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A Study of The Epidemiology of Pre-Senile Cataract in Patients Attending Ophthalmic OPD– A Hospital-Based Study

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ABSTRACT

Pre-senile cataract, or opacification of the lens occurring before 50 years of age is a disease causing visual impairment in young individuals. There have been certain risk factors such as sunlight exposure, high myopia, diabetes mellitus, smoking and exposure to some drugs that are known to be associated with pre-senile cataract.

Aims and Objectives: This study aimed determine the impact of socio-economic, environmental and systemic risk factors on the development of pre-senile cataract. Design: Prospective observational study

Materials and methods: 180 patients with pre-senile cataract were studied. Patients between 20-50years of age who consented to the study were asked to respond to a questionnaire which covered their social, occupational, personal and medical history. A complete eye examination was done to determine presence and morphological type of cataract.

Results: There were 99 (55%) females and 81(45%) males with pre-senile cataract. Posterior subcapsular was the most common type (58.8%). 33.8% cases had outdoor occupation followed by steroid intake (23.8%) and diabetes (22.2%). **Conclusions**: UV exposure (sunlight), steroid intake in some form, high myopia and diabetes were found to be some of the risk factors commonly found in these patients and their modification through health education and life-style changes could have an impact on the development of cataract. Key-words: Pre-senile cataract, risk factors, life-style. modification

1. INTRODUCTION

Cataract is an opacification of the crystalline lens of the eye resulting in impaired vision. Globally, it is the leading cause of preventable blindness, accounting for about 48%. [1,2]

Cataract is usually classified according to the age of onset. While age-related senile cataract is the most commonly occurring cataract, which usually presents after 50 years of age, it can occur at birth (congenital), during the first year of life(infantile) or the first decade (juvenile). When cataract presents before 50 years of age due to causes other than the ageing changes, it is termed as pre-senile cataract.[3] Presenile cataract adds to the burden of an already significant health problem by affecting people in their most productive years of life.

There has been a lot of research in the past to look for risk factors of cataract such as diabetes, hypertension, smoking, exposure to sunlight and socioeconomic factors. [4-7] Studies that explored the risk factors of presenile cataract have also indicated that exposure to either trauma, intra-ocular inflammation, drugs such as steroids and metabolic diseases such as diabetes was found in about 50% cases.[8,9] In India 80% of the blindness is due to cataract. [10,11]. Indian studies have shown an earlier age of onset of lenticular opacities compared to western countries[12-14], which may be due to greater exposure to the risk factors or a genetic predisposition.

This study was undertaken with the aim of exploring the association of various socioeconomic and environmental risk factors with the development of cataract in the age group of 18-50 years. We also aimed to determine the morphological types of cataract encountered in this age group. Recognition of the various factors leading to or influencing the formation of cataract

in this age group can be instrumental in its prevention via health education and public awareness, thereby reducing the burden of cataract related blindness to some extent

2. MATERIALS AND METHODS

This was an observational study of 1.5 years duration, conducted in the department of ophthalmology of a tertiary care hospital in central India with a sample size of 180. Convenient sampling was used. The study was conducted in accordance with the Declaration of Helsinki after obtaining clearance from the institutional ethics committee. Written, informed consent was obtained from the participants, detailing the nature and purpose of the study.

Inclusion criteria: 1. Male and female patients between 20-50 years of age found to have cataract on examination 2. Patients giving consent to participate in the study

Exclusion criteria: 1. Patients with developmental cataract 2. Patients with history of intra-ocular surgery

History: Patients presenting with complaints of diminution of vision were asked about the onset and duration, and exposure to any of the known risk factors such as outdoor occupation, allergies/atopy and steroid intake in any form. The socio-economic status, family history of early onset cataract and any addiction were also enquired about. Past medical history for systemic and ocular co-morbidities was taken.

