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Review Paper

Screen Time Impact on Human Health: A Comprehensive Review

Vaibhav Gavane*, Sonali Nipate, Snehal Gojare

Department of Pharmacology, PES Modern College of Pharmacy, Nigdi- 411044, Pune, Maharashtra, India..

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ABSTRACT

The rapid growth of digital technology has led to an incredible upsurge in the amount of time dedicated to screens by every demographic, raising increasing concern about its adverse impact on human health. Screens used in phones, tablets, desktops, and televisions have become routine tools facilitating work, education, and entertainment. Despite the numerous benefits of digital media, excessive screen exposure has been associated with behavioural, psychological, and physical health concerns. This review aims to evaluate and synthesise existing literature on the impact of screen time on physical health, mental well-being, sleep patterns, attention span, and cognitive development across different age groups. Long-term screen exposure has been linked to metabolic alterations, obesity, musculoskeletal exhaustion, and sedentary behaviour. Visual consequences such as myopia and digital eye strain are frequently reported with prolonged screen use. Screen exposure, particularly during evening hours, disrupts sleep quality and circadian rhythm by inhibiting melatonin synthesis. Excessive screen time has also been associated with increased risks of anxiety, depression, behavioural addiction, reduced concentration, and delayed language and cognitive development, especially among children and adolescents. The duration, timing, and type of screen exposure play a critical role in determining health outcomes. While digital technology offers substantial advantages, excessive and unregulated screen use poses significant health risks. Promoting moderation, awareness of screen habits, and appropriate preventive strategies is essential to minimise adverse health effects while preserving the benefits of digital technology. Relevant studies published between 2000 and 2025 were identified from PubMed, Scopus, Web of Science, and Google Scholar.

INTRODUCTION

Over the past two decades, the explosion of digital technology has entirely changed the way of doing business, schools, communication, and the livelihoods of human beings. Computers, game consoles, tablets, cell phones and televisions are examples of electronic gadgets that have become significant aspects of the daily lives of both younger and older generations. Increasingly, the

***Corresponding Author:** Vaibhav Gavane
Address: *PES Modern College of Pharmacy, Nigdi- 411044, Pune, Maharashtra, India.*
Email ✉: vgavane823@gmail.com
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world is experiencing a skyrocketing screen time or the time spent on digital devices, especially with the emergence of social media platforms, online learning, remote working, and access to the internet, which has led to the increased threat of screen time to health [1,2]. Regardless of the advantages of digital technology, such as simpler access to information, increased mobility, and increased productivity in workplaces and educational institutions, excess screen time can pose tremendous health risks. Young people and children are more exposed due to their incessant neurodevelopment and reliance on technology to learn and entertain, especially social media and games. Adults also deal with prolonged use of screens at work, which is often coupled with poor posture, disturbed sleeping patterns, and lack of activity [3]. COVID-19 has intensified screen usage among the global population and raised the concern of the long-term health impact [4]. As far as the dominant and rising trend of the amount of screen time is concerned, it is crucial that we properly evaluate its impact on human health. The existing study will gather the latest studies regarding the effects of screen use on sleep habits, physical and psychological well-being, cognitive capacities, visual health and physiological performance [5-8].Over the past few years, the concept of screen time has expanded to include much more than just television viewing, including wearable technology, computers, tablets, and smartphones, among other interactive digital platforms. The frequency and intensity of screen time throughout everyday activities have improved as a result of this growth. This has enhanced the frequency and intensity of screen time during daily activities. Due to the increasing number of activities that require constant access to digital interactions, the boundaries between work, the education sector, and leisure have been erased, so people spend more and more hours at the screen during the day [1-2].

