

## Original Research Article

**A observational Study to evaluate visual acuity and clinical ocular profile of patients with pseudoexfoliation syndrome and pseudoexfoliation glaucoma****Soumya Kanta Mohanty<sup>1\*</sup>, Manoj Kumar<sup>2</sup>**<sup>1</sup>*Assistant Professor, Department of Ophthalmology, Kalinga Institute of Medical Sciences, Bhubaneswar, India*<sup>2</sup>*Resident, Department of Ophthalmology, Kalinga Institute of Medical Sciences, Bhubaneswar, India*

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**Abstract**

**Objective:** The main objective of the study was to evaluate visual acuity and clinical ocular profile of patients with pseudoexfoliation syndrome and pseudoexfoliation glaucoma. **Material and Methods:** This was an observational retrospective study and patients who were presented with clinical signs of PEX were included in the study. A signed informed consent from was obtained from each and every participants. Comprehensive ophthalmological assessment were done in all participants. **Result:** 610 patients who were having clinical signs of PEX was participated were included in this study and 150 patients had typical characteristics of PEX as well as glaucomatous optic disc changes. The mean age of patients having PEX and PXG was  $63.45 \pm 7.39$  years and majority of patients i.e. 88% were having age more than 50 years (>50) which was significantly higher ( $p=0.0001$ ). As compare to females in PEX and PXG proportion of males was significantly higher. 1.46:1 was the ratio of male: female in PEX patients and 2.13:1 was the ration in PXG patients. In patients having PEX and PXG, bilateral involvement of disease were observed in most of the patients. Increased cupping at time of presentation were detected with PXG as observed in Slit lamp biomicroscopy. Cupping of 0.7 were present in 33.3% of patients where as >0.8 cupping of disc were present in 50% of patients. Mean average value of  $531 \pm 24.32 \mu\text{m}$  CCT were found in PEX where as it was  $521 \pm 29.82 \mu\text{m}$  in PXG. **Conclusion:** In older population prevalence of PEX and PXG were found to be higher. At presentation more severity of optic nerve damage were found in patients with PXG. To minimize the extent of optic nerve damage regular follow-up of patients is required with a careful assessment for detection of PEX.

**Keywords:** Psynndrome, pseudoexfoliation glaucoma, visual acuity, ocular profile.

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**Introduction**

Pseudoexfoliation (PEX) syndrome is characterized by the accumulation of fibrillar extracellular material in ocular tissues and also is an idiopathic, generalized disorder [1]. Glaucoma is the most severe ocular co-morbidities that PEX predisposes with [1,2]. Over the age of 60 years, 10 to 20% of the general population worldwide were affected with PEX [3]. In adults over 45 years of age, between 1.8 [4] and 7.4% [5] was reported a prevalence rate of PEX in Indian studies. PEX Although doesn't have sex predilection but female preponderance has been previously reported [6-8]. 48-7% [9] of patients are found to be with Unilateral PEX and within 5 to 10 years up to 50% of patients converts to bilateral disease [10]. Of all open angle glaucomas worldwide approximately 25% accounts for pseudoexfoliation glaucoma (PXG) [11]. In elderly adults between 7.5 [12] and 13% [13] was reported a prevalence rate of PXG in Indian studies. PXG as compare to POAG, typically associated with more rapid visual field loss, greater severity of optic neuropathy, marked pressure spikes, greater diurnal variations and with higher mean intraocular pressure (IOP) [2]. The main objective of the study was to evaluate visual acuity and clinical ocular profile of patients with pseudoexfoliation syndrome and pseudoexfoliation glaucoma

**Material and Methods**

This was an observational retrospective study and patients who were presented with clinical signs of PEX were included in the study. A signed informed consent from was obtained from each and every participants.

\*Correspondence

**Dr. Soumya Kanta Mohanty**

Assistant Professor, Department of Ophthalmology Kalinga Institute of Medical Sciences, Bhubaneswar, India.

