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Excessive Screen Time: Understanding Its Long-Term Impact on Health and Behavior

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Abstract

In today's world, digital gadgets, like laptops, game consoles, smartphones, and televisions, are essential since they provide entertainment and convenience. However, their overuse has raised serious concerns regarding long-term health and social implications. This review investigates the extensive effects of excessive screen time on mental, physical, and social well-being, with a special emphasis on children and adolescents. The growing amount of time toddlers and preschoolers spend in front of screens is especially concerning since it undermines their social skills, causes behavioral issues, and interferes with their social development. Prolonged screen time negatively impacts physical health by disrupting sleep cycles, elevating the risk of obesity, and fostering a sedentary lifestyle. Psychologically, it leads to attention difficulties, increased anxiety, and a higher likelihood of depression, severely affecting emotional well-being. Socially, excessive screen use limits face-to-face interactions, weakens communication skills, and strains relationships, often resulting in a sense of isolation. Tackling these challenges necessitates a balanced approach to digital device use, especially among vulnerable groups. This article highlights the need to set clear screen time limits, encourage offline activities, and cultivate healthier habits. Additionally, it underscores the importance of future research in creating comprehensive guidelines and evidence-based policies to manage screen time effectively across various age groups. By recognizing the wide-ranging effects of excessive screen use, we can promote a healthier, more harmonious relationship with technology, leading to improved mental, physical, and social well-being for all.

Keywords: Screen time, physical health, emotional well-being, social health, mental and physical health

INTRODUCTION

Children's and teenagers' lives have been drastically changed by the quick development of digital technology, which has an impact on how they interact with the outside world, learn, and communicate. With major advantages including better information access and increased creative options, gadgets, like computers, cell phones, and tablets, have become essential instruments for social interaction, education, and entertainment [1, 2]. But the growing popularity of screen time has also sparked worries about how it can affect development and health, especially when used excessively.

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Long-term screen time has been repeatedly linked to detrimental impacts on mental health, decreased physical activity, and disturbed sleep patterns [3, 4]. As per the study of Chiu et al. (2022) [5], the disruption of melatonin production, a hormone essential for preserving regular sleep cycles, by blue light from screens is one well-established method. This disturbance frequently results in shorter sleep durations and lower quality sleep, both of which are major causes of more general health issues. At the same time, sedentary

habits associated with prolonged screen time have been connected to an increase in obesity rates, which is made worse by a lack of opportunities for physical activity, especially during times like the COVID-19 pandemic, which increased dependence on electronic devices [6, 7]. Implications for mental health are also important. Lee et al. (2025) [8] and Egami et al. (2024) [9] found that youth who spend too much time on screens are more likely to experience anxiety, despair, and emotional dysregulation. Although there are cognitive benefits to digital technology, such as improved concentration in certain situations, these gains frequently come at the price of social and emotional growth. For example, excessive usage of interactive media might result in social disengagement and increased psychological stress, even while it may enhance specific abilities [5].

In recent years, digital media consumption has increased, raising worries about its impact on children's health and development. Screen time recommendations encourage limiting exposure; however many youngsters surpass these limits [10]. The prevalence of digital gadgets, such as smartphones, tablets, and televisions, has made screen time practically inescapable in modern households. While screens provide educational and entertainment benefits, extended use can have a variety of detrimental health consequences.

Excessive screen time has long-term developmental and cognitive implications, in addition to acute concerns like eye strain and decreased physical activity. This review looks at the incidence of excessive screen usage, the developmental implications, and proposed strategies to mitigate its effects.

The purpose of this review is to compile the most recent findings regarding the complex connections between screen time and health outcomes in kids and teenagers. This study looks at how it affects sleep, physical health, mental health, and academic performance to pinpoint important risk factors and preventative measures. This study attempts to give a complete review of how screen exposure impacts children under the age of five and beyond, with insights into mitigating techniques. To direct future studies and guide policy interventions, it also identifies gaps in the literature. Gaining a thorough grasp of these relationships is crucial to promoting the overall development of this susceptible group and to developing workable strategies for reducing the dangers of excessive screen usage.