2. Patterns and Pathophysiological Processes of Screen Time.

The habits of screen time vary with age, status in society, careers, and culture. The time spent on screens by young people and adolescents is mostly educational, recreational, and communication with others, although adults often regulate the use of the device in work and recreational digital use [9]. The increase in screen time is attributed to the sheer number of reasons, such as expectations of society, academic and professional time constraints, Internet penetration, accessibility of and access to technology, and reasons based on psychology, in particular, the pressure and being isolated. The nature of the time spent on the internet has a colossal impact on psychological well-being. There are psychological and cognitive implications of engaging in screen time compared to passive screen time when one is watching broadcasts. Pathophysiologically speaking, having excessive screen time is the means of pathology development due to biological and psychological interconnected processes. Stress-response systems may become prompted by mental fatigue caused by ongoing interdependence, competition for jobs, and digital peer pressure; this can raise cortisol levels and produce dysregulation of emotions [10-11]. Those responses to stress could contribute to mental health challenges and difficulties with sleep, exacerbated. Additionally, a substitution of screen-based practices for social and physical activities disrupts routines and minimises avenues for restorative activities, which include social engagement and outdoor exposure. The eviction effect appears most prominent in young people and teens, where heavy spending time on screens interferes with movement, recreation, and intimate relationships, thereby rendering them particularly prone to physical and mental health problems [5,7].

3. Impact of Screen Time on Physical Health

3.1 Sedentary Behaviour and Musculoskeletal Disorders

The other significant physical condition caused by extended screen time is the heightened sedentary behaviour. Overall, prolonged sitting when working with digital gadgets reduces the level of physical activity, which could lead to poor skeletal health [12]. There is a significant association between neck pain, shoulder stiffness, backache, and repetitive strain-related injuries and long-term use of screens, especially among pupils and office employees [13]. Mechanical stresses on the cervical spine are aggravated by bad posture in holding a device, rounded shoulders and forward head position, which may cause constant discomfort and musculoskeletal disorders. The rising number of these disorders, especially among the younger population groups, is a factor that poses a greater threat to sanitary problems [14].Long-term connected with screen time has an impact on postural stability and muscular development. Standing for a longer period during the day decreases activation of muscles, which results in weakened core strength, restricted mobility in the joints, and muscular imbalances [12,14]. These changes can heighten the potential of persistent muscular discomfort and impaired productivity over time. Utilising screens for extended periods in the working environment without ergonomic management doubles the risk of work-related muscle imbalances, which are an essential contributor to lower productivity and absenteeism. To lessen this adverse impact, preventive hygienic techniques, including posture remediation, adjustable workstations, and scheduled movement breaks, are vital [13,15].

3.2 Obesity and Metabolic Health

In adults and children, the risk of obesity and overweight has been seen to be a result of prolonged exposure to the screen [16]. Unhealthy feeding habits, such as taking too many beverages containing sugars and high-energy foods, as well as substituting physical activities, are usually accompanied by sedentary screen use [17]. Substantial screen time has been associated in the literature with serious metabolic consequences, such as diabetes, diabetes, insulin resistance, and increased body mass index (BMI) [5]. These changes in metabolism pose a threat of contracting non-communicable chronic illnesses, including type 2 diabetes and cardiovascular diseases [6].The effects of excessive use of the screen on metabolism do not end with gaining weight. Heart attack and stroke risk has been elevated by sedentary screen actions, and these behaviours have a damaging impact on inflammatory reactions, glucose management, and lipid transport [5-6]. Electronic inactivity in teenagers can be especially problematic since early hormonal dynamics can persist to adulthood and create a lifetime threat of severe diseases. Excessive consumption of screens has also been connected to irregular dietary choices, after-hours snacking, and elevated exposure to meal messages, among other factors, which increase bad eating habits. The worldwide epidemic of overweight people and the associated metabolic syndrome is primarily explained by these interacting personality factors [16-17].

