

# Prevalence of Glaucoma among Subjects with Pseudoexfoliation Syndrome at Prince Ali Hospital, Kerak, Jordan

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## Abstracts

**Objective:** To determine the prevalence of glaucoma among subjects having pseudoexfoliation syndrome in this part of Jordan.

**Methods:** This is a prospective study conducted by the ophthalmology clinic at Prince Ali Hospital in Kerak province, during the period from November 2003 to April 2004. 400 consecutive patients, aged 40 years or above attending the eye clinic were included in this study.

**Results :** The prevalence of pseudoexfoliation syndrome among subjects attending the eye clinic at Prince Ali Hospital in Kerak and aged 40 years or above was found to be 21.25%, and the prevalence of glaucoma among those was 27.8% .

**Conclusion:** Pseudoexfoliation is strongly associated with the presence of glaucoma. Prevalence of exfoliative glaucoma among patients with pseudoexfoliation is average compared to studies from other parts of the world.

**Keywords:** pseudoexfoliation, glaucoma, prevalence.

**Abbreviations:** PXF: pseudoexfoliation, PXS: pseudoexfoliation syndrome, PXM: pseudoexfoliation material, IOP: intraocular pressure, OAG: open angle glaucoma, PXG: pseudoexfoliation glaucoma.

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## Introduction

Pseudoexfoliation Syndrome (PXS) was first described in 1917 by Lindberg<sup>1</sup> in a Finnish population. It is the most common identifiable cause of secondary Open Angle Glaucoma (OAG) worldwide,<sup>2</sup> and it is reported to be a risk factor for narrow angles and Angle Closure Glaucoma (ACG).<sup>3-6</sup> The association of glaucoma with exfoliation syndrome has been well demonstrated.<sup>7, 8</sup>

The clinical diagnosis of PXS is made by the presence of typical Pseudoexfoliation Material (PXM) on the anterior lens capsule surface and at the pupillary margin.

In addition to PXM, other features include endothelial pigmentation, loss of pupillary ruff, iris transillumination, Sampaolesi's line, and pigment deposition in the trabecular meshwork.<sup>9</sup>

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PXS is associated with various ocular complications. Elevated Intraocular Pressure (I.O.P.) and glaucomatous nerve damage had been demonstrated in patients with PXS.<sup>3,10,11</sup> Cataracts were reported to be more common in patients with PXS.<sup>12</sup> The exact etiology and pathogenesis remain largely unknown.<sup>13</sup>

Hypothesis of an accumulation of basement membrane components such as fibrillin has been proposed.<sup>14</sup>

It is a generalized disorder of the extracellular matrix characterized by the production of abnormal basement membrane-like material in several intraocular and extraocular tissues. The trigger for the production of PXM remains to be identified.

Clinically, the PXM can be seen deposited in the anterior segment on the pupillary ruff, the anterior lens capsule, and other anterior segment structures. On the anterior capsule, it has a characteristic distribution of a central disc surrounded by a clear zone, surrounded by a peripheral ring-like deposit of granular material.<sup>15</sup>

PXF is a major risk factor for the development of OAG. It is found in 20-60% of patients<sup>4</sup> with glaucoma in many regions of the world.<sup>16,17</sup>

There are a number of characteristics of eyes with PXS which could predispose to the development of (ACG). Pupillary block may be caused by a combination of posterior synechiae, increased iris thickness or rigidity, or anterior lens movement secondary to zonular weakness or dialysis.<sup>18</sup>

## **Materials and Methods**

A total of 400 consecutive patients attending the eye clinic at Prince Ali Hospital during the period from November 2003 to February 2004, and aged 40 years or above, were examined for the presence of pseudoexfoliation.

The relevant medical and ocular history was recorded. Eye evaluation included the visual acuity, slit lamp examination of the anterior segment with special attention to the endothelium, pupillary margin, anterior capsule with/without dilatation, applanation tonometry, gonioscopic examination of anterior chamber angle and fundoscopy to assess the optic nerve cup to disk ratio. PXS was diagnosed clinically by the presence of typical PXM on the anterior capsule or at the pupil border, with or without pigment deposition on the corneal endothelium.

Glaucoma was diagnosed by the presence of characteristic glaucomatous nerve damage and/or field loss associated with raised I.O.P.

