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Frequency And Types Of Cataracts In Diabetic Verses Non-Diabetic Patients In A Peripheral Combined Military Hospital

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Abstract

Introduction: *Cataracts are a multifactorial systemic disease that causes opacity of the optical lens. One etiology of cataracts is chronic hyperglycemia, usually caused by uncontrolled diabetes mellitus. Cataracts represent the world's largest cause of visual impairment and blindness (33%) after refractive problems like myopia, hyperopia, and astigmatism (43%). This study aimed to analyze the frequency and types of cataracts in diabetic patients compared to non-diabetic patients.*

Methods: *This comparative cross-sectional study was carried out in the Eye Outpatients Department of Ophthalmology, Combined Military Hospital, Saidpur from July to December 2020. Patients between 30-60 years of age with and without diabetes were included in the study. All patients underwent a complete ocular examination including uncorrected and best-corrected visual acuity (VCVA), refraction, Slit lamp Bi microscope, and Dilated fundus examination. Cataract was classified on a morphological basis into posterior sub-capsular, cortical and nuclear, and mixed. A purposive sampling technique was used in this study. Data was collected by a pre-designed questionnaire. Data were analyzed using SPSS version 20 (IBM Corp, Armonk, NY, USA) results were compiled in the frequency distribution table. Informed written consent was taken from all participants. Ethical clearance was obtained by the ethical committee of CMH.*

Result: *A total of 90 patients were examined. The average duration of diabetes was at least 5 years with the age group of 30-45 years 22 patients (24.44%) and 46-60 years 68 patients (75.55%). There were 75 (83.83%) patients with diabetes who had cataracts while only 15 (16.16%) non-diabetic patients had cataracts. In this study, the most common type of cataract in diabetic patients was posterior subcapsular cataract (PSC) and it was 40 patients (53.33%) and followed by nuclear cataract in 20 (26.66%) and cortical cataract in 15 (20%) patients. In non-diabetic patients nuclear cataract was seen in 8 (53.53%) patients, cortical was seen in 4 (26.66 %) and PSC was 3 (20%) patients. Among the diabetic patients cataracts frequently developed in the age group of 46-60 years.*

Conclusion: *Diabetic patients should be screened for cataracts as early as possible. Posterior subcapsular cataract (PSC) can cause significant dimness of vision between 46-60 years.*

Keywords: *Cataract, Diabetes Mellitus (DM), Cortical cataract, Nuclear cataract, Posterior Sub Capsular Cataract (PSC).*

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I. INTRODUCTION

A cataract is defined as any opacity in the lens or its capsule, either congenital or acquired, unilateral or bilateral [1]. It is the most common cause of blindness accounting for 51% of the world's total blindness and 33% of the world's visual impairment. WHO (World Health Organization) is defined blindness as "visual acuity of <3/60 using Snellen chart with the best corrected visual acuity(VCVA) & visual field less than 10 degrees".In the year 1999–2000, the National Blindness and Low Vision Survey of Bangladesh was done for detailed information on the prevalence and causes of low vision and blindness, to plan eye care services which was the

first nationally representative population-based survey.[2] The recent prevalence survey attributed 79.6% of bilateral blindness to cataracts in our country. Within the adult population, it is estimated that there are approximately 650 000 adults blind due to cataracts in Bangladesh and a further 130000 new cases are included per year.[3] Diabetes Mellitus is a metabolic disorder which is characterized by hyperglycemia. A cataract is known to occur 2-5 times more frequently in patients with Diabetes Mellitus (DM) which may reach 15-25 times in diabetics below 40 years of age.[4] In 2017, a study suggest that cataracts cause severe dimness of vision (70%) and blindness (57%). The risk of cataract formation increases with increasing duration of diabetes, the severity of hyperglycemia, and control measures of diabetes[5]. Even though aging is another major risk factor for the development of cataracts. Nutritional deficiencies, trace metals, exposure to sunlight, smoking, etc are also responsible for the development of cataracts.[6] In 2002, WHO enlisted the cataract as one of the top leading causes of blindness. It was presented as 47.9% cataract and 4.8% diabetic retinopathy. Vision 2020 is a worldwide activity to find out all preventable and treatable visual impairments around the world.[7] Phacoemulsification is the best and most successful surgical method with great visual outcomes whenever performed by an experienced surgeon under aseptic measures. Diabetic patients must need ophthalmologic evaluation consistently at regular intervals.[8] Cataract in diabetics poses an enormous health and economic burden, particularly in developing countries where DM treatment is insufficient and cataract surgery often inaccessible.[9] Mechanisms of diabetic cataractogenesis have been studied in less detail than those of other diabetic complications. Both animal and human studies support important contribution of increased aldose reductase activity.[10] Cataract in diabetics should be considered a very important and special issue by the academicians, research workers as well as the policymakers. So, this study aimed to determine the frequency and types of cataracts in diabetic patients compared to non-diabetic patients.

