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Assessment of Dry Eye Disease in Patients Attending Eye OPD in Nepalgunj Medical College

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ABSTRACT

Introduction: Dry Eye Disease is a complex multifactorial ocular surface disorder characterized by an unstable tear film and intraocular discomfort. Its estimated incidence is 5% to 50%, ranking amongst the top reasons for outpatient consultation in ophthalmology.

Objectives: This study was done to identify the contributory risk factors, variations in genders, occurrence in different age groups and occurrence of the disease.

Methodology: A prospective, descriptive observational study was conducted at the Ophthalmology Department of Nepalgunj Medical College and Teaching Hospital, Kohalpur. A total of 200 consecutive patients presenting with dry eye symptoms were enrolled. Tear meniscus height, tear film break-up time and Schirmer's test were carried out in all the participants. The data and findings thus collected were recorded on a pre-form proforma and data was analysed using excel and SPSS version 27.

Results: Dry eye disease was more prevalent among females, with a female-to-male ratio of 2.1:1; 60.2% of affected women were premenopausal. Out of 200 patients included in the study, the highest incidence was seen in the 31–40 age group (32.5%). Among modifiable risk factors, 59% of patients were urban dwellers, 34% had regular exposure to computers or air-conditioned environments. Clinically, burning sensation (60%) was the most commonly reported symptom, followed by redness (41%) and excessive tearing (40%). Non-modifiable risk factors included systemic conditions such as diabetes mellitus, hypertension, and arthritis.

Conclusion: Dry Eye Disease is a significant cause of ocular discomfort, indicating a significantly higher proportion of Dry Eye Disease among females. It is advisable to maintain good health, have optimum sleep, limit screen time and establish a better lifestyle modification to reduce dry eye symptoms.

Introduction

Dry eye disease (DED) is a multifactorial disorder of the ocular surface characterized by a loss of tear film homeostasis, accompanied by symptoms such as dryness, burning, irritation, and visual fluctuations. It involves complex interactions of tear film instability, hyperosmolarity, inflammation, and neurosensory abnormalities, which can impair daily functioning and reduce quality of life.[1]

DED is a common ocular condition worldwide. A recent meta-analysis estimated the global prevalence of DED at 11.6% among adults, with substantial geographic variation.[2] In Asian populations, the prevalence is notably higher, reaching up to 20% in pooled estimates.[3] In the United States, studies report rates ranging from 6.8% to 8.1%.[4] In Nepal, a hospital-based study from a tertiary care center found a prevalence of 25% in individuals over 40 years of age, suggesting that DED may be more common in South Asian settings than currently documented in the literature.[5]

Risk factors for DED include both intrinsic and extrinsic contributors. Non-modifiable factors such as advancing age, female sex, and autoimmune disorders like Sjögren's syndrome are well-established.[6] Modifiable risk factors include prolonged screen exposure, environmental pollutants, low humidity, refractive surgery, and contact lens wear.[7] The Terai region of Nepal, including Nepalgunj, experiences dry and dusty climatic conditions along with rising digital screen exposure, both of which may contribute to a higher risk of developing dry eye disease.

Despite its burden, DED remains underdiagnosed in many settings, especially in low-resource countries. Diagnosis is often complicated by poor correlation between symptoms and objective signs, and the condition is frequently overlooked in routine eye care visits.[8] Moreover, limited epidemiological data from western Nepal hinder targeted public health interventions and clinical resource planning.

This study aims to assess the prevalence and risk factors of dry eye disease among patients presenting to the Outpatient Department of Ophthalmology Department of Nepalgunj Medical College. By identifying both demographic and environmental correlates of DED, the study seeks to generate locally relevant evidence to inform prevention and early intervention strategies in the region.

Methodology

A hospital based prospective descriptive observational study was conducted in the Outpatient Department of Ophthalmology at Nepalgunj Medical College and Teaching Hospital (NGMCTH), Kohalpur, over 12 months from June 2016 to May 2017. An Ethical clearance was obtained from NGMCTH Institutional Review Committee.

The six-item questionnaire was based on the frequency of Foreign-body sensation, Dryness, Burning sensation, Redness, Discharge, and Tearing. These questionnaires were graded as "Rarely" if symptoms occurred once in 3–4 months. "Sometimes" if symptoms occurred once in 2–4 weeks, and "Always" if symptoms occurred at least once weekly depending on the complaints by the patients. The responses of "Sometimes" and "Always" were scored as positive markers for dry eye disease. Participants who scored a minimum of 3 in the questionnaire were only considered for inclusion in the study. Diagnostic criteria for dry eye required these patients to test positive for any 2 among the 3 set tests.

