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Original Article

A Clinical Study on Risk Factors Cataracts in Young Adults

Boddikuri Sreekanth

Assistant Professor, Department of Ophthalmology, Kurnool Medical College, Kurnool, Andhra Pradesh, India

Abstract

Background: Cataracts in general population accounts for more than 80% of the causes for impaired vision in India. Usually, cataract formation is a senile disorder due to aging process. However, they may also be formed in young adults. The present study reviews risk factors in younger age groups developing cataracts.

Aim of the Study: The aim is to study the risk factors of early cataract formation in young adults in a hospital setup.

Materials and Methods: In a hospital-based prospective, comparative, cross-sectional clinical study, 183 young patients with diminished vision and nuclear, cortical, posterior subcapsular (PSC), mixed, and posterior polar cataracts were included in the study. Risk factors such as sunlight exposure, atopy, diabetes, steroid intake, glaucoma, and uveitis were elicited.

Observations and Results: Among the 183 patients enrolled, 115 (62.84%) were males and 78 (42.62%) were females. The mean age was 39.46 ± 3.15. Family history was observed in 27.82% of the patients, atopy in 41.73%, trauma in 23.47%, exposure to ultraviolet light (UVL) in 32.17%, uveitis in 25.21%, diabetes mellitus in 26.95%, renal disorders in 10.34%, myxedema in 06.08%, dehydration in 08.69%, glaucoma in 14.78%, hypertension in 33.04%, and usage of steroids in 25.21%. No risk factor mentioned above was elicited in 26.08% of the patients and termed as idiopathic.

Conclusion: Atopy documented higher odds for nuclear cataract (35.41%) with $P = 0.041$ (P significant at <0.05), attaining statistical significance compared to other types. Steroids being the risk factor to cause cataracts was 25.21%, the $P = 0.382$ which was significant. For diabetes-induced cataracts, it was not statistically significant with $P = 0.610$. Risk factors for cataracts in younger age groups were atopy, steroids, uveitis, and exposure to UVL. Idiopathic cataracts were the second most common type in the study.

Key words: Cataract, Diabetes mellitus, Diminished vision, Hypertension and immature cataract, Young age

INTRODUCTION

Multiple etiological factors play their role in the development of cataract. They are genetic,[1] sociodemographic,[2] behavioral, and environmental factors[3,4] acting singly or in combination resulting in a cataract. However, age is the most important risk factor among all the other factors in cataracts. In India, the cataracts account for more than 80% of the patients with diminished vision.[5,6] Compared to industrialized western countries, cataracts have an earlier age of onset in India.[7,8] In a comparative study conducted in Punjab comparing with the prevalence rates according to age with Framingham eye center in the United States of America, the age-specific prevalence of cataract in India was 3 to 6 times higher.[7] Such findings suggest that may be the Indian population is either genetically prone or widely exposed to environmental risk factors (ultraviolet light [UVL], nutritional deficiencies, and severe dehydration from diarrhea/heatstroke).[9-11] Other research workers have studied the role of demographic features such as age, gender, socioeconomic factors, smoking, exposure to UVL, drug usage, and childbearing; anthropometric factors such as higher body mass height and weight; and comorbid diseases such as diabetes, hypertension, myxedema, and renal disorders.[1-4,10-18] Studies on early age cataracts are limited on similar lines as mentioned above, but the available studies show that nearly 50% of the patients in such studies were exposed to trauma, intraocular

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Corresponding Author: Dr. Boddikuri Sreekanth, Assistant Professor, Department of Ophthalmology, Kurnool Medical College, Kurnool, Andhra Pradesh, India. E-mail: boddikuiramulu@gmail.com

inflammation, diabetes, and usage of steroids before developing cataracts.[19-21] Few studies in India have shown an association of early cataracts with dehydration crises and childbearing.[10-12,22] The present study is undertaken to find the various risk factors causing early cataracts in a Regional Eye Hospital based setup catering to the needs of population belonging to Rayalaseema of Andhra Pradesh.