II. OBJECTIVE

General Objective

- To determine the frequency and types of cataracts in diabetic patients compared to non-diabetic patients.

Specific Objectives

- To see the sociodemographic profile of the respondents.
- To compare cataracts in Diabetics versus Non-Diabetics.
- To know about the treatment of diabetes in the study subjects.
- To see associated Co-morbidity

III. METHODS

This descriptive cross-sectional study included 90 diabetic and non-diabetic patients randomly presented in the Eye OPD of Combined Military Hospital, Saidpur from Jul 20 to Dec 20. All subjects underwent a complete eye examination, including uncorrected and best-corrected visual acuity(VCVA), Slit lamp Bi-Microscope, and dilated fundus examination. After taking the history, patients were classified into diabetic and nondiabetic. Visual examination including visual acuity & pinhole testing was done at a six-meter distance using a Snellen's chart. Visual acuity improvement with a pinhole was considered a refractive error and visual acuity of $\leq$ 6/18 was regarded as diminished vision. The patient's visual assessment data was recorded on well-defined proforma. The studied patients were dilated with tropicamide (Trophen 1%) eye drops and was examined to see the presence and/or absence of cataracts and the type of cataract using a slit lamp Bi-Microscope. Diabetic patients with a cataract were monitored at regular intervals and see impacts of cataract on vision, fundus changes for diabetic retinopathy, and surgical plan in correspondence to cataract severity. A purposive sampling technique was used in this study. Data was collected by a pre-designed proforma. Data were analyzed using SPSS version 20 (IBM Corp, Armonk, NY, USA) results were compiled in the frequency distribution table. Informed written consent was taken from all participants. Ethical clearance was obtained by the ethical committee of CMH.

Inclusion Criteria

- Patients of 30-60 years old of both sexes.
- Diabetic patients of at least 5 years of diagnosis.
- Patients who had given consent to participate in the study.

Exclusion Criteria

- Patients with ages < 30 and > 60 years.
- Patients having a history of ocular trauma.
- Patients who use local or systemic steroids.
- Other chronic eye diseases or any ocular
- Patients who did not give consent to participate in the study.

IV. RESULTS

Table 1: Distribution of age and gender in cataracts in patients (N=90)

	Presence of diabetes N (%)	Absence of diabetes N (%)	Total
Subjects	75 (83.33%)	15 (16.16%)	90
Male	25 (33.33%)	6 (40%)	31
Female	50 (66.66%)	9 (60%)	59
Age 30-45 years	10 (13.33%)	12 (80%)	22
46-60 years	65 (86.66%)	03 (20%)	68

Table 1 shows, out of 75 diabetic patients Presence of Cataracts- Was females 50 (66.66%) most common, Males 25 (33.33%), and out of 15 non diabetic patients Female 09 (60%) most common, Male 06 (40%) and Presence of diabetes 46-60 years, 65 (86.66%) most common.

Table 2: Comparison of Cataracts in Diabetics versus Non-Diabetics (N=90)

Cataract	Diabetic N (%)	Non- Diabetic N (%)	Total
Present	67 (89.33%)	04 (26.66%)	71
Absent	08 (10.66%)	11 (73.33%)	19
Age30-45 years	10 (13.33%)	12 (80%)	22
46--60 years	65 (86.66%)	03 (20%)	68
Total	75	15	90

Table 2 shows, out of 75 diabetic patients, cataracts were present in 67 (89.33%), absent in 08 (10.66%), and out of 15 non diabetic patients, cataract present in 04 (26.66%), absent in 11 (73.33%) and age group 46--60 years 65 (86.66%) most common and then age 30-45 years 10 (13.33%)

Table 3: Frequency of Cataract Type in Diabetics versus Non-Diabetics (N=90)

Type of Cataract	Diabetic	Non-Diabetic
PSC	40 (53.33%)	03 (20%)
Nuclear Cataract	20 (26.66%)	08 (53.33%)
Cortical Cataract	15 (20%)	04 (26.66%)
Total	75	15

Table 3 shows, out of 75 diabetic patients, the most common type of cataract was PSC 40 (53.33%) then nuclear cataract 20 (26.66%), and cortical cataract 15 (20%) . and out of 15 non-diabetic patients, the most common type was nuclear cataract 08 (53.33%), cortical cataract 04 (26.66%) and PSC cataract 03 (20%).

Table 4: Treatment for Diabetes (N=90)

On Oral Hypoglycaemic Agents	50 (66.66%)
On Insulin	20 (26.66%)
No Treatment	05 (6.66%)
Total	75

Table 4 shows, out of 75 diabetic patients, oral hypoglycaemic agents were 50 (66.66%), On Insulin 20 (26.66%), and without treatment 05 (6.66%).

