

ORIGINAL RESEARCH

Digital Strain: Linking Screen Habits to Dry Eye in Medical Graduates

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ABSTRACT

Purpose: To investigate the association between digital screen usage habits and the prevalence of Dry Eye Disease (DED) among medical students, focusing on screen time, brightness settings, and viewing distance as potential risk factors. **Methods:** A cross-sectional study was conducted involving 800 medical students stratified by academic year and gender. Participants completed a detailed questionnaire assessing screen characteristics and usage patterns, followed by clinical evaluations for DED, including Tear Breakup Time (TBUT), Schirmer's Test, Tear Meniscus Height (TMH), and Ocular Surface Staining. Logistic regression analysis was utilized to determine associations between screen habits and DED incidence, adjusting for confounders. **Results:** The prevalence of DED among participants was 35%. High screen brightness settings correlated with increased DED prevalence (45%) compared to medium (25%) and low (20%) settings ($p < 0.05$). Each additional hour of academic screen time was associated with a 20% increase in the odds of experiencing DED (OR = 1.2; 95% CI: 1.0-1.4; $p < 0.05$). Viewing distances less than 30 cm resulted in a 30% greater risk of DED (OR = 1.3; 95% CI: 1.1-1.5; $p < 0.05$). **Conclusion:** Prolonged screen time, higher brightness settings, and closer viewing distances are significant risk factors for DED among medical students. Implementing preventive strategies, such as regulating screen brightness, limiting continuous screen exposure, and maintaining appropriate viewing distances, could mitigate the risk of DED in this population.

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INTRODUCTION

The surge in digital screen usage has raised concerns about its impact on ocular health, particularly among academic populations. Dry Eye Disease (DED) is a prevalent condition characterized by tear film instability and ocular surface inflammation, leading to discomfort and visual disturbances. This study aims to explore the association between digital screen characteristics, usage habits, and the incidence of DED among medical students, identifying modifiable risk factors to inform preventive strategies.

METHODOLOGY**1. Study Design and Population:**

- A cross-sectional analysis was conducted on 800 medical students at RIO, GMCH.

2. Stratification and Sampling:

- Participants were stratified by academic year and gender into eight distinct groups, with 100 randomly selected from each stratum to ensure diverse representation.

3. Data Collection and Clinical Assessment:**• Questionnaire:**

- Screen Characteristics: Screen size, resolution, brightness settings (low, medium, high).
- Usage Patterns: Academic and leisure screen time (hours/day), viewing distance (cm).

• Clinical Assessments for DED:

- Tear Breakup Time (TBUT)
- Schirmer's Test
- Tear Meniscus Height (TMH)
- Ocular Surface Staining



4. Statistical Analysis

- Logistic regression was employed to assess the relationship between screen habits and DED incidence, adjusting for potential confounders.

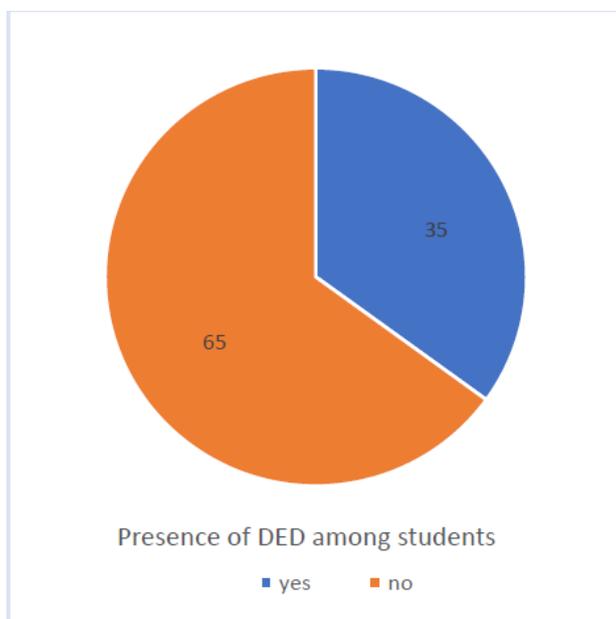
5. Ethical Considerations:

- Ethical clearance was obtained, and informed consent was secured from all participants.

