

# A study of risk factors and epidemiologic profile of posterior polar cataract/posterior subcapsular cataract in Northwest Rajasthan

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## ABSTRACT


**Background:** In India, cataract is the foremost cause of blindness, leading to the mild-to-severe morbidity. **Objective:** The objective of the study was to find out the epidemiologic profile and risk factors of posterior polar cataract/posterior subcapsular cataract. **Materials and Methods:** A prospective non-comparative observational study involving 50 patients having posterior polar cataracts attending our outpatient department was selected and was questioned about their locality, systemic diseases, ocular disease, and use of steroid in any form which were included in the study. **Results:** Of the 50 patients, 30 were male and 20 females, most patients were in the age group of 61–70 years. About 66% of the patient belongs to the rural locality. Most of the females were homemaker, 24% were farmer, 8% were shopkeeper, and 6% retired persons while 2% each of electrician, computer programmer, and bus driver. About 48% had bilateral cataracts, 42% (21) were pseudophakic in one eye, and 1% (5) unilateral cataract. About 24% of patients had hypertension, 18% of patients had of asthma/chronic obstructive pulmonary disease, 16% of patients had diabetes mellitus, 2% of patients had h/o arthritis, 8% had skin disease, 6% had h/o injudicious use of over-the-counter topical drops while 4% of patients of thyroid disease were noted and 34% of patients had h/o steroid use. The most common type of cataract seen Grade I (52%, 26 patients), followed by Grade II (36%, 18 patients), Grade III (8%, 4 patients), and Grade IV (4%, 2 patients). **Conclusion:** With increasing injudicious use of steroid can result in formation of posterior polar/posterior subcapsular cataract in young age and professional office class workers who are seeking medical help at early stage. An ultrasound should be done to rule out posterior capsular defect if suspected and the patient should be counseled well about the complication prior taking into surgery.

**KEY WORDS:** Posterior Polar Cataract; Posterior Subcapsular Cataract; Steroid

## INTRODUCTION

Cataract the word derived from Latin meaning waterfall. According to the World Health Organization (WHO), cataract is opacification of the lens of the eye which stops the transmission of light. Most common cause of cataract is increasing age, can be encountered congenitally,

post-traumatic, post-uveitic, post-radiations, and associated with other eye diseases.<sup>[1]</sup> Approximately 45 million people are blind worldwide, out of which cataract accounts for 17.6 million (39%) cases.<sup>[2]</sup> Southeast Asian region contributes to 50–80% of all blindness.<sup>[2]</sup> The WHO states that about 18 million people are bilaterally blind due to cataract in the world. Cataract is the major cause of blindness and visual impairment across the world. Cataract accounts for 62.6% of all blindness affecting 9–12 million bilaterally blind person.<sup>[3]</sup> In India, 20 lakhs new cases of cataract are being added up every year. Aging is the main non-modifiable risk factor for its development. Other attributed risk factors are trauma, uveitis, diabetes, ultraviolet (UV) light exposure, and smoking.

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Posterior polar cataract is a type of congenital cataract whose occurrence is very rare, it may be autosomal dominant in inheritance or sporadic. Incidence varies from 3 to 5 in 1000.<sup>[4-6]</sup> It is usually bilateral in 65–80% of the cases.<sup>[7,8]</sup> There is no particular gender predominancy. The posterior subcapsular cataract which is Grade I posterior polar cataract is now emerging more due to use of steroids in various form and increasing chances of diabetes in India. The posterior polar cataract is associated with higher incidence of intraoperative complications such as posterior capsular rupture and nucleus drop. In this study, we had focused on the epidemiological profile, correlation with systemic and ocular disease as it is increasing drastically due to unjust use of steroid in various forms.

