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Research Article

IMPACT OF SMARTPHONE ADDICTION ON OCULAR SYMPTOMS IN YOUNG ADULTS IN WESTERN MAHARASHTRA

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ABSTRACT

Background: Smartphones have become an integral part of daily life among young adults for communication, education, entertainment, and social networking. Excessive smartphone usage has led to increasing concerns regarding smartphone addiction and its associated health effects, particularly ocular symptoms related to prolonged screen exposure. Continuous use of smartphones may result in digital eye strain, dryness, headache, blurred vision, and other visual complaints affecting quality of life.

Aim and Objectives: To study the impact of smartphone addiction on ocular symptoms among young adults; to assess the level of smartphone addiction; to identify common ocular symptoms associated with smartphone use; to study the association between duration of smartphone use and ocular symptoms; and to compare ocular symptoms among participants with different levels of smartphone addiction.

Methods: A hospital-based cross-sectional observational study was conducted among 100 young adults aged 18–30 years. Data were collected using a predesigned and pretested questionnaire. Information regarding smartphone usage patterns, daily screen time, and ocular symptoms was recorded. Smartphone addiction was assessed using a validated Smartphone Addiction Scale. Ocular symptoms such as eye strain, headache, dryness, redness, watering, and blurred vision were assessed based on participant responses. Data were analyzed using descriptive statistics and Chi-square test. A p value less than 0.05 was considered statistically significant.

Results: Moderate smartphone addiction was observed in 46% participants, while 22% had severe addiction. Eye strain (72%), headache (60%), and dryness of eyes (54%) were the most common ocular symptoms. A statistically significant association was found between daily smartphone use duration and ocular symptoms (χ^2=12.48, p=0.002). Significant association was also observed between smartphone addiction level and ocular symptoms (χ^2=14.32, p=0.001). Participants with severe smartphone addiction had higher prevalence of ocular complaints compared to those with mild addiction.

Conclusion: Smartphone addiction is significantly associated with ocular symptoms among young adults. Prolonged smartphone use increases the risk of digital eye strain and visual discomfort.

KEYWORDS: Smartphone Addiction, Eye, and Young Adult.

Introduction

Smartphones have become an essential part of modern life and are widely used for communication, education, entertainment, social networking, and professional activities. The rapid advancement of digital technology and easy internet accessibility have significantly increased smartphone usage, especially among adolescents and young adults[1]. Excessive smartphone use has emerged as a growing public health concern because of its physical, psychological, and ocular effects[2].

Young adults are one of the most vulnerable groups for smartphone addiction due to prolonged screen exposure for academic activities, online classes, gaming, and social media interaction[3]. Smartphone addiction is characterized by excessive or uncontrolled use of smartphones leading to dependency, impaired daily functioning, and health-related problems[4]. Studies have shown that prolonged smartphone use is associated with sleep disturbances, anxiety, reduced concentration, musculoskeletal discomfort, and ocular symptoms[5].

Continuous viewing of digital screens requires constant accommodation and convergence of the eyes, resulting in ocular fatigue and visual discomfort[6]. Reduced blinking during smartphone use leads to tear film instability and dryness of the ocular surface[7]. Blue light emitted from smartphone screens may also contribute to eye strain, retinal stress, and visual disturbances[8]. These changes commonly manifest as symptoms such as eye strain, dryness, burning sensation, watering, redness, blurred vision, headache, and foreign body sensation, collectively referred to as digital eye strain or computer vision syndrome[9].

Several studies have reported a significant association between prolonged smartphone exposure and ocular complaints among young individuals. A study conducted among young adults observed that prolonged smartphone usage was associated with decreased tear film stability and increased ocular discomfort[1]. Another study reported higher prevalence of eye pain, dryness, and visual symptoms among frequent smartphone users compared to non-users[9]. Systematic reviews have also demonstrated that excessive smartphone use increases the risk of asthenopia, ocular surface disease, and visual impairment in children and young adults[10].

With the increasing dependence on smartphones in educational and social life, ocular health problems related to smartphone addiction are expected to rise further. Despite growing awareness, limited studies are available in the Indian setting evaluating the relationship between smartphone addiction and ocular symptoms among young adults. Therefore, the present study aims to assess the impact of smartphone addiction on ocular symptoms in young adults and to identify the associated risk factors related to screen exposure and usage patterns.

Methodology

The present study was a hospital-based cross-sectional observational study conducted among young adults attending the outpatient department and students of the medical college. The study was carried out after obtaining approval from the Institutional Ethics Committee and informed written consent from all participants. Young adults aged 18–30 years using smartphones for at least one year were included in the study. Participants with pre-existing ocular diseases, history of ocular surgery or trauma, chronic systemic illness affecting vision, and regular contact lens users were excluded from the study.