**E-mail:** [dr.soumyakantamohanty@gmail.com](mailto:dr.soumyakantamohanty@gmail.com)

This study analysis was conducted in accordance with Helsinki declaration. Patients who were having corneal dystrophies and degenerations, previous ocular surgeries, with the history of ocular trauma and glaucoma without pseudoexfoliation were excluded from the study.

Comprehensive ophthalmological assessment were done in all participants. Before the initiation of the study Detailed ophthalmological examination like intraocular pressure using Goldmann applanation tonometry, slit lamp examination, gonioscopy and fundus examination, visual acuity for distant with Snellen chart and near vision with Jaeger's chart was done. Humphrey's Field Analyzer-II (HFA-II, 24-2 SITA standard) were used to performed visual field assessment. Ultrasound pachymetry were used to evaluate central corneal thickness (CCT). Patients were diagnosed with pseudoexfoliation syndrome (PXS) by on anterior lens capsule after pupillary dilatation, over the pupil margin before pupillary dilatation, trabecular meshwork on gonioscopy and on corneal endothelium. 85 patients were diagnosed with pseudoexfoliation glaucoma (PXG) by pseudoexfoliative material over pupil margin and lens capsule, typical glaucomatous cupping and visual field defects, open angles on gonioscopy, IOP more than 22 mmHg. Study related data were tabulated in can excel sheet for the proper arrangement of the data and later the statistical software like IBM Statistical Package for Social Sciences (SPSS Ver. 25) were used to calculate the statistical analysis. mean  $\pm$  standard deviation were used to express the mean data value of continuous variables.  $P < 0.05$  was considered as statical significant.

**Result**

610 patients who were having clinical signs of PEX was participated were included in this study and 150 patients had typical characteristics of PEX as well as glaucomatous optic disc changes.

The mean age of patients having PEX and PXG was  $63.45 \pm 7.39$  years (>50) which was significantly higher ( $p= 0.0001$ ) (Table 1). years and majority of patients i.e. 88% were having age more than 50

**Table 1: Age Distribution of PEX and PXG**

Age ( Years )	PEX Number (%)	PXG Number (%)
40-50	75 (12.3%)	10 (6.7%)
51-60	211 (34.5%)	34 (22.7%)
61-70	201 (33%)	57 (38%)
>70	123 (20.2%)	49 (32.6%)
Total	610	150

As compare to females in PEX and PXG proportion of males was significantly higher. 1.46:1 was the ratio of male: female in PEX patients and 2.13:1 was the ration in PXG patients (Table 2).

**Table 2: Gender Distribution of PEX and PXG**

Gender	PEX Number (%)	PXG Number (%)
Male	362 (59.3%)	102 (68%)
Female	248 (40.7%)	48 (32%)
Total	610	150
Male : Female	1.46:1	2.13:1

In patients having PEX and PXG, bilateral involvement of disease were observed in most of the patients (Table 3).

**Table 3: Laterality of PEX and PXG**

Laterality of disease	PEX Number (%)	PXG Number (%)
Bilateral	431 (70.7%)	123 (82%)
Unilateral	179 (29.3%)	27 (18%)
Total	610	150

Open angle in Gonioscopy was found in 85% of patients where as occludable angle were present in 15% of patients (Table 4).

**Table 4:Gonioscopy**

Gonioscopy	Number (%)
Open	488 (80%)
Occludable	122 (20%)
Total	610 (100%)

Increased cupping at time of presentation were detected with PXG as observed in Slit lampbiomicroscopy (Table 5). Cupping of 0.7 were present in 33.3% of patients where as >0.8 cupping of disc were present in 50% of patients (table 6).

**Table 5:CUP:Disc Ratio of Patients with PEX**

C:D Ratio	Number (%)
0.3	132 (28.4%)
0.4	145 (31.2%)
0.5	188 (40.4%)
Total	465

**Table 6: CUP:Disc Ratio of Patients with PXG**

C:D Ratio	Number (%)
0.6	25 (16.7%)
0.7	50 (33.3%)
> 0.8	75 (50%)
Total	150

Anterior segment parameters were demonstrated in table 7. Mean average value of  $531 \pm 24.32 \mu\text{m}$  CCT were found in PEX where as it was  $521 \pm 29.82 \mu\text{m}$  in PXG.