The patient complains diminution of vision, sensitivity to light, and altered contrast sensitivity. The patient usually comes to ophthalmologists when the density of the cataract increases which causes diminution of vision, age-related miosis, or increased accommodation because of which pupil contracts and light is not able to penetrate the dense lenticular opacity. In children, it may lead to squint/amblyopia ex anopsia. The diagnosis of a posterior polar cataract is confirmed on slit-lamp examination. Slit-lamp examination and pupillary retroillumination give us a rough idea of the visual impairment caused by the cataract. Various theories had been put forwarded for its development like one school of thought suggested that posterior polar cataracts are remnant of the hyaloid artery<sup>[9,10]</sup> or mesoblastic tissue invasion of the lens.<sup>[11]</sup> It is observed that posterior polar cataract is present since embryonic stage or infancy but presents during the 3<sup>rd</sup>–5<sup>th</sup> decade of life. The pathogenesis of posterior polar cataract is still a mystery which needs to be solved. Because of the increase in the genetic studies, it has been found that posterior polar cataract can occur because of genetic mutation.<sup>[12]</sup> Various genes such as PITX3,8; PAX6,9; FOXE3,10; EYA1,11; and MAF12, 13 have been associated with congenital cataract and anterior segment mesenchymal dysgenesis. A posterior polar cataract results because of lens fibers dysplasia, leading to progressive lens opacity, degenerative changes, with the formation of a specific disc like cataract and the deposition of extracellular material.<sup>[13-15]</sup> The posterior capsule in these cataracts is very fragile and in some cases may be absent.<sup>[16]</sup> The thinness of the posterior capsule was proved histologically in one study<sup>[17]</sup> while another study did not confirmed it.<sup>[7]</sup> About 20% of the cases did not have any posterior capsular support.<sup>[18]</sup> We had classified the posterior polar cataract according to the classification given by Singh, which is given as below.

Singh had classified posterior polar cataract into<sup>[19,20]</sup> four types:

- Type 1: The posterior polar opacity associated with posterior subcapsular cataract
- Type 2: Sharply defined round or oval opacity with ringed appearance like an onion with or without grayish spots at the edge

- Type 3: Type 2 with thin or absent posterior capsule. These dense white spots are a diagnostic sign (Daljit Singh sign) of posterior capsule leakage with or without repair and extreme fragility the incidence of this type in Indian adult cataract patient population was found to be about one in 300
- Type 4: Combination of the above three types with nuclear sclerosis.

In our study, we had focused on the epidemiological profile and risk factors related with its development.

## MATERIALS AND METHODS

This was a prospective, non-comparative case study enrolling 50 patients with posterior polar cataract attending the outdoor of P.B.M Eye Hospital, Bikaner, from October 2019 to December 2019. Permission was taken from the Institutional Review Board. A written consent was taken from all the patients and all underwent cataract surgery. Patients who had congenital, developmental, traumatic, and complicated cataracts were not included in our study. All the cases underwent thorough examination such as best-corrected visual acuity, refraction, detailed slit-lamp examination for grading and to rule out corneal and other pathology, funduscopy, and tonometry. Blood pressure measurement, urine complete, hemoglobin, bleeding time, clotting time, and random blood sugar and in known cases of diabetes fasting blood sugar were done. All the patients were asked regarding their locality, occupation, ocular disease, systemic illness, skin disease, and use of steroid and smoking history. The posterior polar cataract was graded according to Singh's classification.

## RESULTS

Of the 50 patients studied, there were 30 males and 20 females [Figure 1]. In both groups, most of the patients were in the age group of 61–70 years [Table 1]. Thirty-three

