

Prevalence of Dry Eyes in Postmenopausal Females in Hadoti Region of Rajasthan

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Introduction: Dry eye syndrome (DES) is one of the most frequently encountered ocular conditions. Although clinical observation has long been suggested that DES is more common in women, particularly among older women, there are only few epidemiological studies which are available to describe the magnitude of the problem of DES among post-menopausal women especially in India.

Materials and Method: A total of 200 post-menopausal females attending the Out Patient Department were included in the study. All patients were given Ocular Surface Disease Index (OSDI) questionnaire. Diagnosis of dry eye in our study was made when two of the 3 tests are positive viz. Schirmer-I test (<10mm), Tear Film Break-Up Time (TBUT) (<10sec) and Ocular surface dye staining with Lissamine green dye (Van Bijsterveld's score ≥ 4).

Abstract Results: Prevalence of dry eye syndrome was high in this age group i.e. 44% (88/200 post-menopausal women (PMW). 49% (98 Post Menopausal Women) responded with symptoms of dry eye (OSDI score >12). Tear Film Break-Up Time test sensitivity was 97.6% and specificity was 92.36%. Lissamine Green dye staining was less sensitive but more specific test to diagnose dry eye syndrome (sensitivity of 33.6% and specificity of 98.91%). Schirmer I test has high sensitivity (91.2%) and high specificity (96.36%). The positive predictive value was 91.94% and negative predictive value was 96.01%. All three tests were reliable in diagnosing dry eye as each had p value < 0.001. Meibomian Gland Dysfunction was present in 10% of Dry eye positive females.

Conclusion: The high prevalence of dry eye in post-menopausal females is responsible for significant morbidity.

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Keywords: Dry Eye Disease, Postmenopausal Females, Prevalence, Osdi, Schirmer, TBUT

Introduction

Dry eye is a multifactorial disease of the tears and ocular surface that results in symptoms of discomfort and visual disturbance. It is accompanied by increased osmolarity of the tear film and inflammation of the ocular surface.¹ Dry eye is a common source of discomfort that can seriously affect a patient's quality of life, especially in the elderly population.^{2, 3} Epidemiological studies have found that women are more likely to report dry eye symptoms than men^{4,5} and is a condition of multifactorial etiology, which, in most cases, is chronic and progressive.⁶ A key aspect of dry eye that remains a major problem is the lack of association between the symptoms and signs of dry eye⁷⁻¹³ and the poor test reproducibility of objective tests¹⁴ making it difficult to assess disease progression and the impact of treatments on symptoms. This study is first initiative to determine the prevalence of dry eye in post-menopausal females in Hadoti region of Rajasthan.

Material and Method

A total of 200 post-menopausal females (>50yrs) were enrolled in the study from the out-patient department over a period of 1 year.

Exclusion criteria

1. Pre existing ocular surface disease like chemical burns, Vernal-Keratoconjunctivitis, Steven Johnson Syndrome, aniridia, Sjogren syndrome, etc.
2. Ocular surgery in the past 6months like cataract surgery, corneal refractive surgery, prior ptosis surgery, ectropion/entropion surgery, blepharoplasty.

3. Ocular infection within past 3 months like Herpes zoster and varicella zoster
4. Chronic ocular allergy like allergic blepharoconjunctivitis.
5. Topical medication such as glaucoma medications, vasoconstrictors, corticosteroids, antihistaminic.
6. Systemic diseases like ceased menses due to autoimmune disease, pelvic irradiation, hysterectomy or smoking, Rheumatoid Arthritis, Parkinson's, Lupus, Diabetics.
7. Systemic medications like antihistaminics, tricyclic antidepressants, diuretics, hormonal replacement therapy and chemotherapy were excluded from the study.

Patient evaluation

All patients, after obtaining informed consent, were examined. Examination included: visual acuity measurement with correction, external eye examination, and slit-lamp biomicroscopy. Participants were given the Ocular Surface Disease Index (OSDI) and were categorized as being symptomatic or asymptomatic of dry eye based on their response to OSDI. An OSDI score of 0-12 represented No Dry Eye; an OSDI score of 13-22 was categorized as mild Dry Eye; an OSDI score of 23-32 moderate dry eye and an OSDI score of more than 32 as severe dry eye.^{15,16}

Diagnosis and confirmation of dry eyes was done by series of tests performed in standard sequence with difference of at least 10 min as follows: Schirmer's test, Tear film breakup

time (TBUT), ocular surface dye staining (Lissamine green), assessment of meibomian gland. Diagnosis of dry eye in our study was made when two of the 3 tests were positive.

Schirmer- I test

A pre-calibrated dry filter paper strip measuring 5 × 40 mm was placed in each lower fornix at the junction of outer and middle thirds without touching the cornea, and left for 5 minutes and patient was asked to close eyes. After 5 minutes the strips were removed and the amount of wetting in mm was recorded. The result was considered positive if the amount of wetting of the paper was <10mm.

