PREVALENCE AND MANAGEMENT OF DRY EYE SYNDROME AMONG YOUNG ADULTS IN URBAN ENVIRONMENTS

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Abstract. *Objective: This study aims to investigate the prevalence, contributing factors, and management approaches of Dry Eye Syndrome (DES) among young adults residing in urban settings.*

Methods*: A cross-sectional observational study was conducted among 450 individuals aged 18–35 years, living in Samarkand. Participants completed a standardized questionnaire followed by ophthalmologic evaluation including the Schirmer's test, tear break-up time (TBUT), and fluorescein staining.*

Results*: The prevalence of DES among participants was 32.4%. Key contributing factors included prolonged screen time, air pollution, and reduced blink rate. The majority of affected individuals responded well to artificial tear substitutes, lifestyle modification, and environmental adjustments.*

Conclusion*: DES is increasingly prevalent among young urban populations. Early diagnosis and a combination of medical and behavioral management can significantly improve patient outcomes.*

Keywords*: Dry Eye Syndrome, Urban Health, Young Adults, Ophthalmology, Tear Film, Screen Time, Environmental Factors.*

Introduction

Dry Eye Syndrome (DES), also known as keratoconjunctivitis sicca, is a multifactorial disease of the ocular surface characterized by a loss of homeostasis of the tear film. It presents with symptoms such as irritation, redness, blurred vision, and a sensation of dryness or foreign body in the eye. While traditionally associated with older adults, there is growing concern regarding the rise of DES among young adults, especially those residing in urban settings.

The global digitalization of work and education, especially accelerated by the COVID-19 pandemic, has significantly increased the time individuals spend on digital screens. The

ocular surface is directly affected by these behaviors, leading to decreased blink rate and increased evaporation of tears. Coupled with environmental pollution, air-conditioned environments, and dietary changes, the prevalence of DES in the younger population is a growing public health concern.

This study aims to explore the prevalence of DES among young adults in the urban environment of Samarkand, analyze contributing factors, and evaluate the effectiveness of different management strategies.

Materials and Methods

Study Design and Participants:

This was a cross-sectional observational study conducted from January to December 2024 at the Department of Ophthalmology, Samarkand State Medical University. The study population consisted of 450 young adults aged 18–35 years residing in urban areas of Samarkand.

Inclusion Criteria:

- Age between 18 and 35 years
- Residence in urban areas for at least the past 5 years
- Use of digital screens for a minimum of 4 hours daily
- Consent to participate in the study

Exclusion Criteria:

- History of ocular surgery
- Presence of systemic autoimmune diseases
- Use of medications affecting tear production (e.g., antihistamines, antidepressants)

Ethical Considerations:

Ethical clearance was obtained from the institutional review board. Informed consent was obtained from all participants prior to inclusion.

Data Collection:

Data collection was conducted in two stages:

1. Questionnaire-based Evaluation: Participants completed the Ocular Surface Disease Index (OSDI) and provided demographic and behavioral data, including screen time, outdoor activity, and environmental exposures.

2. Ophthalmologic Examination: This included:

- Slit-lamp biomicroscopy
- Schirmer’s Test (without anesthesia)

- Tear Break-Up Time (TBUT)
- Fluorescein staining to assess corneal epithelial integrity

Statistical Analysis:

Data were analyzed using SPSS version 26.0. Prevalence was calculated as a proportion. Logistic regression analysis was performed to identify independent risk factors for DES.

Results

Demographic Characteristics:

Of the 450 participants, 260 (57.8%) were female and 190 (42.2%) were male. The mean age was 24.6 years (SD ±4.2). All participants reported using digital devices for work or study.

Prevalence of DES:

Based on combined clinical signs (Schirmer's ≤10 mm, TBUT <10 seconds) and symptoms (OSDI score >13), 146 participants were diagnosed with DES, resulting in a prevalence rate of 32.4%.

Risk Factors:

Statistical analysis revealed the following significant risk factors ($p < 0.05$):

- Screen time > 6 hours/day (OR: 2.34; 95% CI: 1.56–3.51)
- Exposure to air-conditioned environments (OR: 1.89; 95% CI: 1.22–2.89)
- Low water intake (<1.5 L/day) (OR: 1.75; 95% CI: 1.11–2.77)
- Use of contact lenses (OR: 2.48; 95% CI: 1.49–4.12)

Symptomatology:

Common symptoms reported among DES patients included:

- Burning sensation (82.1%)
- Redness (76.7%)
- Blurred vision (65.0%)
- Foreign body sensation (60.2%)
- Photophobia (42.5%)

Management and Outcomes:

Patients were divided into three groups for treatment based on severity:

1. Mild DES (n=62): Prescribed artificial tears (carboxymethylcellulose) 3 times/day
2. Moderate DES (n=56): Artificial tears + lifestyle modification (screen breaks, increased water intake, blink exercises)
3. Severe DES (n=28): Combined therapy including topical cyclosporine A, lid hygiene, omega-3 fatty acid supplementation

Follow-up at 8 weeks showed significant improvement in OSDI scores in all groups (mean reduction of 18 points, $p < 0.001$).

Discussion

The high prevalence of DES among young adults in this study aligns with recent global trends indicating that DES is no longer confined to older populations. Prolonged screen exposure reduces blink rate and causes evaporative tear loss, exacerbated by dry indoor environments and insufficient hydration.

Our findings support previous studies suggesting digital device use and air-conditioned settings as leading contributors to DES in urban populations. Additionally, modifiable factors such as water intake and lifestyle habits play a crucial role in disease severity.

Interestingly, females had a slightly higher incidence of DES, although the difference was not statistically significant ($p = 0.08$). This observation might be due to hormonal variations, cosmetic use, or behavioral differences, warranting further investigation.

Management of DES through a tiered approach was effective. Artificial tears alone were sufficient for mild cases, but moderate to severe DES required a multimodal approach. The inclusion of dietary and behavioral changes significantly enhanced patient outcomes, consistent with recommendations by the TFOS DEWS II report.

Conclusion

Dry Eye Syndrome is a prevalent and impactful condition among young adults in urban settings. With digital screens becoming an unavoidable part of daily life, it is crucial to raise awareness about DES, its risk factors, and effective management strategies.

Early detection through routine screening in ophthalmology clinics, particularly in academic institutions, can help reduce the long-term impact of DES on visual function and quality of life. Future studies should explore preventive measures and public health initiatives to combat the rising incidence of DES among younger populations.

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