PREVALENCE OF EXCESSIVE SCREEN TIME

According to research [11], excessive screen usage is common among children around the world. Excessive screen time in children under the age of five is strongly associated with developmental delays. Similarly, John et al. (2024) [12] discovered that secondary school students in rural India routinely exceed the suggested screen time limit. These findings highlight the growing need for awareness and regulatory measures. Beyond India, a global view reveals a similar tendency. McArthur et al. (2022) [10] conducted a comprehensive review and meta-analysis, discovering that a significant number of young children do not fulfil screen time guidelines. This tendency is especially alarming in low- and middle-income nations, where access to digital devices is growing but regulatory understanding is low. With the advent of digital education and online entertainment platforms, it is critical to investigate the elements that contribute to excessive screen time and its long-term repercussions.

SCREEN TIME AND SLEEP

One of the most well-established effects of excessive screen time is sleep disturbances, which affect children and adolescents' ability to grow and develop cognitively. Nakshine et al. (2022) [3] showed how increased screen exposure disrupts circadian rhythms and reduces total sleep duration, and Chiu et al. (2022) [5] found that while higher tablet use may improve sustained attention, it is associated with poorer sleep quality in school-aged children. These disruptions are often attributed to blue light emissions, which suppress melatonin production, as well as the cognitive and emotional stimulation from engaging content. Duraccio et al. (2019) [13] suggested other processes that can worsen sleep problems, such as elevated arousal and the habit-forming aspect of digital involvement.

Lack of sleep has many negative effects than just weariness and anger. Lack of sleep, which is frequently brought on by late-night screen usage, has a significant negative impact on one's physical and emotional well-being. Teenagers who don't get enough sleep are more likely to experience mood disorders like anxiety and depression [4]. According to the two-way interaction between sleep disturbances and mental health problems, inadequate sleep can exacerbate pre-existing mental health diseases as well as contribute to the development of mood disorders.

Sleep problems are another serious consequence of excessive screen time. A comprehensive review by Janssen et al. (2020) [14] found a strong link between screen use, sedentary behavior, and poor sleep quality in children under the age of five. Blue light from screens can interfere with melatonin production, interrupting sleep cycles and making it difficult to fall and remain sleep.

Mindell et al. (2013) [15] discovered cross-cultural differences in screen-related sleep disruptions, underscoring the problem's global scope. Disrupted sleep has far-reaching consequences beyond exhaustion, including poor cognitive function, mood issues, and decreased academic performance. Reducing screen usage, particularly before bedtime, is critical for supporting good sleep hygiene in children.

Parental action is critical in preventing sleep problems caused by excessive screen usage. Implementing "screen curfews," limiting digital device use at least an hour before bedtime, and encouraging alternate bedtime routines, such as reading books or participating in relaxing activities, are recommended ways for enhancing children's sleep quality.

Rawat and Singh (2024) [16] examine the relationship between young people's use of electronic devices and how long they sleep. According to the study, there is a notable rise in late-night screen time, which shortens sleep duration. Although specifics are not given, the study also considers other factors that affect sleep patterns. The study implies that treatments aimed at lowering late-night electronic device usage could improve sleep length and general well-being. It also highlights the significance of regulating teenage screen time to develop healthier sleep patterns.

Sleep plays a critical role in cognitive processes, such as learning, executive function, and memory consolidation. Teenagers who don't get enough sleep struggle with focus, memory recall, and problem-solving—all of which are essential for scholastic achievement and general cognitive development. The cumulative impacts of sleep deprivation can have major long-term effects on scholastic attainment and future possibilities, especially during adolescence when academic pressure is higher [3].

According to Massar et al. (2022) [7], working from home and spending more time in front of a screen during the COVID-19 epidemic and the lockdowns that followed caused major sleep disturbances. The study found that teens' natural circadian cycles were disrupted by digital media use, resulting in sleep problems that had an impact on their physical and emotional well-being.

SCREEN TIME AND PHYSICAL HEALTH

Several mental health issues, such as anxiety, sadness, and emotional dysregulation, have been linked to excessive screen use. The kind and intent of digital content consumption frequently influence the psychological effects of screen time. According to Lee et al. (2025) [8], outdoor play helps preschoolers with emotional dysregulation, highlighting the significance of striking a balance between screen time and social and physical activities. In their study of the effects of insomnia and sleep deprivation on teenage mental health, Uccella et al. (2023) [4] connected these disorders to increased risks of anxiety and depression. Prolonged screen time, especially when combined with excessive social media use, can also lead to social isolation, cyberbullying, and low self-esteem. The causal impacts of video gaming on mental health were investigated by Egami et al. (2024) [9], who found complex associations that vary depending on game content, moderation, and social situations.

