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Original Article

STUDY OF CLINICAL PROFILE OF PSEUDO-EXFOLIATION SYNDROME AND PSEUDO-EXFOLIATION CATARACT IN A TERTIARY HEALTH CARE HOSPITAL IN WESTERN ODISHA

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ABSTRACT

Objective: The pseudo-exfoliation (PEX) syndrome is a complex disorder characterized by the deposition of fibrillary materials around the blood vessels of organs. This study was conducted with the aim of knowing the actual prevalence of PEX in Western Odisha and the characteristics of cataracts in those PEX patients.

Methods: This cross-sectional study included 340 OPD patients and was conducted between January 1, 2021, and December 31, 2022, at Hitech Medical College and Hospital. The prevalence of PEX and cataracts was studied. The data was analyzed using basic descriptive statistics and reported in frequencies and percentages.

Results: The study showed 74 patients out of 340 were diagnosed with pseudoexfoliation syndrome, with a prevalence of 23%. 42 patients (58%) were male and 32 (42%) were female, with a M: F ratio of 1.3:1. The mean age of presentation was 67 y (range 51–84 y), and the majority of patients (41%) were in the age group of 61–70 y. The increased intraocular pressure was noticed in 11 cases (15%) in our study. Two patients each had open-angle glaucoma and lens-induced glaucoma. Nuclear cataract was the most common type of cataract observed in 27% of the study group, followed by cortical cataract with nuclear sclerosis in 19% of cases.

Conclusion: It is concluded that pseudo-exfoliation syndrome is more common in males than in females, with a higher number of patients in the age group of 81 y and older. Therefore, it can be assumed that it is associated with the age factor. Nuclear cataract was the most common type of cataract observed in our study population.

Keywords: Cataract, Glaucoma, Pseudoexfoliation (PEX) syndrome, Prevalence, Western Odisha

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INTRODUCTION

Pseudoexfoliation syndrome (PXS) is a complex disorder affecting the eye and visceral organs [1]. Lindberg, a Finnish ophthalmologist, was the first to describe the PXS in 1917. It is distinguished by fibrillar deposits in the eye's anterior region. Pseudoexfoliation material (PXM) is deposited around the blood vessels of organs and is identified by electron microscopy [2] and immunohistochemistry [3]. In eye, it has various presentations based on the location where it is deposited. Deposits have been discovered on and in the iris pigment epithelium, pupillary edge, ciliary epithelium, lens, lens capsule, trabecular meshwork, cornea, zonules, orbital soft tissues, and iris blood vessels. Multiple pathological changes like corneal decompensation, poor pupillary dilation, secondary open angle, and secondary angle closure glaucoma develop due to the deposition of PXM material [4]. The disease may be bilateral and is diagnosed by slit lamp examination as fibrillar dandruff-like material on the anterior segments of the eye. Over time, the PXS gets converted to the PXG. Approximately 5% of patients with PXS progress and convert to PXG over five y; 15% at 10 y; and 60% at 15 y have a 15 y risk of PXG [5].

Also, there is an association between PXF and cataracts, possibly due to ocular ischemia and defective antioxidant mechanisms. Cataracts appear sooner and progress quicker in these patients.

Apart from systemic manifestations, it also involves other organ systems like the lung, liver, kidney, gall bladder, meninges, and cerebrovascular diseases such as angina, aortic aneurysm, etc. However, this association is controversial. The prevalence of PXS is different across different populations in the world [6]. In Asian people, PXS tends to occur significantly less frequently. This study is done to determine the clinical profile and characteristics of PXS in a hospital over a period of 2 y in Western Odisha.

MATERIALS AND METHODS

The present study is a cross-sectional study that has been carried out in a tertiary care hospital in western Odisha, India. All the patients aged 35 y or older were evaluated with PXS and PXG and attended the eye outpatient clinic between January 1, 2021, and December 31, 2022. The duration of the data analysis was two y. Institutional ethical committee approval was obtained.

Inclusion criteria

Patients giving willful written consent, eyes with PXM, and pseudophakic patients having a history of cataract surgery were included in the study.

Exclusion criteria

Patients with a known case or family history of primary glaucoma and other causes of secondary glaucoma, Existing or previous optic disc or nerve disorders, Patients with an age<35 y and refusing consent were excluded from the study.

