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Original Research

A Comparative Study of Dry Eye Disease Among Computer Users and Non-Computer Users Attending a Tertiary Care Hospital

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Abstract
Background: Dry Eye Disease (DED) is a multifactorial disorder of the ocular surface characterized by tear film instability, ocular discomfort, and visual disturbance. Increasing digital screen exposure has emerged as an important risk factor for DED, particularly among computer users. Studies have reported a significantly higher prevalence of dry eye symptoms among visual display terminal users compared to the general population. (PubMed) *Aim:* To compare the prevalence and severity of Dry Eye Disease among computer users and non-computer users attending a tertiary care hospital. *Materials and Methods:* A hospital-based comparative cross-sectional study was conducted among 200 participants (100 computer users and 100 non-computer users) attending the Ophthalmology Outpatient Department of a tertiary care hospital. Dry eye assessment was performed using Ocular Surface Disease Index (OSDI), Schirmer's Test-I, and Tear Film Break-Up Time (TBUT). Statistical analysis was carried out using Chi-square test and independent t-test. A p-value <0.05 was considered statistically significant. *Results:* The prevalence of DED was significantly higher among computer users (58%) compared to non-computer users (24%) ($p<0.001$). Mean TBUT was significantly lower among computer users (8.9±2.4 seconds) compared to non-computer users (12.6±2.8 seconds). Mean Schirmer's Test values were also lower among computer users (10.8±3.5 mm) than non-computer users (15.2±4.1 mm). Longer daily screen exposure showed a significant association with DED severity. *Conclusion:* Computer users exhibited significantly higher prevalence and severity of Dry Eye Disease than non-computer users. Regular screening, ergonomic modifications, and preventive measures may reduce the burden of DED among computer users.

Keywords: *Dry Eye Disease, Computer Vision Syndrome, TBUT, Schirmer Test, OSDI, Computer Users.*

Introduction

Dry Eye Disease (DED) is one of the most common ocular surface disorders affecting millions of individuals worldwide. It is characterized by loss of tear film homeostasis accompanied by ocular symptoms such as dryness, burning sensation, foreign body sensation, redness, and fluctuating vision. The Tear Film and Ocular Surface Society (TFOS DEWS II) defines DED as a multifactorial disease involving tear film instability, hyperosmolarity, inflammation, and neurosensory abnormalities. The rapid expansion of digital technology has dramatically increased the duration of computer and smartphone use. Prolonged visual display terminal exposure leads to reduced blink rate, incomplete blinking, increased tear evaporation, and ocular surface stress, predisposing individuals to dry eye symptoms. Multiple studies have demonstrated a higher prevalence of DED among computer users and office workers exposed to prolonged screen time. (PubMed)

Computer Vision Syndrome has become a growing public health concern, particularly among young adults and professionals. Despite increasing awareness, comparative data between computer users and non-computer users in tertiary care settings remain limited.
Therefore, the present study was undertaken to compare the prevalence and severity of Dry Eye Disease among computer users and non-computer users attending a tertiary care hospital.

Objectives

1. To determine the prevalence of Dry Eye Disease among computer users.
2. To determine the prevalence of Dry Eye Disease among non-computer users.
3. To compare tear film parameters between both groups.
4. To assess the relationship between screen exposure duration and Dry Eye Disease severity.

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Materials and Methods

Study Design
Hospital-based comparative cross-sectional study.

Study Setting
Department of Ophthalmology, Tertiary Care Teaching Hospital.

Study Duration
12 months.

Sample Size
200 participants.
- Group A: 100 computer users (≥4 hours/day computer use for at least 1 year)
- Group B: 100 non-computer users (<1 hour/day screen exposure)

Inclusion Criteria
- Age 18-60 years.
- Willing to participate.
- Computer users with regular screen exposure.

Exclusion Criteria
- Contact lens users.
- Ocular surgery within previous 6 months.
- Autoimmune disorders.
- Current ocular infections.
- Use of topical ocular medications.

Data Collection
Detailed history was recorded regarding:
- Age
- Gender
- Occupation
- Duration of computer use
- Ocular symptoms

Dry Eye Assessment
OSDI Questionnaire
Severity classification:
- Normal: 0-12
- Mild: 13-22
- Moderate: 23-32
- Severe: ≥33

Schirmer's Test-I
- Normal: >10 mm
- Dry Eye: ≤10 mm

Tear Film Break-Up Time (TBUT)
- Normal: >10 seconds
- Abnormal: <10 seconds

Statistical Analysis
Data were analyzed using SPSS version 26.0.
- Chi-square test
- Independent t-test
- $p<0.05$ considered significant.

Results

Table 1: Age Distribution

Age Group (Years)	Computer Users	Non-Computer Users
18-30	35	22
31-40	30	26
41-50	22	28
51-60	13	24

Mean age: 36.8 ± 9.5 years.

Table 2: Gender Distribution

Gender	Computer Users	Non-Computer Users
Male	58	54
Female	42	46

Table 3: Prevalence of Dry Eye Disease

Group	Dry Eye Present	Dry Eye Absent
Computer Users	58 (58%)	42 (42%)
Non-Computer Users	24 (24%)	76 (76%)

Chi-square = 24.76, p <0.001

Table 4: Mean Tear Film Parameters

Parameter	Computer Users	Non-Computer Users	p-value
TBUT (sec)	8.9 ± 2.4	12.6 ± 2.8	<0.001
Schirmer (mm)	10.8 ± 3.5	15.2 ± 4.1	<0.001

Table 5: Severity of Dry Eye According to OSDI

Severity	Computer Users	Non-Computer Users
Mild	18	12
Moderate	24	8
Severe	16	4

Discussion

The present study demonstrated a significantly higher prevalence of Dry Eye Disease among computer users (58%) compared to non-computer users (24%). Similar findings were reported by Sharma et al., who found a prevalence of 58.51% among visual display terminal users. (PubMed). Our findings are also consistent with Chaitra et al., who observed a prevalence of approximately 51% among computer operators and reported a positive association between duration of computer use and dry eye symptoms. (PMC). Reduced blink frequency during prolonged screen viewing increases tear evaporation and destabilizes the tear film, resulting in lower TBUT values. In the present study, computer users showed significantly reduced TBUT and Schirmer values compared to non-computer users.

Several recent studies have identified prolonged screen exposure, air-conditioned environments, and occupational visual demands as major contributors to DED severity. (ijprt.org). The findings highlight the growing burden of digital eye strain and emphasize the need for preventive ophthalmic interventions among computer users.

Conclusion

Dry Eye Disease was significantly more prevalent among computer users than non-computer users. Reduced tear film stability and decreased tear production were observed among computer users. Longer duration of screen exposure was associated with increased disease severity.

Early diagnosis, awareness programs, regular ophthalmic evaluation, ergonomic practices, and adoption of the 20-20-20 rule can help reduce the burden of Dry Eye Disease among computer users.

Limitations

1. Single-center study.
2. Cross-sectional design.
3. Limited sample size.
4. Long-term follow-up was not performed.

Recommendations

- Routine screening of computer users for Dry Eye Disease.
- Workplace ergonomic modifications.
- Regular blinking exercises.
- Use of lubricating eye drops when indicated.
- Public awareness regarding digital eye strain.

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