Excessive screen time has a direct impact on physical health in addition to its impacts on sleep and mental health. Long-term, sedentary use of digital media has been connected to several physical health issues, such as musculoskeletal diseases, obesity, and bad posture. Long periods of time spent in front of screens discourage adolescents from exercising, which can lead to weight gain and cardiovascular issues. According to a study by Li et al. (2025) [17], social isolation and a decrease in physical activity acted as mediators between middle-aged and older individuals' increasing internet device use and higher levels of depressive symptoms. This study's consequences for adolescents are evident despite its focus on older adults: extended screen time limits possibilities for physical activity, which can result in obesity and other related health issues.

Furthermore, there are now more cases of bad posture because of the rise in the usage of digital devices. Teenagers commonly use computers, smartphones, and tablets in ways that create strain on their shoulders, back, and neck, which can cause musculoskeletal pain and discomfort. If left untreated, these physical problems can develop into chronic conditions that could eventually impair general physical health and wellbeing.

Teenagers who don't get enough sleep have been associated with several detrimental effects on their physical health, such as weight gain and an elevated risk of obesity. According to research by Duraccio et al. (2019) [13], sleep loss brought on by prolonged screen time can interfere with metabolism, resulting in a decrease in physical activity and an increase in caloric intake. In addition to impairing immune function and raising inflammation, inadequate sleep can exacerbate long-term health conditions like diabetes, hypertension, and cardiovascular disease.

The study of Dhabaria (2022) [18] found that 55.5% of students used digital devices for more than six hours per day, with PCs, laptops, and desktops being the most common devices used to watch classes. The study concluded that excessive use of digital technology has unforeseen effects on students' eye health, emphasizing the necessity for thorough investigations and empirical research to address these issues.

Increased risks of obesity, type 2 diabetes, metabolic syndrome, heart disease, stroke, hypertension, and immune system deficiencies are linked to chronic sleep disruption. Chronic sleep deprivation can lead to diminished brain function, memory loss, and cognitive impairment. It is advised to speak with a healthcare provider about recurrent sleep problems. Resolving sleep disturbance is essential for preserving general health, and methods to enhance sleep hygiene, such keeping a regular sleep schedule and setting up a cozy sleeping space, can lessen these negative consequences [19].

SCREEN TIME'S IMPACT ON MENTAL HEALTH: A TWO-SIDED SWORD

Video gaming is one of the most common ways that teenagers consume digital media. Even while video games are frequently linked to poor mental health results, there are some situations in which they can be beneficial. Research indicates that playing video games to relax or interact with others can enhance mental health. Teenagers who owned gaming consoles, particularly the Nintendo Switch, reported higher levels of life satisfaction, according to study on the causal impacts of gaming in Japan. When gaming was utilized as a social interaction tool, this beneficial effect was more noticeable [9]. Screen time and mental health, however, have a complicated relationship. There is a darker aspect to video gaming, according to other research like those by Anderson and Dill (2000) [1]. Claussen et al. (2024) [20] in their study revealed that playing violent video games was associated with increased aggression and subpar academic achievement, indicating that the kind and substance of games played can have a big impact on mental health outcomes. Excessive screen time can worsen symptoms of melancholy, anxiety, and aggression and have a negative impact on mental health, especially when it involves violent content or solo gaming Thus, it's critical to understand how important it is to balance the kind and amount of video games to avoid detrimental psychological effects. Li et al. (2025) [17] interpreted that lower levels of depressed symptoms were linked to increased use of various online

devices, but over time, increasing levels of depressive symptoms were linked to decreased variety of internet devices. Participating in social activities was linked to a decreased likelihood of depressive symptoms, suggesting that social engagement acted as a mediator.

Uccella et al. (2023) [4] investigate how insomnia and sleep deprivation affect teenagers' mental health. It shows that there is a reciprocal association between mental health problems and sleep disruptions, with mental health problems causing sleep disturbances and insufficient sleep causing mental health difficulties. In addition to impairing reward processing, sleep deprivation raises the likelihood of mood disorders, especially serious depression. Lack of sleep can cause cognitive impairments that impact executive function, memory, and attention.

Neophytou et al. (2021) [20, 21] emphasized the negative impacts on neurodevelopment, learning, and memory, raising concerns about long-term cognitive problems. Early childhood is a vital phase for brain development, and excessive screen time can interfere with important learning processes, such as language acquisition, problem-solving abilities, and social interaction.