Exclusion criteria included; patients not willing for full examination, previous eye trauma causing angle recession, uveitis, previous laser trabeculoplasty and previous intraocular surgery.

## **Results**

The total number of patients included in this study was 400 [800 eyes], 169 (42.25%) males and 231 (57.75%) females, with an age range from 40 to 85 years.

PXS was found in 85 (21.25%) patients [115 eyes (14.325%)], 35 (20.71%) males and 50 (21.65%) females. The youngest age found to have PXS was 50 years. No subjects under this age were found to have PXS.

The ocular involvement was bilateral in 30 subjects (7.5% of all subjects and 35.29% among those with PXF); 12 (40%) females and 18 (60%) males, and it was unilateral in 55 subjects (13.75% among all subjects and 32.54% among those with PXF) ; 38 (69.1%) females and 17 (30.9%) males, and involving right eye in 35 (63.6%) subjects and left eye in 20 (36.4%) subjects.

The mean age of all the study population included in this study was 58.9 years. The mean age of subjects found to have PXS was 63.0 years, while the mean age of subjects without PXS was 57.76 years.

The mean age of females and males with PXS was 58.3 and 69.7 years respectively, while the mean age of females and males included in the study was 52.03 and 64.62 years, respectively.

Among the 115 eyes with P.X.F., 27 eyes (23.48%) were already diagnosed to have Pseudoexfoliation Glaucoma (PXG), while 6 more eyes (5.22%) were discovered to have it.

So, a total number of 33 eyes (28.7%) were found to have glaucoma. Their distribution into open, narrow and closed angles is shown in table (1). The mean age of females and males with PXG was 61.2 and 70.5 years, respectively.

**Table 1: Angle width in PXG.**

Angle	No. of cases (%)
Open*	25 (75.75%)
Narrow**	5 (15.15%)
Closed***	3 (9.1%)
Total	33(100%)

\*Angle width >25°

\*\*Angle width <25°

\*\*\*Presence of peripheral anterior synechiae

## Discussion

The prevalence rate of PXS in different populations shows extensive variations – from 0% in Eskimos<sup>19</sup> to 38% in Navajo Indians.<sup>20</sup>

These variations arise from racial, genetic and /or geographical differences. Similarly, prevalence of PXG among those patients with PXF varies extensively, from as low as 7.5% to as high as 63%. On the other hand, PXG is found in 20-60% of patients with glaucoma in many regions of the world.<sup>16,17</sup> In a study by Karger et al. (21) PXG was diagnosed in 44% of PXF patients, 74% of whom were females.

In another study by Arvind et al,<sup>22</sup> he found that 16.7% of PXF cases had high I.O.P. (>21 mmHg), 14.8% had occludable angles, 13% had PXG, and in another study by Krishnadas et al,<sup>23</sup> the prevalence of glaucoma among subjects with PXF was 7.5%, and exfoliation was present in 26.7% of those identified as primary OAG. While in a study by Cashwel,<sup>24</sup> 21 out of 33 patients (63.6%) with PXF had open angle glaucoma. Mitchell et al.<sup>11</sup> Confirmed the strong relationship between glaucoma and PXF in their study where glaucomatous damage was present in 14.2% of eyes with PXF compared with 1.7% of eyes without PXF, and ocular hypertension was also more frequent in eyes with PXF (9.3%) than in eyes without PXF (3.1%).

In our study, the prevalence of PXS was found to be 21.25% in the province of Kerak, in patients 40 years of age or older, and the prevalence of PXG was found to be (27.8%).

The mean age of subjects with PXS was found to be 63.0 years, while the mean age of subjects with PXG was 66.2%, and, considering age specific prevalence rates, there was a significant linear increase in prevalence with age. It is well known that the prevalence of PXG increases with age.<sup>11, 22, 24</sup>

No significant age difference was found between bilateral and unilateral cases, and this is similar to those of other studies.<sup>22</sup>

