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RESEARCH ARTICLE

PREVALENCE OF OCULAR SYMPTOMS AND DRY EYE DISEASE IN ELDERLY INDIVIDUALS AT AN EYE CAMP

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ABSTRACT

Aims: Ocular symptoms and dry eye disease have a strong relationship with ageing. In this study, we evaluate the prevalence of ocular symptoms and dry eye disease in elderly attending an eye camp. **Method:** A total of 120 elderly (>60 years) outpatients visiting an eye camp organized at a geriatric speciality hospital in Lucknow were assessed for presence of ocular symptoms like foreign body sensation, burning, discharge, itching, heaviness, redness, photophobia, watering and eye pain/heaviness. Details regarding presence of cataract disease at present or in past and chronic systemic illnesses like hypertension, diabetes, asthma, COPD, osteoarthritis were noted. All the participants were then evaluated for dry eye disease using Schirmir strips. Dry eye disease was noted at a cut-off <10 mm, those having values <5 mm were considered to have severe dry eye disease. Data was analyzed using SPSS 21.0 package. Chi-square and Independent samples 't'-tests were used for comparisons. **Results:** Age of participants ranged from 61 to 82 years. Mean age of elderly was 69.98±5.80 years. Almost half (50.8%) were males. A total of 109 (90.8%) elderly were symptomatic, discharge from eye (54.2%), photophobia (49.2%) and eye pain/heaviness (49.2%) were the most common ocular symptoms. Mean number of ocular symptoms was 3.89±1.81. A total of 64 (53.3%) had cataract and 76 (63.3%) had chronic systemic illness history. Prevalence of dry eye disease was 38.3%. Severe dry eye disease was seen in 14 (11.7%) cases. Older age, foreign body sensation, Itching, photophobia, eye pain/heaviness, symptomatic eye, higher number of symptoms cataract and chronic systemic illness history were significantly associated with dry eye disease. **Conclusion:** Elderly OPD patients had a high prevalence of ocular symptoms and dry eye disease. Older age, chronic systemic illness and cataract history were significant predictors of DED.

INTRODUCTION

Dry eye disease and associated ocular symptoms are age associated problems of the eye that are highly prevalent in elderly¹. In the previous studies, prevalence of dry eye disease among elderly has been reported to range from 5 to 30% of general elderly population^{2,3}. Blurred vision, foreign body sensation, pain, itching and heaviness of eyes are some of the common symptoms associated with dry eye disease that show an increased prevalence in the elderly. A number of theories for age-related ocular changes resulting in dry eye symptoms and dry eye disease have been proposed, viz., biological clock or programmed theory and wear and tear or error theory⁴. It is believed that ageing is associated with an increase in free radical levels that are responsible with oxidative stress⁵, that has a strong relationship with systemic illnesses too, that are often quite common in elderly, thus predisposing the elderly to an increased risk of dry eye disease. Persistence of dry-eye symptoms have an influence both on the quality of vision as well as the overall quality of life of the affected patient^{6,7}. Moreover, elderly having undergone cataract surgery procedure are also at an increased risk of developing dry eye disease⁸. Despite older age being a high-risk for dry eye disease yet there are limited studies evaluating its prevalence in elderly, with special reference to Indian population.

Our facility is a geriatric speciality hospital that organizes health camps, including eye camps for elderly at frequent intervals. Hence, the present study was planned to study the prevalence of ocular symptoms, dry eye disease, its severity and determinants in elderly individuals attending these camps.

MATERIALS AND METHODS

This study was performed at Aastha Hospice and Geriatric Care Centre, Lucknow, a premier geriatric speciality hospital in north India in July, 2023 during eye camp organized for the benefit of elderly community residents and outpatients. The inclusion criterion of study was age >60 years irrespective of refractive error status. Hospitalized patients with any infectious eye disease or surgical procedure within last six months and those having any traumatic injury to eye were excluded from the assessment. Data for the study was collected using a three-part structured inventory prepared specifically for the purpose of the study. The first part of the form included demographic information and items related with inclusion and exclusion criteria, details regarding current/previous cataract disease, history of chronic systemic illness such as diabetes, hypertension, chronic kidney disease, coronary artery disease, asthma, chronic obstructive pulmonary disease, osteoarthritis, other cardiovascular illnesses etc.

were also noted. The second and third parts were used only in cases who fulfilled the sampling norms (inclusion and exclusion criteria). The second part enquired the elderly regarding a total of eight dry eye symptoms, *viz.* foreign body sensation, burning, discharge, itching, heaviness, redness, photophobia, watering and eye pain/heaviness. The third part recorded information related to dry eye disease evaluation using Schirmer's test.