4. Visual Health and Screen Exposure

Excessive displays lead to digital eye strain, commonly referred to as computer vision syndrome. Some of the symptoms include fatigued eyes, irritated eyes, headaches, vision problems, and concentration issues [18]. The slower rate during the time in front of the screen makes the tearing of the film detached, and this increases the itchiness of the eyes. The blue light of digital displays solves problems with eye health and a violation of the circadian rhythm. Even though the

research regarding the long-term effects of retinal damage in the case of blue light exposure remains ongoing, there is reason to believe that when overexposed to blue light during sleep, it might disrupt melatonin production and sleep cycles [8]. Children might be extremely vulnerable to the emerging symptoms of myopia and various visual issues caused by the use of screens. According to epidemiological evidence, the cases of myopia continue to rise all across the world, and this is mainly because of the reduced number of external exposures that can be blamed on the use of screens and more on close jobs [10].

5. Circadian Cycle Disturbance and Sleep Disturbances

Screen time has a substantial effect on the quantity and quality of sleep, particularly during the nighttime. Light enriched with blue reduces the production of melatonin, slows the process of sleeping, and interferes with the circadian clock [19]. A number of studies have linked too much screen time with reduced cognitive ability, fatigue during the day, insomnia, and reduced sleep efficiency [11,18]. The teens are the most affected because gaming late at night and social media consumption usually go hand in hand with getting the necessary levels of sleep, therefore, negatively affecting their mental health and academic performance [20]. Excessive screen time has been associated with chronic sleep disturbance that increases the likelihood of obesity, depression, poor immunity and cardiovascular illness [21].

6. Psychological and Mental Health Effects

6.1 Anxiety, Depression, and Stress

There is an accumulating body of evidence that there is a direct relationship between excessive screen time and adverse mental health outcomes. Prolonged use of social media has been proven to be scientifically correlated with the symptoms of anxiety, despair, isolation and perceived stress [22]. Self-esteem and mental stability can be harmed by social competition, abuse on social media, FOMO, and constant interaction, in particular among young people and adolescents [23]. However, whereas a sensible reliance on screens can provide society with support and the use of knowledge, excessive or disruptive screen use patterns seem to generate more psychological distress [24].The time spent on content and the environment of screen usage all have a direct effect on mental health. The exposure to disruptive or negatively charged information in the form of a passive agent may worsen the feeling of sadness, whereas interactive and educative content may be used to offer social support and neural stimulation in excess [19,24]. Additionally, excessive use of screens may promote mental health illnesses and also be a result of them. Consumers who are anxious or distressed could depend increasingly on screens for interactions with others or distractions, and this could promote detrimental use behaviours [11, 21].

6.2 Addiction and Behavioural Disorders

Addiction to the Internet and video games are problematic application of screens, proven to be issues of psychological wellness. These psychological problems involve those characterised by impaired autonomy in terms of screen time, negligence of routine duties, and withdrawal symptoms [25]. The misuse of social media, including playing games, has been linked to impulsivity, a deficiency in concentration and poor intellectual or professional performance [26].

7. Cognitive Process and Neurodevelopment

The reliance of youth on screens throws light on issues related to cognitive and language development. It is known that excessive exposure to screens among young kids leads to poor mental

processes, delayed language growth and reduced attention span [27]. However, when applied in an efficient way, multimedia and instructional digital resources could lead to knowledge and the development of cognitive ability. Therefore, the nature and the environment of screen consumption are immensely impactful on cognitive performance [28].According to a developmental investigation, prolonged use of screens from birth to the toddler stage could leave an influence on cerebral growth and attention. Rapid visual stimulation and continual informational switching can stunt the process of focused attention and the ability to concentrate [27, 28]. The consequences could present their patients with inferior academic performance, learning challenges, and an overall decrease in solving issues.
But when correctly designed and deployed, technological tools might provide chances for psychological enrichment. Designed for education and monitored usage of mobile devices may assist with the acquisition of languages, growth in memory, and comprehension of technology, emphasising the need for purposeful, moderated time spent watching television [24, 28].

