Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i3.5054

SCREEN TIME AND ITS EFFECT ON OCULAR DRYNESS

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Abstract

Objective: The purpose of this study was to look into the relationship between dry eye symptoms and screen use.

Study design: Cross-sectional study

Place and Duration This study was conducted in Primary Health Care Doha/Qatar from September 2022 to September 2023.

Methodology: There were a total of 110 participants and age between 12 to 70 years, who had normal anterior and posterior eye segments, symptoms of dry eyes, and frequent usage of screens such as laptops and mobile phones. To verify dry eye, the tear film break-up time was evaluated using a fluorescein strip. The three categories for daily screen time were marked (> 6 hours), moderate (2-4 hours), and mild (< 2 hours). The data was analysed using SPSS version 26 at a significance threshold of $P < 0.05$.

Results: The participants mean age was 43.65 ± 15.96 years, with 73 (66.36%) females and 37 (33.64%) males. The most common symptom reported was itching in 38 (34.54%) patients. Tear film break-up time test confirmed dry eye in 64 (58.18%) participants. Among those with mild screen time (n = 32), 18 (56.25%) had dry eye; among those with moderate screen time (n = 40), 30 (75%) had dry eye; and among those with severe screen time (n = 38), 18 (47.36%) had dry eye. However, statistical analysis revealed a non-significant association between screen time and dry eye symptoms ($P = 0.156$).

Conclusion: This study found no significant relationship between increased screen time and the presence of dry eye symptoms. Nonetheless, it emphasizes the importance of taking precautions to alleviate discomfort associated with prolonged screen exposure.

Keywords: Screen exposure, Dry eye, Screen time duration, Ocular discomfort

Introduction

The advent of the digital age has ushered in an era defined by unprecedented connectivity, technological innovation, and widespread reliance on electronic devices. From smartphones and tablets to laptops and desktop computers, the proliferation of screens in everyday life has transformed how we work, communicate, and engage with information. According to recent statistics, the average individual spends a significant portion of their waking hours interacting with screens, whether for work, entertainment, or socializing [1]. While these technological advancements have undoubtedly enhanced productivity and convenience, they have also given rise to a myriad of health concerns, particularly regarding their impact on ocular health.

The incidence of dry eye syndrome, a multifactorial disorder marked by insufficient tear production or poor tear quality that results in ocular pain, irritation, and visual abnormalities, is one such issue that has drawn more attention in recent years [2]. Millions of people worldwide suffer from dry eye syndrome, which is a serious public health concern that places a heavy cost on healthcare systems [3]. The scientific community is now very interested in and divided about the connection between screen usage and symptoms of dry eyes. Several research endeavors have endeavored to examine the plausible correlation between extended periods of screen time and the emergence or intensification of dry eye syndrome [4, 5].

While some studies have reported a positive correlation between increased screen time and the prevalence of dry eye symptoms [6, 7], others have yielded conflicting results, suggesting a more complex interplay of factors [8, 9].

Understanding the mechanisms underlying screen-induced dry eye syndrome is essential for developing effective preventive strategies and interventions to mitigate its impact on ocular health. Factors such as reduced blink rate, increased exposure to blue light, and alterations in tear film dynamics have been proposed as potential contributors to the development of dry eye symptoms in individuals who spend significant time in front of screens [10, 11].

Despite the growing body of research in this field, several questions remain unanswered, necessitating further investigation into the nuanced relationship between screen time and dry eye symptoms. By elucidating the underlying mechanisms and risk factors associated with screen-induced dry eye syndrome, we can inform clinical practice, guide public health initiatives, and empower individuals to adopt healthier screen usage habits.

In light of these elements, the goal of this research is to further our understanding by examining the connection between the length of screen time and the onset of symptoms associated with dry eyes in a hospital setting..
Through comprehensive evaluation and statistical analysis, we seek to shed light on this complex relationship and provide valuable insights that can inform preventive strategies and promote ocular health in an increasingly digital world.

Methodology

This study employed a cross-sectional, observational design to investigate the association between screen time duration and the manifestation of dry eye symptoms.
A total of 110 participants were recruited for this study. The inclusion criteria comprised individuals aged 12 to 70 years, regardless of gender, who presented with symptoms suggestive of dry eye syndrome. Additionally, participants were required to have normal anterior and posterior eye segments on clinical examination. To ensure homogeneity in exposure, only individuals with a history of regular use of screen devices such as mobile phones and laptops were included in the study population.

Dry eye symptoms were assessed using a standardized questionnaire administered to all participants upon enrolment. The questionnaire included inquiries regarding ocular discomfort, irritation, redness, and visual disturbances, which are commonly associated with dry eye syndrome.

Tear film break-up time (TBUT) was utilized as a diagnostic tool to confirm the presence of dry eye syndrome in study participants. TBUT measurements were performed using a fluorescein strip, following standardized protocols. Briefly, a fluorescein strip moistened with preservative-free saline solution was applied to the inferior fornix of each participant's eye. Participants were then instructed to blink several times to ensure uniform distribution of the fluorescein dye across the ocular surface. The TBUT measurement was therefore defined as the duration between the last full blink and the emergence of the first dry spot or tear film disruption. For dry eye syndrome, a TBUT value of fewer than 10 seconds was considered significant.

Participants' daily screen time duration was assessed through self-reported measures and categorized into three groups based on duration: mild (< 2 hours), moderate (2 – 6 hours), and marked (> 6 hours). This classification allowed for the exploration of potential dose-response relationships between screen time exposure and dry eye symptoms.