Schirmer's Test: Schirmer strips were used for the assessment of dry eye disease. The cut-off for diagnosis of dry eye disease was kept at <10 mm. Values between 5 and 10 mm were considered as mild dry eye disease, value <5 mm was considered as severe dry eye disease. Both the eyes were examined by a trained ophthalmologist. Inability to achieve ≥ 10 mm in either of two eyes was marked as dry eye disease. Assignment of severity grade was done as described above. Those diagnosed of dry eye disease were advised to use a tear drops/gels/moisteners thrice a day.

Data Analysis: Statistical Package for Social Sciences, version 21 was used to analyze the data. Chi-square test was used to compare the data. Multivariate assessment was done using Binary logistic regression. 'p' value less than 0.05 was considered significant.

RESULTS AND DISCUSSION

RESULTS

Age of study population ranged from 61 to 82 years. Mean age of study population was 69.98 ± 5.80 years. Almost half (50.8%) were males. Discharge from eyes (54.2%) was the most common ocular symptom followed by eye pain/heaviness and photophobia (49.2% each), foreign body sensation, burning sensation and redness 48.3% each, watering (46.7%) and itching (45%) respectively. A total of 109 (90.8%) elderly had at least one ocular symptom. Number of ocular symptoms ranged from 0 to 7 with a mean of 3.89 ± 1.81 . Current/previous history of cataract disease was reported by 64 (53.3%) patients. History of chronic systemic illnesses was revealed by 76 (63.3%) elderly (Table 1). Majority of elderly had normal Schirmer's test (61.7%). There were 46 (38.3%) elderly having dry eye disease. Mild and severe dry eye disease was recorded in 32 (26.7%) and 14 (11.7%) elderly respectively (Table 2). On evaluating the association of dry-eye disease with different clinicodemographic factors and ocular symptoms, older mean age ($p=0.016$), foreign body sensation ($p=0.030$), itching ($p=0.006$), photophobia ($p=0.017$), eye pain/heaviness ($p<0.001$), symptomatic status ($p=0.036$), higher number of symptoms ($p<0.001$), history of chronic systemic illness ($p=0.032$) and cataract history ($p=0.005$) were found to be significantly associated with dry eye disease (Table 3).

DISCUSSION

Dry eye disease is a common ocular problem with a number of underlying etiologies. Ageing, use of topical hypotensive agents, cataract surgery, chronic systemic illnesses, *etc.*^{2,9-13}, interestingly all these risk factors have a strong link with older age and hence, it is of interest to evaluate the prevalence of ocular symptoms, dry eye disease and its severity in elderly population and to identify various risk factors associated with it. In the present study, we found a high prevalence of ocular symptoms in elderly (90.8%) and found the prevalence of dry eye disease to be 38.3% with as many as 11.7% elderly having severe dry eye disease as per the criteria used by us. Finally, we identified older age, specific symptoms like foreign body sensation, itching, photophobia, eye pain/heaviness, symptomatic state and higher frequency of ocular symptoms apart from history of chronic systemic illness and cataract history to be significantly associated with prevalence of dry eye disease in the elderly population. One of the important findings was the fact that ocular symptoms were highly prevalent in the elderly and they seemed to transform into dry eye disease.

