

Original Article

Demographic Profile and Risk Factors for Dry Eye

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ABSTRACT

Introduction: 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.

Materials and Methods: This was a hospital-based prospective observational study conducted to study the demography of dry eye patients and associated attributable risk factors for the disease. Every patient presenting with symptoms suggestive of dry eye was given a questionnaire, as per Salisbury Eye Evaluation Study and thorough ocular examination was done along with two tests for dry eye i.e Schirmer test I measuring less than 10mm and Tear film break up time measuring less than 10 sec. Final data analysis was done using statistical tool SPSS.

Results: Demographic profile revealed a female preponderance in the patients with a ratio of 1.9:1. Amongst them, prevalence of premenopausal age was 53%. Dry eye was found to be more common in age group between 30 to 40 years (29%). The modifiable attributable risk factors were urban residence (67%), exposure to air condition and computer user (52%), indoor workers (59%), and environmental pollutants (60%).

Conclusions: This study revealed the patients who presented with dry eye were mostly female of premenopausal age group, and exposed to modifiable risk factors which included residing at urban areas, indoor work, and exposure to environmental pollutants.

Key words: Eye; Salisbury; Schirmer test; Sjogren; Tear

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INTRODUCTION

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. In 2007, International Dry Eye Workshop (DEWS)¹ gave a new definition of dry eye: "Dry eye is a multifactorial disease of tear film & ocular surface resulting in symptoms of ocular discomfort, visual disturbance and tear film instability with potential damage to the ocular surface. This is associated with hyperosmolarity of the tear film and inflammation of ocular surface. Surveys over the last five years have estimated the prevalence of dry eye to be between

5% to more than 30% at various age groups.² The epidemiology subcommittee of the 2007 Beijing eye study found out that the prevalence of dry eye to be 60 percent.

In a survey by American Academy of Ophthalmology respondents reported that approximately 30% of patients seeking treatment at an ophthalmologist's office have symptoms consistent with dry eye.³ The Beaver Dam study⁴ reported overall prevalence of dry eye to be 14.4 percent. Similarly, study based in rural sector of Rajasthan reported the prevalence to be 18.4 percent.⁵ Literatures have recognized various risk factors for the development of dry

Table 1: Distribution of patients according to the age group

Age in years	No of patients (%)
10-20	13 (13)
20-30	24 (24)
30-40	29 (29)
40-50	18 (18)
50-60	12 (12)
>60	4 (4)

eye. These include: female gender, hormonal changes, systemic autoimmune disease (most prominently Sjogren syndrome), decreased corneal sensation, refractive surgery, blinking abnormalities, drug effects, viral infections such as HIV, diabetes mellitus, Vitamin A deficiency and graft versus- host disease.⁵ The purpose of this study was to identify the demographic prevalence and risk factors associated with dry eye.

MATERIALS AND METHODS

This was a hospital-based prospective observational descriptive study on population attending outpatient department of Ophthalmology from 1st June 2017 to 30th November 2017 (erratum 1st March 2019 - added from 1st June 2017 to 30th November 2017). Permission was obtained from institutional review board to conduct the study. A performa was created which included questionnaire as per Salisbury Eye study.⁶ One hundred patient participants were included. A questionnaire for each patient presenting with symptoms suggestive of dry eye was filled and recorded. Diagnostic criteria for dry eye required these patients to test positive for following three tests: a) presence of strands / filaments on cornea, b) Schirmer test I measuring less than 10mm, and c) Tear film break up time measuring less than 10 seconds.

Patient scoring a minimum of 3 in the questionnaire and diagnosed to have dry eye as per the diagnosed criteria were included in this study. Patients with any other ocular pathologies and children less than 10 years of the age were excluded in this study. Detail history was elicited from the patients outlining all the probable risk factors under evaluation. Different variables were recorded from the standard performa. Final data analysis was done using statistical tools- SPSS vs. 21.

RESULTS

Among 100 patients studied, the age of the patients ranged from 10 to 79 years. Most of the patients who presented with dry eye were in age group 30 to 40 years (n=29; 29%), followed by 20-30 years (n=24; 24%) as shown in Table 1.

