Screen time and children 2020). Regular monitoring for total screen-time and maintaining a record of it, may help in early detection of problem-use. Early health-seeking and hence, detection and management of adverse health-effects in the children will be beneficial. Clinicians should obtain history of screen-time in children and adolescents during hospital visits and educate regarding ill-effects of screen-time exposure. Assessment of pathological internet-use should be done. Cognitive-behavioral approach of treatment and family therapy (addresses dysfunctional family) are possible treatment options, too (Young 1999).

CONCLUSION

Online learning during COVID-19 pandemic in the digital era has warranted enhanced screen-time and brought a "digital new-norm", especially for children and adolescents. Excessive screen-time sprouts plethora of physical and mental health consequences, more-so for this vulnerable group. Awareness about these deleterious effects among guardians, teachers and policy-makers is required. Greater emphasis on early detection of those at-risk and prompt management of these ill-health effects is the call of time. Appropriate measures like awareness programs for carers and educating them for judicious use of technology during the pandemic and post-pandemic era, is of paramount importance.

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Bichitra Nanda Patra: designing of the concept and literature search, revising it critically for important intellectual content, and final approval of the version to be published.

Kumari Rina: literature searches, manuscript writing, and final approval of the version to be published.

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