Clinical Examination: The patients underwent complete ophthalmic examination including visual acuity on Snellen's chart, intra-ocular pressure measurement with applanation tonometer, slit lamp examination and dilated fundus examination with indirect ophthalmoscopy. The presence of cataract was noted and grading was done on slit lamp after dilatation of the pupil.

Definitions: High myopes were defined as patients with axial lengths greater than 26mm. Patients working for more than 8 hours in open air upto 5 days a week were considered to have outdoor occupation. Diabetics and hypertensives were identified by medical history. Steroid intake was defined as continuous use in any form, topical or systemic for more than 3 months. Those patients in whom no identifiable cause was present, were placed in idiopathic group.

Statistical analysis: The collection of data was done on Microsoft Excel and analysis by SPSS version 2.1. Frequencies and percentages the different types of cataract were calculated. Continuous variables were analyzed by the student *t* test. Odds ratios of the risk factors found to be associated with pre-senile cataract were calculated using bivariate analysis by chi-square test. p value of <0.05 was considered significant.

3. RESULTS

Table 1. Demographic table

S. No.	Age groups (years)	No. of cases	Laterality (%)	
			Unilateral	***Bilateral***
1	20-30	23	11 (47.8)	12 (52.17)
2	31-40	36	15 (41.66)	21 (58.33)
3	41-50	121	51 (42.14)	70 (57.85)
Total		**180**	**77**	**103**

Table 2. Risk factors

S. No.	Risk factors	No. of cases	Percentage	p- Value
1	Outdoor work	61	33.88	.027167
2	Steroid intake	43	23.88	
3	Diabetes Mellitus	40	22.22	
4	Tobacco Addiction	26	14.44	
5	Idiopathic	23	12.77	
6	Family History	17	09.44	

7	Trauma	13	07.22	
8	Hypertension	11	06.11	
9	Myopia	6	03.33	

The chi-square statistic is 6.9477. The p-value is .027167. The result is significant at $p < .05$.

Table 3. Risk factors associated with type of cataract

S. No.	Risk factors	No. of cases	Type of cataract				
			Posterior Sub Capsular	***Nuclear***	***Cortical***	***Mixed***	***Total* (mature)**
1	Outdoor work	61	33	1	0	14	12
2	Steroid intake	43	24	0	0	12	7
3	Diabetes Mellitus	40	11	2	2	15	10
4	Tobacco Addiction	26	14	0	0	5	7
5	Idiopathic	23	11	0	0	7	5
6	Family History	17	3	0	1	6	7
7	Trauma	13	2	0	2	7	2
8	Hypertension	11	5	0	2	4	0
9	Myopia	6	3	0	0	3	0
	Total		**106**	**3**	**7**	**73**	**50**

This study was done on 180 patients, 99 (55%) females and 81 (45%) males (Figure 1). The mean age was 41.3 ± 8.14years. Table 1 shows the demographic profile of the patients. 103 (57.2%) patients had bilateral cataract, while 77 (42.7%) had unilateral cataract. Table 2 lists the different risk factors found to be associated with pre-senile cataract. It was found that 33.8% cases had outdoor occupation, followed by steroid intake (23.8%) and diabetes mellitus (22.2%). There were 23 (12.7%) cases where no known risk factor could be found and so they were classified into the idiopathic group.

Figure 2 shows the different morphological types of cataract found in our study. The most common cataract was found to be posterior subcapsular (58.8%), followed by mixed (cortical and nuclear) cataract (40.5%). Figure 3 shows the distribution of socio-economic status of the study population. Maximum patients (57.7%) were in the lower middle-class income group. Only 3% belonged to the upper class. Table 3 shows the morphological types of cataract associated with exposure to different risk factors. It was found that whatever the nature of exposure was, the most commonly occurring cataract was posterior subcapsular. Exposure to sunlight, which was the most frequently encountered risk factor, was found to be associated with all types of cataract including posterior subcapsular, mixed and total (mature).

