

## Original Research Article

## Study of morphological type of cataract in type 2 Diabetes Mellitus patients at a tertiary care centre in Karnataka

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### Abstract

**Objective:** To determine the morphological type of cataract seen in type 2 diabetes mellitus patients. **Methods:** Cross sectional study carried out at a tertiary eye care centre in North Karnataka from 2012 to 2014. All patients with type 2 diabetes mellitus 40 years and above diagnosed as per WHO criteria were enrolled. A detailed demographic and complete ocular examination was done. Examination of anterior segment by slit lamp biomicroscopy and grading of lens opacity was done after full dilatation of pupil according to the Lens Opacity Classification System (LOCS) III system. The severity of the lens opacities, according to the photographic standards, was separated into three major groups: nuclear cataract (NC), cortical cataract (CC), and posterior subcapsular (PSC). **Results:** Out of the 750 patients with Type 2 Diabetes Mellitus enrolled in our study, 492 patients had cataract and 258 had no cataract. 242 (60.35%) were males and 250 (71.63%) were females. Prevalence of cataract in Type 2 Diabetes was 65.60%. Mixed cataract was seen in 70.52% and monotype in 29.48% patients. A combination of nuclear, cortical and posterior subcapsular cataract had highest incidence with 42.26% followed by cortical cataract with posterior subcapsular 33.43%, nuclear cataract and cortical cataract in 13.83% and lowest incidence was with nuclear cataract and posterior subcapsular cataract with 5.48%. Among the monotype cataract 68.28% of patients had cortical cataract, 25.52% had nuclear cataract and 6.21% had posterior subcapsular cataract. **Conclusion:** In our study two thirds of the diabetic population showed evidence of cataract and mixed type of cataract was the most commonly seen.

**Keywords:** Cataract, Types of cataract, Diabetes Mellitus, mixed cataract

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### Introduction

The prevalence of diabetes mellitus (DM) is increasing steadily on daily basis, with the International Diabetes Federation estimating that there will be 439 million Diabetes patients by 2030. An aging population and longer patient life expectancy also means that the prevalence of DM will exceed 33% by 2050 [1]. Type 2 Diabetes Mellitus is more common involving 90% of all cases. Diabetes is a state of chronic hyperglycemia and is characterized by insulin resistance and relative insulin deficiency [2].

Cataract is the most common cause of blindness through out the world. The proportion of blindness due to cataract among all eye diseases ranges from 5% in developed countries to 50% or more in poor and/or remote regions [3]. Cataract occurs 2-5 times more frequently in patients with diabetes mellitus [4]. It has been suggested that the polyol pathway - via which the enzyme aldose reductase (AR) catalyzes the reduction of glucose into sorbitol - is a central part of the mechanism of cataract development [5,6,7].

Cataract in diabetics should be considered a very important and special issue by the academicians, research workers. There exists scanty local literature about the prevalence and risk factors of cataract in diabetics [5,6]. This study was done to show frequency and morphological type of cataract in diabetic population.

### Materials and methods

A cross sectional study of the morphological type of cataract in type 2 diabetes patients was conducted on 750 patients with type 2 diabetes attending the outpatient department of Ophthalmology and Medicine at Chigateri General Hospital and Bapuji Hospital attached to J. J. M.

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Medical College, Davangere from 2012 to 2014 applying following inclusion and exclusion criteria.

### Inclusion criteria

Patients with type 2 diabetes mellitus 40 years and above diagnosed as per WHO criteria.

### Exclusion criteria

Patients who are non-compliant, less than 40 years of age, type 1 diabetes mellitus, pregnant women, lactating women and immunocompromised patients were excluded from the study.

### Method of collection of data

Detailed history, detailed demographic data, diabetes history and ocular history was obtained from all patients. Data was collected on a predefined semistructured proforma. The study was approved by the institutional ethical committee.

Systemic examination was done followed by complete ophthalmic examination that included: Examination of ocular adnexa and extraocular structures, recording of Best corrected visual acuity (BCVA) and intraocular pressure (applanation), examination of anterior segment by slit lamp biomicroscopy. The grading of lens opacity, according to the Lens Opacity Classification System (LOCS) III system, after the pupils were dilated with tropicamide (1%) and phenylephrine hydrochloride (2.5%) drops the subject's eyes were examined with a slit lamp, comparing each eye with the LOCS III standard photographs (mounted close to the slit lamp), specific lens opacity were identified and assigned a severity grade. The severity of the lens opacities, according to the photographic standards, were separated into three major groups: nuclear cataract (NC), cortical cataract (CC), and posterior subcapsular (PSC). In patients who had undergone unilateral cataract surgery or had a nongradable lens, the LOCS III score of the fellow eye was used. Those who had undergone bilateral cataract surgery were excluded from the analysis. A detailed

fundus examination was done. All patients underwent biochemical tests: Fasting Blood Sugars(FBS) and glycosylated hemoglobin(HbA1c)

**Statistical analysis**

The data was analyzed on SPSS version 16.0. Descriptive Analysis was done using Percentages, Proportions, Mean and Standard Deviations and inferential Analysis was done using unpaired T-tests and chi-square.