8. Screening-Associated Diseases: Age-Wise Incidence and Epidemiology

Overuse of computers is being more widely recognised as a modifiable behavioural threat that is linked to many different kinds of health issues impacting adults of varying ages. Related to screens, prolonged sitting, difficulties sleeping, and unhealthy digital usage are severe problems for public wellness, according to both WHO and large community-based studies, though symptoms are not categorised as a disease [5-7].

The age-wise burden of screen-related disorders is summarised in Table 1.

Age group	Common screen exposure	Major associated diseases
<5 years	Tablets, smartphones, TV	Language delay, attention deficits, behavioural problems
6–18 years	Smartphones, gaming, and laptops	Myopia, anxiety, depression, sleep disorders, and gaming addiction
18–60 years	Occupational screens	Obesity, metabolic syndrome, musculoskeletal disorders
>60 years	Television, smartphones	Cognitive decline, depression, and physical inactivity

WHO-estimated prevalence of screen-related health outcomes is presented in Table 2.

Health condition	Estimated global prevalence	Primary age group
Insufficient physical activity	~31% of adults	Adults
Excess recreational screen time	~46% of children	Children/adolescents
Developmental delay (screen-related)	60–75% exceed limits	<5 years
Problematic gaming behaviour	10–12%	Adolescents

Major screen-time–related diseases and their mechanisms are outlined in Table 3.

Disease	Mechanism	Affected age group
Myopia	Near work, reduced outdoor activity	Children/adolescents
Depression	Social comparison, sleep disruption	Adolescents/adults
Obesity	Sedentary behaviour, poor diet	All age groups
Sleep disorders	Melatonin suppression	Adolescents/adults
Cognitive decline	Reduced stimulation, inactivity	Older adults

9. Effect on Social and Behavioural Health

The overuse of screens may diminish social interaction, which may cause social isolation and a lack of social skills. Teenagers and children who spend a high amount of time on screens can exhibit a lower level of empathy, emotional sense, and interpersonal ability [29]. The rise in the use of smartphones by people may also affect contact with family members by reducing the number of communication and activities they have together [30].

10. Vulnerable Populations

Some demographic groups are likely to be negatively impacted by the negative effects of screen time on health. Other consequences may be experienced by children, teens, the elderly, and individuals who already possess a mental health condition [7]. Professional activities, education history, and socioeconomic level influence both the screen exposure habits and the health conditions. Special treatments should be developed to meet the varying demands of diverse groups of people [31].

11. Prevention Strategies and Recommendations

The importance of moderate use of screen time is incorporated in the safety guidelines. Some of the suggestions include limiting enjoyable screen time, forcing regular breaks when engaging in long screen time, physical exercises, and setting screen-free habits before sleep [32]. The educational policies of the institution and parental orientation play a significant role in the healthy screen habits of children and teens [15].

12. FUTURE RESEARCH DIRECTIONS

Despite all the studies performed, there are still a lot of questions related to long-term health consequences that are linked with the use of electronic devices. Future studies must be focused on longer-term research, objective measures of screen time, and the ability to discriminate types of information and situational use [8]. The explanation of the interrelations between screen time, physical activity, sleep quality, and mental health will lead to a better understanding of digital medical outcomes [33].

CONCLUSION

Screen time has become an inevitable aspect of modern life, which affects virtually all aspects of human health and behaviour. Although digital technological devices have numerous benefits, the overuse, such as the lack of screen time supervision, has been linked with several negative effects on physical, mental, visual, and metabolic health. The data that has been analysed highlights the importance of moderating, using it sparingly, and having a set of environmental guidelines to

reduce the health risks and maximise the positive health effects of digital dependency. In order to solve the health risks of spending screen time, a multifunctional approach involving medical professionals, educators, lawmakers, families, and individuals is needed. Wholesome digital habits are important in supporting human health in an environment that is increasingly becoming more technologically dependent.All things taken into account, the study that is currently available illustrates how excessive, unsupervised, and poorly defined screen time is potentially hazardous. Living an appropriate life in today's connected world requires integrating exercise, gaining enough sleep, and practising cautious digital behaviour.

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