

## TO DETERMINE PREVALENCE OF PSEUDO EXFOLIATION AT A TERTIARY EYE CARE CENTRE: A hospital based study

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### ABSTRACT

**Objective:** To report the prevalence of pseudo exfoliation in association with Cataract and other ocular diseases at a tertiary eye care centre in Sindh, Pakistan.

**Methodology:** This was a hospital based study at Liaquat University Eye hospital, Hyderabad Sindh, Pakistan conducted from July, 2005 to November, 2006. A total of 1450 subjects of more than fifty years with senile cataract were registered who underwent a comprehensive ophthalmic evaluation. Visual acuity, refraction, Goldmann applanation tonometry, gonioscopy, slit lamp examination, and dilated pupil fundus examinations were performed. Pseudo exfoliation was diagnosed on slit lamp biomicroscopy by the presence of white dandruff-like material at pupillary margin, on the anterior lens capsule, and trabecular meshwork, in one or both eyes.

**Results:** Out of 1450 patients, sixty five (4.48%) subjects was diagnosed having senile cataract with pseudo exfoliation. There was a significant increase in prevalence with age. Out of 65 cases, 15 cases (23.0%) were unilateral and 50 cases (76.9%) bilateral. Forty one eyes (63.0%) had raised intraocular pressure, in which four eyes (9.7%) had angle closure glaucoma, and 37 eyes (90.2%) had pseudo exfoliation (open angle) glaucoma. The prevalence of nuclear cataract was significantly higher (66.1%) in patients with pseudo exfoliation.

**Conclusion:** It appears to be a common disorder in older individuals in the notified area. The association of pseudo exfoliation (PXF) with aging and cataract has public health implications.

**KEY WORDS:** Aging, Cataract, Pseudo exfoliation, Glaucoma.

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## INTRODUCTION

Pseudo exfoliation (PXF) is a senile disorder characterized by the accumulation of a fibrillar material in ocular tissues.<sup>1</sup> The condition was first described by Lindberg in 1917.<sup>2</sup> The pseudo exfoliative material is believed to be secreted in the iris pigment epithelium, the ciliary epithelium and the peripheral anterior lens epithelium.<sup>3</sup> The material moves into the aqueous humor and is carried to the trabecular meshwork, following the normal flow. Some times there is obstruction of the trabecular meshwork by this fibrillar material and

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pigment resulting to the elevation of intraocular pressure (IOP) leading to glaucoma.<sup>4</sup>

Pseudo exfoliation (PXF) is rarely seen before the age of 50, and its prevalence increases markedly with age.<sup>5</sup> Rashad Qamar Rao and others from Bahawalpur Pakistan report an overall prevalence of pseudo exfoliation as 6.45% of the total of 1860 patients.<sup>6</sup>

The prevalence of PXF from India based on hospital reports varies between 1.87% and 13.5%.<sup>7</sup> In some other population-based studies from south India, the prevalence of PXF above 40 years was found to be between 3.8% of 2850 patients and 6.0% of 5150 patients.<sup>8</sup> According to the reports by Bartholomew, the prevalence of pseudoexfoliation syndrome in the Bantu tribes of South Africa was 8.2% of 2584 patients.<sup>9</sup> In the Framingham study, prevalence of PXS was found to be 1.8%.<sup>10</sup>

In another study of subjects over 60 years in various ethnicities, prevalence rates ranging from 0% in Greenland Eskimos to 21% in Icelanders were noted.<sup>11</sup> In northern/western European countries including England, Germany, and Norway prevalence of 4.0%, 4.7% and 6.3% have been reported respectively.<sup>12</sup> Pseudo exfoliation is frequently associated with secondary open angle glaucoma, known as pseudo exfoliation glaucoma.<sup>13</sup>

Roth and Epstein reported that pseudo exfoliation glaucoma was present in 12% of patients with glaucoma.<sup>14</sup> In a prospective study, Cashwell and Shields found that the prevalence of pseudo exfoliation syndrome in the southeastern United States was 1.6% of the total of 2121 patients and in 6% of an open-angle glaucoma.<sup>15</sup>

Pseudo exfoliation syndrome (PXS) is also suspected to be a systemic disorder and has been associated with stroke, systemic hypertension and myocardial infarction.<sup>16</sup>

Schlotzer and Koca et al, stress upon the presence of pseudo exfoliative like material in skin, lungs, liver, heart, kidney, gallbladder, blood vessels, extra ocular muscles and meninges.<sup>17</sup> In the current study, we determined the prevalence of PXF and its associations with cataract and glaucoma.

