ISSN (P) : 2589-9120 / (O) : 2589-9139
PubMed-National Library of Medicine - ID: 101773527

International Journal of Medical Science and Applied Research (IJMSAR)

Available Online at: https://www.ijmsar.com

Volume – 7, Issue – 5, October – 2024, Page No. : 10 – 16

An Observational Study to Assess Prevalence and Etiology of Dry Eye Disease in Adults Visiting Tertiary Health Care Centre

[1]Dr. Pooja Sajjan, [2]Dr. Priti Kapadia

[1]Junior Resident, Department of Ophthalmology, Government Medical College, Surat, Gujarat, India

[2]Professor and Head of Department, department of Ophthalmology, Government Medical College, Surat, Gujarat, India

Citation of this Article: Dr. Pooja Sajjan, Dr. Priti Kapadia, "An Observational Study to Assess Prevalence and Etiology of Dry Eye Disease in Adults Visiting Tertiary Health Care Centre.'' IJMSAR – October – 2024, Vol. – 7, Issue - 5, Page No. 10-16.

Corresponding Author: Dr. Pooja Sajjan, Junior Resident, Department of Ophthalmology, Government Medical College, Surat, Gujarat, India

Type of Publication: Original Research Article

Conflicts of Interest: Nil

ABSTRACT

Background

Dry Eye Disease (DED) is a multifactorial ocular condition that affects a significant portion of the population globally, causing discomfort and visual disturbances significantly impacting the quality of life. The aim of this study was to assess the prevalence and etiology of Dry Eye Disease (DED) in adults visiting a tertiary health care centre in South Gujarat, India, and to identify the key risk factors associated with the condition.

Methods

This cross-sectional study involved 407 adult participants attending the Ophthalmology Outpatient Department. Participants were evaluated using the Ocular Surface Disease Index (OSDI) questionnaire to Assess the severity of symptoms. Objective tests, including Schirmer's test, Tear Break-Up Time (TBUT), and Lissamine Green staining, were used to measure tear production and ocular surface integrity. Data regarding patient demographics, environmental exposure, and screen time were also collected.

Results

The study found that 15.97% of the participants had moderate to severe DED. Prolonged screen time, age, and environmental factors (such as hot and windy conditions) were identified as key risk factors. The most common underlying cause was Meibomian Gland Dysfunction (MGD), along with age-related decline in tear production and hormonal changes in post-menopausal women.

Conclusion

This study underscores the significant burden of DED, with environmental and lifestyle factors playing key roles in its etiology. Early screening and diagnosis using a combination of OSDI, Schirmer's Test, and TBUT can facilitate effective management in vulnerable group and improve patient outcomes and prevent long term complications. Comprehensive management strategies, including lifestyle modifications, artificial tears, and anti-inflammatory treatments are recommended for effective control of DED symptoms and improvement in patient's quality of life.

Keywords

Dry Eye Disease, Prevalence, Etiology, Ocular Surface Disease Index (OSDI), Tear Break-Up Time (TBUT), Schirmer's test, Meibomian Gland Dysfunction (MGD). Screen time, Environmental factors.

INTRODUCTION

Dry Eye Disease (DED) is a prevalent ocular disorder affecting 5% to 50% of the global population, [(1)] with symptoms that significantly reduce the quality of life [(2)] and results in reduced productivity and increased work absenteeism [(3)]. The disease is often underdiagnosed due to its nonspecific symptoms, which may mimic other ocular conditions. Diagnostic tools like the Ocular Surface Disease Index (OSDI) questionnaire [(4)], Schirmer's test, Tear Film Break-Up Time (TBUT), and Lissamine green staining are employed to assess DED severity[(5)]. India's urban climate, pollution, and digital screen exposure further exacerbate DED. This study aims to assess the prevalence, etiology and severity of DED in a tertiary care health care centre in South Gujarat so that we can treat the cause of dry eye and prevent consequences of dry eye.

MATERIALS AND METHODS

Study Design: A hospital-based, cross-sectional observational study conducted at the New Civil Hospital, Surat.

Sample Size: A total of 407 participants were included based on inclusion/exclusion criteria

Inclusion: Adults ≥18 years

Exclusion: Patients with acute conjunctival/corneal infection, contact lens wearers, and recent ocular surgery.