Type of Study

This was a retrospective, comparative, cross-sectional study.

Period of Study

The study period was from May 2003 to October 2005.

Institute of Study

The study was conducted at Regional Eye Hospital, Kurnool Medical College Kurnool, Andhra Pradesh.

MATERIALS AND METHODS

A total of 183 patients visiting the Regional Eye Hospital, Kurnool, with complaints of diminished vision and diagnosed as cataracts were included in the present study. An ethical committee clearance was obtained before commencing the study.

Inclusion Criteria

The following criteria were included in the study:

1. Patients aged above 30 years and below 45 years.
2. Patients with a history of diminished vision.
3. Patients with family history of early age cataracts. Patients with a history of trauma, exposure to UVL, and inflammations of the eyeball.
4. Patients with unilateral or bilateral diminished vision.

Exclusion Criteria

The following criteria were excluded from the study:

1. Patients aged below 30 and above 50 years.
2. Patients who were pregnant.
3. Patients who have undergone cataract surgery.

All the medical records of the patients who underwent cataract surgery were collected from medical records section of the hospital to collect the data. The demographic data were collected from the records. Slit-lamp examination was performed using standardized illumination and magnification, findings were collected. The type of cataract was determined using the direct observation and retro illumination method. The cataracts were classified as (1) nuclear, (2) cortical, (3) posterior subcapsular (PSC), (4) posterior polar (PP), and (5) mixed cataract. The axial length (AXL) was measured 10 times in each eye using an A scans and an average value obtained. Intraocular pressures were measured by applanation tonometry, and all the participants underwent a dilated fundus examination using indirect ophthalmoscopy. An atopy questionnaire was used to elicit the history of allergic disorders such as bronchial asthma, atopy, and other skin and/or food allergies. Information regarding trauma, sunlight exposure, steroid intake, drugs used, diabetes, myopia, myxedema, renal disorders, and previous history of inflammations of the orbit or eye ball (uveitis) were collected. Those patients who gave positive history to allergic symptoms were further investigated by antigen-specific immunoglobulin E estimations to confirm atopy. Exposure to UVL was taken as positive where the patients have worked > 8 h/day and 6 days in a week for more than 10 years. Diabetes was confirmed by positive glucose tolerance test. Steroids usage was taken as risk factor if the patients had used oral, injectable, inhaled steroids, or in combination for more than 6-month duration. Participants were classified as high myopia if their AXL was more than 26 mm. All the patients who did not show any risk factor in their history or examination were classified as idiopathic cause. Patients with mixed and cortical cataract were combined into a single category representing "other" types. The nuclear cataract, PSC, and PP cataracts are considered as a single unit as well as reference category. The influences of risk factors on these two categories are compared with the later as a reference unit. All the data were analyzed using standard statistical methods.

OBSERVATIONS AND RESULTS

Among the 183 patient's records included in the present study, there were 131 (71.58%) bilateral cataracts and 52 (28.41%) unilateral cataracts. Among 131 patients with bilateral cataracts, 16 (12.21%) had dissimilar cataracts in each eye and hence were excluded from the study. Finally, 115 eyes (patients) (87.78%) only of 131 were included in the study taking only one eye randomly among the bilateral cataracts. Patients with mixed and cortical cataract were combined into a single category representing "other" types. The nuclear cataract, PSC, and PP cataracts are considered as a single unit as well as reference category. The influences of risk factors on these two categories are compared with the later as a reference unit. Among the 115 patients, 79 (68.69%) were males and 36 (31.30%) were females. The mean age of the study group was 39.46 ± 3.15 years [Table 1]. The study group consisted of manual laborers 40%, office goers 33.04%, and housewives 13.91%. Low socioeconomic group patients were 42.60%, middle-income group were 33.04%, and high-income group were 24.34%. Childbearing women were 11/36 (30.55%) as summarized in Table 1.

