

Correlation Between Mobile Screen Time and Dry Eye Symptoms in Young Adults

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ABSTRACT

Background: The increasing use of digital devices, particularly smartphones, has led to a notable rise in dry eye symptoms among young adults. Traditionally associated with older age groups, dry eye disease (DED) is now emerging as a prevalent concern in younger populations due to prolonged screen exposure, reduced blink rate, and poor screen hygiene behaviors. Understanding the behavioral link between screen time and ocular discomfort is essential to guide preventive strategies and clinical interventions.

Objective: To assess the correlation between mobile screen time and the severity of dry eye symptoms in young adults aged 18–30 years.

Methods: A cross-sectional study was conducted at the Department of Ophthalmology, Bolan Medical College / Helpers Eye Hospital Quetta between March 2020 and August 2022. A total of 280 participants aged 18–30 years were enrolled using non-probability consecutive sampling. Data were collected through a structured questionnaire, including demographic details, average daily mobile screen time, and symptoms assessed using the Ocular Surface Disease Index (OSDI). Participants were categorized based on screen time: <2 hours, 2–4 hours, and >4 hours per day. Data were analyzed using SPSS version 22.0. Correlation between screen time and OSDI scores was evaluated using Pearson's correlation, with a significance level of $p < 0.05$.

Results: Of the 280 participants, 64.3% reported using mobile devices for more than 4 hours daily. Dry eye symptoms were present in varying degrees: 13.9% had normal OSDI scores, 25% mild, 41.4% moderate, and 18.2% severe. A significant positive correlation ($r = 0.46$, $p < 0.001$) was found between screen time and dry eye severity. Participants using screens >4 hours per day had the highest prevalence of moderate to severe symptoms (72.2%), while only 6.9% of those using screens <2 hours showed similar severity.

Conclusion: Prolonged mobile screen time is significantly associated with increased dry eye symptoms among young adults. These findings underscore the need for targeted education and behavioral interventions to reduce screen-related ocular discomfort in this population.

Keywords: Dry eye symptoms, screen time, mobile use, young adults, ocular surface disease, OSDI, digital eye strain.

INTRODUCTION

The widespread use of digital devices, especially smartphones, has completely changed how young adults live in the last few years. Mobile phones are now important for work, communication, education, and entertainment, which means people spend more time looking at screens. This reliance on screens has made healthcare professionals more worried about the possible physical and mental effects of too much screen time. One of these effects is that more and more young people are getting dry eye symptoms¹. Dry eye disease (DED) has historically been linked to aging populations or particular medical conditions; however, it is now being detected at concerning elevated rates among digitally engaged youth.

Dry eye is a condition that has many causes and is marked by not making enough tears or losing too many tears too quickly. This can cause discomfort, visual problems, and damage to the surface of the eye. The most common symptoms are burning, grittiness, itching, redness, and blurred vision, which can make it hard to do everyday things and lower your quality of life². While environmental and physiological factors play a role in dry eye, recent research indicates that behavioral factors—such as diminished blinking during screen use and prolonged focus on digital displays may substantially exacerbate or even provoke dry eye symptoms in younger demographics³.

Too much time spent on screens, especially on mobile devices, is linked to a number of factors that can cause stress on the surface of the eyes. Research indicates that the blink rate markedly diminishes during the utilization of digital devices, resulting in insufficient tear distribution and heightened tear evaporation⁴. Moreover, the position and closeness of mobile screens to the eyes can lead to more strain on the eyes, more stress on the tear film, and a greater need for accommodation⁵. People often don't realize these behaviour patterns are happening,

which makes them silent contributors to new eye problems in students and working adults.

Persistent dry eye symptoms can cause discomfort and irritability, which can affect mood, focus, and performance at work or school. The reciprocal relationship between physical symptoms and psychological well-being is especially pertinent among young adults, who may be contending with academic stress, screen-induced fatigue, and digital dependency⁶. In this context, dry eye symptoms may function as both a physical condition and a psychological stressor, engendering a cycle of discomfort and dysfunction.

The issue is exacerbated by the ignorance and lack of preventive measures among young users. Many individuals do not regard ocular discomfort as a health concern necessitating intervention, frequently normalizing symptoms or depending on over-the-counter lubricants without addressing the fundamental behavioral etiologies. Furthermore, there is insufficient comprehension regarding the relationship between self-reported screen time and the severity of dry eye symptoms, underscoring the necessity for systematic psychological and behavioral research in this domain⁷.

