Assessment of Risk Factors for Presenile Cataract among Patients Attending Tertiary Care Hospital, Amreli, Gujarat

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Abstract

Introduction: Cataract is one of the common causes for preventable blindness amongst adults in India. Presenile cataract is cataract occurring before age of 55 years.

Objective: To assess risk factors present in patients with presenile cataract.

Materials and Method: Study was conducted amongst patients attending tertiary care hospital at Amreli. Duration of study was May 2020 to October 2020. Eligible patients with presenile cataract who gave consent were included in the study. A total of 150 participants aged 18 to 55 years were included in th study. Confirmed presenile cataract cases were interviewed for questions related to risk factors.

Result: Out of 150 study participants, 80% had atleast one possible risk factors present. Top 5 most common risk factors present amongst participants in the present study were tobacco consumption 34 (22.7%), followed by obesity 14 (9.3%), diabetes 13 (8.7%), auto-immune disorder 10 (6.7%) and thyroid disorder 7 (4.7%). Most participants had unilateral cataract (104; 69.3%) while posterior sub-capsular cataract (66; 44.0%) was most common variety of cataract followed by combined cataract type (42; 28%) found amongst the participants.

Conclusion: Four out of every five study participants with presenile cataract had some form of possible risk factor present. Presence of possible risk factor may increase incidence of presenile cataract.

Keywords: Myopia; Non Communicable disease; Presenile cataract; Tobacco.

Introduction

Cataract is clouding of lens in the eye caused by degenerative changes leading to decrease in vision.[1,2] One of the major causes of preventable blindness in country like India is Cataract.[3,4] Cataract accounts for almost 48% of total blindness in world and around 51% in Southeast Asian region which includes India.[5] Cataract is second major cause for visual impairment after refractive error.[6]

Presenile cataract refers to occurrence of cataract before the age of 55 years.[4,7] Various risk factors have been found to be associated to presenile cataract which includes diabetes mellitus, hypertension, prolonged use of steroids, trauma, exposure to ultraviolet light, family history, refractive error, etc.[4,6] Certain studies from India have shown that Indian population is at more risk to develop presenile cataract due to environmental factors or genetic predisposition compared to population of developed countries like United States.[8] There are estimates that delaying the onset of cataract by 10 years could reduce the need for surgery by 45%. Therefore primary and secondary prevention of cataract is an optimal approach and could be more cost effective than cataract surgery in preventable blindness.[4] If cataract is left untreated it ultimately may even endanger jobs and quality of life of

patients which is very significant in economically productive age group. Moreover cataract surgeries are a form of economic burden especially in developing country like India.

Hence present study was conducted to assess risk factors amongst population resulting in presenile cataract. If these risk factors could be identified and modified it may reduce incidence of presenile cataract. Certain studies can be found worldwide assessing risk factors for presenile cataract, however no study could be found to have been conducted in Gujarat state. Also large number of possible risk factors for presenile cataract were explored in the present study.

Objective

Primary Objective: To assess risk factor present in patients with presenile cataract.

Secondary Objective: To find statistical association between identified risk factors and type of presenile cataract.

Materials and Methodology

Present cross-sectional study was hospital based study carried out at a tertiary care hospital at Amreli district, Gujarat. Patients between age of 18 to 55 years attending the ophthalmology department, diagnosed with presenile cataract and who were willing to participate in the study were included in the study. Study duration was May 2020 to October 2020. Convenient and feasible sample size of 150 participants to be included in the study was decided.

Exclusion criteria: Intellectually disabled, Congenital cataract patient.

Self prepared questionnaire was used. Pilot study of questionnaire was done amongst 10% of sample size i.e. 15 participants before the start of actual study for validation. Questions related to socio-demographic profile of participants, possible factors leading to presenile cataract such as prevalent disease, medications taken regularly, addiction, family history, history of ocular trauma were inquired. Ophthalmic examination was also carried out to assess type of cataract. Visual acuity, ocular pressure, slit lamp examination, fundus examination were also carried out. Patient in whom none of the risk factor was present was classified as idiopathic presenile cataract.

