A Study on Prevalence of Dry Eye and Its Attributable Risk Factors in Medical College, Jhansi

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ABSTRACT *Dry eye is a common but an underdiagnosed disorder of ocular surface causing discomfort to the patients. Aim: To study the prevalence and to evaluate attributable risk factors of dry eye in a hospital-based population. Material and methods: A cross sectional study of randomly selected 200 patients in OPD of medical college, Jhansi was conducted. A pre tested questionnaire, Tear film break-up time and Schirmer's test were used to diagnose dry eye. Chi square test was used to show association of dry eye with various environmental factors. Result: 20% patients had dry eye with maximum prevalence in those above 60 years of age and significant association in patients exposed to wind and sunlight. Conclusion: Dry eye is an under-diagnosed disorder and its prevalence can be decreased by reducing its modifiable risk factors.*

INTRODUCTION

Tears are necessary for maintaining the health of the front surface of the eye and for providing clear vision. Abnormality in preocular tear film causes dry eye. The preocular tear film, classically, is a three-layered structure consisting, from posterior to anterior, of the mucous, the aqueous and the lipid layers. The National Eye Institute/ Industry Workshop on Clinical Trials in Dry Eyes[1] defined dry eye as "a disorder of the tear film due to tear deficiency or excessive tear evaporation, which causes damage to the inter- palpebral ocular surface and is associated with symptoms of ocular discomfort". Dry eye is the most frequent disorder in ophthalmology practice.[2] According to Whitcher and colleagues,[3] the dry eye area most fraught with misinterpretations concerns the patient's ocular symptoms. The prevalence of dry eyes varies from 10.8% to 57.1%,[4-8] thereby showing wide disparity. Much of this disparity stems from the fact that there is no standardisation of the types of patients selected for the study, dry eye questionnaires, objective tests and dry eye diagnostic criteria.

Dry eye syndrome is a fairly common condition and there is increasing prevalence of dry eye syndrome in recent years. Increasing longevity of population, increasing computer use, more patients having LASIK surgery, and more people taking medication with side effects that have adverse effect on production of high-quality tears seem to result into a large number of patients with dry eye. Dry eye condition takes a toll on the quality of life of the patients by its direct negative impact on their physical state of well being as well as on their social and professional life. The study of dry eye syndrome is important because of increasing frequency of its occurrence, various risk factors with which disease is associated and difficulties in treatment of disease.

Objectives:

1. To study the prevalence of dry eye in Ophthalmology department of medical college, Jhansi.
2. To evaluate attributable risk factors associated with dry eye among patients.

Material and methods:

Type of study: cross-sectional study

Place of study: The study was conducted in Ophthalmic department of medical college, Jhansi.

Duration of study: August to November 2014

Study population: 200 patients with various ophthalmic problems participated in this study. Patients suffering from acute ocular infections with extensive corneal or conjunctival pathology, contact lens users and those who had undergone extra ocular or intraocular surgery within six months of the screening were excluded. Informed consent was obtained from subjects recruited for the study.

Study tool: A pretested, semi-structured questionnaire was used which included socio-demographic characteristics, history and factors related to dry eye. General, systemic examinations and various ophthalmic tests were also used.

Sampling: A total of 200 patients were selected for this study by simple random sampling technique.

Methodology: In the study, firstly patient was informed about the study. Then pretested questionnaire was filled by taking history and asking about attributable risk factors like exposure to sunlight/high temperatures, excessive winds, air pollution, smoking and drugs. After that ocular and systemic examination of each patient was done.

Objective tests (under room temperature conditions) comprised (in order, each at 10-minute intervals to minimize reflex tearing and ocular surface changes secondary to testing) Lissamine Green staining, Schirmer's test and tear film breakup time (TBUT). Precut strips for these tests were obtained from a common source to ensure uniformity. Presence of strands/filaments was also looked for before and after the tests. In those already using tear substitutes, dry eye tests were performed after overnight discontinuation of medication. A symptom score of more than 3, Lissamine green staining score ≥ 3 (as per a staining score

key proposed by Norn[9], Schirmer's test value ≤ 5 mm in 5 minutes on Whatman's filter paper No. 41, TBUT value <10 seconds and presence of strands and/or filaments in either/both eyes were taken as indicators of dry eye. If three or more of the above 5 tests were positive, the subject was deemed to be suffering from dry eye.

Statistical Analysis: The data was entered in Excel sheet and analyzed using SPSS trial version 16. The results were expressed as proportions and percentages. Chi square test was used for qualitative variables to find association and P value <0.05 was considered significant.

Results: The baseline characterstics of the 200 participants who participated in our study is being shown in table no. 1. In our study, we found that out of the 200 participants, most of the participants belonged to the 41-60 years (43%) age group. Majority of the them were found to be males (51%), belonged to the rural background (69%) and were usually unskilled workers (27%).