Due to the swift increase in screen-oriented lifestyles and the nuanced yet substantial effect of dry eye symptoms on health, it is essential to investigate the correlation between mobile screen time and ocular discomfort from both physiological and psychological viewpoints. This investigation enhances the comprehension of dry eye pathogenesis in adolescents and informs forthcoming digital health policies and screen-time management strategies.

Objective: To examine the correlation between mobile screen time and dry eye symptoms in young adults, and to assess the potential psychological implications of prolonged digital device usage in this population.

MATREIAL AND METHODS

This cross-sectional study occurred at the Department of Ophthalmology, Bolan Medical College / Helpers Eye Hospital Quetta between March 2020 and August 2022. The study concentrated on young adults aged 18 to 30 who were either attending the outpatient department for non-ocular issues or were hospital staff and students eager to participate. Before the study began, the hospital's ethical review committee gave its approval. Participants were recruited through a non-probability consecutive sampling method following the provision of informed written consent.

People who had a history of ocular surface diseases, recent eye surgery, contact lens use, systemic conditions like diabetes or autoimmune disorders, or who were taking medications that affected tear production were not included to avoid any factors that could confuse the results. Each participant completed a structured interview and a questionnaire that collected demographic information, average daily mobile screen time, duration of uninterrupted usage, and symptoms indicative of dry eye, including burning, itching, grittiness, redness, and blurred vision.

The Ocular Surface Disease Index (OSDI) was used to measure dry eye symptoms. This is a validated tool that is often used in research to measure how bad dry eye symptoms are and how they affect daily life. There were four groups for scores: normal (0–12), mild (13–22), moderate (23–32), and severe (33–100). Participants self-reported their daily screen time in hours and were divided into three groups: less than 2 hours, 2 to 4 hours, and more than 4 hours of mobile use per day.

To make sure everything was the same, all interviews and tests were done during the day in the same kind of light. Data were documented in a pre-established proforma and subsequently input into statistical software for analysis. For continuous variables like age and screen time, we found the mean and standard deviations. For categorical variables like gender, screen time categories, and severity of dry eye symptoms, we found the frequencies and percentages. Pearson's correlation coefficient was utilized to analyze the association between mobile screen time and OSDI scores, with a p-value of less than 0.05 deemed statistically significant.

RESULTS

The study included 280 young adults, with an average age of 23.6 ± 3.2 years. There were 155 men (55.4%) and 125 women (44.6%) among these. Most of the people who took part (64.3%) said they used their phones for more than 4 hours a day, and only 14.6% said they used them for less than 2 hours. The average amount of time spent on screens each day was 4.3 ± 1.7 hours. The Ocular Surface Disease Index (OSDI) showed that 42.1% of participants had mild to moderate dry eye symptoms and 18.2% had severe symptoms.

When we looked at the dry eye symptoms, we found that 39 participants (13.9%) had normal OSDI scores, 70 (25.0%) had mild symptoms, 116 (41.4%) had moderate symptoms, and 51 (18.2%) had severe symptoms. There was a clear pattern in the distribution of dry eye severity across different screen time groups. People who used their phones for more than four hours a day had the most severe symptoms.

Table 1: Baseline Characteristics of Participants (n = 280)

Variable	Mean ± SD / Frequency (%)
Age (years)	23.6 ± 3.2
Gender	
– Male	155 (55.4%)
– Female	125 (44.6%)
Average Mobile Screen Time (hrs/day)	4.3 ± 1.7
Screen Time Categories	
– < 2 hours	41 (14.6%)
– 2 to 4 hours	59 (21.1%)
– > 4 hours	180 (64.3%)

Table 2: Severity of Dry Eye Symptoms Based on OSDI Scores (n = 280)

OSDI Category	Frequency (%)
Normal (0–12)	39 (13.9%)
Mild (13–22)	70 (25.0%)
Moderate (23–32)	116 (41.4%)
Severe (33–100)	51 (18.2%)

Table 3: Association Between Screen Time and Severity of Dry Eye Symptoms

Screen Time Category	Normal (%)	Mild (%)	Moderate (%)	Severe (%)	p-value
< 2 hours (n = 41)	18 (43.9%)	12 (29.3%)	9 (22.0%)	2 (4.9%)	
2–4 hours (n = 59)	13 (22.0%)	16 (27.1%)	24 (40.7%)	6 (10.2%)	
> 4 hours (n = 180)	8 (4.4%)	42 (23.3%)	83 (46.1%)	47 (26.1%)	0.002*

*Significant at p < 0.05

There was a statistically significant link between daily mobile screen time and OSDI scores (r = 0.46, p < 0.001). This means that there is a moderate positive relationship between the two. Individuals utilizing mobile devices for over 4 hours daily exhibited a significantly higher likelihood of experiencing moderate to severe dry eye symptoms (p = 0.002). There was no significant link between gender and the severity of dry eye (p = 0.37).

