Environmental Factors in the Dry Eye Diseases subjects

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Abstract
Background: *Around the world it is learnt that between 5-34% of people have some form at dry eye and prevalence significantly increases with age.* [4, 5] *The large variation in the prevalence of dry eye disease is attributed to the variations in the study population, geographical differences and lack of uniformity in method and definitions of the disease dry eye.*

Patients and Methods: *during the period from July 2015 to Nov-2016 Patients were consecutively selected and underwent a routine ophthalmological examination along with tear film break-up time (TBUT), Schimers test and Rose Bengal test or flourescien staining as a screening tools for detecting the presence of dry eye. Statistical Analysis: Data are expressed as mean, standard deviation and range. For quantitative data, statistical evaluations are performed by using t test and for qualitative data chi square test is used.*

Results: *In the present study 115 of patients developed dry eye cause of environmental cause. 28.57% of dry eye patients were noted to be farmers and laborers and 23.33% of dry eye patients belong to high exposure group(computer operator, driver, salesman, mechanics, field worker, cooks) this explains the fact that these are the person who worked more outdoors and exposed to sun and/or dust developing dry eye.*

Conclusion: *our study showed that the prevalence of dry eye disease is significantly affected by the person who worked more outdoors and exposed to sun and/or dust developing dry eye Thus environmental factors plays pivotal role in the development of dry disease.*

Introduction

Dry Eye Diseases is one of the most frequently encountered clinical diagnosis in ophthalmic practice. Dry eye's is one of the conditions seen at all levels of ophthalmic care.

In 2007, the International Dry Eye Workshop (DEWS) revised the original definition and classification scheme of dry eye disease (DED) and developed a new definition based on etiology, mechanism, and severity of the disease. The term dry-eye syndrome according to DEWS has been defined as "a multi-factorial disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance, and tear-film instability with potential damage to the ocular surface. It is accompanied by increased osmolarlity of the tear film and inflammation of the ocular surface".[1] Dry eye refers to disorders of the tear film due to reduced tear production and/or

excessive tear evaporation associated with symptoms of ocular discomfort.[2]

Dry eye impairs functional vision; especially during reading, driving, using computers, and mobile phones [3,4,5,6]. Reading speed for instance is significantly reduces at positively correlates and with dry eye disease severity.[3]

The psychological problems associated with highly symptomatic, incurable, Chronic disease can required considerable support .Quality-of-life studies have shown that impact of moderate to severe dry eye is similar to that of moderate to severe angina.[7]

Dry eye is chronic disease [8] which may have substantial impact on patient's quality of life.

Patients and Methods

during the period from July 2015 to Nov-2016 Patients were consecutively selected and underwent a routine ophthalmological examination along with tear film break-up time (TBUT), Schimers test and Rose Bengal test or flouroscien staining as a screening tools for detecting the presence of dry eye. Statistical Analysis: Data are expressed as mean, standard deviation and range. For quantitative data, statistical evaluations are performed by using t test and for qualitative data chi square test is used.

Detailed ocular history was taken. Special emphasis given over history of using any ocular medication and also using medication especially for dry eyes. Whether the patients have maximal complaints early in morning or at the end of the day or at the end of the work are asked.

Medical history which may be significant for coexisting connective tissue disease, rheumatoid arthritis, or thyroid abnormalities is also asked. Analysis was done to find out prevalence of dry eye symptoms and its risk factor. For this analysis factors such as age, sex, occupation, responsible diseases and season are taken into consideration.

The cut off value for Schirmer's test is 15 mm at the end of the 5 mm. (Reddy M 1991)[9]

The intensity of the Rose Bengal staining of the cornea and conjunctiva on the zone was recorded, with a possible minimum score being 0 and a possible maximum score being 3 on each nasal conjunctiva, cornea, and temporal conjunctiva.

Van Bjisterveld scoring system[10]

Minimum score 0

Maximum score 9

Dry eye >4

Flurescein staining of the cornea was also rated, with a possible minimum score being 0 and a possible maximum score being 3 on each upper, central, and lower cornea.[10]

A normal TBUT is more than 10 seconds and a TBUT of less than 10second is considered abnormal[11.12.13] The break-up time was noted in seconds. The mean of the three readings were taken as the final TBUT. If the film broke-up at the same location all the three times, this spot was ignored as this was indicative of local epithelial defect or a come-al surface abnormality and not as an intrinsic instability of the precorneal tear film.

