

STUDY OF CLINICAL PROFILE OF PSEUDOEXFOLIATION SYNDROME AND PSEUDOEXFOLIATION GLAUCOMA IN A TERTIARY HEALTH CARE HOSPITAL IN CENTRAL ODISHA

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Abstract

Background: Patients with pseudoexfoliation syndrome have fibrillary materials accumulated around the iris, pupillary edge, lens capsule, and organ blood vessels. The syndrome characterizes this condition. The presence of fibrillary materials is the defining characteristic of this challenging disorder called fibrillary fibrosis. To be more specific, this study aimed to determine the incidence of PEX in the central region of Odisha, as well as the characteristics of cataracts in patients who had PEX. **Materials and Methods:** This study was a cross-sectional examination conducted between January 1, 2021, and December 31, 2022, comprising 340 patients diagnosed with OPD. Between those two dates, the research was carried out. Within the scope of this investigation, the incidence of cataracts and PEX was also thoroughly examined. The data were analyzed using fundamental descriptive statistics, and the findings were presented as frequencies and percentages. **Result:** There were 74 people out of 340 patients were found to have PEX syndrome, with a frequency of up to 23%, as shown by the research findings. There were 42 patients, or 58% of the total, who were male, and 32 patients, or 42% of the total, were female. The ratio of men to females was 1.3 to 1. Most patients (41%) were between 61 and 70 years old when they presented themselves. The mean age of the patients was 67 years old, with the range of ages ranging from 51 to 84 years. Within our investigation, we found that 11 eyes, which is fifteen percent, had an increase in intraocular pressure. In each of the two individuals, open-angle glaucoma and lens-induced glaucoma were the diseases that were present. Among the cataracts seen in the study group, nuclear cataracts were the most prevalent form, accounting for 27% of the cases. Cortical cataracts with nuclear sclerosis were identified in 19% of the cases. In addition, we found that PEX is more often linked to hypertension (28 percent), diabetes mellitus (27 percent), asthma (6.75%), coronary artery diseases (4.05%), and thyroid problems (2.70%). **Conclusion:** It is observed that males are more likely to experience pseudoexfoliation syndrome compared to females, with a more significant percentage of patients aged 70 years or older. That being the case, it is connected to one's age. It was found that nuclear cataracts were the most prevalent form of cataracts seen in the population under research.

INTRODUCTION

PEX, also known as pseudoexfoliation syndrome, is a difficult condition that affects the eyes and visceral organs. It is frequently called PEX. Finland's Lindberg, an ophthalmologist, was the first to describe PEX. It was in 1917 when he performed this. One characteristic that sets this specific form of cataract apart from others is the presence of fibrillar deposits in the anterior area of the eye.^[1] When PEX

is found deposited around the blood arteries of these organs, two techniques that may be used to determine its presence are electron microscopy and immunohistochemistry.^[2,3] The eye can manifest itself in a multitude of ways, depending on the area where it is placed. It has been shown that deposits are present in the iris pigment epithelium, pupillary edge, ciliary epithelium, lens, lens capsule, trabecular meshwork, cornea, zonules, orbital soft tissues, and iris blood vessels. Pathological alterations such

corneal endothelium decompression, inadequate pupillary dilation, phacodonesis, secondary open angle, and secondary angle closure glaucoma can be brought on by the deposition of PEX material.^[4] These alterations may be brought about by a number of distinct causes. A slit-lamp examination can identify the problem as a material on the anterior areas of the eye that mimics fibrillar dandruff. This process can be used to identify whether or not the issue is bilateral. PXG, or pseudo-exfoliative glaucoma, is a disorder brought on over time by exposure to PEX. Based on estimates, around 5% of those diagnosed with PEX will develop and become PXG over the next five years, 15% will do so after 10 years, and 60% will have a fifteen-year chance of becoming PXG.^[5]

Furthermore, there is a connection between PEX and cataracts, which is most likely brought on by ocular ischemia and impaired antioxidant systems. This syndrome causes cataracts to develop more quickly and appear sooner in individuals.

In addition to the systemic symptoms, it also affects various organ systems, including the lungs, liver, kidneys, gall bladder, meninges, and cerebrovascular illnesses, such as angina and aortic aneurysm. With that being said, the association continues to be contentious. There is a wide range of variations in the prevalence of PEX across various communities worldwide.^[6] The incidence of PEX is much lower among Asians than in other ethnic groups. This two-year study, which aimed to identify the clinical profile and characteristics of PEX, was conducted in a hospital in central Odisha.