Ray and Jat (2010) [22] underlined that early exposure to electronic media may impair attention span and academic performance. Increased screen time may replace interactive learning opportunities, like reading and play, which are critical for cognitive development. The rising reliance on screens for both education and entertainment raises critical concerns regarding the balance of digital engagement and developmental needs.

Furthermore, excessive screen use throughout infancy and early childhood has been linked to delayed expressive and receptive language development. According to research, passive screen viewing provides fewer linguistic and cognitive benefits than face-to-face contact. Thus, it is critical to create educational programs that incorporate screen use while maintaining developmental milestones.

SCREEN TIME AND ACADEMIC ACHIEVEMENT

The interaction of screen time, sleep, and physical exercise affects academic results. Overuse of screens frequently takes up time that could be used for learning, exercise, and sleep, which results in less-than-ideal academic achievement. According to Faught et al. (2017) [23], this displacement has a negative impact on academic performance, especially for younger children. Additionally, Anderson and Dill (2000) [1] looked at how video games affected social and cognitive behaviors and found that the results varied depending on the kind of game and how long the player played. Long-term use of non-educational content frequently results in a loss of motivation and focus, even if instructional games and learning apps can improve problem-solving abilities and knowledge retention.

The study results of impact of screen time on children's development in the cognitive, linguistic, physical, and socio-emotional domains show that although there are advantages and disadvantages to technological use, too much screen time can harm a child's development in several ways [24]. As a result, it is advised that kids' screen time be closely watched and restricted to encourage growth in all areas of life. Limiting daily screen usage to zero minutes for children ages 0–2, less than 60 minutes for those ages 3–5, and 60 minutes for those ages 6–8 is advised by specific standards

DIGITAL MESSAGING'S IMPACT ON HEALTH BEHAVIOUR

A growing number of studies shows that digital media can encourage healthy behaviors, even if it has also been linked to harmful results. Vodopivec-Jamsek et al. (2012) [25] investigated the potential of mobile texting to encourage preventative health practices, such as quitting smoking and taking medications as prescribed. According to their research, when properly crafted, digital interventions have the potential to be a useful instrument for enhancing health outcomes and promoting constructive behavioral changes among teenagers. To prevent causing issues, like screen addiction or heightened anxiety related to health monitoring, these treatments must be properly planned.

Kast (2023) [26] studied at trait creativity as a possible moderator in the association between university students' affective moods and smartphone screen time. The study discovered a strong inverse relationship between screen time and good affect, with more screen time being associated with fewer happy feelings. While creativity was a strong predictor of happy affect, trait creativity did not significantly mitigate the connection between screen time and positive affect. The study highlights how crucial it is to take individual characteristics, like creativity into account, when analyzing how smartphone screen time affects emotional states.

Screen overuse is linked to psychological suffering, such as depression and anxiety. Majumdar et al. (2020) [27] found that during the COVID-19 epidemic, students and office workers had higher screen exposure, which caused sleep disruptions and mental health issues. These findings are consistent with previous research indicating a link between prolonged screen use and emotional control issues in children.

Excessive screen time can also lead to irritation, focus problems, and diminished social contacts. A lack of face-to-face communication may impede the development of emotional intelligence and social skills, which are required for good partnerships. According to studies, youngsters who spend more time using digital gadgets have lower levels of empathy and struggle to understand social signs.

Early and late outdoor play was linked to higher levels of emotional dysregulation in preschoolers, whereas midday outdoor activity between noon and six PM was linked to lower levels of emotional dysregulation [8]. Working memory acted as a major mediating factor in the beneficial effects of noon outdoor play on emotional regulation. The results indicate that coordinating outdoor play with kids' circadian cycles can improve working memory and emotional control, among other cognitive abilities.