Tear break-up time (TBUT) test

It was performed by moistening a fluorescein strip with sterile non- preserved saline and applying it to the inferior tarsal conjunctiva. The tear film was examined using a broad beam of the slit-lamp microscope with a cobalt blue filter. The time lapse between the last blink and the appearance of the first randomly distributed dark discontinuity in the fluorescein stained tear film was TBUT. The result is considered positive if value was less than 10 seconds.

Ocular surface dye staining

- Lissamine green staining stains superficially damaged cells with a defective mucin layer. A pre-sterilized filter paper strips with 1.5mg Lissamine green per strips was placed in lower cul-de-sac of each eye after adding sterile non-preserved saline. Exposure-zone punctate or blotchy staining was observed in dry eye.

Van Bijsterveld’s score was used to analyses the staining pattern. A score of 4 or more was considered positive for dry eye diseases.¹⁷

To determine the condition of the meibomian glands, the eyelid margins in both the lower and upper lids was examined in the slit lamp. Digital pressure was applied on the tarsi to assess the degree of obstruction. The presence of lid margin telangiectasia, collarette and meibomian gland plugging was recorded and graded

Ethics

Clearance was taken from the local ethical committee of college and procedures were done according to the standards of the committee.

Result

The age group was between 50 to 85 years, with the mean age of the patients being 59.23 + 7.39 years. Among the entire group, 88 patients (125 eyes) were diagnosed to have dry eye based on the tests, i.e. prevalence of 44%. (Figure 1)

In our study prevalence of dry eye among females from rural areas were slight higher than urban areas (45.23% and 43.67% respectively). (Table 1)

The ocular surface disease index (OSDI) was administered to the patients before subjecting them to examination or tests. Of the entire study group, 49% (98 patients) responded with symptoms of dry eye (score >12). According to OSDI score 57.95% had mild dry eye, 17.04% had moderate dry

eye and 13.64% had severe dry eye. The OSDI total score was significantly different between the two groups (Non Dry Eye (NDE) = 8.92+ 7.74 vs. Dry Eye (DE) = 20.86 + 11.31; p<0.001). (Table 2)

Table 1: Dry eye in relation to residence

Residence	Dry Eye Present	Dry Eye Absent	Total	Percentage
Urban	69	89	158	43.67%
Rural	19	23	42	45.23%

Table 2: OSDI Score and correlation with dry eye

OSDI Score	Dry Eye Present	Dry Eye Absent	Total No. Of Patients
0-12	10	92	102
>12-22	51	16	67
>22-32	15	1	16
>32	12	3	15

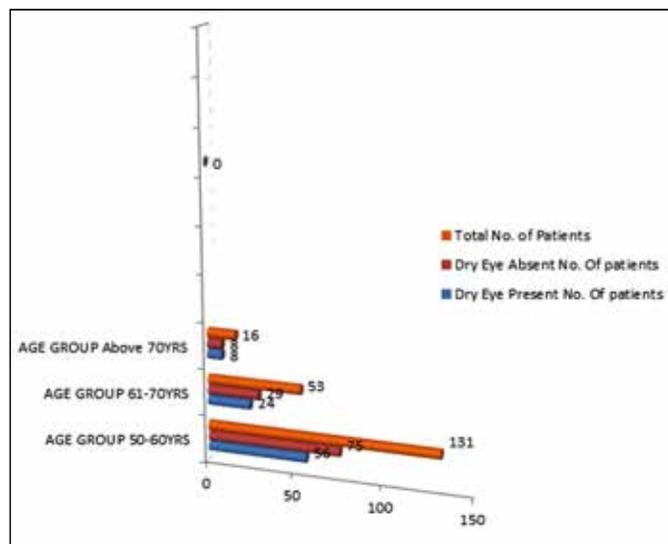


Figure 1: Bar diagram showing dry eye in relation to age group

TBUT was found to be positive (<10 seconds) in 143 eyes (35.75%). Among these, 122 eyes were proved to be positive for dry eye based on pre-determined diagnostic criteria. This test was found to have a sensitivity of 97.6% and specificity of 92.36%. The positive predictive value was 85.31% and negative predictive value was 98.83%.

A total of 45 eyes (11.25%) showed positive staining. Among these, 42 eyes (93.33%) were positive for dry eye. The test was found to have a sensitivity of 33.6% and specificity of 98.91%. The positive predictive value was 93.33% and negative predictive value was 76.62%.

A total of 124 (31%) eyes gave a wetting of less than 10mm on performing the Schirmer I test. Among these, 114 were proved to be positive for dry eye based on pre-determined diagnostic criteria. The Schirmer I test showed a sensitivity of 91.2 % and specificity of 96.36%. The positive predictive value was 91.94% and negative predictive value was 96.01%. Schirmer I Test score was <0-5 in 44 eyes (11%), between 6-9 in 80 eyes (20%) and ≥ 10 in 276 eyes (69%).