Table 5: Associated Co-morbidity

	Hypertension	Dyslipidemia	None
Diabetics	55 (73.33%)	15 (20%)	05 (6.66%)
Non Diabetics	08 (53.53%)	05 (6.66%)	02 (13.33%)

Table 5 shows, out of 75 diabetic patients, Hypertension 55 (73.33%), Dyslipidemia 15 (20%), and out of 15 nondiabetic patients, Hypertension 08 (53.53%), Dyslipidemia 05 (6.66%).

V. DISCUSSION

Duration of diabetes and increasing age is a key factors for the advancement of cataracts in diabetic patients. Charles et al. examine in 2003 in which the normal term of diabetes was 5- 7 years and the time of diagnosis was 46.5 years.[11] While In this study, the duration of diabetes was at least 5 years. Although in the present study, age was classified into two groups 30-45 & 46-60 years. Results showed that patients in 30-45 years10 (13.33%) and patients in 46-60 years 65 (86.66%) presented with cataracts including diabetic and non-diabetic. Cataract was more in the age group between 46-60 years. Thus, the result of both studies is almost equal. In the present study in diabetic patients cataract was found in 67 (86.66%) and absent in 08 (19.6%). On the other hand in non-diabetic patients cataract was present in 03 (14.1%) and absent in 12 (80.4%) patients. Diabetes is the major risk factor for cataracts. As the higher prevalence of diabetes mellitus in females, it follows that the incidence of diabetic cataracts is higher in females than males. Sung et al.in 2006 reported two groups of diabetic patients, the control group and the cataract group. The author (s) concluded that females were more common in the cataract group than in the control group.[12] In this study prevalence of diabetes and cataract was more in females than males. Out of 90 patients 50 (66.66%) females and 25 (33.33%) males were presented with cataracts. In the correlation between diabetes and gender, the increased incidence of diabetic cataracts was more in females. In 2012 Eydis conducted a study on the prevalence of cataracts in a population with and without diabetes mellitus. In their conducted study three types of cataracts were observed 65.5% cortical, 42.5% PSC, and 48% nuclear cataracts in diabetic patients. [13] Similarly to compare recent studies, Patricia et al. conducted a study in 2017 on pre-senile cataracts in Diabetic Patients. The hypothesis of Patricia was a cortical cataract is more common in diabetic patients. The author (s) concluded that among the diabetic patients, 64.4% were having PSC, 25.3% cortical, and 9 % had nuclear cataracts which are almost similar as compared to the present study.[14] Results of the present study show a significant association between diabetes and PSC. In this study 40 (53.33%) PSC, 20 (26.66%) nuclear, and 15 (20%) cortical cataract in diabetic patients that was higher than previous study. While in non-diabetic patients 03 (20%) were present with PSC, 08 (53.33%) present with nuclear cataract and cortical cataract was 04 (26.66%).In our study, there was an increased number of cataract patients who are suffering from hypertension and dyslipidemia in association with diabetes. In a study done by Nirmalan in Southern India, it was found that hypertension and diabetes were associated with the development of cataracts.[15] In another study done by Chen among diabetic patients in Kinmen, Taiwan it was found that dyslipidaemic patients may increase the risk of development of PSC and nuclear cataract. Similarly, in the Framingham studies, hypertriglyceridemia is associated with the development of posterior subcapsular cataracts in men.[16] Improvement of pharmacological and careful methods for ophthalmologic examination for cataracts is one of the fundamental needs for future cataract evaluation. At present the only available treatment for the disease is the surgical removal of the cataractous lens and followed by posterior chamber intraocular lens implantation (PCIOL). The success rate of cataracts surgery, improvement of vision is possible without complications and with an advanced surgical procedure like phaco-emulsification and with the aid of modern equipment's.[17] However, the most common side effects observed in the post-surgical treatment were inflammatory reaction and cystoid macular oedema[18]. The present study helped to find a statistically significant correlation between age, sex, and the type of cataract which develops in the two groups. Appropriate glycemic control was taken among the uncontrolled diabetic patients and all were advised for operation with intraocular lens implantation.

VI. Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

VII. CONCLUSION

Posterior subcapsular cataract (PSC) was the most common type of cataract among diabetic patients followed by other mature cataracts. Females are more prone to develop cataracts. Longer duration of diabetes and poor glycaemic control were the risk factors for the development of cataracts in diabetic patients. This study shows that there is a higher incidence of cataracts in diabetic patients which can be avoidable by timely referring to an ophthalmologist to diagnose, evaluate and manage early for better visual outcomes.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

VIII. RECOMMENDATION

Chronic hyperglycemia can increase a patient's risk of cataracts. Healthcare providers and patients should be more aware of the risk factors of cataracts and work together to handle those risks appropriately. Moreover, further studies should be conducted involving a large sample size and multiple centers in this regard.

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