DIGITAL MEDIA'S EFFECT ON SOCIAL HEALTH

Teenagers can communicate with their friends through digital media, but the quality of these exchanges is sometimes questioned. Teenagers' interactions with their social networks have changed dramatically because of the emergence of social media platforms. Digital platforms can foster a sense of community, but they can also result in feelings of isolation and loneliness. According to studies by Lee et al. (2025) [8], excessive use of social media can take the place of face-to-face social contacts, which can result in weakened connections with family and friends as well as a decline in face-to-face communication skills. Constantly being exposed to well chosen, idealized photos and lifestyles on social media can lead to low self-esteem and feelings of inadequacy, which can exacerbate mental health issues. In contrast, engaging in outdoor play and physical activities has been shown to enhance emotional regulation and social health. Claussen et al. (2024) [20] demonstrated that outdoor play between noon and 6 PM significantly reduces emotional issues in preschool children. This suggests that outdoor play fosters social skills, improves cognitive function, and enhances emotional well-being, counteracting the negative effects of excessive screen time

According to a study by Meythaler (2025) [28], users may experience anxiety because of some kinds of social media information. According to the study, there are six types of content that can cause anxiety: incivility, political content, social comparison content, negative news, misinformation, and content that show harmful behavior. Developing solutions to lessen the detrimental effects of social media on mental health and the anxiety-related consequences linked to social media use requires an understanding of these areas.

THE ROLE OF COVID-19

The problems with screen time were made worse by the COVID-19 epidemic. Digital gadgets become indispensable for social interaction, entertainment, and distant learning during lockdowns. According to Massar et al. (2022) [7], sleep, physical exercise, and general well-being were all adversely affected by distant learning and growing usage of digital devices. Because access to digital devices and reliable internet connections became crucial factors in determining academic continuity, this changes also made socioeconomic inequities worse. In their analysis of mental health patterns in

Germany prior to, during, and following the pandemic, Patzina et al. (2025) [29] found long-lasting effects of increased screen time on psychological outcomes. The results highlight the pressing need for flexible approaches to strike a balance between the advantages and disadvantages of digital interaction.

Children and adolescents are now far more likely to be obese because of the COVID-19 epidemic, which can result in health problems such metabolic diseases and mental health problems. Promoting physical activity, putting dietary knowledge into practice, and creating policy interventions are some suggestions for addressing issues. It is crucial to promote healthy dietary habits, limit screen time, and encourage regular exercise. To reduce these health hazards, public health measures must be taken immediately [6].

SUGGESTIONS FOR REDUCING ADVERSE EFFECTS

1. *Promoting Balanced Lifestyles:* Parents and schools should encourage balanced routines that include enough sleep, exercise, and little screen time for leisure. Children who follow structured schedules are better able to balance important activities with excessive screen time.
2. *Creating Child-Friendly Digital Content:* To lessen cognitive and emotional strain, developers should give top priority to producing interesting yet non-overstimulating content. Healthy screen habits can also be maintained with the help of parental controls and content monitoring programs.
3. *Encouraging Outdoor Activities:* The negative impacts of sedentary behavior can be mitigated by community efforts to expand access to secure outdoor areas. It has been demonstrated that group sports and outdoor activities improve mental and physical wellness.
4. *Putting Screen Time Guidelines into Practice:* Parents and educators can effectively control screen use by following clear, research-based recommendations. Age-appropriate recommendations should take individual circumstances and developmental requirements into consideration.
5. Effective treatments are needed to reduce excessive screen time. Wahi et al. (2011) [30] conducted a meta-analysis of screen-reduction programs and discovered that structured parental guidance and behavioral tactics significantly reduced children's screen usage. Encourage alternate activities, such as outdoor play, interactive learning, and hands-on creative endeavors, to serve as practical alternatives. Policymakers and educators have an important role in encouraging responsible screen use. Schools should use balanced digital learning approaches that promote physical activity and in-person connections. Furthermore, awareness efforts can assist parents understand the consequences of excessive screen usage and provide concrete recommendations for developing healthier screen habits.

FUTURE RESEARCH DIRECTIONS

- Investigate the long-term impacts of screen time on developmental outcomes, particularly cognitive and social skills.
- Explore interventions targeting vulnerable populations, such as children with pre-existing mental health conditions or socio-economic disadvantages.
- Examine cultural and socioeconomic factors influencing screen use patterns to develop tailored interventions that address diverse needs.
- Assess the efficacy of digital literacy programs in equipping children and adolescents with the skills to navigate digital spaces responsibly.

CONCLUSIONS

Excessive screen time among children and adolescents poses significant health and behavioral challenges. While digital devices offer benefits, such as education and social interaction, their overuse disrupts sleep, reduces physical activity, and contributes to anxiety, depression, and emotional dysregulation. The decline in outdoor activities due to prolonged screen exposure has led to higher obesity rates and lifestyle-related diseases.

