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# PREVALENCE OF DRY EYE DISEASE AND ITS RISK FACTORS IN VISUAL DISPLAY TERMINAL USERS AMONG PATIENTS COMING TO OPD OF KATIHAR MEDICAL COLLEGE HOSPITAL: A PROSPECTIVE OBSERVATIONAL STUDY.

Ophthalmology

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KEYWORDS

## INTRODUCTION:

Dry eye disease (DED) is a chronic ocular pathology and a major global health problem that manifests as a plethora of symptoms such as burning, photophobia, tearing, and grittiness. Patients with DED experience difficulties in daily routine activities thus compromising their quality of life.[1]

The prevalence of DED is greatly influenced by geographic location, climatic conditions, and lifestyle of the people and ranges from 5% to 35%.[6],[7],[8] However, different definitions of dry eye are employed in various epidemiological studies which may not be standardized, and limited data exist on the potential effect of race or ethnicity on dry eye prevalence.

## MATERIAL & METHOD:

A cross-section hospital-based, observational study was conducted at an apex tertiary care ophthalmic institution. Patients presenting to the outdoor patient department over a period of 1 year (01 July 2019 30 June 2020) were evaluated. Ethical clearance was obtained from the Institutional Ethical Committee. Informed consent was obtained from the patients.

All consenting patients above 10 years of age were included in the study and divided into four groups based on age: ≤20 years, 21–40 years, and >40 years. Patients younger than 10 years or not providing consent were excluded from the study.

The primary objective of the study was to analyze the prevalence of symptomatic DED based on the OSDI questionnaire and to analyze the associated risk factors. The secondary objective was to assess the tear film stability and secretion in patients with symptoms of DED.

Comprehensive history was obtained from all the patients with emphasis on history pertaining to dry eye. In addition, history of visual display terminals (VDT) usage including television, smartphones, tablets, laptops, etc., was also elicited and analyzed.

OSDI questionnaire was administered to all patients. The questionnaire was administered by a single examiner. To those who were nonconversant in English, the questions were explained to the patients in their local language. The OSDI questionnaire has 12 items, with each question given a score ranging from 0 (none of the time) to 4 (all of the time). The patients had to assign a score based on the duration of symptoms experienced over the preceding week. The final score was calculated by multiplying the sum of all the scores by 25 and then dividing the total by the number of questions answered. Scores range from 0 to 100 with 0–12 representing normal, 13–22 representing mild DED, 23–32 representing moderate DED, and ≥33 representing severe DED.[5],[14]

The objective tests were undertaken only in patients with DED (based on the OSDI questionnaire) who gave consent for further investigations. These patients underwent tear film break up time (TBUT) and Schirmer test. The tests were carried out in the same room by a single examiner, with similar temperature and humidity conditions for all patients.

## STATISTICALANALYSIS:

The data were analyzed using Stata 14.0 (StataCorp LP, College Station, TX, USA). Chi-square test/Fischer Exact test were used to establish the association between categorical data. Bivariate logistic regression analysis was used to calculate the odds ratio (OR). Multivariate analysis was performed to identify independent risk factors. $P < 0.05$ was considered statistically significant.

## RESULT:

A total of 1264 patients were administered the OSDI questionnair. Their demographic profile is elaborated in significant DED was detected in 18.04% (228) patients. Of these, 11.84% (27) had mild DED, 62.28% (142) had moderate DED, and 25.76% (59) had severe DED. The mean OSDI scores were 20.59 ± 1.14 in cases with mild DED, 28.60 ± 2.68 in cases with moderate DED and 42.32 ± 7.82 in cases with severe DED. The prevalence of DED was more in males (69.3% males, 30.7% females) and in patients between 23 and 44 years of age (68.1%). Majority of patients belonged to the urban areas (60.02%) as compared to a rural background (39.98%). Patients involved in desk jobs with computer use were more predisposed to develop DED.

A bivariate analysis of the risk factors associated with the development of severe DED as well as a multivariate analysis of risk factors associated with DED was undertaken. Significant odds of having severe DED were associated with age, occupation, VDT use, cigarette smoking, and contact lens use.

There was no significant difference in the severity of the disease between males and females ($P = 0.16$). Occupation involving desk job with regular computer usage was associated with the development of dry eye, with 79.47% of computer users having severe DED. Hours of video display terminal (including computers, television, and mobile phone screens) usage significantly correlated with DED ($P< 0.001$), and 87.76 % patients with 4 h or more of VDT use had severe dry eye.

