



## Original Research Article

## Dry eyes in patients with pseudoexfoliation –A descriptive study

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## ABSTRACT

**Introduction:** Pseudoexfoliation syndrome is seen commonly above 60 years of age. It can lead to various complications such as poor dilatation of pupil, increased IOP and intraoperative complications such as zonular dehiscence or capsular rupture, vitreous loss and subluxation of intraocular lens. Pseudoexfoliative glaucoma is one of the common types of secondary open angle glaucoma. Pseudoexfoliation syndrome can also cause ocular surface disorders due to tear film instability. Hence this study was done to assess the prevalence of dry eyes in patients with pseudoexfoliation.

**Materials and Methods:** This was a descriptive study which involved 150 eyes with pseudoexfoliation syndrome. Tear secretion assessment was done using Schirmer's test I. Then the tear film stability was evaluated using Tear break-up time (TBUT). Ocular surface damage was assessed using Fluorescein staining and Lissamine green staining.

**Result:** Schirmer's test I, 144 eyes out of 150 eyes had Schirmer's test value more than 15 mm (96%). 4 eyes (2.6%) had value between 10-15 mm. 2 eyes (1.4%) had value between 5-10 mm. Six eyes with dry eye syndrome were identified by Schirmer's test I. Tear breakup time was decreased in 3 eyes (between 7-9 seconds). Three eyes with dry eye syndrome were identified by TBUT test. Fluorescein staining was positive in one eye. Lissamine staining was positive in 2 eyes with score of 2 and 3. In this study of pseudoexfoliation patients, there were 9 eyes (6%) with dry eye syndrome.

**Conclusion:** Early recognition of dry eye syndrome in patients with pseudoexfoliation syndrome can reduce ocular morbidity and prevent a significant compromise in their quality of life.

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## 1. Introduction

Pseudoexfoliation syndrome is a systemic connective tissue disorder usually present in 10% population over 60 years of age.<sup>1</sup> It is characterized by accumulation and deposition of white fluffy amyloid like proteinaceous material which is not degraded in vivo. In eyes it is present in anterior chamber and its angle, trabecular meshwork, epithelium of ciliary body, iris and lens.<sup>2</sup> Apart from eyes, pseudoexfoliative material is also seen in other organs such as heart, lung, kidney, brain and vessels using electron microscopy or specific histochemical markers.<sup>3</sup> Ocular manifestations

such as dry eye syndrome, open angle glaucoma, central retinal vein occlusion and cataract are well known in pseudoexfoliation. It affects the dilatation of pupil, causes increased IOP and intraoperative complications such as zonular or capsular rupture, vitreous loss and subluxation of intraocular lens.

Dry eye syndrome is an ocular surface disorder due to tear film deficiency or its excessive evaporation. Dry eye syndrome affects about 6.9-10.6% of the adult population.

Pseudoexfoliation is accompanied by an increase in the osmolarity of the tear film and inflammation of the ocular surface. Damage occurs because of tear deficiency or tear film instability.<sup>4</sup> In pseudoexfoliation dry eye syndrome is due to instability of tear film.<sup>5</sup> Few recent studies have

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shown prevalence of dry eye syndrome in patients with pseudoexfoliation.<sup>1,5</sup>

In this study we aim to establish the ocular surface changes in patients with pseudoexfoliation with the use of Schirmer-1 test, TBUT test, Lissamine green staining and Fluorescein staining.

## 2. Materials and Methods

150 eyes of patients with pseudoexfoliation in Department of Ophthalmology opd were recruited in the study after obtaining informed consent. A comprehensive assessment of patients was undertaken including patients age, gender, medical, ocular history, visual acuity assessment and slit lamp examination. The descriptive study was done from November 2015 to April 2017. Patients over age 40 and belonging to either sex with pseudoexfoliation were included in the study. Patients with Sjogren's syndrome, lacrimal gland and drainage disorders, previous ocular surgeries, patients using any topical eye drops such as timolol, known Diabetic patients, pseudoexfoliative glaucoma were excluded. Data entry was done using MS EXCEL 2013 and analyzed using Epi Info and SPSS Version 20. Mean and standard deviation for continuous variables, number and percentage for categorical variables were used to represent the data. Chi square test, Yate's corrected chi-square test and Fisher's exact test were used to assess the prevalence of dry eyes among pseudoexfoliation patients. Z test was used to assess the difference between two means. P value <0.05 was considered statistically significant.

Tear secretion assessment was done using Schirmer's test I. Then the tear film stability was evaluated using Tear break-up time(TBUT). Ocular surface damage was assessed using Fluorescein staining and Lissamine green staining.

## 3. Results and Discussion

In this study 150 eyes with pseudoexfoliation were recruited from Ophthalmology Out Patient Department and were assessed for the prevalence of dry eye syndrome. Four dry eye syndrome tests were performed in all 150 eyes with pseudoexfoliation to assess ocular surface changes. Tear secretion was assessed by doing Schirmer's I test. Tear film stability was assessed by Tear breakup time test and ocular surface damage was assessed by Lissamine green staining and Fluorescein staining. The age distribution were minimum of 50 years and maximum of 90 years. Mean age in this study group was 65.76 years. Out of 150 sample size studied, 130 eyes were above 60 years in this study. Many studies have shown that pseudoexfoliation was seen in more than 60 years of age. In a study by Skegro et al, approximately 10% of population above 60 years had pseudoexfoliation.<sup>1</sup> A study conducted by Aravind et al in South Indian population stated that the prevalence of

pseudoexfoliation increases over 50 years.<sup>6</sup> Among the population studied males were 100 and females were 50. In some studies female population were most affected and in some males were affected. Aravind et al showed no gender based predisposition to pseudoexfoliation.<sup>6</sup> In this study of 150 eyes, 56 (74.5%) patients had pseudoexfoliation in both eyes. 38 people(25.5%) had unilateral involvement. In a study by Subhashini et al.56.6% were unilateral and 43.4% were bilateral.<sup>6</sup> A study by Parekh et al states that 81% of uninvolved eyes in unilateral pseudoexfoliation syndrome patients had ultra structural involvement detected with electron microscopy.<sup>7</sup> In this study of 150 eyes, symptoms of dry eye syndrome such as grittiness was seen in 2 eyes (1.3%) and burning sensation was seen in 14 eyes(9.33%).