## METHODOLOGY

The study was conducted at Liaquat University Eye Hospital Hyderabad. The Liaquat University Eye Hospital is a regional tertiary care centre and university hospital of Liaquat University of Medical and Health Sciences Hyderabad / Jamshoro, Sindh.

The patients of both the sexes, more than 50 years of age from different areas of Hyderabad division were selected. Ocular examination was conducted at an out patient department by two ophthalmologists, two resident doctors and other Para medical staff trained for the study.

*Study Criteria:* The criteria of this study were to ensure presence of white dandruff like pseudo exfoliation material on one or more structures of anterior segment of eye. The patients with pre-existing glaucoma, aphakia and Pseudophakia were excluded from the study. After informed consent, all eligible subjects underwent comprehensive ocular examination. The distance and near visual acuity was recorded with refractive glasses and best corrected after refraction. External eye examination was performed by ophthalmologist including assessment of pupillary reaction and anterior segment examination with a slit lamp biomicroscopy. The intraocular pressure (IOP) was measured with a Goldmann applanation tonometer. For IOP measurement, only the higher IOP between the two eyes was considered. The IOP of more than 22mm Hg was considered as glaucoma.

The gonioscopy was performed with a three-mirror lens (Ocular Instruments Inc.) and Zeiss gonio lens. The angle was graded according to the classification of Scheie, which states the visibility of pigmented trabecular mesh work at the angle circumference in a primary position without manipulation on low illumination. Invisibility of meshwork in three fourths of angle, the angle was considered occludable; otherwise, it was considered open.

Pupil was dilated with tropicamide 1% eye drops, for detailed slit lamp examination. On slit lamp, the lens was examined for the presence of PXF and for lenticular changes. The

Table-I: Age, Sex, laterality and Prevalence of Pseudo exfoliation: n=1450.

<i>Characteristic</i>	<i>Total Subjects 1450</i>	<i>Unilateral PXF</i>	<i>Bilateral PXF</i>	<i>Total Eyes with PXF</i>
<i>Age in Yrs</i>				
51 to 60	870 (60%)	05 (0.6%)	17 (1.9%)	22 (2.5%)
61 to 70	490 (32.41%)	10 (2.0%)	22 (4.5%)	32 (6.5%)
71 to 82	90 (6.20%)	Nil	11 (12.2%)	11 (12.2%)
<i>Sex</i>				
Male	790 (54.4%)	11 (1.3%)	32 (4.1%)	43 (5.4%)
Female	660 (45.5%)	04 (0.6%)	18 (2.7%)	22 (3.3%)

PXF = Pseudo exfoliation.

dilated Fundoscopy was performed with indirect ophthalmoscope using 20D condensing Lens, and with slit lamp using 90D and 78D Bi- spherical lens.

## RESULTS

One thousand four hundred and fifty patients above 50 years of age with senile lenticular changes were registered in seventeen months of study. Seven hundred and ninety were males and remaining six hundred and sixty patients were females with a male to female ratio of 1.19:1 (Table-I). Out of 1450 patients, 321 (22.1%) were house hold, and 1129 (77.8%) patients belonged to out door occupational activities. PXF was present in 65 patients with over all prevalence of 4.48%. The male patients with PXF were 43 and females 22, with male to female ratio of 1.9:1 (Table-I).

The prevalence of PXF was more with increasing age. All the 65 patients with

cataract associated with pseudo exfoliation attended the out patient department due to different reasons i.e. red eyes (39 patients), lid problems (11 patients), corneal problems (4 patients), Itching etc (09 patients) total visual loss (2 patients) mentioned in Table-II.

All registered patients with pseudo exfoliation had different presentation of exfoliative material as mentioned in Table-III. The nuclear cataract was frequently observed (43 eyes) in this study. Forty one eyes with PXF had raised intraocular pressure more than 22 mmHg as shown in Table-IV. The intraocular pressure at higher levels was reported in patients mostly with advancing age, in comparison to the patients younger than 60 years.

The prevalence of PXF was significantly higher in the patients involved in outdoor occupational activities i.e. Fifty four (83.1%) patients out of sixty five. The prevalence of PXF also increased in patients with moderate twenty six (40%) patients to poor twenty eight (43%) patients socioeconomic status as shown in Table-V.