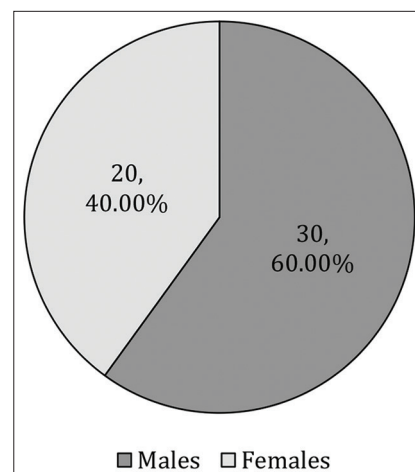


Figure 1: Sex ratio

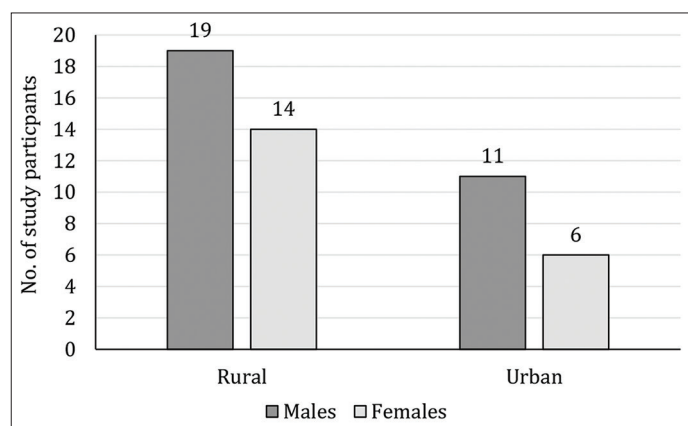
patients (66%) belonged to the rural locality while 44% were of urban locality [Figure 2]. All the females in our study were homemaker (housewife) by occupation, 12 (24%) patients were farmer having increased exposure to UV rays in Northwest Rajasthan, 4 (8%) were shopkeeper by occupation, 3 (6%) were retired persons, while 1 (2%) case of electrician, computer programmer, and bus driver [Figure 3]. About 48% (24) of patients had bilateral cataracts, 42%

**Table 1:** Age profile

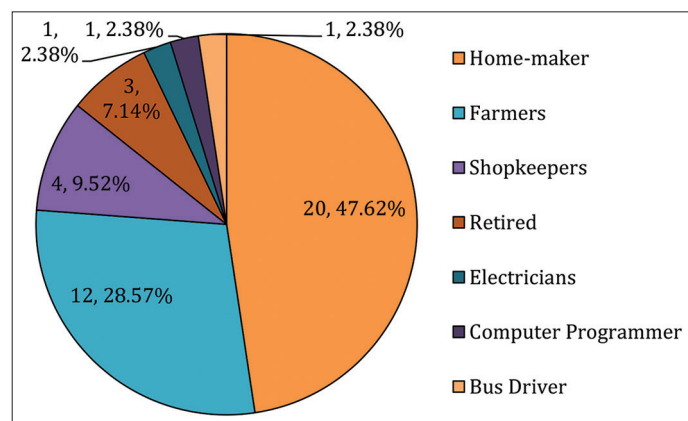
Age group (years)	Male		Female	
	Rural	Urban	Rural	Urban
31-40	-	2		
41-50	-	1	2	
51-60	6	2	4	3
61-70	12	4	8	2
>70	1	2	-	1

**Table 2:** Laterality of the cataract

Group	Number of patients
Bilateral cataract	24
One eye pseudophakia	21
Unilateral cataract	5



