Review Article

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Prevalence and Associated Factors of Dry Eye in Patients Above 40 Years of Age at a Tertiary Centre

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Abstract

Purpose: To determine the prevalence of dry eye in ophthalmology out patients At a tertiary carehospital and its possible association with various clinico epidemiological factors.

Patients and Methods: This was a hospital based cross sectional study involving 390 patients who visited ophthalmology OPD in a tertiary care hospital. Patients who are aged more than 40 years irrespective of their dry eye related complaints. Tear film break up time was used as an indicator for the diagnosis of Dry eye disease. The study span was of 10 months.

Results: Overall prevalence of DED was 51.6% among the patients. The prevalence of DED was more among elderly population as well as among patients who are having diabetes and hypertension with prevalence of 59% and 49% respectively. Females constituted more in number as well as they had higher prevalence of DED 55.8%. Burning sensation and watering was present in 39% and 32% of DED patients respectively.

Conclusion: This study reflects a major burden of DED among the routine out patients. We observed various contributing factors for dry eye such as age, female gender, outdoor jobs, Tobacco consumption, Diabetes Mellitus, Hypertension, Meibomian gland disease, antiglaucoma medications and contact lens use to name a few. There is need to educate general public regarding the awareness and sensitivity toward the symptoms of DED. Further studies need to be undertaken to establish a universal diagnostic criterion, concrete etiologic association and options to deal with the same.

Keywords: Dry Eye Disease; Diabetes Mellitus; Tear Film Breakup Time.

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Overview

Dry eye disease (DED) is one of the most common clinical disease encountered in all the regular OPD patients. Most of patients who visit ophthalmic clinics report symptoms of dry eye directly or indirectly making it a growing public health problem and one of the most common conditions seen by ophthalmologists in general.[1]

Dry eye is a disorder of the tear film which occurs due to tear deficiency or excessive tear evaporation; it causes damage to the interpalpebral ocular surface and is associated with a variety of symptoms reflecting ocular discomfort.[2]

In 2007, the International Dry Eye Workshop (DEWS) revised the original definition and classification scheme of DED and developed a new definition, as well as a three-part classification of DED based on etiology, mechanism, and severity of thedisease.[3] Because the tear film in dry eye patients is unstable andincapable of mentaining theprotective qualities that arenecessary for its structure and function, patients experiencethe discomfort symptoms associated with dry eye, which are burning, stinging, grittiness, foreignbody

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sensation, tearing,ocular fatigue, and dryness etc.[4]

Aim

Aims of this study were to determine the prevalence of dry eye in ophthalmology out patients at a tertiary care hospital and its possible association with various clinico epidemiological factors.

Patients and methods

This prospective hospitalbased study was done during the period of 10 months from November 2020 to August 2021 at Department of Ophthalmology, S.N. Medical College & HSK Hospital, Bagalkot.

Prior to start of the study clearance from institutional ethical committee was obtained.

The study adhered to the declaration of Helsinki. study involving 390 patients who visited ophthalmology OPD in a tertiary care hospital. Patients who are aged more than 40 years irrespective of their dry eye related complaints were considered for study.

All the willing subjects after obtaining valid consent were administered a structured questionnaire.[5]

Questionnaire was administered by single trained resident in local language and examination was done by an experienced ophthalmologist.

Inclusion Criteria

- Patients who are more than 40 years are older
- Patients who are willing to participate in the study.

Exclusion Criteria:

- Patients with ocular surface/lid infections
- Patients with extensive ocular surface pathologies
- Patients who have undergone any ocular surgery within last 2 months.

Data of all patients including sex, age, demographic details such as occupation and duration of diabetes, as well as a history of other diseases wereobtained by reviewing medical records and throughdirect patient interviews.Dry eyes were suspected on the basis of a history ofocular discomfort, including soreness, gritty sensation,itchiness, redness, blurred vision that improves withblinking, and excessive tearing which was evident after scoring in questionnaire.