Version 26 of the Statistical Package for the Social Sciences (SPSS) was used to analyse the data. To describe the study population and enumerate important factors, descriptive statistics were computed, such as mean, standard deviation, and frequency distributions. The study utilized the chi-square test to evaluate the correlation between the amount of time spent on screens and the frequency of dry eye symptoms. The statistical significance was established at $P < 0.05$.

Results

The mean age of participants enrolled in this study was 43.65 ± 15.96 years, reflecting a diverse age range within the study population. Of the 110 participants included in the analysis, the majority were female, comprising 73 (66.36%) individuals, while the remaining 37 (33.64%) participants identified as male.

The most frequently reported symptom among participants was itching, which was documented in 38 (34.54%) individuals. Other common symptoms reported included ocular discomfort, redness, and visual disturbances, although these were less prevalent compared to itching.

Tear film break-up time (TBUT) testing was conducted to confirm the presence of dry eye syndrome in study participants. Of the 110 participants assessed, TBUT testing confirmed dry eye in 64 individuals, corresponding to a prevalence rate of 58.18% within the study population.

Participants' daily screen time duration was categorized into three groups: mild (< 2 hours), moderate (2 – 6 hours), and severe (> 6 hours). Among participants with mild screen time (n = 32), 18 (56.25%) individuals were diagnosed with dry eye syndrome. In contrast, among those with moderate screen time (n = 40), a higher proportion of participants, comprising 30 (75%) individuals, exhibited symptoms consistent with dry eye syndrome. Interestingly, among participants with severe screen time (n = 38), the prevalence of dry eye syndrome was lower, with 18 (47.36%) individuals demonstrating symptoms indicative of the condition.

Statistical analysis was conducted to assess the association between screen time duration and the prevalence of dry eye symptoms. Despite observed differences in the prevalence of dry eye symptoms across varying levels of screen time exposure, statistical analysis revealed a non-significant association between screen time duration and the manifestation of dry eye symptoms ($P = 0.156$). These findings suggest that while screen time may influence the prevalence of dry eye symptoms, additional factors may contribute to the development or exacerbation of the condition.

The study's overall findings highlight the complexity of dry eye disease and its possible connection to prolonged screen use. To further understand the underlying mechanisms underlying this link and to guide targeted therapies meant to lessen the negative effects of screen usage on ocular health, more study is necessary.

Table 1: Participant Characteristics

Characteristic	Value
Mean Age (Years)	43.65 ± 15.96
Gender	
- Females	73 (66.36%)
- Males	37 (33.64%)
Most Common Symptom	Itching (34.54%)

Table 2: Dry Eye Confirmation and Screen Time Duration

Screen Time Duration	Number of Participants (n)	Number of Participants with Dry Eye	Percentage of Participants with Dry Eye
Mild (< 2 hours)	32	18	56.25%
Moderate (2 - 6 hours)	40	30	75%
Severe (> 6 hours)	38	18	47.36%

Discussion

Extended periods of maintaining a higher angle of gaze and prolonged eye opening during screen usage exacerbate tear evaporation, thereby exacerbating ocular dryness [12]. Within our investigation, dry eye syndrome was identified in 56.25% of the subjects. Comparable findings were reported by Mufti, who observed dry eye in 55.6% of patients attributed to exposure to digital screens, mirroring the results of our study [13].

Several studies conducted in Pakistan have documented varying prevalence rates of dry eye syndrome among computer users, ranging from 9.6% to 28% [14, 15, 16]. Our findings suggest that there is no significant association between screen time and the occurrence of dry eye syndrome. These results align with those of numerous other researchers. For instance, Tripathi et al. similarly found no correlation between dry eye and screen time in their study [17].

Akkaya et al. conducted a study wherein they concluded that prolonged computer use does not lead to significant changes in dry eye tests, suggesting that screen time may not be a substantial contributing factor to the development of dry eye syndrome [18]. Building upon this, Jansen et al. conducted their own investigation and similarly reported no discernible relationship between screen time duration and the manifestation of dry eye symptoms. These findings collectively suggest that the impact of screen time on ocular health, specifically with regard to dry eye, may not be as significant as previously thought [19].

Moreover, additional research endeavors have yielded consistent results, further supporting the motion that digital screen exposure may not significantly contribute to the development or exacerbation of dry eye symptoms. For instance, a separate study showed no association between reported dry eye symptoms and the amount of time spent using digital screens [20]. Similarly, Unlu et al. observed analogous results in their investigation, indicating no correlation between screen time duration and tear film break-up time, a commonly used diagnostic measure for dry eye syndrome [21]. Taken together, these studies contribute to a growing body of evidence suggesting that the relationship between screen time and dry eye symptoms may be more nuanced than previously believed. While anecdotal reports and common beliefs often suggest a strong association between prolonged screen exposure and ocular discomfort, empirical research findings such as those discussed here challenge this notion and underscore the need for further investigation into the multifactorial etiology of dry eye syndrome.

Conclusion

In conclusion, while our study did not establish a significant link between screen use and dry eyes, it underscores the importance of promoting healthy screen habits. Educating individuals on measures such as regular eye checkups, frequent blinking, adjusting screen position, limiting screen time, and following the 20-20-20 rule is essential for maintaining ocular health. By adopting these practices, individuals can minimize potential discomfort associated with screen usage and promote long-term eye health in the digital age.

Funding source
None

Conflict of interest
None

Permission
Taken from ethical committee.

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