MATERIALS AND METHODS

The current study, a cross-sectional assessment of the population, was conducted in a hospital in the Indian state of Odisha. Every patient 45 years of age or older who visited the eye outpatient clinic between January 1, 2021, and December 31, 2022 had an evaluation for PEX and PXG. In all, the data analysis took place for two years. Obtaining consent from the institutional ethics committee was accomplished with each participant.

Inclusion Criteria

Patients with pseudophakic eyes who had previously given written approval to participate in the trial, those whose eyes had received PEX treatment, and patients who had previously undergone cataract surgery made up the study's participants.

Exclusion Criteria

Patients with a known case or family history of primary glaucoma and other causes of secondary glaucoma, as well as those who were younger than 45 years old, had abnormalities in the optic disc or nerve, and declined to give consent to participate in the study, were excluded from the study.

Study Procedure: In cases where typical PEX was discovered at the pupil, lens surface, or other intraocular structures, it was considered that PEX

was present in the eye. If a patient's pupil dilation did not disclose any symptoms of PEX in one of their eyes, then it was determined that the patient had a clinically non-PEX eye. "PXG was defined as the coexistence of peripapillary edema and clinical glaucomatous optic neuropathy. Peripapillary atrophy, focal or diffuse neuroretinal rim thinning, and retinal nerve fiber layer defects were the characteristics of PXG. Additionally, corresponding glaucomatous visual field defects or retinal nerve fiber layer defects were observed on Optical Coherence Tomography (OCT) with or without increased intraocular pressure were also present. Patients with PEX who met the following criteria and had either had glaucoma surgery in the past or were presently on topical glaucoma drugs were considered to be PXG cases.

Through the use of indirect ophthalmoscopy with a +20 D lens, gonioscopy, and slit-lamp biomicroscopic examination (both before and after mydriasis), a comprehensive assessment of the peripheral retina was carried out. In addition to a comprehensive ocular and systemic history, a Goldmann application tonometer was used to measure intraocular pressure (IOP) and best-corrected visual acuity (BCVA). These measurements were obtained by using Snellen's chart and a comprehensive clinical history for the symptoms that were being presented. An extensive battery of systemic tests was carried out, which included an electrocardiogram, an echocardiogram, a chest X-ray, an absolute eosinophil count, a thyroid profile, a fasting blood sample, a Hb1ac level, and an electrocardiogram."

Patients with missing or incomplete medical records were not included in the research.

Statistical Analysis

Immediately after the data analysis was completed, the essential descriptive statistics were given in the form of percentages and frequencies. For the purpose of determining the level of correlation that exists between qualitative variables, a chi-square test were performed. At a level of $P < 0.05$, statistical significance was determined to have been established.

RESULTS

The frequency of pseudoexfoliation syndrome was found to be 23% among the 340 individuals evaluated over two years. Of those patients, 74 were diagnosed with the condition. Only 32 patients, or 42%, were female, whereas 42 patients, or 58%, were male. The majority of patients (41%) were between the ages of 61 and 70 years old when they presented themselves, with the mean age being 67 years old (the range being 51–84 years). [Figures 1 and 2] illustrate the distributions according to age and gender, respectively. The most considerable frequency of PEX syndrome was seen in patients aged 70 years and beyond, with ten people (26%) diagnosed with

the condition. This was followed by 18 patients (24%) in the group of patients aged 71 to 80 years. The age-group distribution of individuals diagnosed with PEX relative to the total number of screened patients is presented in [Figure 2].

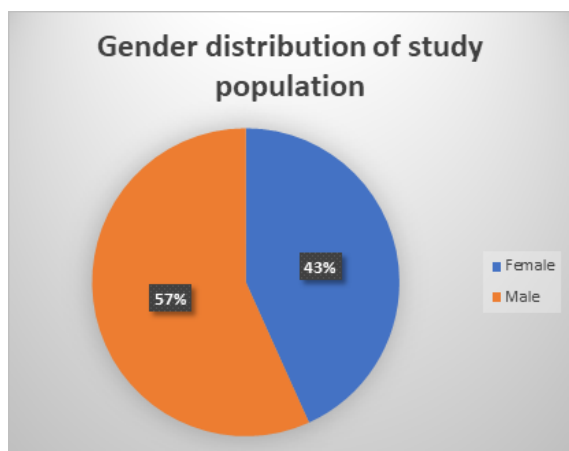


Figure 1: Gender-wise distribution of the study population.