Study procedure

The PXS was considered present when typical PXM was present at the pupil, lens surface, or other intraocular structures. When no PXM was seen in one eye after pupil dilation, the eye was considered clinically non-PXS. PXG was defined as the presence of PXS and clinical glaucomatous optic neuropathy manifested as focal or diffuse neuro-retinal rim thinning, retinal nerve fibre layer defects, or peripapillary atrophy, with corresponding glaucomatous visual field defects manifested, or retinal nerve fibre layer defects on Optical Coherence Tomography (OCT) with or without increased IOP. PXS patients with prior surgical intervention for glaucoma or currently receiving glaucoma topical medications and meeting the above definition of glaucoma were considered PXG cases.

Detailed clinical history was taken for presenting complaints, detailed ocular and systemic history, best corrected visual acuity (BCVA) taken by Snellen's chart and IOP (by Goldmann applanation tonometer), complete slit-lamp biomicroscopic examination (pre and postmydriasis), gonioscopy, and indirect ophthalmoscopy with a+20 D lens for peripheral retina evaluation. Patients with incomplete records were excluded.

Statistical analysis

The data was analysed, and basic descriptive statistics were reported in frequencies and percentages. A chi-square test was used to find the association between qualitative variables. The p-value of<0.05 was considered significant.

RESULTS

Out of the 340 patients screened over a period of two y, 74 patients were diagnosed with pseudoexfoliation syndrome, a prevalence of 23%. 42 patients (58%) were male and 32 (42%) were female. The mean age of presentation was 67 y (range 51–84 y), and the majority of patients (41%) were in the age group of 61–70 y. Age- and sex-wise distributions have been depicted in table 1.

Table 1: Age and sex distribution of patients with pseudoexfoliation

Age	Male	Female	Total number of patient
51-60 y	7	8	15
61-70 y	19	12	31
71-80 y	12	6	18
81-90 y	4	6	10
Total	42	32	74

The number of patients in the age group of 81 y and older had the highest prevalence of PXF syndrome: 10 patients (26%), followed by 18 patients in the 71-80 y group (24%). The age-group-wise distribution of patients with PXF to the total number of patients screened is shown in table 2.

Table 2: Age group-wise distribution of PXF patients to total number of patients

Age	Patient with PXF	Total number of patients	Percentage of patients with PXF
51-60 y	15	95	16%
61-70 y	31	132	24%
71-80 y	18	74	25%
81-90 y	10	39	26%
Total	74	340	22%

PXF was seen in both eyes in 50 (68.0%) patients, while 24 (32.0%) had unilateral involvement. PXF material was present on the lens in 21 (28%) cases and on the pupillary margin in 20 (27%) cases. 16 patients (21%) had PXF material on the lens, iris, and pupillary margin together. PXF material was present on the iris in 8 (10%) cases, and the lens and pupillary margin were involved together in 9 (12%) patients (table 3).

Table 3: PXA material deposited in sites

Sites	Number of patients
Pupillary margin	20 (27%)
Iris	8 (10%)
Lens	21 (28%)
Iris, Pupillary margin and lens	16 (21%)
Pupillary margin and lens	9 (12%)

The increased intraocular pressure was noticed in 11 eyes (15%) in our study. 16.3 mm Hg was the mean intraocular pressure. Two patients each had open-angle glaucoma and lens-induced glaucoma (table 4).

Table 4: Pre-operative intraocular pressure (IOP)

IOP (mm of Hg)	Number of cases with PXF
≤10	6 (8%)
11-15	30 (40%)
16-20	27 (37%)
21 and above	11 (15%)

Morphologically, nuclear cataract was the most common type of cataract observed in 20 patients, which is 27% of the study group, followed by cortical cataract with nuclear sclerosis in 14 cases (19%). The distribution of other morphological types of cataracts is listed in table 5.

Table 5: Distribution of morphological type of cataract

Type of cataract	Number of operated eyes with PXF (%)
Hypermature	6 (8%)
Mature	12 (17%)
Cortical	6 (8%)
Nuclear cataract	20 (27 %)
Cortical and nuclear	14 (19 %)
Posterior subcapsular	9 (12 %)
Posterior subcapsular and nuclear	7(9 %)
Total	74

DISCUSSION

This study was conducted to evaluate the clinical characteristics and incidence of PXS and PXG in our demographic patients. The prevalence of PEX showed extensive variation in various studies. The prevalence of PEX ranges from 0.3% to 22.1%, according to Ringvold A [7]. Sood NN, lamba PA, and Giridhar A; Arvind H *et al.*; and Ramkrishnan R *et al.* have also reported a prevalence rate of PXS and PXG between 1.8% and 7.4% and 7.5% and 13% [8–11], respectively. The explanation for the varied prevalence may be the result of cumulative differences in geographical location, race, age, and gender. While significant numbers of PEX cases may remain undiagnosed due to the failure to dilate the pupil.