The prevalence of dry eye disease in elderly population in our study (38.3%) is close to that reported by Liu *et al.*¹⁴ who on the basis of a meta-analysis reported the prevalence of dry eye disease in elderly above 60 years of age to be 34.4%. Wu *et al.*¹⁵ in another study conducted among Mongolian and Han elderly in northern China reported it to be 32.6% in Mongolian and 35.4% in the Han ethnicities. A slightly higher prevalence of dry eye disease in our study could be owing to its conducted in a speciality camp that may have been attended by a relatively higher proportion of symptomatic cases. Community based studies from Korea show the prevalence of dry eye disease in elderly above 65 years of age to be lower at 17.9%¹⁶. A much lower prevalence of dry eye symptoms (4.1%) and dry eye disease (0.9%) was reported in elderly aged ≥ 60 years in a community survey conducted in India, however, such low prevalence in their study could be owing to exclusion of cases having red or painful eyes, gross anatomical anomaly and using any eye drops¹⁷. In the present study, however, such symptomatic patients were not excluded, moreover, the present study was not carried out in community but was a hospital-based assessment conducted in an eye camp where we can expect a higher probability of footfall of symptomatic cases. In speciality clinics the probability of encountering a higher prevalence cannot be ruled out. In one such study conducted in Indonesia, prevalence of dry eye disease, preclinical dry eye, and predisposition to dry eye were 22.5%, 22.5%, and 26.5%, respectively in an elderly population¹⁸. In their study only 28.5% were normal. In the present study too, as many as 90.8% elderly had at least one symptom of dry eye disease and those with absolutely normal eyes comprised only 9.2% of study population. A relatively higher prevalence in the present study could also be attributed to categorization of abnormal condition to be inclusive of both eyes, thus those elderly having unilateral problem were also considered as dry eye disease.

One of the reasons for discrepancy in prevalence rates of dry eye disease among different studies could be owing to difference in diagnostic criteria. In a study conducted in Korea, the prevalence of dry eye disease in elderly was reported to be 30.3%, using a symptom-based diagnostic criteria³. However, a recent study from Puducherry, India, that used multiple clinical tests (Schirmer's test, Meibomian Gland Dysfunction (MGD) assessment, Tear Film Break Up Time (TBUT), Fluorescein staining and Impression cytology), this prevalence was reported to be only 15.4%¹⁹. In the present study, we did not classify dry eye disease on the basis of symptoms only and used Schirmer's test for this purpose. However, we do not rule out the effect of diagnostic criteria on the overall prevalence of dry eye disease in elderly.

In the present study, we identified older age, specific symptoms like foreign body sensation, itching, photophobia, eye pain/heaviness, symptomatic state and higher frequency of ocular symptoms apart from history of chronic systemic illness and cataract history as the risk factors for dry eye disease in elderly. As such foreign body sensation, itching, photophobia and eye pain/heaviness are known risk factors for dry eye disease and a number of studies even considered the presence of these risk factors itself as dry eye disease^{3,16} while some others considered them as preclinical or predisposing factors related with dry eye disease¹⁸. Older age in general is considered to be a risk factor for dry eye disease¹⁴. The diminishing function of lacrimal gland with ageing is a well-known phenomenon that has been tried to be explained through various theories including programmed and wear/tear or error theories^{4,11}. Though some studies have shown female sex as a risk factor for dry eye disease^{14,16}. In another study, male sex was reported as a risk factor for dry eye disease in elderly¹⁸, however, in the present study no such sex predisposition could be seen. With respect to emergence of history of cataract surgery as a risk factor, it has been established as a risk factor earlier too⁸. Moreover, chronic systemic illness history leads to polypharmacy and oxidative stress that could lead to an increased risk of dry eye disease in elderly apart from the other potent risk factors like decreased blink rate in older age². The findings of the present study, conducted in an eye camp provide some useful information regarding the fact that symptomatic elderly remain at a very high risk

of developing clinically significant dry eye disease. The findings show that there is need to take preventive measures at the onset of symptoms themselves so that their transformation into clinically significant state could be checked. Further studies in community and in different health states of elderly are recommended.

CONCLUSION

There was a high prevalence of ocular symptoms in elderly individuals attending an eye camp. Almost two-fifth of the elderly had clinically significant dry eye disease. Advancing age, symptomatic state, history of cataract surgery and chronic systemic illness predispose the elderly to an increased risk of dry eye disease.

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