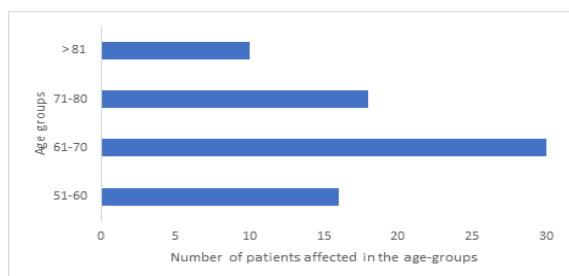


Figure 2: Number of patients affected in the study population according to age groups.

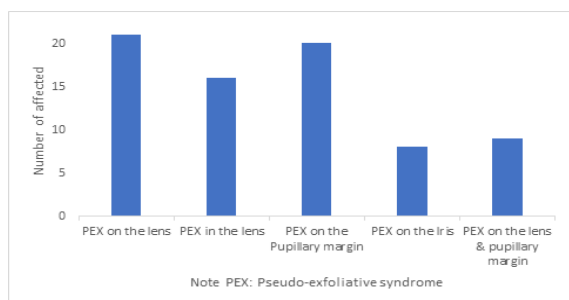


Figure 3: Showing the PEX location in the study population.

The number of individuals related to hypertension, diabetes mellitus, asthma, cardiac, and thyroid illnesses is 21, 20, 5, 3, and 2, accordingly. This is a systemic disease relationship. In fifty patients or 68.0 percent, PEX was found in both eyes, while in twenty-four patients, or 32.0%, it was only found in one eye. In 21 (28%) of the instances, material was found on the lens, and in 20 (27%) cases, it was found on the patient's pupillary edge. PEX material was found in sixteen individuals' lenses, iris, and pupillary margins, which is twenty-one percent. Eight patients, or ten percent, had PEX material present on their iris, and nine patients, or twelve percent, had PEX material present on their lens and

pupillary edge. Pupils that were not dilated and were stiff were noted in 18 individuals.

Within our investigation, we found that 11 eyes, which is fifteen percent, had an increase in intraocular pressure. The average intraocular pressure was 16.3 millimeters of mercury. The open-angle and lens-induced forms of glaucoma were both present in two cases. Only two individuals were discovered to have angle closure. In contrast, forty patients were determined to have open-angle glaucoma out of a total of one hundred thirty patients. Twenty-three percent of the patients with advanced glaucoma had combined surgery. In contrast, the remaining patients were treated with antiglaucoma drugs. The combined operation was conducted on thirty-five individuals.

Nuclear cataracts were the most prevalent kind found in 20 patients, accounting for 27 percent of the total. With 14 cases or 19 percent, cortical cataracts with nuclear sclerosis were the second most prevalent kind of cataract. The distributions of the several additional forms of cataracts that may be classified morphologically are presented in [Figure 4].

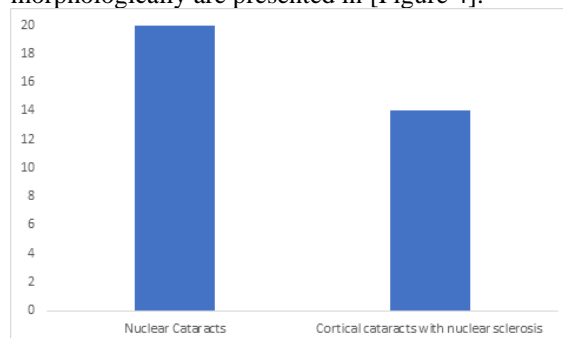


Figure 4: Showing morphological types of cataracts in the study population.

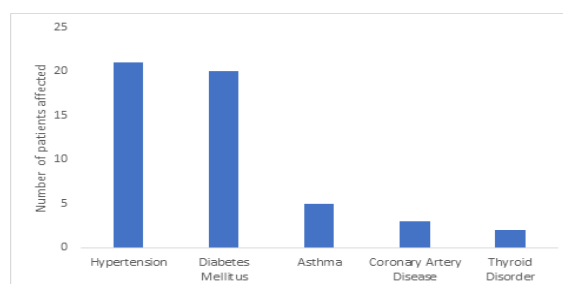


Figure 5: Number of patients associated with comorbidities in the study population.