RESULTS

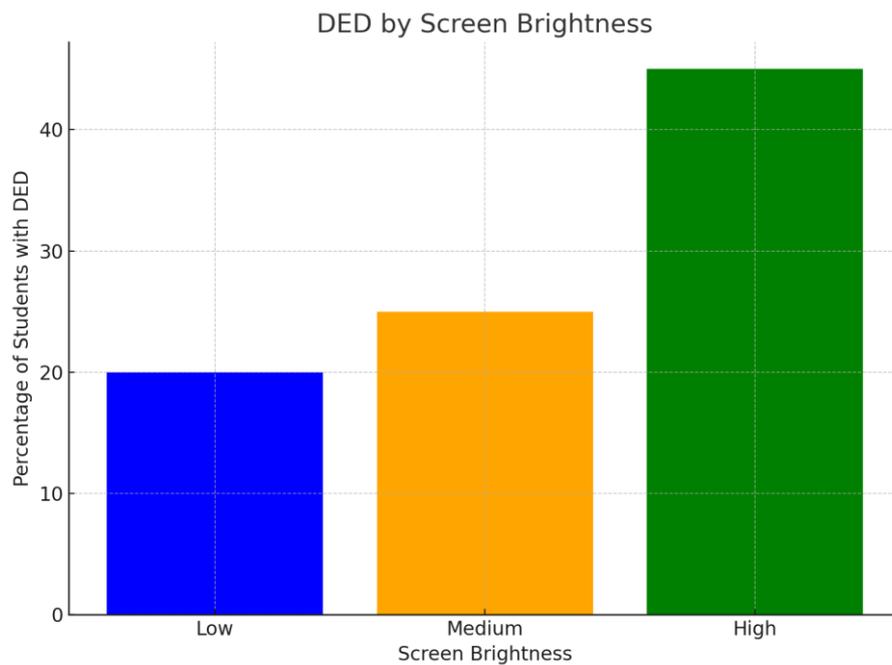
• Prevalence of DED

- 35% of participants were diagnosed with DED.



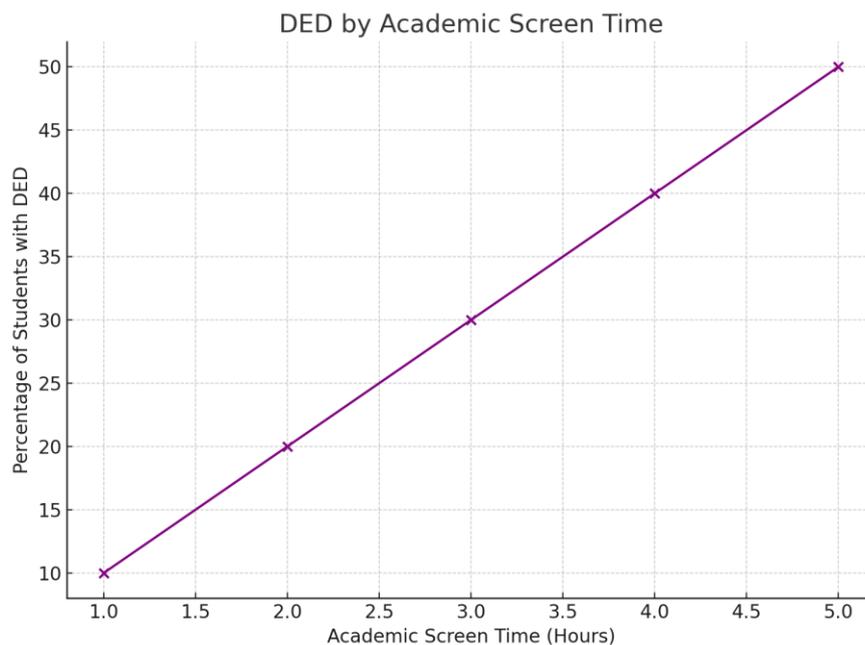
• Impact of Screen Brightness:

- High brightness settings were associated with a higher prevalence of DED (45%) compared to medium (25%) and low (20%) settings ($p < 0.05$).