Fig 1: Gender Distribution

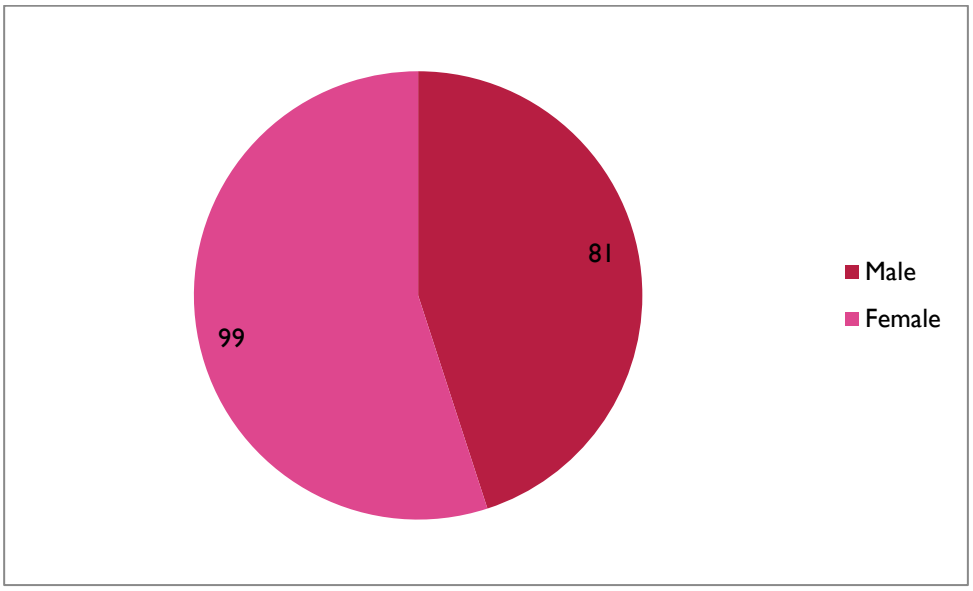


Fig 2:

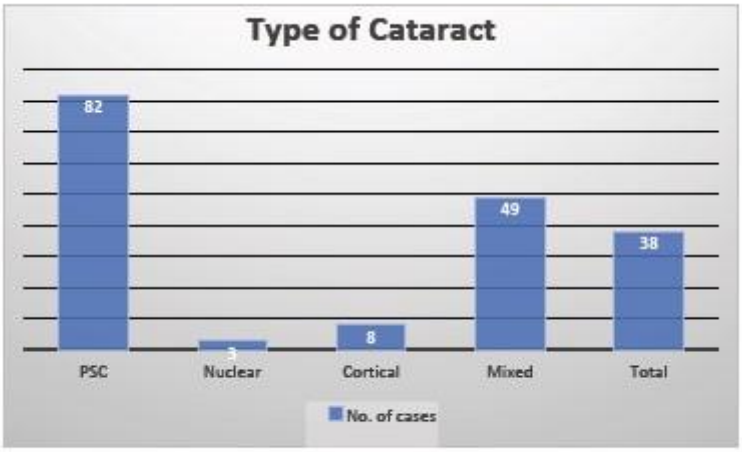
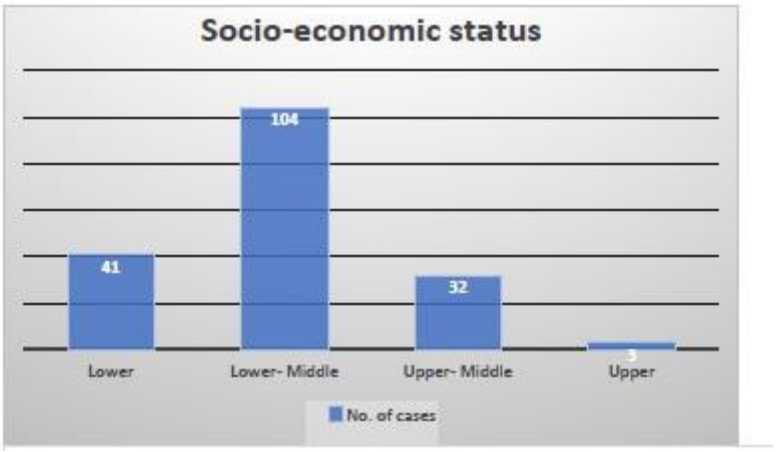


