

The Impact of Mobile Gaming on Health – A Comprehensive Overview

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Abstract

Digital devices have become essential in our lives. They're used for work, school, and fun. In particular mobile gaming has become more popular, especially among young adults. Millions of people play games on mobile which keeps growing yearly. Mobile gaming is becoming increasingly popular, with serious health concerns. The visual and physical demands during prolonged mobile gaming due to smaller screen size and poor posture, have potentially negative consequences such as visual problems, musculoskeletal discomfort, sleep disorders, stress, and behavioral concerns. Despite these issues, mobile gaming has cognitive advantages, such as better memory, concentration, problem-solving abilities, and response times, particularly in action games. Adopting good gaming habits with a balanced diet is crucial to reducing health concerns. Addressing the health consequences of mobile gaming is critical as its popularity grows, demanding further study to better understand long-term implications and develop effective measures for encouraging healthy gaming behaviors

Keywords: Mobile gaming; Health; Digital Devices; Ocular health

Introduction

With advancements in digitalization, digital devices such as computers, tablets, TVs, and mobile phones, have become an integral part of our lives with their usage significantly increasing in recent years for work, academics, and entertainment [1, 2]. This rapid digitalization and evolution of the mobile industry have led to a significant increase in the engagement of young adults in mobile gaming activities. This trend has emerged as a notable shift from traditional computer gaming as mobile phones are easily available nowadays. The Newzoo global games market report suggests around 3.3 billion gamers worldwide majorly from mobile gaming [3]. Similarly, Indian data by Lumikai, highlights 568 million mobile gamers with a 12% YoY (Year on Year) increase in number; among which 50% of gamers are aged between 18-30 years [4]. The professional mobile gaming which is labeled with esports has become a category in professional sports and has been included in the Olympics [5].

With this increase in the popularity of mobile gaming, its impact also should be looked upon. The unique environments and demands observed during mobile gaming, particularly due to the constraints imposed by smaller screen sizes, varying ergonomic considerations, and increasing usage it becomes crucial to understand its potential impacts on ocular health.

Visual demands during mobile gaming:

When a person fixates on a mobile device during gaming several ocular systems are altered to maintain a clear single binocular vision including accommodation, convergence, and pupillary constriction [6]. Moreover, the system of accommodation refers to the

eye's ability to adjust to closer distance to maintain a clear focus on the screen [7]. Convergence involves the inward turning of both eyes to maintain alignment on the screen [8]. Pupillary constriction refers to the narrowing of the pupils due to increased visual concentration during gaming [9]. Along with these components, the blink rate is also reduced during mobile gaming [10, 11] contributing to dry eyes-related symptoms.

Several distinct structural and habitual features differentiate mobile gaming from computer gaming [12]. This difference can be attributed to the following factors.

- **Widespread Mobile Usage:** The popularity of mobile gaming is evident; reports suggest 94% of gamers choose to play on their mobile devices in India [13]. This widespread usage indicates that more and more people are engaging with gaming on their smartphones, making it a dominant platform for gaming.
- **Small Screen Size:** One of the key differences between gaming on mobile devices and traditional monitors is the screen size. Mobile screens are smaller, which requires more visual effort to focus on finer details during gameplay [14].
- **Attention Demands:** Gaming on mobile demands focused attention, making it different from regular mobile phone usage in terms of visual demands [15].
- **Improper Posture:** During prolonged mobile gaming, it is observed to have significantly poor spinal posture, mobility, and stability than normal usage. This is characterized by a forward-head or flexed-neck position, and back rounded [16]. Prolonged mobile phone usage exacerbates these issues, particularly when sitting without back support, leading to increased strain on the neck and back muscles [16].

Negative Health outcomes

Despite the widespread popularity of mobile gaming, prolonged engagement can lead to various negative health outcomes, ranging from vision problems to behavioral issues. Some of the key concerns include:

1. **Visual Problems:** Extended screen time during gaming may result in various vision problems, including eye strain, dry eyes, and blurred vision [10, 11].
2. **Musculoskeletal Pain:** Overuse of certain muscle groups & improper posture during gaming can cause musculoskeletal pain in various regions such as the neck, shoulders, wrists, and lower back along with repetitive strain injuries [16, 17].
3. **Sleep Disturbances:** The habitual gaming pattern of playing at night or early morning can disrupt sleep patterns and lead to sleep disturbances due to blue light exposure [18]. Moreover, exposure to the blue light emitted by screens can disrupt the sleep-wake cycle
4. **Stress:** Excessive gaming can elevate stress levels, especially during competitive gameplay or time pressures [19].
5. **Behavioral Problems:** Excessive gaming has been associated with behavioral issues like addiction, as well as increased aggression and violent tendencies [18].