METHODOLOGY

Human resource and ethical committee approval was obtained before start of the study. The patients who visit Ophthalmology OPD for various problems and fit into the inclusion/exclusion criteria were randomly selected and served pre-validated Ocular surface disease index (OSDI) questionnaire to screen for dry eye disease [(4)] .

In participants having moderate and severe OSDI score informed consent was taken to participate in the study.

A thorough ophthalmic, job related and systemic history was taken noting symptoms and signs related to dry eye disease and the important demographic history.

Ocular examination including visual acuity testing, lid, conjunctiva, cornea, meibomian and lacrimal glands examination was done.

Schirmer's test for tear production without anaesthesia using 35 mm Whatman filter paper for tear secretion [(6)].

Lissamine green dye staining of cornea, temporal and nasal conjunctiva using Oxford grading system was done[7] (Figure 1).

Tear film stability checked by tear film break up time under slit lamp examination [8].

The OSDI score, Ocular examination findings and objective tests results were documented and compared.

RESULTS AND DISCUSSION

Participant Demographics: Out of the 407 participants, 48.16% were male, and 51.84% were female. The majority of participants (47.88%) were between 18-40 years old (Table 1).

Prevalence of DED according to OSDI scores: 15.97% (65 participants) had moderate to severe DED, with a mean OSDI score of 28.07 (Table 2).

Objective Test Results:

Schirmer's Test- 33% showed reduced tear production (≤10 mm) (Table 3).

TBUT- 52.30% had tear film instability (TBUT ≤10 seconds) (Table 4).

Lissamine Green Staining- 50.76% showed no staining, while 29.23% exhibited mild staining and 7.61% exhibited moderate staining (Table 5).

Etiology: Major etiological factors were prolonged screen time (32.84%), age-related changes (19.4%), environmental factors (16.42%) and Meibomian Gland Dysfunction (Table 6).

The prevalence of DED in this study is consistent with global reports, which vary from 5% to 50%, depending on diagnostic methods and geographic factors. Prolonged screen time was identified as a major etiological factor, likely exacerbated by increased digital device usage. Environmental factors such as hot and windy conditions also contributed to the high prevalence of DED in this region.

1. Prevalence: The prevalence of DED in our study (15.97%) is consistent with findings in Sahai et al. (2005) (18.4%) [9] and Chatterjee et al. (2021) (19%) [10] . These studies also emphasize the role of environmental factors and age in contributing to DED.
2. Screen Time: Prolonged screen use is a shared key risk factor across our study, Chatterjee et al. (2021), and Titiyal et al. (2018) [11], which highlights the modern influence of digital device use on eye health.
3. Environmental Factors: All studies, including Stapleton et al. (2017) [1], focus on the impact of environmental conditions like wind, pollution, and humidity as significant contributors to DED.
4. Diagnostic Methods: Our study and Stapleton et al. (2017) utilize similar diagnostic tools, such as Tear Break-Up Time (TBUT) and Schirmer's test, ensuring a comparable methodological approach across studies.

This comparative analysis suggests that while the current study's findings are largely consistent with previous research, the growing impact of digital device usage and environmental conditions on DED prevalence requires more attention. Management strategies that consider modern lifestyle factors will be crucial for effective management of DED.

The results highlight the importance of early diagnosis and intervention to prevent long-term ocular complications. Comprehensive management strategies including lifestyle modifications, artificial tears, and anti-inflammatory treatments are recommended.

Figures and tables

Figure 1: Oxford grading scale for dry eye [7]

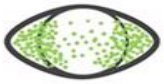
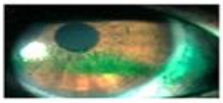
Grade	Description	Scheme	Clinical image
0	Absent		
I	Minimal		
II	Mild		
III	Moderate		
IV	Marked		
V	Severe	> Grade IV	

Table 1: Age and gender wise distribution of participants

Age	Male	Female	Total
18-40	103	100	203
41-60	60	69	129
61-80	27	46	73
81-100	2	0	2

Table 2: Distribution of Dry eye disease according to OSDI score

OSDI score	Number	Percentage
0-12 (Normal)	196	48.16
13-22(Mild dry eye)	146	35.87
23-32 (Moderate dry eye)	53	13.02
32-100 (Severe dry eye)	12	2.94