Dry eye was confirmed by tear film break up time(TBUT) and Schirmer's I test. Diagnosis wasfinalised by positivity of one or both the tests (TBUT or Schirmer's test). Structures of the eye were assessed with slit lamp biomicroscopy examination. Retinal status was evaluated by indirect ophthalmoscopy after dilation with tropicamide drops, and diabetic retinopathy was gradedaccording to Early Treatment Diabetic Retinopathy Study.

Tear film break up time:

Moistened with non preservative saline fluorescein strips (Fluro Touch; Ophthalmic Strips by Medicare surgical Delhi.) were introduced into the conjunctival sac with minimal stimulation, undetected by the patients. The individuals were then instructed to blink several times for a few seconds to ensure adequate mixing of fluorescein. The tear film was examined with a broad beam and a cobalt blue filter.

The interval between the last complete blink and the appearance of the first corneal blackspot or line in the stained tear film was measured using a stopwatch.

A TFBUT value more than 10 s was considered normal, a value of 8–10 s was considered mild dryness, a value of 5–7 s was considered moderate dryness, and a value less than 5 s was considered severe dryness.

Schirmer's test

This test measures tear secretion over a specified time. Schirmer test I without topical anaesthesia (total tear secretion) was carried out with standardized strips. The strip was folded at the notch and placed at the junction of the middle and lateral thirds of the lower eyelids and allowed to stay in place for 5 min with patient's eyes gently closed.

The filter paper was removed, and the amount ofwetting was measured.

More than 10mm of wetting after 5 min was consideredrnormal, 8–10mm of wetting was considered mild dryness, 5–7mm of wetting was considered moderatedryness, and less than5mm of wetting was consideredsevere dryness at the end of 5 min.

Statistical analysis

We obtained the data and entered the data in XL sheets.Data are expressed as Mean±SD. Parameters

between groups were analysed by the Student's t-test, and analysis of variance was performed withthe χ2-test. A P value of less than 0.05 wasconsidered statistically significant.

SPSS for windows 10 (version 14.0; SPSS, Inc., Chicago, Illinois, USA) was) was used for statistical studies.

Various univariate and multivariate observations were noted and subjected to appropriate tests like chi-squared tests etc.With 95% Confidence interval odds ratio were calculated.Tests were done to see the correlation between DED and various socio demographic findings as well as systemic illnesses.

Results

Of the 420 consecutive patients, 390 patients agreed to participate in the study (7% drop out rate). Mean age group of the study population was 60.3 years Figure I.

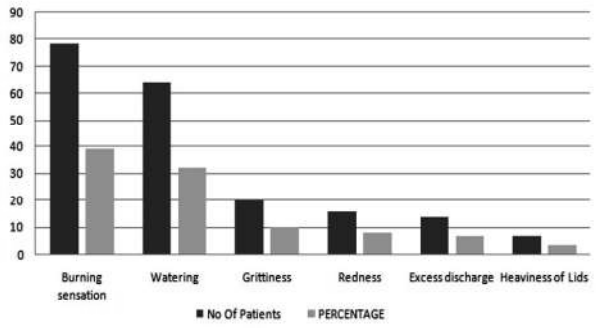

Fig. I: Presenting symptoms of DED in patients.

Sample consisted of 55 % females, and the majority of them were home makers.12% of study population was consuming Tobacco in various forms, hence making it the most prevalent addiction.

Table I: Represents the baseline characteristics of study population (n=390).