**Results**

Out of the 750 patients with Type 2 Diabetes Mellitus, 492 patients had cataract and 258 had no cataract. Thus prevalence of cataract in Type 2 Diabetes was 65.60%. Prevalence of cataract among 40-49yrs was 5.74%, 50-59yrs was 59.85%, 60-69yrs was 94.77% and in patients above 70yrs was 100%. 242(60.35%) were males and 250(71.63%) were females.

In our study mixed cataract was seen in 70.52% and monotype in 29.48% of cataract patients.

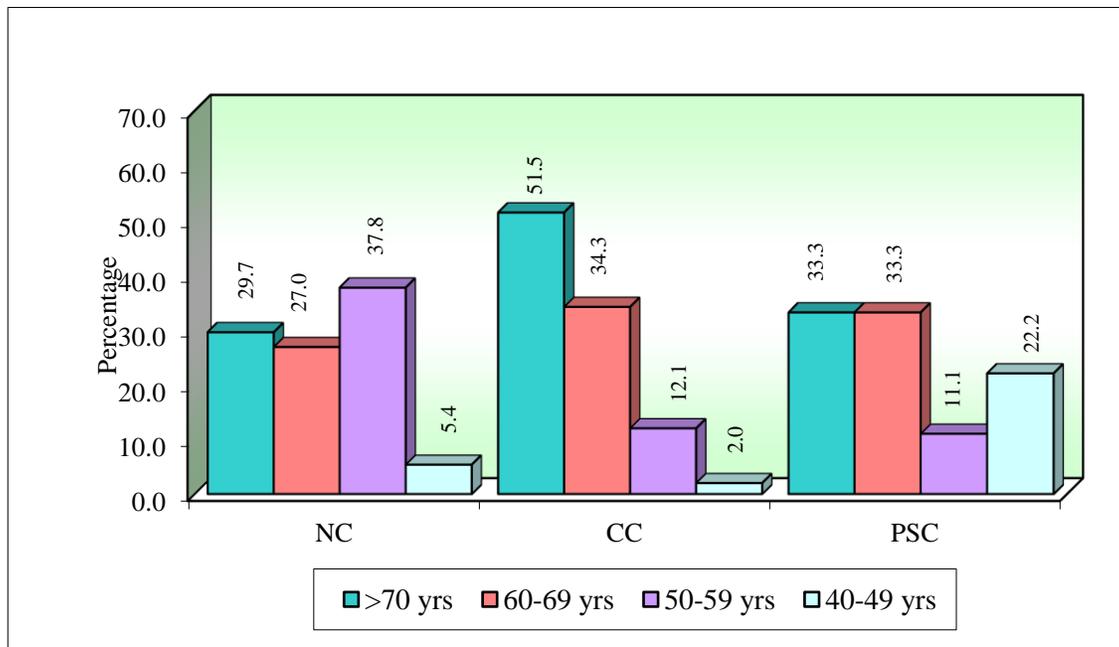
**Table 1: Type of cataract in the study group**

	No. Of patients	% of patients
Monotype	145	29.48
Mixed	347	70.52
	492	100

Among the monotype cataract 68.28% of patients had cortical cataract, 25.52% had nuclear cataract and 6.21% had posterior subcapsular cataract. Cortical cataract was the most common cataract in monotype cataract.

**Table 2: Monotype cataract in the study group**

Monotype cataract	No of patients	% of patients
Nuclear cataract (NC)	37	25.52
Cortical cataract (CC)	99	68.28
Posterior subcapsular cataract (PSC)	9	6.21
Total	145	100.00



**Figure 1: Monotype cataract in different age groups**

**Table 3: Mixed cataract in study group**

Mixed cataract	No of patients	% of patients
NC+CC	48	13.83
NC+PSC	19	5.48
CC+PSC	116	33.43
NC+CC+PSC	164	47.26
Total	347	100.00

**Table 4: Subtype of cataract in different age groups**

		>70 yrs	%	60-69 yrs	%	50-59 yrs	%	40-49 yrs	%	Total
Mixed type	NC+CC+PSC	92	56.10	51	31.10	20	12.20	1	0.61	164

	CC+PSC	75	64.66	26	22.41	13	11.21	2	1.72	116
	NC+PSC	6	31.58	4	21.05	7	36.84	2	10.53	19
	NC+CC	18	37.50	17	35.42	12	25.00	1	2.08	48
Mono type	Chi-square=30.1601, p=0.00001*									
	NC	11	29.73	10	27.03	14	37.84	2	5.41	37
	CC	51	51.52	34	34.34	12	12.12	2	2.02	99
	PSC	3	33.33	3	33.33	1	11.11	2	22.22	9
	Chi-square=21.6781, p=0.00010*									
TOTAL		256	52.03	145	29.47	79	16.06	12	2.44	492

In our study a combination of nuclear, cortical and posterior subcapsular cataract had highest incidence with 42.26%.