**Table 7: Anterior Segment Parameters**

Parameter	PEX Mean $\pm$ SD	PXG Mean $\pm$ SD
CCT ( $\mu\text{m}$ )	$531 \pm 24.32$	$521 \pm 29.82$
AL (mm)	$24.08 \pm 0.61$	$24.16 \pm 0.71$
ACD (mm)	$3.19 \pm 0.22$	$3.32 \pm 0.39$
K1 (D)	$44.02 \pm 1.61$	$45.00 \pm 1.91$
K2 (D)	$44.21 \pm 1.32$	$45.48 \pm 1.62$

## Discussion

Pseudoexfoliation syndrome is characterized by the deposition of fibrillar material on all anterior segment structures and also primarily affecting the eye and also is a systemic disorder of the extracellular matrix. Two to threefold higher risk of open angle glaucoma in either eye of patients with PEX were observed in the Blue Mountains Eye study [14]. Worldwide the most common cause of secondary glaucoma is PEX syndrome and the most frequent cause of unilateral glaucoma. As compared with other type of glaucoma to medical therapy PXG responds poorly and on the other hand it can lead to rapid progression of optic nerve damage [15]. As more than 40% of the patients PXG has developed in the other eye, contralateral eye must be monitored and examined carefully when symptoms are present in one eye. Age is the major risk factor responsible for the higher prevalence of PEX [16]. In our study, the mean age of patients having PEX and PXG was  $63.45 \pm 7.39$  years and majority of patients i.e. 88% were having age more than 50 years ( $>50$ ) which was significantly higher ( $p=0.0001$ ). In accordance to our observation few older studies also concluded with higher prevalence of PEX among patients who were more than 60 years of age [17,18]. At first contact the disease were detected in most of our patients. In one with the few preps studies, our study result shows 1.46:1 was the ratio of male: female in PEX patients and 2.13:1 was the ratio in PXG patients [19,20]. The number of male patients were higher mainly because higher number of male patients were turned out in our ophthalmology out patient department. Our study has also documented that in patients having PEX and PXG, bilateral involvement of disease were observed in most of the patients (70% in PEX and 82% in PXG). As shown in studies, within 5 to 10 years 76% of patients who developed PEX, converts to bilateral disease in up to 50% of patients [21,22]. In our study we also demonstrated that open angle in Gonioscopy was found in 85% of patients where as occludable angle were present in 15% of patients. In current study among 610 patients screened with PEX, 24.59% has

diagnosed with glaucoma. It was already established that 0% of patients with PEX later develops PXG and is considered as the most common type of secondary open angle glaucoma. In a recently conducted study it was observed that glaucoma was developed in 7.5% of the study population with PEX. As compared to patients with POAG more severe optic neuropathy that likely cause by marked spikes as because patients with PXG have higher IOP with greater fluctuations. In our study we observe cup:disc ratio of  $>0.7$  were present in 33.3% of patients where as cup:disc ratio of  $>0.8$  were present in more than 50% of patients. May be due to lack of awareness and due to late presentation more severity of glaucomatous optic nerve damage on presentation were observed in our observational study. Glaucomatous damage can be prevented if we diagnosed the disease at an early stage of the disease or presented in early stages. By optical biometry anterior segment parameters of patients of PEX and PXG were compared. In our study we had noticed that mean average value of  $531 \pm 24.32 \mu\text{m}$  CCT were found in PEX where as it was  $521 \pm 29.82 \mu\text{m}$  in PXG, which means central corneal thickness were significantly thinner in patients with PXG. The same observation also in line with the few early study which also similarly concluded [23-25]. Between PEX and PXG patients, we do not observed any significant difference in K1 and K2 readings, axial length and in anterior chamber depth. Similar finding were also concluded in few early studies [26].

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