Different risk factors mentioned in the literature were observed in the patients of this study and tabulated in

Table 2. Family history was observed in 27.82% of the patients, atopy in 41.73%, trauma in 23.47%, exposure to UVL in 32.17%, uveitis in 25.21%, diabetes mellitus (DM) in 26.95%, renal disorders in 10.34%, myxedema in 06.08%, dehydration in 08.69%, glaucoma in 14.78%, hypertension in 33.04%, and usage of steroids in 25.21%. No risk factor mentioned above was elicited in 26.08% of the patients. Certain patients had more than one risk factor present in their case records [Table 2].

The present study showed that atopy was present in 48/115 patients accounting to 41.73% and remained the single risk factor which was most common followed by idiopathic 30/115 (26.08%). Atopy can be named as dominant risk factors because it was also associated with other risk factors such as usage of steroids, DM, exposure UVL, glaucoma, and diabetes and UVL [Table 3]. The second most common type of cataract was in patients who were negative to all the risk factors hence named as idiopathic 30/115 (26.08%) patients [Table 3]. In this study, the most common type of cataract noted in atopy individuals was nuclear type in atopy individuals 17/48 (35.41%). Mixed type of cataract was next most common type 13/48 (27.08%), followed by subcapsular cataract 10/48 (20.83%) and PP 08 (16.66%), [Table 3]. Among the idiopathic group also, nuclear type of cataract was common in 11/30 (36.66%) patients followed by mixed type 08/30 (26.66%), [Table 3].

Table 1: The demographic and anthropometric data in the early cataract study group (*n*=115)

Observation	*n* (%)
The mean age	39.46±3.15
Gender	
Male	79 (68.69)
Female	36 (31.30)
Occupation	
Manual laborers	46 (40.00)
Office goers	53 (46.08)
Housewives	16 (13.91)
Mean height in feet	5.7±0.93
Mean weight in Kg	68.49±5.15
Socioeconomic groups	
Low	49 (42.60)
Middle	38 (33.04)
High	28 (24.34)
Childbearing-11	
Para 1–2	05 (45.45)
Para 2–3	03 (27.27)
Para 3–4	02 (18.18)
>4	01 (09.09)

Table 2: The risk factors in the patients with early cataract (*n*=115)

Risk factors	*n* (%)
Family history of early cataract	32 (27.82)
Atopy	48 (41.73)
Trauma	27 (23.47)
Exposure to UVL	37 (32.17)
Uveitis	29 (25.21)
Uveitis+steroids	21 (18.26)
DM	31 (26.95)
Renal disorders	12 (10.34)
Myxedema	07 (06.08)
Hypertension	38 (33.04)
Steroids	29 (25.21)
Dehydration	10 (08.69)
None (idiopathic)	30 (26.08)
Glaucoma	17 (14.78)
Glaucoma+UVL	09 (07.82)

UVL: Ultraviolet light, DM: Diabetes mellitus

Atopy documented higher odds for nuclear cataract (35.41%) with $P = 0.041$ (p significant at <0.05), attaining statistical significance compared to other types. Steroids being the risk factor to cause cataracts were 25.21%, the $P = 0.382$ which was statistically significant. For diabetes-induced cataracts, it was not significant with $P = 0.610$. Similarly, uveitis, glaucoma, renal disorders, and hypertension did not reach significant values as their *P* values were above 0.05. The idiopathic category showed increased odds for both nuclear and subcapsular cataracts with $P = 0.026$ and 0.032, respectively (*P* was statistically significant at <0.05). UVL exposure attained statistical significance with $P = 0.001$ with nuclear cataract and remained a high-risk factor [Table 3].