For socio-economic classification of participant,

modified Prasad classification was used.[9] All India Consumer Pricing Index (Industrial worker) was taken as 338 (August 2020).[10] For classification of BMI of participants, standard medical textbook was used.[11]

Data entry was done in MS Excel 2007 and analysis was done in MS Excel 2007 and Statistical Package for Social Science Statistics version.[20] Test applied were frequency, percentage, measures of distribution and measures of statistical association like Pearson chi-square, Fisher's exact and Contingency coefficient.

Result

In present study, 150 participants were included in the study. Basic characteristic details of all the participants are given in Table 1. Mean age of participants was 41.88 + 0.654.

Table 1: Basic characteristic details of all participants (n=150).

Category	Sub-category	Frequency (%)
Age	18–21 years	3 (2.0)
	22–31 years	9 (6.0)
	32–41 years	49 (32.7)
	42–51 years	71 (47.3)
	52–55 years	18 (12.0)
Gender	Male	97 (64.6)
	Female	53 (35.4)
Education (last completed)	Illiterate	4 (2.7)
	Primary	56 (37.3)
	Secondary	65 (43.3)
	Higher secondary	18 (12.0)
	Graduate or above	7 (4.7)
Occupation	Student	10 (6.7)
	Self-employed	60 (40.0)
	Employed / Job	44 (29.3)
	Homemaker	27 (18.0)
	Unemployed / Retired	9 (6.0)
Residence	Urban	79 (52.7)
	Rural	71 (47.3)
Socio-economic classification (Accd. to modified BJ Prasad classification)*	Class I (Upper)	0 (0.0%)
	Class II (Upper Middle)	30 (20.0%)
	Class III (Middle)	48 (32.0%)
	Class IV (Lower Middle)	54 (36.0%)
	Class V (Lower)	18 (12.0%)

* AICPI (IW)- 338 (August 2020)[10]

Presence of non-ophthalmic co-morbidities was informed by 53 (35.3%) participants. Details about these co-morbidities and treatment taken are given

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in Table 2. All participants were known case with co-morbidity and were not newly diagnosed while present study. Autoimmune disorder collectively in below table includes Rheumatoid arthritis, Systemic lupus erythematosus, and Psoriasis.

Table 2: Non-ophthalmic co-morbidity details of participants (n=53)*.

Co-morbidity	Treatment taken	Frequency	%
BMI- Overweight (n=14)	Yes	10	71.4
	No	4	28.6
Hypertension (n=6)	Yes	3	50.0
	No	3	50.0
Diabetes mellitus (n=13)	Yes	7	53.8
	No	6	46.2
Thyroid disorder (n=7)	Yes	6	85.7
	No	1	14.3
Auto-immune disorder (n=10)	Yes	6	60.0
	No	4	40.0
Asthma (n=3)	Yes	1	33.3
	No	2	66.7
None (n=97)	No	97	100.0

*multiple response allowed.

Myopia was reported by 5 (3.3%) participants amongst whom 4 (80.0%) participants regularly used spectacles. Consumption of systemic steroids atleast once during last five years was informed by 6 (4.0%) participants. Majority of participants 4 (66.7%) informed auto-immune disorder as reason for consumption of systemic steroids. 4 (66.7%) participants informed of taking systemic steroids for more than 1 year. Intake of Aspirin was informed by 1 (0.7%) participant and Statin by 1 (0.7%) participant. Exposure to high degree of bright light (sunlight, welding, etc) since many years was informed by 4 (2.7%) participants as a part of their occupation.

On inquiry about addiction, 21 (14.0%) participants were addicted to tobacco chewing while 13 (8.7%) participants to tobacco smoking. Positive family history regarding presenile cataract was informed by 5 (3.3%) participants. Past history of major ocular trauma was informed by 5 (3.3%) participants.