Benefits

Amidst concerns about the potential negative effects of mobile gaming, it's important to acknowledge that there are also potential benefits associated with engaging in this activity. Few studies indicate that action video games have the potential to positively impact various cognitive functions, including memory, attention, and problem-solving skills [20]. Additionally, playing these games may contribute to enhanced reading ability, possibly attributed to heightened visual processing and comprehension skills [21]. Moreover, the fast-paced nature of action games often necessitates rapid responses to in-game stimuli, thereby leading to improved reaction times in players [21]. Furthermore, engaging in action video games can aid in the development of sensorimotor skills by fostering better coordination between sensory perception and physical actions [22]. Mobile games are used in various rehabilitation processes, such as vision therapy for cases of strabismus and amblyopia [23], as well as for stroke rehabilitation [24] and mental rehabilitation [25].

Tips for healthy gaming

1. **Optimize lighting:** The gaming environment should have adequate lighting to reduce eye strain. Avoid glare on the screen by positioning it away from direct light sources. Adjust the brightness and contrast settings on the device to comfortable levels for extended use [26].
2. **Take breaks regularly:** Regular breaks while gaming are advised to provide rest to the eyes from prolonged screen exposure and repetitive movements. Furthermore, such breaks facilitate ocular accommodation relaxation, thereby reducing asthenopic symptoms. Adhere to the 20-20-20 rule which suggests every 20 minutes of gaming/ digital device use take a break of 20 seconds, look at least 20 feet away, and blink [26].
3. **Blink frequently:** Staring at a screen for extended periods can reduce the natural blink rate, leading to dry eyes and discomfort. Blinking regularly while gaming to keep our eyes moist and prevent dryness and irritation [8].
4. **Ergonomic position:** To avoid musculoskeletal fatigue, feet should be flat, resting on the floor; forearm against the armrest, and upper arms and elbows close to the body. The screen should be tilted and positioned slightly below or at eye level. Forward head or neck position should be avoided [16].
5. **Prioritize sleep and set a time limit:** Establish a healthy gaming schedule for sufficient sleep and rest. Avoid gaming late into the night in the dark, and set time limits for gaming sessions to prevent excessive screen time [27].
6. **Healthy lifestyle:** Engaging in regular physical activity, eating a balanced diet, and staying hydrated support overall well-being. Incorporating hobbies and activities outside of gaming promotes mental and physical health [28].

Conclusion

As mobile gaming continues to rise in popularity, it's important to recognize and address its potential impacts on health. The prolonged screen time can lead to vision problems, musculoskeletal pain, sleep disturbances, stress, and behavioral issues. To reduce these risks, adopting healthy gaming practices is crucial. Moreover, limited research has been done focusing on proper recommendations for mobile gaming, highlighting the need for further studies in this area.

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References

1. Reddy Pritika, Bibhya Sharma and Kaylash Chaudhary. "Digital literacy: A review of literature". International Journal of Techno-ethics (IJT) 11.2 (2020): 65-94.
2. Agrawal Shiv Ratan. "Digital pollution and its impact on the family and social interactions". Journal of Family Issues 42.11 (2021): 2648-2678.
3. Newzoo. Global Games Market Report (2024). <https://newzoo.com/resources/trend-reports/newzoo-global-games-market-report-2023-free-version>