Variable	No of subjects	Percentage of total
Age wise distribution		
40-50	101	26%
51-60	129	33%
61-70	121	31%
70-80	35	9%
>80	4	1%
SEX		
Male	175	45.8 %
Female	215	55.12 %
Occupation		
Home makers	170	43.5%
Office worker without AC	83	21.2%
Farmer/Labour/ Outdoor worker	105	27%
Office worker with AC	32	8.2%
Systemic diseases		
Diabetes	117	30%
Hypertension	49	12.5%
Arthritis	46	11.7%
Addictions		
Tobacco chewing	14	7%
Smoking	08	4%
Smoking/chewing/ others	02	1%

The overall prevalence of DED was 51.6% among the of the sample size of 390 participants of age 40 years and above. The prevalence of dry eye was found to be maximum in the elderly. It was 65% in participants aged 71 years and above. 55.8% of females had dry eye disease which was more compared males.We assessed the prevalence of dry eye among various occupation groups

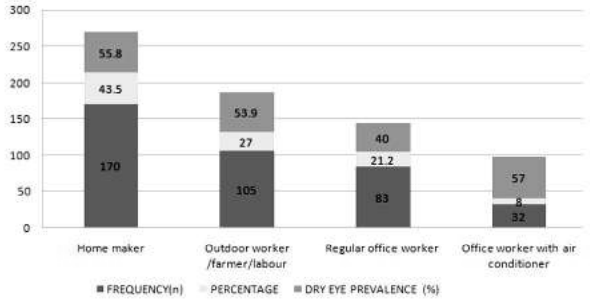

Fig. II: Prevalence of DED among various occupation groups.

Figure II, Home makers had the highest prevalence of dry eye 55.8%, Farmers and those doing outdoor jobs have prevalence of dry eye, which is 53.9%. while those doing indoor jobs without the use of air conditioners have the least prevalence of dry eye 40%. Tobacco consumption in the form of chewing and smoking is frequently seen in this study area hence 12% of study population in our study showed Tobacco consumption in some or the other formTable1.

We also calculated prevalence of DED in systemic illnesses Table 1 like Type 2 diabetes mellitus, hypertension and arthritis with dry eye was evaluated, 62% of the diabetic patients suffered from dry eye. This is quite high as compared to the dry eye prevalence in osteoarthritis (49%) and those suffering from hypertensive patients

(50%). Cataract extraction was the most common intraocular surgery undergone by study group 35%, of that 55% of patients had dry eye disease. Patients who had undergone surgery within the last 2 months were excluded from the study.We also studied the prevalence of dry eye among patients with meibomian gland disease. Twelve percent of the study population had blockage in meibomian glands, which were diagnosed on slit lamp examination. 92% of these patients had dry eye disease.

Sample also consisted of 5 % glaucoma patients who were on various topical antiglaucoma medications, out of which 70 % had dry eye.

We asked the patients regarding dry eye symptoms like burning sensation, watering in eye, excessive discharge etc burning sensation in the eye was the most common complaint 39%followed by watering 32%. Figure 1. A multivariable logistic regression analysis showed an association between dry eye prevalence and outdoor workers, participants working indoor using air conditioner, housewives, diabetics, patients who have undergone cataract surgery and those with meibomian gland dysfunction (MGD), Table II.

Table II: Multivariable logistic regression analysis showing association of dry eye.

Variable	P	OR	CI	
			Lower	Upper
Occupation				
Regular office worker	0.071	Reference category	-	-
Farmer/labour/ outdoor worker	0.036	2.13	1.13	4.029
Indoor worker with air conditioner	0.25	1.985	0.680	4.935
House wife	0.021	1.99	1.132	3.214
Previous ocular surgery				
(no/yes)*	0.090	1.589	0.992	2.667
Meibomian gland dysfunction (no/yes)*	0.00	18.283	4.589	89.91
Diabetes mellitus (no/ yes)*	0.002	2.182	1.467	3.999
Constant	0.002	0.446		

*First variable in parenthesis refers to the reference category.

OR : Odds ratio, CI : Confidence interval.