Ophthalmological examination of participants revealed 104 (69.3%) participants had unilateral presenile cataract while 46 (30.7%) had bilateral presenile cataract. Details about type of presenile cataract of participants during ophthalmological examination are given in Fig. 1.

Table 3: Statistical association between socio-demographic indicators and type of presenile cataract.

Socio-demographic profile indicator	Category	Type of presenile cataract				Total	Statistical value (p value)
		Combined	Cortical	Nuclear	Posterior subcapsular		
Age (in years)	18–21	1	1	0	1	3	12.795 (0.304)@
	22–31	5	1	0	3	9	
	32–41	12	4	6	27	49	
	42–51	21	15	10	25	71	
	52–55	3	4	1	10	18	
Gender	Female	20	9	3	21	53	0.187 (0.141)#
	Male	22	16	14	45	97	
Occupation	Student	3	1	1	5	10	0.467 (<0.001)#
	Self-employed	10	8	4	38	60	
	Employed / Job	15	10	7	12	44	
	Homemaker	14	6	5	2	27	
	Unemployed	0	0	0	9	9	
Residence	Urban	21	18	8	32	79	0.172 (0.215)#
	Rural	21	7	9	34	71	
Socio-economic classification	Class II (Upper Middle)	8	4	4	14	30	0.965 (1.000)@
	Class III (Middle)	14	9	5	20	48	
	Class IV (Lower Middle)	15	9	6	24	54	
	Class V (Lower)	5	3	2	8	18	

Contingency coefficient   @ Fisher's exact.

Table 4: Statistical associations between socio-demographic indicators and eye involvement due to presenile cataract.

Socio-demographic profile indicator	Category	Eye involvement with presenile cataract		Total	Statistical value (p value)
		Unilateral	Bilateral		
Age (in years)	18–21	0	3	3	7.401 (0.099)@
	22–31	7	2	9	
	32–41	37	12	49	
	42–51	49	22	71	
	52–55	11	7	18	
Gender	Female	32	21	53	3.092 (0.059)#
	Male	72	25	97	
Occupation	Student	4	6	10	7.653 (0.098)@
	Self-employed	47	13	60	
	Employed / Job	27	17	44	
	Homemaker	19	8	27	
	Unemployed	7	2	9	
Residence	Urban	47	32	79	7.600 (0.005)#
	Rural	57	14	71	
Socio-economic classification	Class II (Upper Middle)	16	14	30	4.620 (0.209)#
	Class III (Middle)	36	12	48	
	Class IV (Lower Middle)	39	15	54	
	Class V (Lower)	13	5	18	

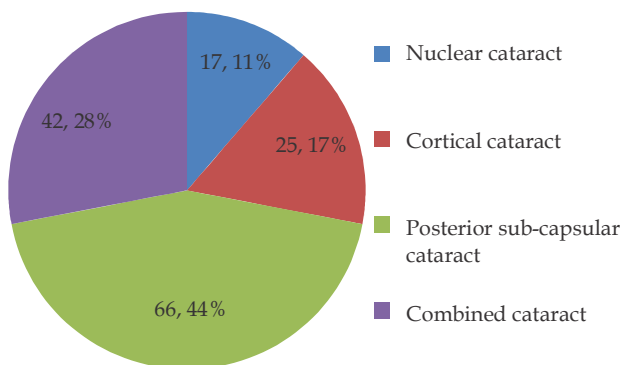@ Fisher's exact   # Pearson Chi-square.

Fig. 1: Type of presenile cataract amongst study participants (n-150).

Other ophthalmological examination revealed, visual acuity of less than 6/60 was present in 133 (88.7%) participants, normal cornea was present in 126 (84.0%) participants, A/C was normal in 144 (96.0%) participants and ocular pressure was normal in 146 (97.3%) participants. Squint was present in 9 (6.0%) participants and amongst them divergent variety of squint was most commonly seen in 6 (66.7%) participants. Fundus examination revealed normal fundus in 139 (92.7%) participants.