First 300 patients in study were screened in winter and next 200 were screened in summer season.

Inclusion Criteria

Patients presenting in ophthalmology Out Patient Department above the age of 5 years with various ophthalmic complaints.

Exclusion Criteria

1. Patients suffering from ocular infections.
2. Patients who undergone extra-ocular and intraocular surgery.
3. Patients already diagnosed and using medications for dry eye.
4. Patients less than 5 years of age

Analysis of data

Data are expressed as mean, standard deviation and range. For quantitative data, statistical evaluations are performed by using t test and for qualitative data chi square test is used.

Results and Observations

A total of 500 patients were screened for dry eye in Department of Ophthalmology in the tertiary care

center. Out of these 82 patients were diagnosed as having dry eye. For the study factors such as age, sex, occupation, responsible diseases and season were taken into consideration.

Table 1 Distribution of Patients according to Age

Age Group (Years)	No of Patients (n)		Patients with Dry Eye (n)	Percentage (%)
	Male	Female		
5-10	10	9	4	21.05%
11-20	28	24	4	7.69%
21-30	33	27	9	15.00%
31-40	50	51	14	13.86%
41-50	54	51	13	12.38%
51-60	50	54	18	17.31%
>60	30	29	20	33.90%
Total	**255**	**245**	**82**	**16.4%**

Total 500 patients were evaluated for the presence of dry eye symptoms. Out of 500 patients 255 were male and 245 were female.

Age wise distribution of patients shows that 21.05 % of patients belong to 5-10 age group, 7.69 % belongs to 11-20 age group, 15% belongs to the 21-30 age group,13.86% belongs to the 31-40 age groups, 12.38% belongs to the 41-50 age group,17.31% belongs to the 51-60 age group and 33.90% belongs to the >60 age group. Difference is statistically significant ($p<0.05$), indicating that dry eye symptoms are more in elderly patients above 50 years of age.

Table 2 : Distribution of Patients according to Gender

Sex	No. of Patients	Number of Patients with Dry Eye (n)	Percentage (%)
Male	255	36	14.12%
Female	245	46	18.78%
Total	**500**	**82**	**16.4%**

Gender wise distribution of patients indicates that 14.12% male and 18.78% female patients developed dry eye.

The difference is not statistically significant. This indicates prevalence of dry eye is comparable in both sexes.

Table 3: Distribution of Patients with dry eye symptoms according to diseases

Disease	Number of Patients with Dry eye (n)	Percentage (%)
Sjogren's Syndrome	3	3.66%
Non Sjogren's Syndrome	13	15.85%
Meibomian gland dysfunction	16	19.51%
Xerophthalmia	10	8.54%
Steven Johnson syndrome	3	3.66%
Computer vision syndrome	6	12.20%
Contact lens related	5	6.10%
Environmental	10	12.20%
Drug induced	5	6.10%
Thyroid disease	2	2.44%
Others	8	9.76%
Total	82	100%

Above table shows 3 patients (3.66%) have Sjogrens syndrome, 15.85% of patients have non – Sjogrens syndrome, 19.51% has Meibomian gland dysfunction, 8.54% has xeropthalmia, 3.66% patients have Steven Jonson syndrome, 12.20% has computer vision syndrome, 6.10% has contact lens, 12.20% patients have environmental causes and 6.10% and 2.44% has drug induced and thyroid diseases related dry eye symptoms respectively. This indicates that prevalence of dry eye is more in patients with lid related diseases computer vision syndrome and in those with dry eye because of environmental causes.

Table 4 : Results of Schirmer test and TFBUT test in patients with dry eye.

Disease Condition	Dry eye subjects (n)	Schirmer test (mm)		TFBUT (Sec)	
		Mean	Range	Mean	Range
Sjogrens Syndrome	3	3.6	3-4	4.8	3.8-5
Non – Sjogrens Syndrome	13	8.6	6-12	5.4	4-7
Meibomian gland disfunction	16	15.18	12-19	4.02	2-7
Xerophthalmia	7	15.4	13-18	10.9	7-13
Steven Jonson Syndrome	3	5	g4-6	4.5	3-4.6
Computer Vision Syndrome	10	11.5	8-16	8.4	6-11
Contact Lens related	5	9.8	7-13	7	5.2-8
Environmental	10	9.7	6-14	8.4	6-12
Drug induced	5	8.6	6-10	8.02	7-9
Thyroid disease	2	9	8-10	6.5	6-7
Others	8	8.6	6-11	5.9	2-8

Findings of study result indicate that significantly low Schirmer's values in patients with Sjogren's syndrome and Steven Johnson syndrome as compared to others.