Discussion

Dry eye prevalence as estimated in this study is around 51.5 % in patients aged more than 40 years visiting the Outpatient Department at a Tertiary Care Center.in recent years there has been a substantial increase in the knowledge and understanding of dry eye disease. One major advance in the understanding of DED is the recognition of the two distinct parts of the disease tear evaporation and insufficient tear production and their roles individually or concomitantly in DED.[6] One more important realization that the thickness of the lipid layer might determine the stabilityof the tear film. As tear film instability is invariably seen in various stages of DED.[7,8]

Various epidemiological studies over the years have thrown light over many risk factors associated with DED such as increase in age and female gender particularly post menopause groups.DED in menopausal and postmenopausal can be attributed to the significantdecrease of tear production around the 6thdecade of lifein women.[9,10]

A study by Guillon et al.[11] have shown in Britain that the tear film evaporation is significantly higher in people aged more than 45 years.

The prevalence of dry eye disorder varies considerably as evident from the previous hospital as well as population- based studies. Studies have reported the prevalence of dry eye to be anywhere between 5% to as high as 73.5%.[12,13]

The International DEWS on its update stated that the global prevalence of dry eye is about 17% while several other studies show a higher prevalence of approximately 30% in people of Asian descent.[14] One study done by Miami and Broward Veterans Affairs eye clinics showed a prevalence of 22% DED in females compared to 12% in males.[15] A study done by Shah s et all showed prevalence of DED in patients aged more than 40 years of age to be 54.3%.[16] According to a study conducted in Korea, 33.2 percent of people are affected by DED.[17] The overall prevalence of dry eye in our study sample of patients aged 40 and over is 51.6% percent, which is significantly greater than that seen in other similar studies.This could be due to the impact of tropical weather in our study area, as well as other population features in the sample group. Daily wage workers and farmers and also outdoor labours showed high degree of DED in them (53.9%), it could be due to over exposure to sunlight and dry weather and it could also be due to lack of awareness regarding usage of protective goggles etc while working.Among diabetes patients, we observed a prevalence of 62% DED. This matches a research by Manaviatet al.[18] in Iran, which found that 54.3 percent of type 2 diabetic

patients had dry eye syndrome.The possible cause behind this could be the autonomic and sensory neuropathy occurring due to diabetes in lacrimal gland.[19] 70% of glaucoma patients had DED in our study, which could be attributed to harmful effects of preservatives like benzalkonium chloride etc epithelium of cornea.[3] 92% of patients who had meibomian gland disease had DED.According tothe definition of the International Workshop on MGD, MGD is a chronic and diffuse anomaly of the meibomian glands, generally characterized by terminal duct obstruction and/or qualitative/ quantitative changes in glandular secretion. This can lead to changes in the tear film, symptoms of eye irritation, clinically evident inflammation and disease of the surface of the eye.[20] Dry eyes have been observed in asymptomatic patients or in those with very few symptoms. We found that the prevalence of dry eye in asymptomatic patients is 24.1%.

There are many limitations to our study first and the foremost is the usage of fluorescein stain for TBUT instead of noninvasive BUT. As fluorescein is an irritant which can trigger the reflex watering in patients which testing for TBUT. Since our study was done in a tertiary care hospital it doesn't represent the overall community which might have different prevalence of DED.This study emphasizes the burden of Dry eye disease among routine OPD patients and need for careful evaluation and treatment irrespective of presence of symptoms. Very few studies are available in our region regarding DED. Although a similar study was conducted in the state of Rajasthan,using univariate analysis which on itself was a major drawback.[21] This reiterates the need for gathering more data regarding the extent of dry eye disease in our country. Millions of dollars are spent annually by Americans for DED as reported by a population based study done by LempMA[22] Le et al.[23] in a study done in Republic of china highlighted the various psychological effects as well as adverse effects on vision related quality of life in various DED patients.

Conclusion

A careful history taking and through clinical evaluation are the key factors in diagnosing this under reported disease. We need more extensive research and standard diagnostic criterion which are universally applicable for effective treatment and reduction in the disease burden in susceptible groups.

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Conflicts of Interest: There are no conflicts of interest.

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