DISCUSSION

The present study is a retrospective, comparative cross-sectional study to analyze the risk factors found in young adults who developed cataracts. A case-control study in India showed a strong correlation between dehydration crises and early cataract formation.[22] Few studies have concluded that childbearing will increase the risk of cataract among women.[12] Few studies are done exclusively to observe the risk factors of cataract in early age groups [12,19,20] In this context, an attempt was made by this study to review the risk factors in patients aged below 45 years. In the present study, multiple factors were observed in the young patients with cataract, and in few of them, more than one factor was present. In patients with multiple factors, certain factors were ignored as in very few patients the multiple factors with different combinations were present. In the present study, more than 40% of the patients had a history of atopy and proved by laboratory diagnosis. This is supported by many authors that atopy in the form of atopic dermatitis is associated with early cataract formation.[23-28] Even though the cause of atopic dermatitis is unknown, it was observed that cataract formation is progresses during active dermatitis

Table 3: The incidence of combination of risk factors in atopy individuals compared to idiopathic type (*n*=48, *n*=30)

Observation	Nuclear (%)	PSC (%)	PP (%)	Mixed (%)	Total (%)
Idiopathic	11 (36.66)	06 (20.0)	05 (16.66)	08 (26.66)	30
Atopy alone	04 (44.44)	02 (22.22)	01 (11.11)	02 (22.22)	09
Atopy+steroids	03 (37.50)	02 (25)	01 (12.50)	02 (25)	08
Atopy+DM	04 (44.44)	02 (22.22)	01 (11.11)	02 (22.22	09
Atopy with UV	03 (27.50)	01 (12.50)	02 (25.0)	02 (25.0)	08
Atopy with glaucoma	01 (20)	01 (20)	01 (20)	02 (40)	05
Atopy with DM and UVL	01 (25)	01 (25)	01 (25)	01 (25)	04
Atopy with UVL and steroids	01 (20)	01 (20)	01 (20)	02 (40)	05
Subtotal of cataracts with atopy	17 (35.41)	10 (20.83)	08 (16.66)	13 (27.08)	48

PSC: Posterior subcapsular, PP: Posterior polar, UVL: Ultraviolet light, DM: Diabetes mellitus

stage[24,25] and lens opacities are often associated with severe manifestations of this disease.[24,25] In a Japanese study, 12.4% of atopic dermatitis patients had early cataract.[23] In another study, authors observed 10–23% incidence of cataract with patients of atopic dermatitis.[29] Nuclear type of cataract was common in this study unlike the studies from other countries which showed a higher incidence of PSC (50%) and anterior subcapsular in 25%.[30,31] About 30 patients in the present study had no positive risk factors mentioned in their case records and labelled as idiopathic. Similar observations were made by Indian authors.[32] History of using steroids was present in 25.21% of patients in this study compared to other studies.[33] Using steroid in all its forms and more than 6 months usage was considered in this study as a risk factor. However, total dosage used proof of steroids usage by urine and blood examination was not possible as this was a retrospective study. Nuclear cataract was commonly seen in this category. History of DM was present in 26.95% of the total patients. PSC cataracts were observed in these patients and the finding was supported by few authors.[34-36] In the present study, UVL exposure was reported by 32.17% of the patients. UVL was reported as a risk factor in many of the studies.[4,37] The incidence of PSC cataracts was observed in patients with UVL exposure. The limitations of this study were that many factors even though recorded could not be confirmed with suitable tests as it was a retrospective study such as socioeconomic status, renal disorders, childbearing women, myxedema, hypertension, and dehydration.

CONCLUSIONS

Atopy documented higher odds for nuclear cataract (35.41%) with $P = 0.041$ (P significant at <0.05), attaining statistical significance compared to other types. Steroids being the risk factor to cause cataracts was 25.21%, the $P = 0.382$ which was statistically significant. For diabetes-induced cataracts, it was not statistically significant with $P = 0.610$. Risk factors for cataracts in younger age groups were atopy, steroids, and exposure to UVL. Idiopathic cataracts were the second most common type in the study. The idiopathic category showed increased odds for both nuclear and subcapsular cataracts with $P = 0.026$ and 0.032, respectively (P was statistically significant at <0.05).

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