Similarly TFBUT values are also significantly low in Sjogren's syndrome, Steven Johnson syndrome and dry eye related to meibomian gland disease.

Table 5: Results of TFBUT test in patients with dry eye and normal patients

	TFBUT (Sec)	
	Mean	Range
Dry eye subjects	6.62	2 – 13
Normal Persons	10.85	6 -117

The comparison of mean score of TFBUT test in normal person and patients with dry indicates that normal person has significantly high TFBUT score as compared to patients with dry eye.

Summary

Dry eye prevalence in the present study is 16.4%.   But, this is a hospital based study which is unlikely to give a true representation of the prevalence of dry eye of the population, as it will be overrepresented.

In our study, dry eye prevalence is more common among elderly i.e, above the age of 50 years, which is consistent with findings in other dry eye studies.

Though the difference is not statistically significant, the number of patients developing dry eye is more common in females than males.

In the present study 115 of patients developed dry eye cause of environmental cause. 28.57% of dry eye patients were noted to be farmers and laborers and 23.33% of dry eye patients belong to high exposure group(computer operator, driver, salesman, mechanics, field worker, cooks) this explains the fact that these are the person who worked more outdoors and exposed to sun and/or dust developing dry eye.

Dry eye symptoms are not influence by place of residence in our study. Prevalence of dry eye is more in patients with lid related diseases, computer vision syndrome and in those with dry eye because of environmental causes.

Most common symptom reported by the patients was irritation followed by discomfort and foreign body sensation.

Although the Schirmer's test is easy to perform it gives variable results, poor reproducibility and low sensitivity for detecting dry eyes. In our study Schirmer's test result in meibomian gland related dry eye is within range 12-19mm with mean 15.18mm; from this can be inferred that Schirmers test result in meibomian gland related dry eye is towards normal range cannot be used for the diagnosis of meibomian gland related dry eye. In our study normal values for tear film break up time is within 6-17 seconds with mean 10.82 seconds. Tear film break up time in dry eye subjects in our study is within 2-13 seconds with mean of 6.62 seconds.

A limitation of the present study was the exclusion of patients who undergone extra ocular and intraocular surgery leading to an underestimation of dry eye prevalence. Because in such cases it is difficult to interpret dry eye is because of surgery or is present preoperatively and aggravated by surgery.

Table No. 6 Distribution of Patients according to the occupation

Occupation	No. of Subjects	Percent age
Students / Home workers	66	13.5%
Other with low exposure	60	12.00%
Farmer / Laborers	142	28.57%
Other / Shopkeepers	67	13.64%
Other with high exposure	115	23.33%
Factory Worker	50	10%
Total	500	

In our study the high exposure workers to the computer use 23.33% have more symptomatic for the question are then the other patients having low exposure in the study. However it was found that laborers and farmers 28.57% (n=142) exposed more to dry and sunny environment are more affected that rest of the subjects in the study. The prevalence of symptoms and signs were found to be not statistically found to be significant (p>0.05) in the patients which are having high exposure to the

computer, rather than low exposure to computer works. It was also found that prevalence was more in farmers and laborers who are exposed the dry environmental condition which is quiet common in the region. Thus environmental factors and worker occupation plays an important role in the pathogenesis of the dry disease.

Conclusions

The study with title" Clinical study of Dry eye disease" s carried out in department of Ophthalmology in the tertiary care center Study included total 500 patients which 82 were diagnosed of the disease. Dry eye-is under-diagnosed disorder. Symptoms of dry eye are common in the older population. Dry eye symptoms were more common in female as compared to male. Tear film break up time is very useful test in the diagnosis of dry eye should be used more frequently in the diagnosis and management of dry eye syndrome. Now a day's dry eye seem to occur more frequently in contact lens wearers and computer users and should be taken care of The study reflects a major burden of dry eye disease among the routine outpatients.

Limitation of Study

The study was conducted in the hospital based set up so it doesn't reflact the actual burden of the society.

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