Table-II: Associated Reasons to attend Eye OPD (Total of 65 Patients with Cataract and Pseudo exfoliation)

<i>Reason to Attend</i>	<i>Total Eyes</i>	<i>Percentage (%)</i>
Cataract	65	100
-Red Eyes	39	60.0
-Lid disorders	11	16.9
-Peripheral Corneal- degenerations	04	06.1
-Itching and Foreign Body feelings	09	13.8
-Blindness	02	03.0

Table-III: Presentation of Pseudo exfoliation (Total Pts=65)

<i>Characteristic</i>	<i>N/O Eyes</i>	<i>Percentage (%)</i>
PXF on Iris	18	27.6
PXF on Iris and Lens	40	61.5
Flakes on Trabecullum	27	41.5
Phacodonesis	12	18.4

Table- IV: Pseudo exfoliation associated with cataract and glaucoma (n=65)

Characteristic	N/O Patients	Percentage (%)
Cataract	65	100
Nuclear cataract	43	66.1
Cortical cataract	16	24.6
Post. Sub. Cap cataract	06	09.2
Glaucoma	41	63.0
Open angle glaucoma	37	90.2
Angle closure glaucoma	04	09.7

## DISCUSSION

The over all prevalence of pseudo exfoliation in this study was found to be 4.48%, which is less than reported by Rashad Qamar Rao and others at Bahawalpur Pakistan (6.45%).<sup>6</sup> In one hospital based study conducted in India, the prevalence of pseudoexfoliation was 7.4%.<sup>18</sup> In another hospital based study from South India the prevalence was 6%.<sup>19</sup> In one study from Andhra Pardesh India the over all prevalence of pseudo exfoliation was 0.71% (73 of 10293 patients of all ages).<sup>20</sup> and from Iran it was 9.6%.<sup>21</sup> In the cross-sectional study, by Eva Forsman from Finland, the prevalence of exfoliation syndrome was 8.1%.<sup>22</sup> In Ethiopia the prevalence of pseudoexfoliation in patients scheduled for cataract surgery was higher i.e. 39.3 %.<sup>23</sup>

In this study, we strongly observed the association of PXF with increasing age which estimates 11.0%, up to 70 years. In one study by Rashad Qamar Rao and others from Bahawalpur Pakistan the prevalence of PXF with increasing age was 20.8% up to 70 years.<sup>6</sup> Another study from Ethiopia report the prevalence related to age as 36.8%, between 61 to 70 years.<sup>23</sup> In some previous studies, age-related increase in the prevalence of PXF was 6.28% among subjects 60 years of age or older.<sup>24-26</sup> As reported in other studies, the prevalence increased with increasing age reaching 13.04%.<sup>27-29</sup>

We could not find the reason for this age-related increase, although, Karger and Jeng, in their study narrated the reason for such an age

Table-V: The Occupational and Socioeconomic Status (n=65)

Characteristic	Patients	Percentage (%)
<i>Occupation</i>		
Indoor Activity	11	16.9
Out Door Activity	54	83.1
<i>Socioeconomic Status</i>		
Good	11	16.9
Moderate	26	40.0
Poor	28	43.0

related increase in PXF due to the aging changes in genetic expression.<sup>30</sup>

In this study all subjects were above 50 years of age having senile lenticular changes. Out of 65 patients with pseudo exfoliation, the association of nuclear cataract was in 43 patients (66.1%). Kozart and Yanoff in their study at Philadelphia, stressed upon the existence of glaucoma in 7% of 100 consecutive patients with pseudo exfoliation.<sup>31</sup> In Bahawalpur Pakistan study, the prevalence of glaucoma associated with PXF was 40%. In some other different studies the prevalence of high intraocular pressure with or without glaucoma was 22% to 30%.<sup>32,33</sup> Our results suggest that, out of 65 patients 41 patients (63.0%) with pseudo exfoliation had raised intraocular pressure.

There are conflicting reports of gender differences in the prevalence of PXF.<sup>34,35</sup> According to Rashad Qamar Rao, the male to female ratio was marginally higher i.e.1.5:1.6. In our study, the male to female ratio was 1.9:1.

We also found a strong association between PXF and occupation. The people exposed to outdoor activity as part of their occupation had a significantly higher prevalence of PXF compared with those whose occupation was restricted to indoor activity. Such an observation truly supports the theory of Tayler HR, which shows concern of PXF to the environmental factors possibly solar radiation.<sup>36,37</sup> We observed that the people with moderate to poor socioeconomic status had increased prevalence of pseudo exfoliation.

Eyes with PXF usually develop complications such as zonular dialysis, capsular rupture, and vitreous loss at the time of cataract extraction. The surgical procedure also becomes more difficult due to less pupillary response to mydriatics. It has also been shown that the patients with PXF have an increased tendency of rise of intraocular pressure after cataract surgery.

### CONCLUSION

The evaluation and diagnosis of pseudo exfoliation requires a thorough clinical examination including slit lamp biomicroscopy and dilated anterior and posterior segment examination. Detection of pseudo exfoliation syndrome preoperatively may help ophthalmologist to manage the surgical complications related to pseudo exfoliation. The diagnosis of PXF may also be important in the detection and management of glaucoma.

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