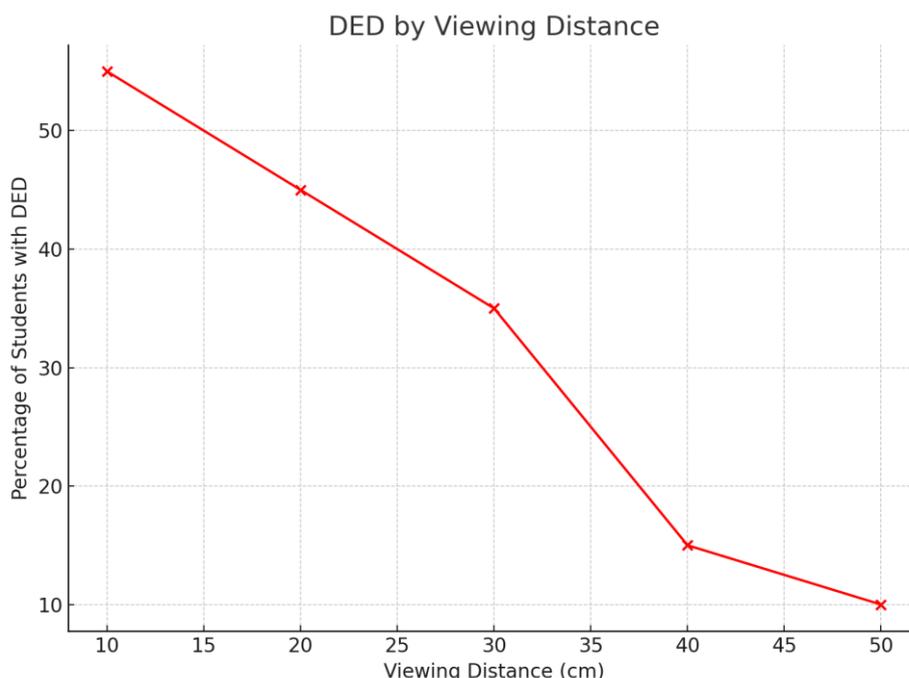
- **Academic Screen Time:**

- Each additional hour of screen time increased the odds of DED by 20% (OR = 1.2; 95% CI: 1.0-1.4; $p < 0.05$).



- **Viewing Distance:**

- Viewing distances less than 30 cm were linked to a 30% greater risk of DED (OR = 1.3; 95% CI: 1.1-1.5; $p < 0.05$).



DISCUSSION

The 35% prevalence of DED in this study is lower than reported in similar studies, which may be attributed to differences in sample characteristics, methodologies, and environmental conditions. Higher

awareness and adherence to eye care practices among participants could also contribute to the reduced prevalence. Comparative analysis with other studies is presented in Table 1.

Table 1: Comparative Analysis of DED Prevalence in Similar Studies

Study	Sample Size	Sample Occupation	Prevalence of DED	Main Findings
Our Study	100	Medical Students	35%	Association between screen brightness, prolonged screen time, and closer viewing distance with increased DED.
Utlu et al., 2023	255	Medical Students	63%	Direct correlation between increased screen time and higher DES scores; impact of screen distance.
Abu-Ismaïl et al., 2023	1223	Medical Students	74%	Significant symptomatic DED linked to screen use, poor sleep quality, and minimal impact from caffeine.
Ezinne et al., 2023	400	University Students	84%	High symptomatic DED associated with over 4 hours of screen use, reading mode on computers, and lack of dry eye education.

CONCLUSION

Prolonged screen time, high brightness settings, and close viewing distances are significant risk factors for DED among medical students. Implementing preventive measures, such as adjusting screen brightness, limiting continuous screen exposure, and maintaining appropriate viewing distances, can help

reduce the risk of DED in this population. Future research should include larger, more diverse populations and consider longitudinal designs to better understand DED progression and the effectiveness of educational interventions on screen-related habits.