

**Original article:**

## **Evaluation of Prevalence of Complications of Dry Eye Disease: An Institutional Based Study**

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### **ABSTRACT**

**Background:** Xerophthalmia is a major clinical entity which routinely misses out in clinical examination and its ocular manifestations ranges from night blindness to corneal melting. Xerophthalmia is known to occur in any age group and especially in preschool-age children, adolescents and pregnant women. Dry eye causes a significant impact on the everyday life, which indirectly have an effect on the overall economy of a nation.

**Materials and Methodology:** 325 patients attending the Department of Ophthalmology, Shadan Institute of Medical Sciences Teaching Hospital & Research Centre, Hyderabad, Andhra Pradesh (India) who fulfilled the inclusion criteria were chosen for the study. History of any other systemic diseases, ophthalmic history and previous treatment history was recorded. Scoring of the patients was done and the scores ranged as follows: OSDI – 0 to 100 and the OSDI score  $\geq 12$  was taken as positive for the arriving at the consideration of dry eye disease. DEQ: 5 – 0 to 22 and the score  $\geq 6$  was taken as positive 3,4 for dry eye disease.

**Results:** The prevalence of dry eye is reported to be 40.7%. With the maximum patients having evaporative type (43.3%) followed by the mixed type (35.2%) and the aqueous tear deficiency (21.5%) being the least common among the study participants. Prevalence among females (46.1%) is greater than males (36.2%). The farmers and labourers (64.4%) are maximally affected followed by factory workers (37.9%).

**Conclusion:** Xerophthalmia is a major clinical entity that commonly affects millions of people globally. It is a distressing problem which is often overlooked and is frequently missed in routine examination. The multifactorial aetiopathogenesis and lack of specificity of symptoms might explain why the clinical diagnosis of dry eye remains a challenge. Moreover, there is a reportedly poor association between the signs and symptoms of xerophthalmia.

**Key words:** Xerophthalmia, Vitamin A Deficiency, Night Blindness, Corneal Melting.

### **INTRODUCTION**

One of the major conditions that arises due to the deficiency of vitamin – A is Xerophthalmia/dry eye which refers to all ocular manifestations which ranges from the initiation of night blindness to the progression till corneal melting. Proper recognition of the signs and symptoms of Xerophthalmia and the initiation of prompt treatment based on the international classification is the prime goal of the therapy. Children & pregnant women

are primarily at risk of developing the condition. Xerophthalmia is the most frequent and the most devastating ocular disease which could be attributing to nutritional deficiency.

The word xerophthalmia literally means “dry eye” which denotes the entire spectrum of ocular abnormalities arising from vitamin A deficiency. These most commonly include night blindness, retinopathy, conjunctival and corneal xerosis, corneal ulceration and melting, and less obvious alterations in the epithelial structure of the eye and various other organs. The importance of vitamin A in the normal host resistance and survival has become topic of interest. Even children with mild, subclinical deficiency are mostly at the increased risk of developing respiratory disease and diarrhoea, anaemia, growth retardation and death.<sup>1</sup> Although the ocular complications of vitamin – A deficiency are best identified and clinically well notable. Studies reported that around 250 million preschool children are at risk of vitamin A deficiency especially in the developing countries like India because of insufficient and varied diets, poor maternal education and also improper hygiene.<sup>2</sup> Vitamin - A Prophylaxis Programme was first launched in the year 1970 with the objective of minimising the disease and preventing the development of blindness due to vitamin - A deficiency.

Xerophthalmia is known to occur in any age group and especially in preschool-age children, adolescents and pregnant women. Therefore, the children are at higher risk of vitamin-A deficiency and xerophthalmia, due to their greater vitamin A requirements for their physiological and skeletal growth. Children are also at the higher risk of intestinal infestations and infections, which has the capability of impairing the absorption of vitamin A and increase its availability. A peak in the incidence of night blindness is generally observed between 3 and 6 years of age. However, as it is almost impossible to evaluate night blindness in infants and young children who have not yet begun to crawl or walk, its presence may not always be identified earlier and hence it may be erroneously perceived that night blindness is not a serious condition at that age. Affected children often perceive limited activity after dusk and are commonly reported to be unable to find their food or toys.<sup>3</sup> Pregnant and lactating women are also at risk for night blindness. Neonates born to vitamin A-deficient mothers are born with decreased vitamin A reserves.<sup>3,4</sup>

## **MATERIALS AND METHODOLOGY**

This study is designed to be a hospital based cross sectional study and the patients were directly selected from the Department of Ophthalmology, Shadan Institute of Medical Sciences Teaching Hospital & Research Centre, Hyderabad, Andhra Pradesh (India) after obtaining the proper written informed consent.

The various inclusion criteria that had been followed in this study were those patients with a clear symptom of dry eyes for more than a month, those who are 20 years and older. Exclusion criteria include those patients not willing, recent ocular infection, inflammation or acute allergic conjunctivitis, those patients who require emergency care and those who are unable to follow the instructions properly.

325 patients attending the department of ophthalmology OPD who fulfilled the inclusion criteria were chosen for the study. History of any other systemic diseases, ophthalmic history and previous treatment history was recorded. Systemic and ocular examination was done. These patients were supplied with over the two dry eye questionnaires (OSDI and DEQ 5) which had questions related to the various signs and symptoms of dry eye. Scoring of the patients was done and the scores ranged as follows: OSDI – 0 to 100 and the OSDI score  $\geq 12$  was

taken as positive for the arriving at the consideration of dry eye disease. DEQ: 5 – 0 to 22 and the score  $\geq$  to 6 was taken as positive 3,4 for dry eye disease.