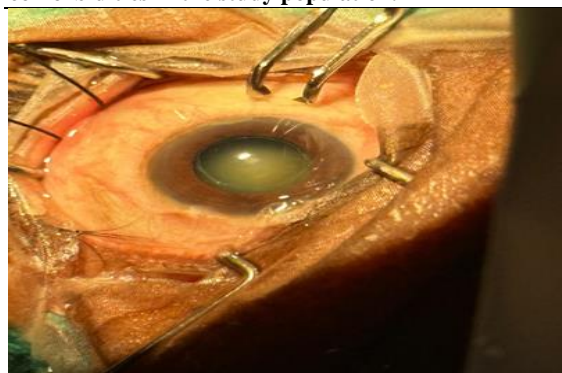


Figure 6: Pseudo-exfoliation syndrome (PEX) on the anterior lens capsule

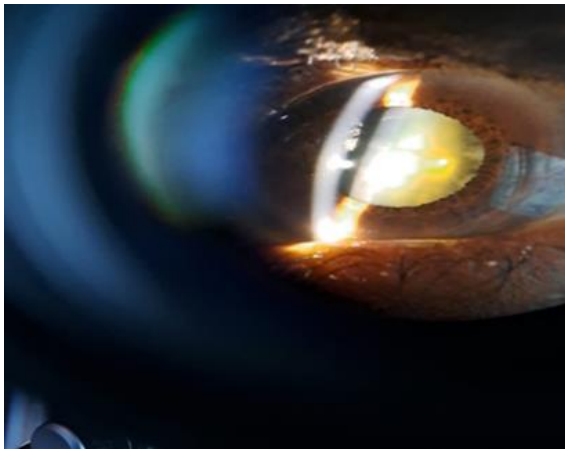


Figure 6: PEX with dilated pupil



Figure 7: Pseudoexfoliation syndrome with rigid pupil

DISCUSSION

The purpose of this research was to investigate the prevalence of PEX and PXG in persons, as well as the clinical features of these particular illnesses. A great number of studies have shown that there is a considerable amount of diversity in the incidence of PEX. According to the findings of a research,^[7] the incidence of PEX might be as high as 22.1 percent or as low as 0.3 percent over the study period. When it comes to PXG and PEX, the prevalence rates have been shown to range anywhere from 7.5% to 13% and 1.8% to 7.4%, respectively, according to research.^[8-10] There is a possibility that the prevalence will vary depending on factors such as age, gender, race, and location of residence. One possible explanation for the varying levels of prevalence is that this is the cause. On the other hand, a sizeable portion of PEX cases may not be treated at all if the pupil is not dilated. This is necessary for inspection by slit-lamp bio-microscopy, which is something that is being found at ophthalmology institutions of higher learning.

The ratio of males to females was 1.81 to 1, with 42 patients made up 58% of the total and 32 patients made up 42% of the total. It was discovered by the authors that the majority of the patients were male. The vast majority of the research suggested that there

were more males than females in the population. It is possible that the male predominance in the Indian population may be attributed to the fact that spending more time outdoors brings about an increase in exposure to ultraviolet light. Twelve.

Both cataracts and pseudoexfoliation syndrome are conditions that typically affect individuals who are in their latter years. Cataracts are also age-related in the majority of patients, much like pseudoexfoliation syndrome. It has been shown that there is a connection between PEX and cataracts, which may be a result of ocular ischemia and inadequate antioxidant systems. Individuals who have this illness also have cataracts that appear sooner and progress more rapidly than those who do not have it. An age-related association was found to exist between the prevalence of PEX in the population that was the subject of the inquiry. There have been other examinations, such as those,^[12,13] that have discovered conclusions that are analogous to those that have been stated before. Those persons who were younger than fifty years old and had undergone cataract surgery were not characterized as having the PEX syndrome.^[12]

The characteristics of PEX were described in accordance with the findings of a population-based research conducted in rural south India.^[8] It was shown that there was a statistically significant difference in the prevalence of cataracts between those who had PEX and those who did not have PEX ($p = 0.014$). It was shown that 16.7% of those who had been diagnosed with PEX also had excessive intraocular pressure.