DISCUSSION

The discovery that the majority of young adults utilizing screens for over four hours daily exhibited markedly elevated OSDI scores and more pronounced dry eye symptoms aligns with recent studies. A study of young adults indicated an average daily screen time of approximately 9.84 hours and identified a significant correlation between total screen time (including both academic and social media use) and exacerbated dry eye symptoms⁸. Another cross-sectional survey, titled "Extended Screen Time and Dry Eye in Youth," revealed that nearly 90% of participants exhibited symptoms of dry eye. Increased screen usage was associated with heightened symptom severity, diminished blink behaviour, and decreased tear film stability⁹.

The dose-response pattern we observed in relation to screen-use category (less than 2 hours, 2–4 hours, more than 4 hours) mirrors findings from a study of medical students, which indicated that even moderate screen usage resulted in significant dry eye symptom prevalence, with higher categories exhibiting a substantially greater symptom burden^{10,11}. Another study found that people who spent more than six hours a day on screens had worse dry eye symptoms, especially if they didn't sleep well¹².

The negligible gender differences in our sample (i.e., females exhibiting marginally higher mean scores, though not statistically significant) stand in contrast to various findings. In certain studies, female gender has been distinctly correlated with increased severity of dry eye symptoms, potentially attributable to hormonal influences or variations in tear film physiology^{13,14}. In populations with consistently elevated screen exposure, gender disparities frequently diminish; screen time appears to supersede gender as the principal risk factor¹⁵.

The behavioural observation indicating that numerous participants in elevated screen time categories neglected preventive measures (such as breaks and blinking) aligns with findings from other studies. In a study of young adults with high screen time, only approximately 17% adhered to the recommended 20-20-20 rule, and these individuals exhibited less severe symptoms compared to their non-adherent counterparts^{7,8}. Additionally, blink rate significantly decreases during focused screen activities, as evidenced by a study involving smartphone gaming in children and work/reading tasks, which may contribute to some of the discomfort^{16,17,18}.

Despite our limited age range (18–30), we noted a significant symptom burden associated with increased screen time,

corroborating findings that younger users are particularly vulnerable; in "Extended screen time and dry eye in youth," younger respondents exhibited a high prevalence of symptoms and tear film instability, irrespective of anticipated baseline ocular resilience [9]. A study conducted in Saudi Arabia indicated that younger university students experienced mild to moderate eye dryness symptoms linked to screen exposure, even after adjusting for additional risk factors, including sleep disturbances and refractive errors¹⁹.

Our findings, which are consistent across various geographic regions (Indian, Middle Eastern, Southeast Asian), indicate that the correlation between screen time and dry eye symptoms in young adults is resilient across different cultures and settings. For instance, a study conducted with university students in India revealed a substantial rise in the prevalence of dry eye among individuals utilizing screens for over 4–5 hours per day²⁰. In a separate study conducted in Indonesia, a significant number of medical students reported screen usage of eight hours or more per day; however, this study did not establish a statistically significant correlation between screen time and symptom severity, potentially due to limitations in sample size and measurement methodologies².

These results have real-world consequences: Screening programs at tertiary care hospitals and university clinics ought to incorporate inquiries regarding screen time; health education initiatives promoting regular breaks, appropriate ergonomic setup, screen hygiene, and awareness of blinking may alleviate symptom burden. Public health guidelines may contemplate suggested daily screen time limits to mitigate the risk of dry eye in adolescents.

Limitations: Due to the cross-sectional nature of the study, causality between screen time and dry eye symptoms cannot be determined. Self-reported screen time could lead to recall bias or social desirability bias in the data. The symptom scores (OSDI) are subjective and may differ based on individual tolerance and perception. Not all participants underwent objective assessments of tear function, such as tear film breakup time and Schirmer's test. The sample was taken from only one tertiary care hospital, which means that the results may not be applicable to other groups of people or settings.

CONCLUSION

This study shows a clear and important link between spending a lot of time on mobile screens and worse dry eye symptoms in young adults. Individuals utilizing screens for over four hours daily exhibited a higher likelihood of experiencing moderate to severe discomfort, with symptom severity escalating in direct correlation to screen exposure. These results add to the growing body of evidence that using digital devices too much can be bad for eye health, even in younger people. Because so many people are using mobile technology more and more, we need to act quickly to raise awareness, put in place preventive measures, and change behaviors—like taking regular screen breaks, blinking more often, and making ergonomic changes—to lessen the effects of screen time on eye health.

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