The Participants then subjected to underwent a comprehensive examination test sequence. TBUT was performed before the other dry eye tests, to avoid any unnecessary interference followed by ocular surface staining. The Schirmer’s test was conducted last so that ocular irritation by the test strip would not impede the other test results. The tests were done under room temperature condition in order and at 10 minutes interval to minimize reflex tearing and ocular surface changes secondary to testing. In those already using tear substitutes, dry eye tests were performed after overnight discontinuation of medication.

## RESULTS

The prevalence of dry eye is reported to be 40.7%. With the maximum patients having evaporative type (43.3%) followed by the mixed type (35.2%) and the aqueous tear deficiency (21.5%) being the least common among the study participants. Prevalence of dry eye increased progressively with age with age group 60-69 years showing the maximum, that is, 54.6%. Prevalence among females (46.1%) is greater than males (36.2%). The farmers and labourers (64.4%) are maximally affected followed by factory workers (37.9%). This finding is statistically significant (p value =0.001). None of the risk factors included in the study that may attribute to dry eye were found to be statistically significant in this study. Itching was the commonest reported symptom (72%) followed by watering (65%).

**Table 1: Distribution of Dry Eye According to Type**

Type	Patients	Prevalence (%)
Evaporative	140	43.3
Aqueous deficiency	70	21.5
Mixed	115	35.2
Total	325	100

**Table 2: Age Distribution**

Age (in years)	Subjects	Dry eyes	Prevalence (%)
20 – 29	27	7	28.0
30 – 39	33	12	37.5
40 – 49	41	14	33.3
50 – 59	72	26	36.6
60 – 69	86	47	54.6
70 – 79	52	21	40.2
80 – 89	10	3	30.3
90 - 99	4	1	33.3

**Table 3: Sex Distribution**

Gender	Subjects	Dry eyes	Prevalence (%)
Male	134	49	36.2
Female	191	88	46.1

**Table 4: Distribution of Cases According to Occupation**

Occupation	Exposed	Affected	Prevalence (%)
Farmers/ Daily laborer's	70	45	64.4
Factory workers	63	24	37.9
Office workers	40	15	38.4
Home makers	65	24	37.5
Students	30	7	22.7
Unspecified	57	20	34.9

**Table 5: Distribution of Cases According to Risk Factors**

Associated risk factors	Number of exposed	Number of affected
Smoking	129	52
Systemic disease	90	31
Topical medication	52	19
Systemic medication	61	23
Contact lens wearing	7	3
Air conditioning	67	29

## DISCUSSION

There are many earlier Indian studies which revealed the prevalence of xerophthalmia between the range from 10.8% to 57.1%. This might be reported because of the two factors: first the geographical location of the study population and secondly the lack of standardization in selecting the study population, questionnaires on dry eyes, various objective tests and dry eye diagnostic criteria. The predominant type of dry eye was mostly the evaporative dry eye (43.3%) followed by the mixed pattern which is observed in 35.2 %). The reason that could be attributed for this might be due to the effect of meibomian gland dysfunction in all age groups.<sup>5-8</sup> We had observed that prevalence of dry eyes increased progressively with age.<sup>9,10</sup> This varied response could be explained by the fact that with increasing age there is an increase in lacrimal gland ductal pathology which could promote lacrimal gland dysfunction by its obstructive effect and also there is decrease in the levels of androgen.<sup>11,12</sup> In this study we revealed that there was a greater prevalence of dry eye among females than males<sup>13-15</sup> and this difference is statistically significant. This could be supported by the fact that hormonal changes influence greatly in the pathogenesis of dry eye<sup>16</sup> which have a greater bearing on females than males. Sex hormone levels might be known to influence both the lacrimal and meibomian glands. The increased prevalence in females may also have been due to higher number of females with dry eye symptoms who are in

the verge of seeking advice for their ocular problems. This study, therefore, does not show any interest to comment on the pre and postmenopausal prevalence of dry eye among the females. Farmers/labourers (64.2%) had maximum prevalence.<sup>17</sup> The possible explanation for this trend could be due to the increased exposure to precipitating or causative environmental conditions.<sup>18</sup> (Sunlight/ high temperatures/ windy conditions/ dirt/ dust/ smoke) among those involved in field jobs. Considerable prevalence among the young individuals who are involved in office work (38.4%), could be due to increased screen viewing time which considerably reduces blinking rate,<sup>15-17</sup> exposure to air conditioners for long hours, exposure to air pollution.

Smokers had a dry eye prevalence of 39.6% which is not statistically significant. Further confirmatory large-scale studies are necessary to establish the key role of smoking in the progression of xerophthalmia. In this study 35.5% of the patient had history of some systemic disease. Diabetes and hypertension were the most frequently reported diseases. Second most frequently encountered was arthritis.<sup>19,20</sup> The statistical correlation of diabetes mellitus and hypertension, in this study, was not reported to be significant statistically. Amongst the associated drugs taken for the systemic diseases like anti-hypoglycaemic, amlodipine topped the list. Other drugs included thyroxin, non-steroidal anti-inflammatory, H1 inhibitors. 36% had a history of topical medication (Anti-glaucoma, anti-histaminics, steroid antibiotic combination) although none of these drugs revealed statistical significance in this study as a risk factor. In our study the most frequently encountered symptom was itching (72%) followed by watering (65%)

## CONCLUSION

To conclude this study, dry eye is a major clinical entity that commonly affects millions of people globally. It is a distressing problem which is often overlooked and is frequently missed in routine examination. The multifactorial aetiopathogenesis and lack of specificity of symptoms might explain why the clinical diagnosis of dry eye remains a challenge. Moreover, there is a reportedly poor association between the signs and symptoms of xerophthalmia.

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