During the course of our research, fifty people, which accounts for 68% of the total, demonstrated bilateral engagement. The findings of this study are comparable to those of the research conducted by Gelaw and Tibebu,^[14] which found that 66.7% of patients developed bilateral involvement. Because to PEX, forty to fifty percent of patients initially have unilateral involvement, and after five years, bilateral involvement occurs in the majority of patients. Intraocular administration of the PEX material was carried out on the population that was the subject of the experiment, which is in line with the findings of earlier observations. An impact was shown to have a probability of 26 percent on the lens, 27 percent on the pupillary margin, and 21 percent on the pupil, iris, and lens collectively. The lens was determined to have the highest probability of an impact. It was found that PEX material was present in the pupillary edge and lens peripheral zones of each and every patient who took part in the research conducted by Idakwo et al.^[15] During the course of their examination, Joshi RS and colleagues found that PEX material was present on the iris, pupil, and lens of thirty-nine percent of the patients.^[16]

The mean pupillary dilation was found to be considerably smaller in patients who had PEX material in the iris, lens, and pupillary margin compared to those who did not have PEX. Those patients who had PEX material in their iris

demonstrated that this was particularly apparent. Philip and his colleagues conducted a research in which they found that 96.7% of the eyes that were affected by PEX syndrome had a pupillary dilation that was less than 6 millimeters when measured.^[17] The findings of another research shown that the pupillary dilation of PEX patients was much lower than that of individuals who did not receive PEX.^[12] With regard to the twenty patients, nuclear cataracts were the most prevalent, accounting for 27 percent of the total. Coronal cataracts with nuclear sclerosis were the second most common kind of cataract, accounting for 19 percent of all cases. There were 14 occurrences of this type of cataract. In figure 4, the distributions of a number of additional morphological forms of cataracts are shown. The correlation between these findings and those discovered in earlier research is strong. The research conducted by Joshi and colleagues, on the other hand, found that hyper-mature cataracts were present in 43.4% of individual individuals. It is possible that this is due to the common notion in rural India that cataract surgery is only necessary once the cataract has reached a mature stage.^[18] The findings of our study population indicate that the prevalence of PEX decreased with increasing age, which is consistent with the findings of studies that have been published in the past. There have been several investigations that have shown evidence of both high intraocular pressure and PEX syndrome. The results of our research showed that fifteen percent of the sample, or eleven individuals, had excessive intraocular pressure. In terms of intraocular pressure, the average was 16.3 millimeters of mercury. A total of two of the patients were diagnosed with open-angle glaucoma (OAG). Compared to the findings of Philip et al,^[17] our research showed that the incidence of glaucoma was reduced. This finding is in line with their findings. According to the findings of the research conducted by Joshi RS and colleagues, the intraocular pressure (IOP) was elevated in 9.3 percent of the eyes. Despite this, it was established that the average intraocular pressure (IOP) was 24 millimeters (\pm 6 millimeters). Nine percent of eyes were affected by lens-induced glaucoma, whereas eight percent of eyes were affected by open-angle glaucoma.^[16] There were 0.4% of the eyes that were affected by chronic angle-closure glaucoma. According to the findings of our research, PEX is linked to a wide range of disorders, including hypertension (28 percent), diabetes mellitus (27 percent), asthma (6.75%), coronary artery diseases (4.05%), and thyroid problems (2.70 percent). And according to the results of a previous research,^[19] that investigated the relationship between diabetes mellitus and PEX, those who had diabetes had a significantly lower incidence of PEX compared to people who did not have diabetes who were the same age. Furthermore, according to the findings of a different research that was carried out by Kovac et al,^[20] patients who were diagnosed with PEX had a higher risk of developing coronary heart disease.

There is a possibility that the prevalence of PEX among individuals who have diabetes and hypertension might be attributed to several geographical and environmental variables that contribute to the formation of PEX. Some of these conditions include diabetes, high blood pressure, and obesity. The prevalence of diabetes mellitus and hypertension is higher among those who have been diagnosed with PEX compared to other individuals.

CONCLUSION

Cataracts and PEX syndrome are associated with one another, which can affect the results of surgical procedures. Additionally, it has consequences for India's public health, particularly when taking into consideration the prevalence of cataracts and the elevated incidence of problems that are associated with cataract surgery in individuals who have developed PEX syndrome. Therefore, it is of the highest significance to identify PEX in all patients, particularly those who arrive with cataracts, to prevent problems and enhance the results of surgical procedures. On the other hand, it is essential to be alert regarding PEX syndrome. This is because a preoperative diagnosis helps to avoid numerous intraoperative difficulties, which ultimately leads to a better surgical outcome in predisposed populations such as those found in our region. It has been found that systemic disorders are connected with male prevalence. Systemic disorders can be prevented from causing intraocular problems and other complications by carefully examining and treating the condition.

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