The authors found male preponderance, with 42 patients (58%) being males and 32 (42%), with a male-female ratio of 1.81:1. In most of the studies, the predominance of males was higher as compared to females. Ultraviolet exposure due to increased outdoor activity time may be an explanation for the male predominance in the Indian population [12].

Pseudoexfoliation syndrome predominantly affects the elderly age group, and cataracts in the majority of patients are also age-related. There is an association between PXF and cataracts, possibly due to ocular ischemia and defective antioxidant mechanisms. Moreover, cataracts appear sooner and progress quicker in these patients.

The prevalence of PXF increased with age in our study population. Similar observations are seen in other studies, like Govetto *et al.* [13] and Al-Shaer *et al.* [14]. PXF syndrome was not noted in patients under 50 who were scheduled for cataract surgery in the Govetto *et al.* trial [13].

In 2003, Arvind H. [10] *et al.* studied the profile of PXF in a population-based study in rural south India. Those with PXF had a considerably greater prevalence of cataracts than did those without PXF ($p = 0.014$). A raised IOP was seen in 16.7% of people with PXF.

50 patients (68%) of the patients in our study had bilateral involvement, which is similar to the Gelaw and Tibebu study [15], where it was 66.7%. In PXF, there is an initial unilateral involvement in 40 to 50% of patients that becomes bilateral within 5 y. The intra-ocular distribution of PXF material in our study population is consistent with that reported previously. The most often afflicted structure was the lens (28%), which was followed by the pupil, iris, and lens combined (21%), and the pupillary border (27%). All patients in the research by Idakwo *et al.* [16] contained PXF material on the pupillary edge and lens peripheral zones. Joshi RS *et al.* [17]. Reported the distribution of PXF material on the iris, pupil, and lens in 30.9% of the cases in their study.

The mean pupillary dilation was significantly lower than in patients who did not have PXF, especially in patients with PXF material in the pupillary margin, lens, and iris together. In a study by Philip *et al.* [18], 96.7% of eyes diagnosed with PXF syndrome had pupillary dilation of<6 mm. 32 Govetto *et al.* reported that pupillary dilation is significantly less in PXF patients than in non-PXF patients [13].

Morphologically, nuclear cataract was the most common type of cataract observed in 20 patients, which is 27% of the study group, followed by cortical cataract with nuclear sclerosis in 14 cases (19%). The distribution of other morphological types of cataracts is listed in table 5. These results are consistent with earlier research. Joshi RS *et al.*'s study did note 43.4% of cases with hypermature cataracts, which may have been brought about by the rural Indian perception that cataract surgery is only necessary once the condition has matured [17]. The prevalence of PXF increased with increasing age in our study population, which is in line with that reported in other studies.

Increased IOP and PXF syndrome have been linked in numerous studies. Increased intraocular pressure was noticed in 11 patients (15%) in our study. 16.3 mm Hg was the mean intraocular pressure. Two patients had open-angle glaucoma. The incidence of glaucoma is lower in our study, similar to Philip *et al.* [18]. In a study by Joshi RS *et al.*, increased IOP was observed in 9.3% of eyes, but the mean IOP was 24 (±6) mm. 8% of eyes had open-angle glaucoma, 0.4% had chronic angle-closure glaucoma, and 0.9% had lens-induced glaucoma [17].

CONCLUSION

The association of PXF syndrome in patients with cataracts can have an impact on surgical outcomes. It also has public health implications for India, especially considering the burden of cataracts as well as the increased rate of complications of cataract surgery in patients with PXF syndrome. Therefore, it is of utmost importance to diagnose PXF in all patients, especially those presenting with cataracts, so as to avoid complications and improve surgical outcomes. At the same time, it is important to be vigilant about PXF syndrome, as a pre-operative diagnosis helps in avoiding various intraoperative complications, thus resulting in a better surgical outcome.