**References:**

1. Lindberg JG. Kliniska undersökningar över depigmenteringen av pupillarranden och genomlysbarheten av iris vid fall av alderstarr samt i normala ögon hos gamla personer [Thesis]. Helsinki, Finland: Helsinki University, 1917.
2. Ritch R, Schlotzer-Schrehardt U. Exfoliation (Pseudoexfoliation) syndrome: toward a new understanding. *Acta Ophthalmol Scand* 2001; 79: 213-217.
3. Layden WE, Shaffer RN. Exfoliation syndrome. *Am J Ophthalmol* 1974; 78:835-841.
4. Wishart PK, Spaeth GL, Poryzees EM. Anterior chamber angle in pseudoexfoliation syndrome. *Br J Ophthalmol* 1985; 69:103-107.
5. Aasved H. The geographical distribution of fibrillographia epitheliocapsularis, so-called senile exfoliation or pseudoexfoliation of the anterior capsule. *Acta Ophthalmol* 1969; 47:792-810.
6. Gross FJ, Tingey D, Epstein DL. Increased prevalence of occludable angles and angle-closure glaucoma in patients with pseudoexfoliation. *Am J Ophthalmol* 1994; 117:333-336.
7. Aasvid H. Intraocular pressure in eyes with and without fibrillographia epitheliocapsularis. *Acta Ophthalmol (kbh)* 1971; 49:601- 610.
8. Kozart DM, Yanoff M. Intraocular pressure status in 100 consecutive patients with exfoliation syndrome. *Ophthalmology* 1982; 89:214- 218.
9. Prince AM, Ritch R. Clinical signs of the pseudoexfoliation syndrome. *Ophthalmology* 1986; 93:803-807.
10. Davanger M, Ringvold A, Bilka S. Pseudo-exfoliation, IOP and glaucoma. *Acta Ophthalmol* 1991; 69:569- 573.
11. Mitchell P, Wang JJ, Hourihan F. The relationship between glaucoma and Pseudoexfoliation. The Blue Mountains Eye Study. *Arch Ophthalmol* 1999; 117:1319-1324.
12. Hirvela H, Luukinen H, Laatikainen L. Prevalence and risk factors of lens opacities in the elderly in Finland. *Ophthalmology* 1995; 102:108-117.
13. Damji KF, Bains HS, Stefansson E, et al. Is pseudoexfoliation syndrome inherited? A review of genetic and nongenetic factors and a new observation. *Ophthalmic Genetics* 1998; 19:175- 185.
14. Schlotzer-schrehardt U, von der Mark K, Sakai LY, et al. Increased extracellular deposition of fibrillin-containing fibrils in pseudoexfoliation syndrome. *Invest Ophthalmol Vis Sci* 1997; 38:970-984.
15. Ritch R. Exfoliation Syndrome. In: Ritch R, Shields MB, Kravits T, eds. *The glaucomas*, 2<sup>nd</sup> ed. St Louis: Mosby, 1996: 993-1022.
16. Forsius H. Exfoliation syndrome in various ethnic populations. *Arch Ophthalmol (Suppl)* 1988; 184: 71-85.
17. Ringvold A. Epidemiology of glaucoma in northern Europe. *Eur. J. Ophthalmol* 1996; 6:26- 29.
18. Ritch R. Exfoliation Syndrome: Clinical Findings and Occurrence in Patients with Occludable Angles. *Trans Am Ophthalmol Soc*, excerpt. 1994; 92: 845- 944.

19. Forsius H. Prevalence of pseudoexfoliation of the lens in Finns, Lapps, Icelanders, Eskimos and Russians. *Trans Ophthalmol Soc UK* 1979; 99: 296.
20. Faulkner HW, Pseudoexfoliation of the lens among Navajo Indians. *Am J Ophthalmol* 1971; 72: 206.
21. Karger RA, Jeng SM, Johnson DH, et al. Estimated incidence of pseudoexfoliation syndrome and pseudoexfoliation glaucoma in Olmsted County, Minnesota. *J Glaucoma* 2003; 12(3):193- 197.
22. Arvind H, Raju P, Paul PG, et al. Pseudoexfoliation in south India. *Br J Ophthalmol* 2003; 87:1321- 1323.
23. Krishnadas R, Nirmalan PK, Ramakrishnan R, et al. Pseudoexfoliation in rural population of southern India: Aravind Comprehensive Eye Survey. *Am J Ophthalmol* 2003; 135(6); 830- 837.
24. Cashwell LF, Shields MB. Exfoliation syndrome; prevalence in a southeastern United States population. *Arch Ophthalmol* 1988; 106:335- 336.