The interconnection between screen time, sleep, and physical activity highlights the need for structured digital habits. The COVID-19 pandemic further emphasized the risks of excessive screen

dependence, making it crucial to implement effective strategies. A balanced approach involving parents, educators, and policymakers is essential to mitigate these negative effects.

Parents can encourage responsible screen use by setting limits, modeling healthy behaviors, and promoting outdoor activities. Schools should adopt digital learning strategies that integrate both online and offline experiences. Policymakers must implement guidelines that ensure children maintain adequate physical activity and mental well-being.

Future research should focus on tailored interventions, considering cultural and socioeconomic factors. As digital technologies evolve, achieving a balance between their benefits and risks is crucial. A collaborative effort can create a healthier digital environment, ensuring the well-being of future generations.

REFERENCES

1. Anderson CA, Dill KE. Video games and aggressive thoughts, feelings, and behavior in the laboratory and in life. J Pers Soc Psychol. 2000;78(4):772. https://doi.org/10.1037//0022-3514.78.4.772.
2. Tremblay MS, LeBlanc AG, Kho ME, Saunders TJ, Larouche R, Colley RC, et al. Systematic review of sedentary behaviour and health indicators in school-aged children and youth. Int J Behav Nutr Phys Act. 2011;8:98. https://doi.org/10.1186/1479-5868-8-98.
3. Nakshine VS, Thute P, Khatib MN, Sarkar B. Increased screen time as a cause of declining physical, psychological health, and sleep patterns: A literary review. Cureus. 2022;14(10):e30051. https://doi.org/10.7759/cureus.30051.
4. Uccella S, Cordani R, Salfi F, Gorgoni M, Scarpelli S, Gemignani A, et al. Sleep deprivation and insomnia in adolescence: Implications for mental health. Brain Sci. 2023;13(4):569. https://doi.org/10.3390/brainsci13040569.
5. Chiu K, Lewis FC, Ashton R, Cornish KM, Johnson KA. Higher tablet use is associated with better sustained attention performance but poorer sleep quality in school-aged children. Front Psychol. 2022;12:742468. https://doi.org/10.3389/fpsyg.2021.742468.
6. Jha S, Mehendale AM. Increased incidence of obesity in children and adolescents post-COVID-19 pandemic: A review article. Cureus. 2022;14(9):e29348. https://doi.org/10.7759/cureus.29348.
7. Massar SA, Ng AS, Soon CS, Ong JL, Chua XY, Chee NI, et al. Reopening after lockdown: The influence of working-from-home and digital device use on sleep, physical activity, and wellbeing following COVID-19 lockdown and reopening. Sleep. 2022;45(1):zsab250. https://doi.org/10.1093/sleep/zsab250.
8. Lee JJ, Flouri E, Jackson Y. The role of timing and amount of outdoor play in emotional dysregulation in preschool children. Child Care Health Dev. 2025;51(1):e70020. https://doi.org/10.1111/cch.70020.
9. 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):1191–207. https://doi.org/10.1080/07420528.2020.1786107.
10. Egami H, Rahman MS, Yamamoto T, Egami C, Wakabayashi T. Causal effect of video gaming on mental well-being in Japan 2020–2022. Nat Hum Behav. 2024;8(10):1943–56. https://doi.org/10.1038/s41562-024-01948-y.
11. McArthur BA, Volkova V, Tomopoulos S, Madigan S. Global prevalence of meeting screen time guidelines among children 5 years and younger: A systematic review and meta-analysis. JAMA Pediatr. 2022;176(4):373–83. https://doi.org/10.1001/jamapediatrics.2021.6386.
12. Varadarajan S, Govindarajan Venguidesvarane A, Ramaswamy KN, Rajamohan M, Krupa M, Winfred Christadoss SB. Prevalence of excessive screen time and its association with developmental delay in children aged <5 years: A population-based cross-sectional study in India. PLoS One. 2021;16(7):e0254102. https://doi.org/10.1371/journal.pone.0254102.
13. John R, Pokale A, Chutke A, Narula APS, Shinde S, Deshmukh R. Prevalence of excess screen time among secondary school children in rural India. J Prev Med Hyg. 2024;64(4):E457. https://doi.org/10.15167/2421-4248/jpmh2023.64.4.3030.