In our study, prevalence of dry eye was found to be 20% among the study population.In this study it was found that the prevalence of dry eye was not more high among the study population. Maximum prevalence of dry eye was found in those above 60 years of age (33.33%) and in those living in rural area (23.19%). Dry eye disease was found to be more prevalent in females(24.49%) as compared to males and more in unskilled workers(27.08%). Association of dry eye disease was found to be statistically significant (p value <0.05) in patients exposed to excessive wind, sunlight/high temperature, air pollution and certain drugs but association with smoking was found to be statistically insignificant in our study.(Table 3)

TABLE-1 SOCIO-DEMOGRAPHIC DETERMINANTS OF STUDY SUBJECTS

Characteristics		Frequency	%
Age	21-40	61	30
	41-60	85	43
	>60	54	27
Gender	Male	102	51
	Female	98	49
Place of residence	Rural	138	69
	Urban	62	31
Occupation	Students	28	14
	Unemployed	43	21
	Unskilled worker	54	27
	Skilled worker	38	19
	Semiprofessional/ Professional	37	19

Table 2: Prevalence of dry eye according to age, sex, place of residence and occupation

Characteristis		Frequency	Dry eye subjets	Prevalence	Chi squae value	P value
Age	21-40	61	9	14.75	8.226	0.016*
	41-60	85	13	15.29		
	>60	54	18	33.33		
Gender	Male	102	16	15.68	2.421	0.11
	Female	98	24	24.49		
Place of residence	Rural	138	32	23.19	2.828	0.09
	Urban	62	8	12.90		
Occupation	Students	32	7	21.87		
	Unemployed	46	9	19.56	2.835	0.58
	Unskilled worker	48	13	27.08		
	Skilled worker	45	7	15.55		
	Semiprofessional/ Professional	29	4	13.79		

*p value <0.05 i.e. statistical significant

Table 3: Strength of association of environmental exposure factors and drugs with dry eye

Exposure factors	Non exposed group		Exposed group		Chi square value	P value
	Total subjects	Dry eye subjects	Total subjects	Dry eye subjects		
Excessive wind	165	12	35	28	47.45	0.000*
Sunlight/ High temp	148	7	52	33	46.52	0.000*
Air pollution	179	29	21	11	8.337	0.003*
Smoking	120	26	80	14	0.35	0.55
Drugs	182	28	18	12	13.44	0.0002*

*p value <0.05 i.e. statistical significant

Discussion: Diagnosis of dry eye is often overlooked as a possible cause of patient's complaint. Therefore, detection of disease at the earliest stage and prevention of attributable risk factors for dry eye alluded to in literature include air pollution, cigarette smoking, low humidity, high temperature, sunlight exposure, drugs, and uncorrected refractive error should be the goal so that disease progression to severe stage and serious sight-threatening complications caused by severe dry eye could be prevented. Thus prevention of attributable risk factors and early diagnosis could be the key for dry eye and offers good hope for better outcome. DED has a significant impact on visual function that can negatively impinge on the patient's quality of life and productivity.

Past studies suggest that dry eye prevalence ranges from 10.8% to 57.1%. [4-8] The vast disparity in dry eye prevalence stems mainly from the different dry eye diagnostic criteria employed and different cut-off values for objective dry eye tests. Our dry eye prevalence of 20%% falls within this range. The Beaver Dam study [10] reported overall prevalence of dry eye to be 14.4. Similarly, study based in rural sector of Rajasthan reported the prevalence to be 18.4%[11]. In this study, prevalence of dry eye increased with the age, which is consistent with the findings of dry eye studies conducted by chaudhary al[12], sahai & malik[11], galor et al [13],. In our study, higher prevalence of dry eye was found in females as compared to the males which is consistent with the findings of most of the other dry eye studies as in chaudhary et al[12], Sharma B[14], sahai & malik[11], albeit et al[7], hikichi [4] but the difference was statistically insignificant (P=0.11). Menopause results in oestrogen deficiency causing changes in the local hormonal environ-

ment of the lacrimal gland. It is believed to decrease the tear production and explains occurrence of dry eye more in females. We noted a higher dry eye prevalence in rural residents than in urban dwellers, (but statistically not significant) contrary to reports from Japan.[4] and Sharma B[14] but in consistency with study conducted by chaudhary et al[12],sahai & malik[11]. In our opinion, the increased rural prevalence in our study population was a direct consequence of the overwhelming exposure of rural residents, largely farmers and manual labourers, to sunlight, high temperature and excessive wind.

Significant association was found in patients exposed to excessive wind and sunlight as in studies by sahai & Malik (11), chaudhary et al[12] ,moss et al[10]. Those participants exposed to air pollution and drugs were also significantly associated with dry eye which has been also seen in studies conducted by C sahai & malik[11], chaudhary et al[12], moss et al[10]. A drug may disrupt one or more components of the tear film causing it to become unstable. Smoking was not found to show any satistically significant association with dry eye in our study which is in accordance with Sharma B[14] although it has been suggested as a risk factor for dry eye in studies by sahai & malik[11], chaudhary et al[12],,moss et al[10]

Conclusions: Dry eye is a underdiagnosed disorder causing discomfort to the patients in doing their day to day work. Patients with dry eye are at direct risk for potentially blinding infections, including bacterial keratitis. Dry eye can indirectly be a marker for secondary conditions, especially a painful target of diffuse auto immune conditions. Dry eye disease has significant economic implications, including costs associated with increased healthcare utilization, missed school or work days, adverse effect on leisure and quality of life issues. Dry can be prevented by minimizing its attribuble risk factors

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