Fig 3:



4. DISCUSSION

Cataract is one of the leading causes of reversible blindness and pre-senile cataract, which affects people between 20-50 years of age, is an early onset cataract which either occurs secondary to exposure to some known factors or is idiopathic, which can lead to visual disability and loss of livelihood in the young population. Our study aimed to detect cases with pre-senile cataract and find associations with any known risk factors.

Our study population consisted of 180 patients with pre-senile cataract, with 55% females and 45% males. This female preponderance found in our study was also seen in other studies from our country. [14,15,16]. Meanwhile there are also studies that have reported that pre-senile cataract is more common in males [17,18]. The higher incidence in females could be because of hormonal factors or prolonged exposure to heat and smoke while cooking or engaging in farming activities as observed by Pokhrel et al[19]. We found the mean age of presentation as 41.3 ± 8.14years. This is similar to that found in other studies[16,21-23]. The slight variations found may be due to the range of ages included in the definition of pre-senile cataract.

The risk factors associated with cataract in our study were exposure to sunlight in 33.8%, steroid intake in 23.8%, diabetes mellitus in 22.2%, tobacco smoking or chewing in 14.4%, trauma in 7.2%, hypertension in 6% and high myopia in 3.3%. Similar risk factors have been reported in varying proportions by past studies, the variation probably due to genetic and environmental differences in the study populations. Sunlight exposure, especially UVB radiation, has been implicated as a cause for presenile cataract in many studies [22-25]. Praveen et al[22] reported steroid intake as the most commonly found risk factor, while it was diabetes mellitus in other studies [12,17,18,]. A number of studies including ours have found tobacco smoking and consumption as an important risk factor. Krishnaiah and others have studied the role of nicotine and cyanide from tobacco smoke in opacification of the lens.[25,26] Since it is one of the few modifiable risk factors in the pathogenesis of pre-senile cataract, it is important to create awareness among young adults to give up smoking and tobacco chewing. Myopia also emerged as one of the important risk factors with Praveen et al reporting it in 12.5% and Verma et al in 7.5% of their cases. Those in whom no risk factor could be identified, i.e. the idiopathic cases were 12.8% in our study and varied from 19-30% in other studies.[23,27]

Most of our patients belonged to lower-middle class, and lower class. The impact of socio-economic status on the patients' awareness of their ocular problems, their nutrition and their occupational exposure to sunlight have been explored by some studies[27]

The most common morphology of cataract found in our study was posterior subcapsular (PSC, 58.8%) and mixed cortical and nuclear cataract (40.5%). Numerous studies have consistently shown PSC to be the most commonly found pre-senile cataract,[28,29] which could in-part be due to PSC cases developing early visual impairment and therefore reporting more often. [30]

An attempt was made to see the correlation between the type of cataract and exposure to different risk factors (table 3). Again the most frequently seen cataract was PSC. Praveen et al found a higher incidence of PSC in diabetic patients and in those engaged in outdoor activities, which correlates with our study as well. High myopia was found to be associated with nuclear sclerosis type of cataract more commonly[22]. In our study the six myopic patients were more commonly found to have either PSC or a mixed type of cortical and nuclear cataract.

Study limitations: Some of the limitations of this study were relatively small sample size and a certain degree of recall bias, as this was a questionnaire based survey. Also, no genetic evaluation was performed in this study.

5. CONCLUSION

This study had been done with the purpose of evaluating the risk factors associated with the cases of pre-senile cataracts whose incidence has been increasing in recent times. Our study found certain environmental factors such as sunlight and certain behavioral factors such as cigarette smoking to be prominent factors which can be modified through health education and awareness

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