14. Duraccio KM, Krietsch KN, Chardon ML, Van Dyk TR, Beebe DW. Poor sleep and adolescent obesity risk: A narrative review of potential mechanisms. Adolesc Health Med Ther. 2019;10:117–30. https://doi.org/10.2147/AHMT.S219594.
15. Janssen X, Martin A, Hughes AR, Hill CM, Kotronoulas G, Hesketh KR. Associations of screen time, sedentary time and physical activity with sleep in under 5s: A systematic review and meta-analysis. Sleep Med Rev. 2020;49:101226. https://doi.org/10.1016/j.smrv.2019.101226.
16. Mindell JA, Sadeh A, Kwon R, Goh DY. Cross-cultural differences in the sleep of preschool children. Sleep Med. 2013;14(12):1283–9. https://doi.org/10.1016/j.sleep.2013.09.002.
17. Rawat SR, Singh RR. Impact of screen time and other factors on sleep time. In: Emerging Horizons: Business and Society in the Post-Pandemic Era. CRC Press; 2024. p. 160–72.
18. Li C, Long C, Wu H, Zhu G, Liu D, Zhang C, et al. The impact of internet device diversity on depressive symptoms among middle-aged and older adults in China: A cross-lagged model of social participation as the mediating role. J Affect Disord. 2025;368:645–54. https://doi.org/10.1016/j.jad.2024.09.037.
19. Dhabaria VJ. Eyes over exposed: Ocular health of students in higher education. J Ophthalmol Adv Res. 2022;3(1):1–15. https://doi.org/10.46889/joar.2022.3102.
20. Medic G, Wille M, Hemels ME. Short- and long-term health consequences of sleep disruption. Nat Sci Sleep. 2017;9:151–61. https://doi.org/10.2147/NSS.S134864.
21. Claussen AH, Holbrook JR, Hutchins HJ, Robinson LR, Bloomfield J, Meng L, et al. All in the family? A systematic review and meta-analysis of parenting and family environment as risk factors for attention-deficit/hyperactivity disorder (ADHD) in children. Prev Sci. 2024;25(Suppl 2):249–71. https://doi.org/10.1007/s11121-022-01358-4.
22. Neophytou E, Manwell LA, Eikelboom R. Effects of excessive screen time on neurodevelopment, learning, memory, mental health, and neurodegeneration: A scoping review. Int J Ment Health Addict. 2021;19(3):724–44. https://doi.org/10.1007/s11469-019-00182-2.
23. Ray M, Jat KR. Effect of electronic media on children. Indian Pediatr. 2010;47:561–8. https://doi.org/10.1007/s13312-010-0128-9.
24. Faught EL, Ekwaru JP, Gleddie D, Storey KE, Asbridge M, Veugelers PJ. The combined impact of diet, physical activity, sleep, and screen time on academic achievement: A prospective study of elementary school students in Nova Scotia, Canada. Int J Behav Nutr Phys Act. 2017;14:1–13. https://doi.org/10.1186/s12966-017-0476-0.
25. Panjeti-Madan VN, Ranganathan P. Impact of screen time on children's development: Cognitive, language, physical, and social and emotional domains. Multimodal Technol Interact. 2023;7(5):52. https://doi.org/10.3390/mti7050052.
26. Vodopivec-Jamsek V, de Jongh T, Gurol-Urganci I, Atun R, Car J. Mobile phone messaging for preventive health care. Cochrane Database Syst Rev. 2012;(12):CD007457. https://doi.org/10.1002/14651858.CD007457.pub2.
27. Kast S. Exploring the relationship between smartphone screen time and affect in university students, moderated by trait creativity: An experience sampling method study [Bachelor's thesis]. University of Twente; 2023.
28. Meythaler A. Understanding the role of social media content in inducing anxiety: A qualitative study [Unpublished manuscript]. 2025. https://hdl.handle.net/10125/109175.
29. Patzina A, Collischon M, Hoffmann R, Obrizan M. Mental health in Germany before, during, and after the COVID-19 pandemic. PLoS One. 2025;20(1):e0313689. https://doi.org/10.1371/journal.pone.0313689.
30. Wahi G, Parkin PC, Beyene J, Uleryk EM, Birken CS. Effectiveness of interventions aimed at reducing screen time in children: A systematic review and meta-analysis of randomized controlled trials. Arch Pediatr Adolesc Med. 2011;165(11):979–86. https://doi.org/10.1001/archpediatrics.2011.122.