**Figure 2:** Demographic profile

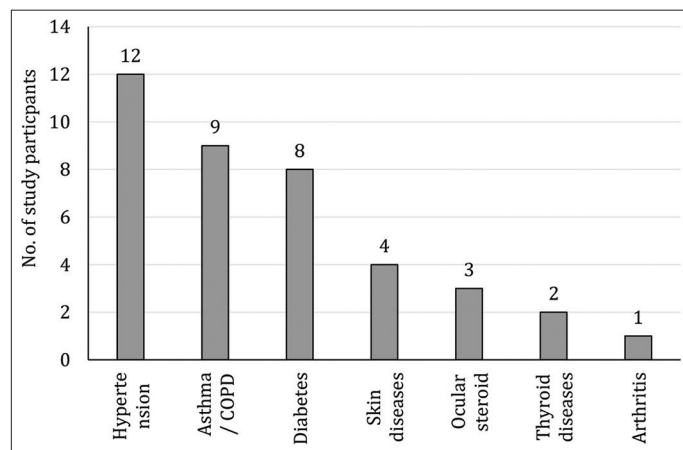


**Figure 3:** Occupation

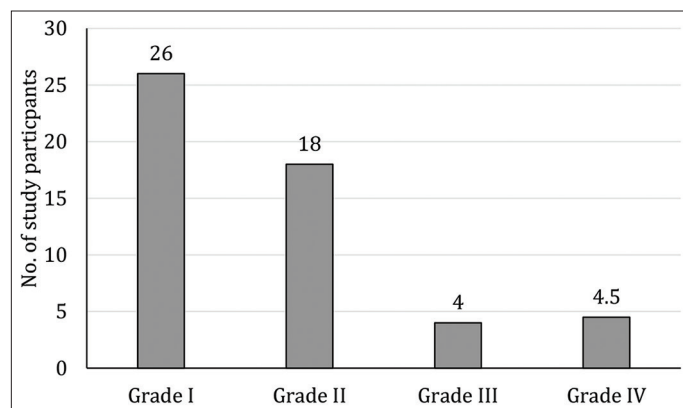
(21) were pseudophakic in one eye, and 1% (5) unilateral cataract [Table 2]. The percentages of patients with various risk factors are shown in Figure 4. Twelve (24%) cases were idiopathic of the systemic illness, 12 (24%) patients were reported of having hypertension, 9 (18%) patients had a history of asthma/chronic obstructive pulmonary disease (COPD), 8 (16%) patients had diabetes mellitus (DM), 1 patient had h/o arthritis, 4 (8%) had skin disease, and 3 (6%) had h/o injudicious use of over-the-counter topical drops, while 2 (4%) patients of thyroid disease were noted and 34% (17) patients had h/o steroid use (9 inhaler, 5 oral steroid, and 3 topical ocular drops) which was found to be the most common risk factor in the study population. The most common type of cataract seen Grade I (52%, 26 patients), followed by Grade II (36%, 18 patients), Grade III (8%, 4 patients), and Grade IV (4%, 2 patients) [Figure 5].

**DISCUSSION**

In our present study, we found that male:female ratio is 3:2 and majority of patients were in the age group of 61-70 years. Rural patients outnumbered the urban patients, farmers were more prone to the development of cataract due to increased UV exposure for longer duration. Asthmatic patient using inhalers outnumbered the other diseases.



**Figure 4:** Risk factors



**Figure 5:** Grades of posterior polar cataract

Similar results regarding age group were seen by Chatterjee *et al.*<sup>[21]</sup> which says that age was the most common risk factor observed in the cataract development. Similarly, Singh *et al.*<sup>[22]</sup> also stated that elderly males were at higher risk in the development of cataract. Contradictory to our study which was conducted by Raizada *et al.*<sup>[23]</sup> had the prevalence of cataract more in females. A study done by Singh *et al.*<sup>[24]</sup> in 2019 postulated that the preponderance of cataract in rural people coinciding with our study. Similar observations regarding steroid use and cataract were observed by Kačmař and Cholevík<sup>[25]</sup> in 2019. The Blue Mountain Study<sup>[26]</sup> also supported the association between DM and posterior subcapsular cataract.

With the increasing use of steroid through various modalities such as oral or intravenous route used for skin diseases, inhalers for asthma or COPD, topical eye drops or ointments for allergic conjunctivitis, topical creams for skin disorder steroid-induced cataracts are emerging. The use of steroid for various autoimmune diseases has become an important factor for the development of posterior polar cataract. A long-term study is needed for the establishment of the various risk factors for the occurrence of posterior polar cataract except the long known congenital cause.

## CONCLUSION

In our study, we conclude that with increasing injudicious use of steroid can result in the formation of posterior polar/posterior subcapsular cataract in young age and professional office class workers who are seeking medical help at early stage. An ultrasound should be done to rule out posterior capsular defect if suspected and the patient should be counseled well about the complication prior taking into surgery.

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