4. Lumikai. Leveling up: State of India Gaming FY'23 Executive Summary (2023). <https://www.lumikai.com/post/indian-gaming-industry-poised-for-strong-growth-projected-to-reach-7-5-bn-by-fy28>
5. Hou Jue, Xiaoxu Yang and Elliot Panek. "How about playing games as a career? The evolution of E-sports in the eyes of mainstream media and public relations". *International Journal of Sport Communication* 13.1 (2020): 1-21.
6. Allen Louise and Jignasa Mehta. "The impact of smartphone use on accommodative functions: pilot study". *Strabismus* 31.1 (2023): 66-72.
7. Read Jenny, et al. "Modelling the neural control of ocular accommodation". *Journal of Vision* 22.14 (2022): 3272-3272.
8. Cooper Jeffrey and Nadine Jamal. "Convergence insufficiency-a major review". *Optometry (St. Louis, Mo.)* 83.4 (2012): 137-158.
9. Myers Glenn A and Lawrence Stark. "Topology of the near response triad". *Ophthalmic and Physiological Optics* 10.2 (1990): 175-181.
10. Chidi-Egboka, et al. "Smartphone gaming induces dry eye symptoms and reduces blinking in school-aged children". *Eye* 37.7 (2023): 1342-1349.
11. Jordan Catherine O and David L Rogers. "Effect on blink rate during videogame related activities and reading in school-aged children". *Journal of American Association for Pediatric Ophthalmology and Strabismus* 19.4 (2015): e48-e49.
12. Syvertsen André, et al. "Problem mobile gaming: The role of mobile gaming habits, context, and platform". *Nordic Studies on Alcohol and Drugs* 39.4 (2022): 362-378.
13. KMPG. Beyond the tipping point - A primer on online casual gaming in India (2021). <https://assets.kpmg.com/content/dam/kpmg/in/pdf/2021/06/digital-mobile-casual-gaming-in-india.pdf>
14. Ashwini KV, et al. "The Consequences of Gaming on Mobile Devices versus Laptops on Binocular Visual Functioning". *tnoa Journal of Ophthalmic Science and Research* 61.2 (2023): 207-214.
15. Lam, Wing-Kai, et al. "Health risks and musculoskeletal problems of elite mobile esports players: a cross-sectional descriptive study". *Sports Medicine-Open* 8.1 (2022): 65.
16. Lam Wing-Kai, et al. "Spine Posture, Mobility, and Stability of Top Mobile Esports Athletes: A Case Series". *Biology* 11.5 (2022): 737.
17. Kumar CR Satish, et al. "Digital gaming, musculoskeletal, and related health hazards among adolescents and young adults". *Indian journal of psychiatry* 65.6 (2023): 698-700.
18. Mylona Ioanna, et al. "The Impact of Internet and Videogaming Addiction on Adolescent Vision: A Review of the Literature". *Frontiers in Public Health* 8 (2020): 63.
19. Palanichamy Thamilselvan, et al. "Influence of Esports on stress: A systematic review". *Industrial psychiatry journal* 29.2 (2020): 191-199.
20. Quiles Clélia and Hélène Verdoux. "Benefits of video games for people with schizophrenia: a literature review". *Current opinion in psychiatry* 36.3 (2023): 184-193.
21. Peters Jessica L, et al. "Action video game training improves text reading accuracy, rate and comprehension in children with dyslexia: a randomized controlled trial". *Sci Rep* 11.1 (2021): 18584.
22. Gonçalves Edimilson dos Santos, and Goiara Mendonça de Castilho. "Effects of action video game engagement on attention and working memory". *Psychology & Neuroscience* (2024). <https://psycnet.apa.org/record/2024-65172-001>
23. Paudel Nabin. "Smartphone Applications for Amblyopia Treatment: A Review of Current Apps and Professional Involvement". *Telemedicine journal and e-health: the official journal of the American Telemedicine Association* 24.10 (2018): 797-802.
24. Choi Yoon-Hee and Nam-Jong Paik. "Mobile game-based virtual reality program for upper extremity stroke rehabilitation". *Journal of visualized experiments: JoVE* 133 (2018).
25. Xie Huiting. "A scoping review of gamification for mental health in children: Uncovering its key features and impact". *Archives of psychiatric nursing* 41 (2022): 132-143.
26. Moulick Parthasarathi. "Digital eye strain: Time for a break". *Journal of Ophthalmic Research and Practice* 1.1 (2023): 10-13.
27. Lam Lawrence T. "Internet gaming addiction, problematic use of the internet, and sleep problems: a systematic review". *Current*

psychiatry reports 16.4 (2014): 444.

28. Efe Hacer and Ünsal Umdü Topsakal. "LET'S EAT HEALTHY WITH DIGITAL GAMES!". European Journal of Education Studies 10.2 (2023).

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