- Tear meniscus height
- Tear film break up time (TBUT)
- Shirmer's test I and Shirmer's test II

Clinical Examination

- **Visual Acuity:** Best-corrected acuity measured with a Snellen chart.
- **Anterior Segment:** Slit-lamp evaluation (Appasamy AIA-11-2S) of lids, lashes, meibomian glands Dysfunction (graded 0–3), conjunctiva (dryness, wrinkling, sheen), and cornea (superficial punctate keratitis, mucous plaques, filamentary keratitis). Corneal sensation was tested with a cotton wisp and classified as intact, reduced, or absent.

Tear-Film Testing Procedures

1. **Tear Meniscus Height:** Measured under cobalt-blue illumination, post-fluorescein staining, at 4–7 minutes; ≤0.35 mm indicated low height.
2. **Tear film Break-Up Time:** After instilling fluorescein, the interval from the last blink to the first dry spot was timed; <10 sec was abnormal.
3. **Schirmer's Test:** Filter paper strips (5 mm×35 mm) were placed in the lower fornix for 5 minutes, with and without topical anesthesia; <10 mm (without) or <6 mm (with anesthesia) wetting was deemed abnormal.

All patients 20 years of age and above who scored at least 3 points on the six-item questionnaires and diagnosed to have dry eye as per the diagnosis criteria were included in the study. Patients under 20 years of age, eyelid malposition like ectropion, entropion, and trichiasis, active corneal/conjunctival pathology, previous ocular surface surgery and lacrimal drainage obstructions were excluded from the study. The demographic data (age, sex, residence, occupation), ocular and systemic history and their medication usage, and environmental/ occupational exposures, and additional information regarding female menopausal status and the use of hormone-replacement therapy were also collected on the preformed pro-forma and all the datas were analysed using excel and SPSS version 27. Convenient sampling was done, and the sample size (n) was calculated as:

$n = [z^2 \times p \times q] / d^2$

$n = [1.96^2 \times 0.25 \times 0.75] / (0.06)^2$

$= 200.08$

Where, Z = 1.96 at a 95% confidence interval, n = sample size,

p = prevalence, 25% = 0.25, q = 1-p= 0.75

d = Desired degree of accuracy, considered as 0.06.

Results

Out of 200 patients included in the study, about one-third of the participants were in the age group of 31-40 years (32.5%), followed by 21-30 years of age (24%). These two age groups comprised more than half of all the patients with dry eye symptoms as shown in table 1.

Table 1: Age Distribution of Patients

Age groups (in years)	Number	Percentage (%)
21-30	48	24.00
31-40	65	32.50
41-50	24	12.00
51-60	41	20.50
>60	22	11.00
Total	200	100.00

In our study, 136 (68%) were female and 64 (32%) were male, resulting in a female-to-male ratio of approximately 2.1:1. indicating a significantly higher proportion of Dry Eye Disease among females as shown in table 2.

Table 2: Gender Distribution of Patients

Gender	Number	Percentage (%)
Male	64	32.00
Female	136	68.00
Total	200	100.00

Among the 136 female patients included in the study, 82 (60.2%) were pre-menopausal and 54 (39.8%) were post-menopausal indicating Dry Eye Disease was more frequently observed in pre-menopausal women as shown in table 3.

Table 3: Distribution of Menopausal State

Menopausal state	Number	Percentage (%)
Pre-menopausal	82	60.20
Post-menopausal	54	39.80
Total	136	100.00

The majority of patients with Dry Eye Disease in our study were from urban areas, accounting for 118 individuals (59%), while 82 patients (41%) resided in rural areas as shown in Table 4.

Table 4: Distribution of Residence among Patients

Residence	Number	Percentage (%)
Urban	118	59.00
Rural	82	41.00
Total	200	100.00

About 27% of our patients included in the study were laborers, followed by farmers (13%), administrative officers (12%), teachers (11%), students (10%), banking officers (6%), shopkeepers (4%), and others (17%), indicating a varied range of work-related exposures as shown in fig 1.