No specific cause (idiopathic) for presenile cataract was identified in 29 (19.3%) participants while 121 (80.7%) had atleast one possible risk factor present. Statistical associations between socio-demographic indicators and type of presenile cataract have been given in Table 3. No statistical association was

obtained between presence of co-morbidity and type of pre-senile cataract (Contingency coefficient value–0.116; p value–0.57). Similarly no statistical association was obtained between addiction and type of pre-senile cataract (Contingency coefficient value–0.054; p value–0.949).

Statistical associations between socio-demographic indicators and eye involvement due to presenile cataract have been given in Table 4. No statistical association was obtained between presence of co-morbidity and eye involvement due to pre-senile cataract (Pearson Chi-square value–0.158; p value–0.419). Similarly no statistical association was obtained between addiction and eye involvement due to pre-senile cataract (Pearson Chi–square value–0.059; p value–0.482).

Discussion

The greater the exposure to risk factors, higher the chance of development of cataract at young age.[12] A total of 150 participants meeting the inclusion criteria and giving consent for participation in the study were included. Almost four out of five participants had atleast one possible risk factor present. In the present study in terms of socio-demographic profile, 42–51 age group (71; 47.3%), males (97; 64.6%), self employed including labourers (60; 40.0%), urban residing population

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(79; 52.7%) and lower middle class (54; 36.0%) were most commonly affected.

Top 5 most common risk factors present amongst participants in the present study were tobacco consumption 34 (22.7%), followed by obesity 14 (9.3%), diabetes 13 (8.7%), auto-immune disorder 10 (6.7%) and thyroid disorder 7 (4.7%). Due to absence of risk factors, no specific cause for presenile cataract was identified in 29 (19.3%) participants. They were classified as idiopathic presenile cataract. Most participants had unilateral cataract (104; 69.3%) and posterior sub-capsular cataract (66; 44.0%) was most common variety of cataract followed by combined cataract type (42; 28%) found amongst the participants.

Occupation of participant was statistically associated with type of presenile cataract. Those self employed and unemployed participants had more commonly posterior capsular type of presenile cataract while homemaker and employed including labourer had combined form of presenile cataract more commonly. Similarly residence of participants had statistical association with number of eye involvement due to presenile cataract. In rural unilateral involvement was more common while in urban, unilateral and bilateral eye involvement with presenile cataract were almost nearly equal. These may be due to less pollution in rural areas.

Studies done at Madhya Pradesh and Kerala found female preponderance for presenile cataract.[4,13] However in present study, male preponderance was found for presenile cataract.

In the study done at Madhya Pradesh it was found that 65.9% participants had idiopathic cause for presenile cataract.[4] Similarly 38.0% participants were classified as idiopathic in Kerala based study.[6] However in present study, idiopathic cause was classified amongst only 19.3% participants which is quite less compared to other two studies. These may have been due to exploring more number of possible risk factors leading to presenile cataract.

In the study done at Madhya Pradesh it was found that tobacco consumption was highest risk factor present followed by diabetes.[4] In present study also same result was obtained. While in Kerala based study, diabetes was found to be most common risk factor.[6]

In Kerala based study, posterior subcapsular cataract was most common.[6] Similar results were also seen in study done in western India and southern India.[12,14] In present study also posterior subcapsular cataract was the most common form of presenile cataract amongst participants. Possible explanation as also given in other article 6 is that in Posterior subcapsular cataract patient may develop early visual impairment and hence early reporting of cataract may occur.

Conclusion

Risk factor presence among participant with presenile cataract was more common. Co-morbidities like obesity, diabetes, auto-immune disorder were commonly seen amongst presenile cataract participants. Unilateral eye involvement with presenile cataract was more common amongst study participants. Posterior subcapsular type of presenile cataract was most commonly seen amongst study participants.

Recommendation: Large scale longitudinal study can be carried out to further identify risk factors of pre-senile cataract and they should be addressed so that incidence of presenile cataract can be reduced.

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