**Table 1:** Tear secretion assessment using Schirmer's 1 test

Schirmer's test Grading	Frequency	Percent
Normal	144	96.0
Mild	4	2.7
Moderate	2	1.3
Severe	0	0
Total	150	100

**Table 2:** Tear film stability evaluation using tear break-up time(TBUT)

TBUT Grading	Frequency	Percent
Normal	147	98.0
Mild	3	2.0
Moderate	0	0
Severe	0	0
Total	150	100

**Table 3:** Ocular surface damage assessment using Lissamine green staining

Lissaminegreen staining Score	Frequency	Percent
0	148	98.7
1	0	0
2	1	0.7
3	1	0.7
Total	150	100.0

**Table 4:** Ocular surface damage assessment using fluoresce in staining

Fluorescein staining	Frequency	Percent
Nil	149	99.3
Positive	1	0.7
Total	150	100.0

In our study all 150 eyes had cataract with varying grades. Immature cataract with various nucleus sclerosis

**Table 5:** Prevalence of dry eyes among pseudoexfoliation patients distribution

Prevalence	Frequency	Percent
Normal	141	94.0
Dry Eye	9	6.0
Total	150	100.0

grading was seen in 114 eyes (76%), Mature cataract was seen in 32 eyes (21.3%), Hypermature cataract in 4 eyes (2.7%). All patients underwent cataract surgery. There were many studies which explain intraoperative complications<sup>8,9</sup> and its management during cataract surgery.<sup>2</sup> In our study complications during cataract surgery were not assessed, but most of the patients underwent small incision cataract surgery and few extracapsular cataract extraction due to poor pupillary dilatation. One eye out of 150 eyes had phacodonesis. In our study tear secretion was assessed using Schirmer's test I, 144 eyes out of 150 had Schirmer's test value more than 15 mm (96%). Four eyes (2.6%) had value between 10-15 mm. 2 eyes (1.4%) had value between 5-10 mm. (Table 1). p value was 0.6585 which was not statistically significant with regards to gender. Six eyes with dry eye syndrome were identified using Schirmer's I test in this study. In a study conducted by Subhashini et al at Pondicherry, tear secretion value was decreased in pseudoexfoliation syndrome patients when compared to normal eyes.<sup>5</sup> The results showed Schirmer's test value between Group 1 and Group 2 were 22.05±4.4 mm and 10.6±7 mm respectively. In other studies such as Erodogan et al.<sup>10</sup> and Kozobolis et al.<sup>11</sup> mean values of Schirmer's test was decreased between case and control group. In Kozobolis study average Schirmer's test value was 10.6mm and 13.4 mm between case and control group. In our study tear film stability was assessed using tear break up time. Three eyes (2%) had value between 7-9 second (Table 2). p value was 0.293 which was not statistically significant with regards to gender. 3 eyes with dry eye syndrome were identified in this study with TBUT. Other studies such as Erodogan et al<sup>10</sup> also showed decreased TBUT between case and controls. Subhashini et al showed results of TBUT were 14.75 ±2.5s and 5.6±2.8s respectively between Group 1 and Group 2.<sup>5</sup> In Kozobolis study TBUT was 8.6 sec and 12.3s between case and control group respectively.<sup>11</sup> A study by Cho et al revealed cataract surgery in itself can induce dry eye.<sup>12</sup> Presence of pseudoexfoliation can cause many intraoperative complications as explained by Sushil Kumar et al<sup>2</sup> and Pranithi et al.<sup>8</sup> So if a patient has dry eyes due to pseudoexfoliation then cataract surgery further induces dry eye syndrome in such patients. According to Kuppan et al antiglaucoma medications such as timolol can cause dry eye.<sup>13</sup> Out of 150 eyes assessed with Lissamine green staining for ocular surface damage, one eye had score of 2 and one eye had score of 3 (Table 3). Out of 150 eyes

studied, Fluorescein staining was positive in one eye 0.7% (Table 4)

In our study 9 eyes (6%) had dry eye syndrome among 150 eyes studied (Table 5).

#### 4. Conclusion

The prevalence of dry eye syndrome in pseudoexfoliation patients was 6% in this study. Patients with pseudoexfoliation syndrome are at higher risk for developing pseudoexfoliative glaucoma and cataract. Early recognition of dry eye syndrome in susceptible population of patients with pseudoexfoliation syndrome can reduce ocular morbidity and prevent a significant compromise in their quality of life.

#### 5. Ethical Consideration

The study was done after obtaining approval from ethical review board of Pondicherry Institute of Medical Sciences. Purpose of the study was explained to the patient. Written informed consent in patient's own language was taken from both the subjects and their nearest relatives.

#### 6. Source of Funding

None.

#### 7. Conflicts of Interest

No conflict of interest.

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