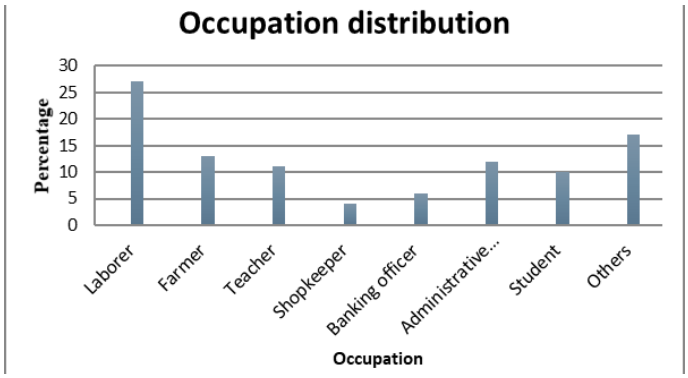

Figure 1: Distribution of patient's occupation

Out of the total participants, 68 individuals (34%) reported occupational exposure to computers, while the remaining 132 participants (66%) had no such exposure. 24 participants (12%) reported regular occupational exposure to air-conditioned environments, whereas 176 participants (88%) did not report any occupational AC exposure as illustrated in fig 2.

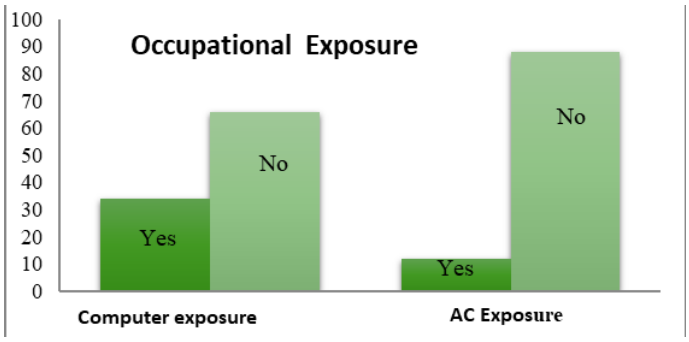

Figure 2: Occupational Exposure to Computer and Air Conditioner in Patients

Among the 200 participants, 42 individuals (21.0%) were smokers, while the remaining 158 (79.0%) were non-smokers as shown in table 5.

Table 5: Association of Smoking with Dry Eye Disease among Patients

Smoking habit	Number	Percentage (%)
Smoker	42	21.00
Non-smoker	158	79.00
Total	200	100.00

Out of the 200 patients, 147 (73.5%) reported no known systemic illness. Among those with systemic conditions, diabetes mellitus was the most commonly reported (18 patients, 9%), followed by hypertension (14 patients, 7%), osteoarthritis (13 patients, 6.5%), and other conditions (8 patients, 4%) as shown in fig 3.

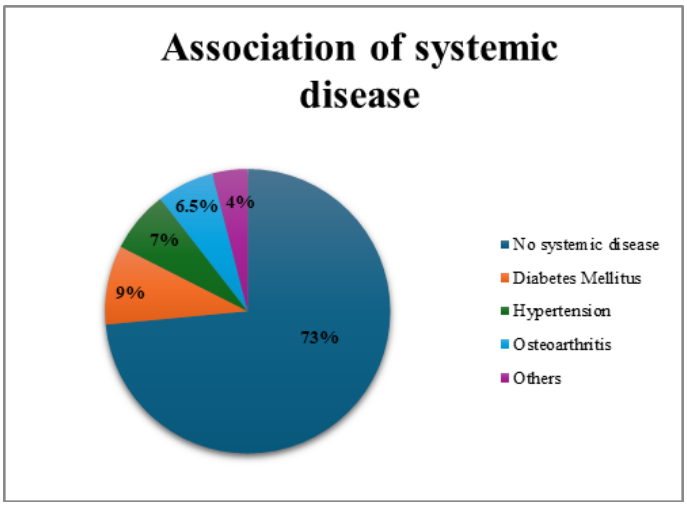

Figure 3: Association of Systemic Disease

The most commonly reported symptoms in our study were burning sensation seen in 60% patients, followed by redness in 40% and tearing in 40% patients. Similarly, Foreign body sensation was also seen in 34%, dry eye feeling in 27% patients, discharge and crusting was also observed in 19% patients. All of these symptoms have been individualized in the total study population as shown in fig 4.