Data were collected using a predesigned and pretested questionnaire. Information regarding socio-demographic profile, duration of smartphone use, average daily screen time, night-time smartphone usage, screen brightness habits, viewing distance, and frequency of breaks during smartphone use was recorded. Smartphone addiction was assessed using a validated Smartphone Addiction Scale questionnaire. Ocular symptoms such as eye strain, dryness, redness, watering, blurred vision, headache, burning sensation, itching, and foreign body sensation were assessed based on participant responses.

All collected data were entered into Microsoft Excel and analyzed using appropriate statistical software. Descriptive statistics such as mean, standard deviation, frequency, and percentage were used. Association between smartphone addiction and ocular symptoms was analyzed using Chi-square test and p value <0.05 was considered statistically significant.

Results

The study showed that moderate smartphone addiction was the most common pattern among participants, accounting for 46% of the study population, followed by mild addiction in 32% and severe addiction in 22% participants. These findings indicate that a large proportion of young adults are excessively dependent on smartphones due to increased use for communication, social networking, entertainment, and academic purposes. The presence of moderate to severe addiction among many participants highlights the growing impact of smartphone overuse in daily life and its potential influence on health-related problems, especially ocular complaints.

Table 1: Distribution of Participants According to Level of Smartphone Addiction

Smartphone Addiction Level	Frequency (n)	Percentage (%)
Mild	32	32%
Moderate	46	46%
Severe	22	22%
Total	100	100%

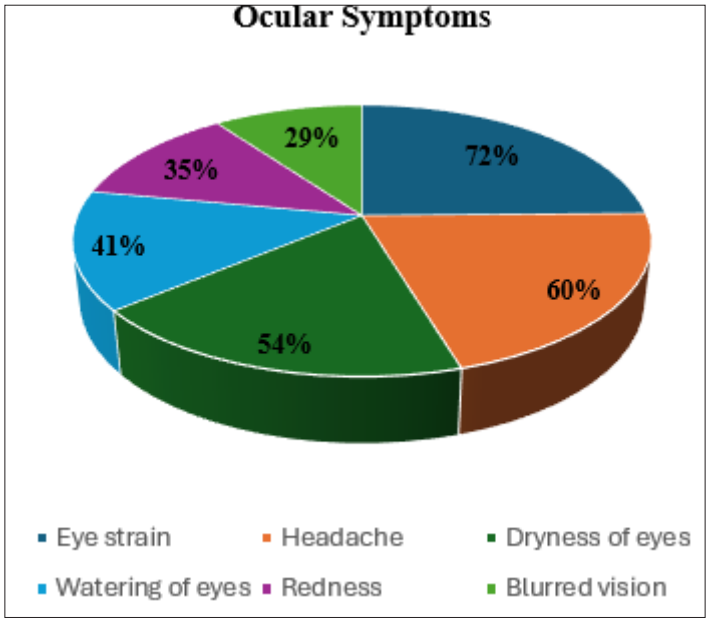

Chart 1: Distribution of Common Ocular Symptoms Among Participants

Table 2: Association Between Daily Smartphone Use Duration and Ocular Symptoms

Daily Smartphone Use Duration	Ocular Symptoms Present n (%)	Ocular Symptoms Absent n (%)	Total n (%)	Chi-square / p value
<4 hours	12 (46.2%)	14 (53.8%)	26 (100%)	$\chi^2 = 12.48$, p = 0.002
4–6 hours	28 (73.7%)	10 (26.3%)	38 (100%)	
>6 hours	32 (88.9%)	4 (11.1%)	36 (100%)	
Total	72 (72%)	28 (28%)	100 (100%)	

Table 4: Association Between Smartphone Addiction Level and Ocular Symptoms

Smartphone Addiction Level	Ocular Symptoms Present n (%)	Ocular Symptoms Absent n (%)	Total n (%)	Chi-square / p value
Mild	16 (50.0%)	16 (50.0%)	32 (100%)	$\chi^2 = 14.32$, p = 0.001
Moderate	36 (78.3%)	10 (21.7%)	46 (100%)	
Severe	20 (90.9%)	2 (9.1%)	22 (100%)	
Total	72 (72%)	28 (28%)	100 (100%)	

Among the ocular symptoms assessed, eye strain was the most frequently reported symptom, present in 72% of participants, followed by headache in 60% and dryness of eyes in 54% participants. Other symptoms such as watering, redness, and blurred vision were also commonly observed. Continuous exposure to smartphone screens may lead to prolonged accommodation stress, decreased blink rate, and tear film instability, resulting in ocular discomfort and symptoms related to digital eye strain. The high prevalence of these symptoms suggests that excessive smartphone use is an important contributing factor to ocular morbidity among young adults.