Cigarette smoking ($P< 0.001$, OR 1.5; 92% CI 1.12–1.14) and contact lens usage ($P< 0.001$, OR 6.4; 95% CI 3.29–11.58) were identified as significant risk factors for severe DED.

There was no significant association between severe DED and the presence of systemic disease, systemic or ocular allergy, previous ocular surgery, alcohol intake or any systemic, or topical medications including steroid use.

Objective tests were undertaken in 382 patients (764 eyes) with DED. Of these, 19.89% (76) had nonsevere DED (mild and moderate), and the remaining 80.1% (306) had severe DED. The mean Schirmer's test values were 23.0 ± 7.1 mm in cases with mild DED, 19.1 ± 5.9 mm in cases with moderate DED, and 15.2 ± 6.9 mm in cases with severe DED. The mean TBUT was 11.1 ± 1.4 s in cases with mild DED, 7.3 ± 1.8 s in cases with moderate DED and 5.2 ± 1.9 s in cases with severe DED. A Schirmer's test value of <5.3 mm (indicative of severe DED) was observed in only 4.9% cases . TBUT of <10 s (indicative of tear film instability) was observed in 95.8% cases.

## DISCUSSION

DED is one of the most prevalent ophthalmic disorders and may have an adverse impact on the quality of life. In addition to causing various disabling symptoms, it may also compromise the results of the corneal, cataract, and refractive surgical procedures.

Several objective tests have been developed to diagnose and grade the severity of DED. However, these tests show poor repeatability, significant interobserver variability and correlate poorly with the patient symptoms as well as the quality of life.[2],[3],[4] Different patient-reported outcome (PRO) questionnaires have been developed to assess the quality of life in patients with DED, which act as a useful tool to aid in the screening, monitoring, and management of DED.[5],[17] Two validated, reliable dry eye questionnaires are currently available that are in accordance with the FDA PRO guidelines: OSDI and the impact of dry eye on everyday life questionnaire.[5],[17],[18],[19],[20] In our study, we used the OSDI questionnaire as the basic tool for screening the patients. Its shorter completion time, easy comprehension by patients, and no additional cost make it ideal for clinical use in the outpatient department.[5],[20]

The prevalence of dry eye in our study based on OSDI questionnaire is 18.04%. The prevalence of DED in India is higher than the global prevalence and ranges from 18.4% to 54.3%.[9],[13] The vast disparity in the prevalence of DED may be attributed to endemic geographic variations as well as the use of different diagnostic criteria by various studies.

In our study, the majority of patients with DED were in the age group of 21–40 years.

Females are affected more commonly than males in a majority of studies.[6],[7],[8],[9],[10],[11],[12],[13] We observed a significantly higher occurrence of DED in males. Since ours was a hospital-based study, this trend could be attributed to the lack of treatment-seeking behavior among females in the developing countries.

Desk job with computer use was significantly associated with the risk of developing severe DED. The low-relative humidity in indoor office environment and air-conditioned rooms negatively impacts the tear film by causing desiccation of the eye. We observed a strong association between VDT usage and severe DED. Computer use for more than 8 h a day has been reported as a significant risk factor for DED, mainly attributed to the decrease in blink rate while using these devices, thereby hampering the uniform distribution of the tear film over the ocular surface.[22] Since the main route of tear elimination is through evaporation, longer periods of eye opening and the higher gaze angle when viewing a computer screen results in faster tear loss which further worsens the dry eye.

We observed a significant association of DED with contact lens usage as well as smoking. Contact lens usage may cause dry eye or aggravate preexisting DED.[23],[24] Nearly 50% of contact lens users may complain of symptoms of dryness, discomfort, grittiness, irritation, burning, or foreign body sensation.[23],[24] Smoking may affect the tear film stability as well as ocular surface sensitivity, and a significant association has been reported between smoking and DED.[25]

We did not observe any association with systemic comorbidities, allergies, previous ocular surgery, alcohol or medication use, either systemic or topical.

The inherent bias associated with hospital-based studies is a limitation of our study. Rural population staying in far-flung areas with limited access to healthcare, females and elderly are less likely to visit the hospital due to sociocultural environment prevalent in developing nations. Moreover, the patients had come for specific reasons mostly not pertaining to DED, and these patients were usually not willing to undergo further examination.

## CONCLUSION

We observed the prevalence of DED among the patients coming to our OPD to be 18.04%, with the age group of 23–44 years affected most commonly. VDT use, smoking, and contact lens use were associated with increased odds of developing DED.

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