Meibomian Gland Dysfunction (MGD) was found in 18 out of 125 dry eyes (14.4%) and 20 out of 275 non dry eyes (7.27%). Overall prevalence of MGD was 9.5% (38/400 eyes).

Discussion

Dry eye is a distressing problem for both subject and treating ophthalmologist. The actual prevalence of this condition in the community is unknown because patient present late to ophthalmologist when the condition is moderate to severe and the symptom have become intolerable. Even at this stage, the diagnosis may not be made if the ophthalmologist does not perform the diagnostic tests required to detect dry eye. The condition of dry eye is therefore often overlooked and hence under diagnosed in the population.

In our study, out of 200, 88 females were positive for dry eye based on the tests, i.e. prevalence of 44%. This result was similar to result of Mohana Majumdar et al¹⁸ who included 293 post-menopausal females and reported prevalence of dry eye to be 43.34% in their study group.

- Similar results were reported in Shihpai Eye Study.¹⁹ It was a population-based survey of eye diseases in the elderly (> or =65 years). In this population, 33.7% (459/1361) were symptomatic, defined as reporting 1 or more dry-eye symptoms often or all of the time. Women were more likely to report frequent symptoms of dry eye (odds ratio, 1.49; 95% confidence interval, 1.19-1.87). In our study prevalence of dry eye among females from rural areas were slight higher than urban areas (45.23% and 43.67% respectively). Though it was not statistically significant (p = 0.85). This in coherence with the study of Schuamberg et al,⁴ surveyed 39,876 US women participating in the Women's Health Study, who reported there were no significant differences with respect to region of residence on the probability of having dry eye syndrome.

This is in contrast to other studies such as Beijing Eye Study²⁰ that reported higher prevalence of dry eye in urban areas. This difference between the studies can be attributed to difference in cohort selected and geographical location and the criteria selected for diagnosis of dry eye in the study.

In our study out of 200 PMW, 49% (98 PMW) responded with symptoms of dry eye (score >12). Among them 89.80% (88 females) were diagnosed to have dry eye based on the objective test performed, that was statistically significant (p value <0.001). The OSDI total score was significantly different between the two groups (Non Dry Eye = 8.92+ 7.74 vs. Dry Eye = 20.86 + 11.31; p<0.001). According to OSDI score 57.95% had mild dry eye, 17.04% had moderate dry eye and 13.64% had severe dry eye. Our study shows that correlation between symptoms and signs of dry eye is statistically significant.

- Our result were consistent with studies done by Ozcura et al²¹ who evaluated the OSDI questionnaire for diagnosis of dry eye and concluded that OSDI is a

standardized instrument to evaluate symptoms, and can easily be performed and used to support the diagnosis of dry eye syndrome.

- Similarly Schiffman et al²² in their study of 139 person (09 patients of dry eye and 30 normal controls) reported OSDI demonstrated both high internal consistency and good to excellent test-retest reliability in a large sample of patients with dry eye disease and normal controls. In our study Tear Film Break-Up Time test sensitivity was 97.6% and specificity was 92.36%. The positive predictive value was 85.31% and negative predictive value was 98.83%. Chi- square test was applied and p value was < 0.001 so the results were statistically significant and we conclude that TBUT test is a reliable test to diagnose dry eye coherent with studies of J.H. Lee et al²³ on 30 normal subjects and 20 dry eye patients.

Ocular surface staining is an important endpoint, reflecting ocular surface integrity.^{24,25} In our study Ocular surface dye staining score using van Bijsterveld system with Lissamine Green dye was less sensitive but more specific test to diagnose dry eye syndrome (sensitivity of 33.6% and specificity of 98.91%). The results were significant as the p value was <0.001. As reported by P Hamrah et al²⁶ that Lissamine Green has good inter-observer reliability and is well tolerated for the diagnosis of dry eye syndrome.

In our study, Schirmer I test sensitivity was 91.2 % and specificity was 96.36%, i.e. a high sensitivity and specificity. The positive predictive value was 91.94% and negative predictive value was 96.01%. The results were statistically significant as p value was <0.001. This is in coherence with results of M. Ramesh Chandra et al²⁷ who in their study of 70 patients reported that Schirmer test has a sensitivity of 91.1% and specificity of 93.7%. The positive predictive value of the test was found to be 91.07% and the negative predictive value was 93.7%.

In our study prevalence of MGD was 14.4% in dry eyes and 7.27% in non dry eye. There were substantial differences in the exact clinical signs used to define MGD across these studies. So direct comparisons between studies or drawing overarching conclusions is difficult.

This study provides data about the prevalence of dry eye in Post menopausal females in the Hadoti region of Rajasthan which has not been done prior, thus , it signifies the importance of dry eye as a major morbidity causing factor.

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