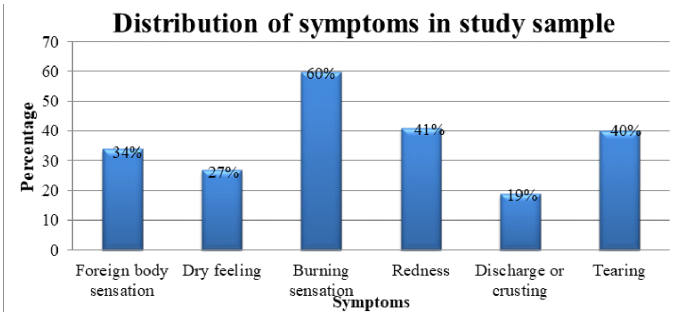

Figure 4: Distribution of symptoms among patients

In our study, Hypoglycemic agents were the most frequently reported, used by 18 patients, followed by antihypertensive medications in 14 patients and non-steroidal anti-inflammatory drugs (NSAIDs) in 13 patients. Antipsychotic drugs and medications classified under "others" were each used by 6 patients, while antihistamines were reported by 4 patients as shown in table 6.

Table 6: Systemic Medication on Regular Usage by the Patients

Name of drug	Frequency
NSAIDS	13
Antihistamine	4
Antihypertensive	14
Antipsychotic	6
Hypoglycemic	18
Others	6

Discussion

In our study, females accounted for 68% of the patients, while males made up 32% , with a peak prevalence in the 31-40 years age group which correlates well with study done by Joshi Shrestha L. et al. which revealed a prevalence of DED by 25% in persons above 40 years old, with 57.7% being female.5 Similar study done by Paulsen AJ. Et al. in the Beaver Dam Offspring Study, also indicated an overall prevalence of 14.5% (17.9% women, 10.5% men).[13]

Our study showed that 59% of patients reside in urban areas; 34% patients work with computers, and 12% were exposed to air conditioning, this is consistent with a study done by Galor A. et al. that revealed a VDT worker meta-analysis, which combined a 49.5% of population and documented considerable meta-analyses on digital screen exposure as an estimated prevalence range of DED in users from 9.5% to 87.5%.[9] Independently from each other, elements of the environment such as dust, wind, and air-conditioning are associated with DED in the US veterans.[9] In contrast Mandell JT. et al. in their study reveal that Urban outpatients in China displayed a disconcerting prevalence of 61.6% in polluted environments which may be due to smaller sample size and short study duration of our study.[16]

Our study showed no significant association of smoking with dry eye disease which is in contrary to the study done by Tariq MA. et al. who in their six studies (four cross sectional and two cohort) reported an association between former smokers and dye eye, but one study did not adjust the estimates for confounding factors revealing no significant association suggesting not much impact of either current or former tobacco on DED risk.[17]

In our present study, 73.5% patients reported no systemic illness, 9% had diabetes, 7% had hypertension, 6.5% had osteoarthritis and 4% had other systemic conditions, coincides well with the study done by Chia EM. et al. in their Blue Mountain study showed similar systemic comorbidities -diabetes, hypertension, arthritis, systemic medication in the older population has common association with female gender and systemic diseases.[14]

In the study done by Courtin R. et al. the assessment of symptom questionnaire was the combination of two versus three diagnostic criteria, which led to a range of prevalence from 54% to 16% respectively and the disparities between their clinical findings due to differing methodologies, diagnoses and population which is in contrary to our study as six-item questionnaire was used to grade dry eye symptoms.[15]

Conclusion

Females had more dry eye symptoms especially in pre-menopausal women reflecting higher age-related increase in Dry Eye Disease. Environmental stressors such as air pollution, low humidity, and prolonged screen use are the significant risk factors. It is crucial to increase awareness about the condition, identifying symptoms and risk factors could enable the implementation of appropriate preventive measures against dry eye disease.

Recommendations

A Study with a large sample size is advocated for more authentic results.

Limitations of the study

1. Single-center convenience sampling limits how well findings apply beyond this patient group.
2. Cross-sectional, self-reported data prevent causal conclusions and may introduce recall bias.
3. No objective or longitudinal measures of environmental exposures (e.g., pollution, humidity).

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We extend our heartfelt thanks to the researchers whose work underpins this review of Dry Eye Disease in Nepal, as their studies across diverse communities enriched our understanding of this pressing issue. Their dedication and rigorous investigations have been instrumental in shaping future research directions and practical interventions in this field. We gratefully acknowledge these contributions, which provide a concise yet solid foundation for continued progress in addressing dry eye disease.

Conflict of Interest: None

Financial Disclosure: None

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