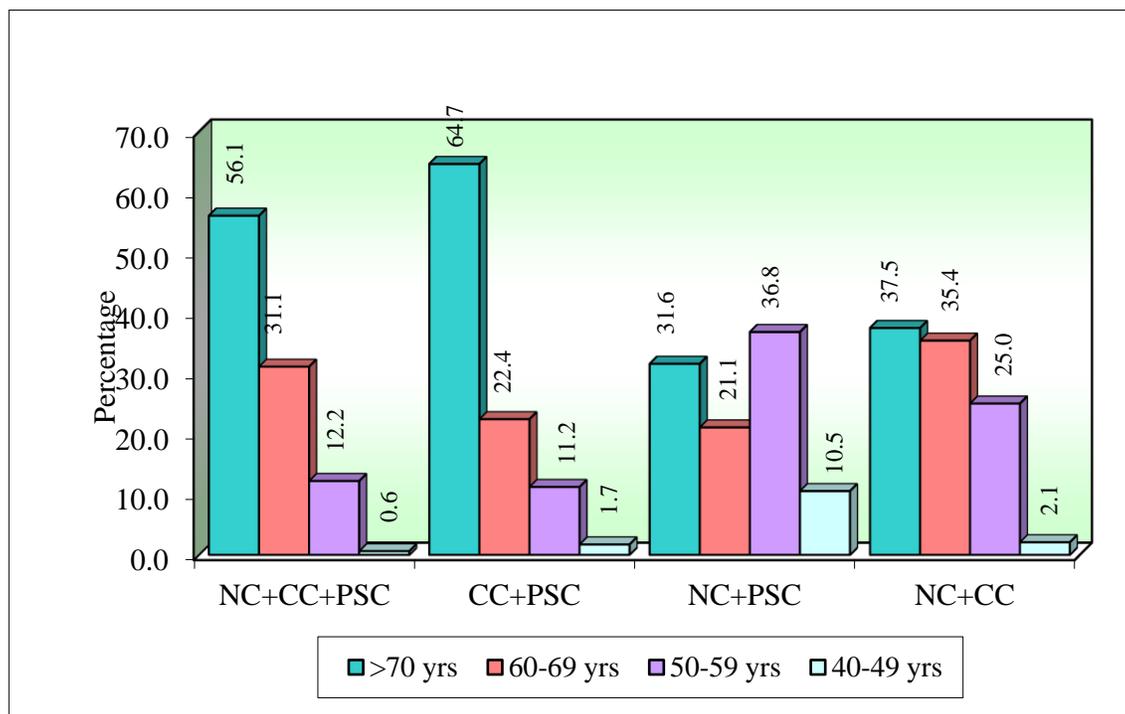


Figure 2: Mixed type of cataract in different age groups

Our study showed that the most common cataract in all age groups was a combination of nuclear, cortical cataract and posterior subcapsular cataract, followed by cortical cataract with posterior subcapsular in patients above 70yrs, cortical cataract in 60-69yrs group and nuclear cataract in 50-59yrs age group

**Discussion**

In our study mixed cataract was seen in 70.52% and monotype in 29.48% of cataract patients. A combination of nuclear, cortical and posterior subcapsular cataract had highest incidence with 42.26% followed by cortical cataract with posterior subcapsular 33.43%, nuclear cataract and cortical cataract in 13.83% and lowest incidence was with nuclear cataract and posterior subcapsular cataract with 5.48%. Among the monotype cataract 68.28% of patients had cortical cataract, 25.52% had nuclear cataract and 6.21% had posterior subcapsular cataract. Cortical cataract was the most common cataract in monotype cataracts.

Study done by Raman et al showed that the prevalence of mixed cataract was higher (42%), more than twice that of monotype cataract (19%). Of the mixed types, the most common type was a combination of NC, CC, and PSC (20%) followed by the combination of CC and PSC (16%). Of the monotype ones, the most common cataract CC (15%) followed by NC (5%) and PSC (1%) [8].

The Framingham Study also noted that CC was more common in individuals with diabetes. Similarly, the Lens Opacities Case-Control Study observed a lower frequency of NC in patients with diabetes. Study done by Schafer reported a higher percentage of cortical opacities in diabetics [9].

**Conclusion**

Diabetics patients are prone to developing cataract four times more than the non-diabetics of same age group. There appeared to be differences in the frequencies and severity of specific lens opacities in different anatomic locations in the lens in diabetic patients. Mixed

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cataract had highest incidence with a combination of cortical, nuclear and posterior subcapsular cataract than monotype cataract

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