A statistically significant association was observed between duration of daily smartphone use and ocular symptoms ($\chi^2 = 12.48$, p = 0.002). Participants using smartphones for more than 6 hours daily had the highest prevalence of ocular

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symptoms (88.9%), whereas those using smartphones for less than 4 hours showed comparatively lower prevalence (46.2%). The findings indicate that increased screen time significantly increases the risk of ocular symptoms such as eye strain, headache, dryness, and blurred vision. Prolonged exposure to smartphone screens without adequate breaks may result in visual fatigue and ocular surface disturbances, thereby affecting ocular health.

The study also demonstrated a statistically significant association between smartphone addiction level and ocular symptoms ($\chi^2 = 14.32$, $p = 0.001$). Ocular symptoms were more prevalent among participants with severe smartphone addiction (90.9%) compared to those with moderate (78.3%) and mild addiction (50.0%). This suggests that higher levels of smartphone addiction are associated with greater ocular discomfort and visual problems. Excessive and compulsive smartphone usage often leads to prolonged uninterrupted screen exposure, poor viewing habits, and reduced blinking frequency, all of which contribute to digital eye strain and ocular surface abnormalities among young adults.

Discussion

The present study was conducted to assess the impact of smartphone addiction on ocular symptoms among young adults. The findings of the study demonstrated that moderate to severe smartphone addiction was highly prevalent among participants, with a large proportion reporting multiple ocular complaints. Increased dependence on smartphones among young adults may be attributed to academic activities, social networking, entertainment, and prolonged internet usage. Similar findings were reported by Alotaibi et al.[2] who observed that excessive smartphone usage has become increasingly common among university students and is associated with adverse physical and psychological health effects. Kumar and Kumar[4] also reported high prevalence of smartphone addiction among young individuals in India, indicating that smartphone dependency has emerged as a growing public health concern.

In the present study, eye strain, headache, and dryness of eyes were the most commonly reported ocular symptoms. These findings are consistent with studies conducted by Issa et al.[5] and Logaraj et al.[9] who observed that prolonged digital screen exposure was significantly associated with symptoms such as eye strain, blurred vision, headache, burning sensation, and ocular fatigue among students and young adults. Reduced blinking during smartphone use leads to tear film instability and ocular surface dryness, thereby increasing visual discomfort. Rosenfield[6] explained that continuous accommodation and convergence stress during digital screen viewing contribute significantly to the development of computer vision syndrome and digital eye strain.

The present study also demonstrated a statistically significant association between duration of smartphone use and ocular symptoms, with higher prevalence of symptoms among participants using smartphones for more than six hours daily. Similar findings were observed by Wang et al.[3,10] in their systematic review and meta-analysis, which showed that prolonged smartphone exposure increases the risk of visual impairment and ocular discomfort in children and young adults. Moon et al.[7] reported that excessive smartphone use was significantly associated with dry eye disease due to reduced blink rate and prolonged near work activity. These studies support the present findings that increased daily screen time adversely affects ocular health.

A significant association was also observed between smartphone addiction level and ocular symptoms in the present study. Participants with severe smartphone addiction had markedly higher prevalence of ocular complaints compared to those with mild addiction. Excessive smartphone dependency often leads to prolonged uninterrupted screen exposure, poor viewing posture, inadequate rest intervals, and night-time usage, all of which increase visual stress and ocular surface disturbances. Similar observations were reported by Kumar and Kumar[4] and Issa et al.[5] who found that higher smartphone addiction scores were significantly associated with greater frequency of ocular symptoms among young smartphone users.

The increasing use of smartphones in educational and social activities has resulted in a rising burden of digital eye strain among young adults. The findings of the present study emphasize the importance of awareness regarding healthy smartphone usage practices such as limiting screen time, maintaining adequate viewing distance, frequent blinking, taking regular breaks, and reducing unnecessary smartphone exposure. Early identification of smartphone addiction and ocular symptoms may help in preventing long-term visual problems and improving ocular health among young adults.

Conclusion

The present study concludes that smartphone addiction is highly prevalent among young adults and is significantly associated with ocular symptoms. Eye strain, headache, dryness of eyes, redness, watering, and blurred vision were the most commonly observed ocular complaints among smartphone users.

A significant association was found between prolonged duration of smartphone use and occurrence of ocular symptoms. Participants using smartphones for longer durations showed higher prevalence of visual discomfort and digital eye strain symptoms. Similarly, participants with severe smartphone addiction had greater frequency of ocular complaints compared to those with mild addiction levels.

The study highlights the growing impact of excessive smartphone use on ocular health among young adults. Increasing awareness regarding responsible smartphone usage, limiting screen time, adopting healthy viewing habits, and taking regular visual breaks may help reduce ocular morbidity associated with smartphone addiction. Further

large-scale studies are recommended to evaluate long-term ocular effects of excessive smartphone exposure.

Conflict of Interest

The authors declare no conflict of interest.

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