Gender distribution showed a preponderance of females as compared with male. Male to female ratio was 1:1.9 (P<.001). Among females dry eye was more prevalent in premenopausal females (n=53; 53%) than postmenopausal women (n=47; 47%). Most of the patients in this study were from urban areas (n=67; 67%) with remaining 33 patients (33%) from rural areas. Most of the patients with dry eye were indoor workers (n=59; 59%) as

compared to outdoor workers (n=41; 41%). This study showed that dry eye was more common in patients with exposure to environmental pollutants like dust, smoke and sun (n=60; 60%) than those who has no exposure to the pollutants (n=40; 40%). As per derived from patient's history 52 (52%) of patients those who are using computers and exposure to air condition had dry eye as compared to non-computer users (n=48; 48%).

DISCUSSION

Dry Eye Workshop (DEWS) reviewed major epidemiological studies of dry eye and demonstrated that the prevalence of dry eye ranged from 5-30% of the individual above 50 years. Questionnaire-based survey, like ours, have reported the prevalence of dry eye ranging from 14.4 to 33 % of the populations sampled.⁶ In this study, largest number of patients cluster was in group of 30 to 40 years of age, which was 29 percent. Female patients (66%) presented more frequently with dry eye than males (34%). The published data regarding the relation between dry eye and gender study performed by Mc Carty et al⁷ in Australia indicated that women were more likely to report the symptoms of eye. In the Beaver Dam study,⁴ age-adjusted prevalence in men was 11.4% compared with 16.7% in women (P<.001). A study conducted in North America by Moss et al.⁸ indicated that the age adjusted prevalence in men was 11.4% which was significantly lower than the 16.7% prevalence in women. Regarding the premenopausal and post menopausal state, both tend to have dry eye symptoms. Lambert et al⁹ demonstrated that tear production decreases significantly in women aged 50-59 years. In our study, the number of premenopausal females accounts for 53% of the female population.

This study showed that 67% of the patients resided in urban and only 33% patients in rural sector which is similar to findings of SK Gupta and Rohit Saxena.^{10,11} SK Gupta et al indicated that people traveling in highly polluted areas and exposed to high level of air pollutants are likely to suffer from significantly high incidence of ocular surface disorders.¹⁰ Environmental pollutants and stresses like dust, smoke, and excessive sunlight have shown significant association in this study as well. Sixty percent of patients were reported having excessive exposure to environmental pollutants like dust, smoke, and sunlight. Hikichi T et al¹² found out that there was no seasonal pattern for dry eye but was more prevalent in urban and sub-urban areas.

This study showed that patients who presented with dry eye work indoor (59%) more than outdoor (41%). Indoor workers patients such as administrative officers, students, banker, and home maker are more likely to use computers for prolonged period which is one of the risk factors for dry eye. Duneryl B al¹³ conducted a study regarding eye strain, blink rate, and dry eye syndrome in video display terminal (VDT) users, and obtained result suggested that using the VDT causes decrease blink rate that in turn produces dry eye.

Most of the patients who presented with dry eye were exposed to environmental pollutants (60%). A study conducted USA by Galor A et al¹⁴ found out that air pollution and atmospheric pressure emerged to be the most influential risk factors for dry eye. Climate and environmental challenges such as relative humidity, indoor environment, pollution, and extreme temperatures play role in the prevalence of dry eye disease. Both relative humidity and temperature influence the overall thermal climate and effect

on the precorneal tear film and thus cause dry eye symptoms.¹⁵ Outdoor air quality and temperature also affect tear film stability. Exposure to sun, dust, and wind exacerbate dry eye disease.¹⁶

In our study, patients who presented with dry eyes were frequent computer users and exposed to air condition environment (52%). A study conducted in Japan¹⁷ suggested that the link between computer use and dry eye disease is probably not co-incidental since people who use these devices blink at a low rate, i.e. one third less than normal; and we know that blinking and lubricating of the ocular surface is important to prevent dryness. The Salens eye study¹⁸ conducted among elderly Tibetans mentioned that computer use were found to be independently and significantly associated with dry eye.

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CONCLUSIONS

This study revealed the patients who presented with dry eye were mostly female of premenopausal age group, and exposed to modifiable risk factors which included residing at urban areas, indoor work, and exposure to environmental pollutants.