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AUTHORS CONTRIBUTIONS

All the authors have contributed equally

CONFLICTS OF INTERESTS

Declared none

REFERENCES

1. Schlotzer Schrehardt U, Naumann GO. Ocular and systemic pseudoexfoliation syndrome. Am J Ophthalmol. 2006;141(5):921-37. doi: 10.1016/j.ajo.2006.01.047, PMID 16678509.
2. Schlotzer Schrehardt UM, Koca MR, Naumann GO, Volkholz H. Pseudoexfoliation syndrome. Ocular manifestation of a systemic disorder? Arch Ophthalmol. 1992;110(12):1752-6. doi: 10.1001/archopht.1992.01080240092038, PMID 1463418.
3. Schlötzer Schrehardt U, Kuchle M, Hofmann Rummelt C, Kaiser A, Kirchner T. Latent TGF-beta 1 binding protein (LTBP-1); a new marker for intra- and extraocular PEX deposits. Klin Monbl Augenheilkd. 2000;216(6):412-9. doi: 10.1055/s-2000-10588, PMID 10919121.
4. Al-Saleh SA, Al-Dabbagh NM, Al-Shamrani SM, Khan NM, Arfin M, Tariq M. Prevalence of ocular pseudoexfoliation syndrome and associated complications in Riyadh, Saudi Arabia. Saudi Med J. 2015;36(1):108-12. doi: 10.15537/smj.2015.1.9121, PMID 25630014.
5. Henry JC, Krupin T, Schmitt M, lauffer J, Miller E, Ewing MQ. Long-term follow-up of pseudoexfoliation and the development of elevated intraocular pressure. Ophthalmology. 1987;94(5):545-52. doi: 10.1016/s0161-6420(87)33413-x, PMID 3601370.
6. Konstas AG, Ringvold A. Epidemiology of exfoliation syndrome. J Glaucoma. 2018;27Suppl 1:S4-S11. doi: 10.1097/IJG.0000000000000908, PMID 29419641.
7. Ringvold A. Epidemiology of the pseudo-exfoliation syndrome. Acta Ophthalmol Scand Scand 1999. 1999;77(4):371-5. doi: 10.1034/j.1600-0420.1999.770401.x, PMID 10463402.
8. Sood NN. Prevalence of pseudoexfoliation of the lens capsule in India. Acta Ophthalmol (Copenh). 1968;46(2):211-4. doi: 10.1111/j.1755-3768.1968.tb05179.x, PMID 5755679.
9. Lamba PA, Giridhar A. Pseudoexfoliation syndrome (prevalence based on random survey hospital data). Indian J Ophthalmol. 1984;32(3):169-73. PMID 6335132.
10. Arvind H, Raju P, Paul PG, Baskaran M, Ramesh SV, George RJ. Pseudoexfoliation in South India. Br J Ophthalmol. 2003 Nov;87(11):1321-3. doi: 10.1136/bjo.87.11.1321, PMID 14609823.
11. Ramakrishnan R, Nirmalan PK, Krishnadas R, Thulasiraj RD, Tielsch JM, Katz J. Glaucoma in a rural population of southern India: the aravind comprehensive eye survey. Ophthalmology. 2003 Aug;110(8):1484-90. doi: 10.1016/S0161-6420(03)00564-5, PMID 12917161.
12. Triveni DC, Divya DD, lakshmi DN, Sirisha DG. A study of clinical spectrum of pseudo exfoliation syndrome. Trop J Ophthalmol Otolaryngol. 2019;4(5):341-8. doi: 10.17511/jooo.2019.i05.06.

13. Govetto A, Lorente R, Vazquez de Parga P, Rojas L, Moreno C, Lagoa F. Frequency of pseudoexfoliation among patients scheduled for cataract surgery. J Cataract Refract Surg. 2015 Jun;41(6):1224-31. doi: 10.1016/j.jcrs.2014.09.039, PMID 26100955.
14. Al-Shaer M, Bamashmus M, Al-Barrag A. Point prevalence of pseudoexfoliation syndrome in patients scheduled for cataract surgery in eye camps in yemen. Middle East Afr J Ophthalmol. 2010;17(1):74-7. doi: 10.4103/0974-9233.61221, PMID 20543941.
15. Gelaw Y, Tibebu Y. Clinical characteristics of cataract patients with pseudoexfoliation syndrome at Jimma University specialized hospital, South West ethiopia. Ethiop J Health Sci. 2012;22(1):1-6. PMID 22984326.
16. Idakwo U, Olawoye O, Ajayi BG, Ritch R. Exfoliation syndrome in Northern Nigeria. Clin Ophthalmol. 2018;12:271-7. doi: 10.2147/OPTH.S153298, PMID 29440869.
17. Joshi RS, Singanwad SV. Frequency and surgical difficulties associated with pseudoexfoliation syndrome among Indian rural population scheduled for cataract surgery: hospital-based data. Indian J Ophthalmol. 2019;67(2):221-6. doi: 10.4103/ijo.IJO_931_18, PMID 30672474.
18. Philip SS, John SS, Simha AR, Jasper S, Braganza AD. Ocular clinical profile of patients with pseudoexfoliation syndrome in a tertiary eye care center in South India. Middle East Afr J Ophthalmol. 2012;19(2):231-6. doi: 10.4103/0974-9233.95259, PMID 22623865.