Table 3: Schirmer's test in individuals with moderate ad severe OSDI score

Schemer's test	RE	LE
5-10mm	22	21
11-15mm	34	33
16-20mm	7	8
21-25mm	2	3

Table 4: TBUT in individuals with moderate and severe OSDI score

TBUT	RE	LE
0-10s	34	32
>10s	31	33

Table 5: Lissamine green staining in individuals with moderate and severe OSDI score

Lissamine green staining	Number	Percentage
No staining (Grade 0)	29	44.61
Minimal staining (Grade 1)	12	18.46
Mild staining (Grade 2)	19	29.23
Moderate staining (Grade 3)	5	7.61

Table 6: Probable etiology of dry eye disease in the present study

Etiology	Number	Percentage
Age related	13	19.4
Hormonal (Peri menopausal)	3	4.48
Daily cosmetic use	4	5.97
Environmental	11	16.42
Occupational	10	14.93
Poor sleep	4	5.97
Prolonged screen time	22	32.84

ABBREVIATIONS

DED	Dry Eye Disease
OSDI	Ocular Surface Disease Index
TBUT	Tear Film Break up Time
MGD	Meibomian Gland Dysfunction

CONCLUSIONS

The study found 15.97% prevalence in moderate and severe dry eye disease according to OSDI score. The comparative analysis of the major objective tests in DED revealed that 33.08% of the participants had dry eye on Schirmer's test, 52.30% of them had dry eye on TBUT and on 36.92% of them had dry eye on Lissamine green staining. The common etiology we observed was prolonged digital screen time, followed by Meibomian gland dysfunction, age related, and environmental including air pollution and dry climate. This study underscores the significant burden of DED, with environmental and lifestyle factors playing key roles in its etiology. Early screening and diagnosis using a combination of OSDI, Schirmer's Test, and TBUT can facilitate effective management in vulnerable group and improve patient outcomes. The results highlight the importance of early diagnosis and intervention to prevent long-term ocular complications. Comprehensive management strategies including lifestyle modifications, artificial tears, and anti-inflammatory treatments are recommended.

REFERENCES

1. Stapleton F, Alves M, Bunya VY, Jalbert I, Lekhanont K, Malet F, et al. TFOS DEWS II Epidemiology Report. Ocul Surf. 2017 Jul;15(3):334–65.
2. Uchino M, Schaumberg DA. Dry Eye Disease: Impact on Quality of Life and Vision. Curr Ophthalmol Rep. 2013 Jun 15;1(2):51–7.
3. McDonald M, Patel DA, Keith MS, Snedecor SJ. Economic and Humanistic Burden of Dry Eye Disease in Europe, North America, and Asia: A Systematic Literature Review. Ocul Surf. 2016 Apr;14(2):144–67.
4. Schiffman RM. Reliability and Validity of the Ocular Surface Disease Index. Archives of Ophthalmology. 2000 May 1;118(5):615.
5. Baudouin C, Aragona P, Van Setten G, Rolando M, Irkeç M, Benítez del Castillo J, et al. Diagnosing the severity of dry eye: a clear and practical algorithm. British Journal of Ophthalmology. 2014 Sep;98(9):1168–76.
6. Clinch TE. Schirmer's Test. Archives of Ophthalmology. 1983 Sep 1;101(9):1383.
7. Bron AJ, Evans VE, Smith JA. Grading Of Corneal and Conjunctival Staining in the Context of Other Dry Eye Tests. Cornea. 2003 Oct;22(7):640–50.
8. Vidas Pauk S, Petriček I, Tomić M, Bulum T, Jandroković S, Pauk Gulić M, et al. Diagnostic accuracy of non-invasive tear film break-up time assessed by the simple manual interferometric

device. Contact Lens and Anterior Eye. 2023 Apr;46(2):101776.

9. Sahai A, Malik P. Dry Eye: Prevalence and Attributable Risk Factors in a Hospital-Based Population. Indian J Ophthalmol. 2005;53(2):87.
10. Chatterjee S, Agrawal D, Sanowar G, Kandoi R. Prevalence of symptoms of dry eye disease in an urban Indian population. Indian J Ophthalmol. 2021 May;69(5):1061–6.
11. Titiyal J, Falera R, Kaur M, Sharma V, Sharma N. Prevalence and risk factors of dry eye disease in North India: Ocular surface disease index-based cross-sectional hospital study. Indian J Ophthalmol. 2018;66(2):207.