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Original Article

Evaluation of visual acuity among diabetic retinopathy patients

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***ABSTRACT*:**
Background: Diabetic retinopathy (DR) is emerging globally as one of the main causes of avoidable blindness and a leading cause of blindness in low and middle income countries. Present study aimed to assess visual acuity among diabetic patients. **Materials and methods:** The study was carried on eyes of 40 patients, 20 diabetic and 20 non-diabetic visiting the outpatient department. **Results:** A total of 40 patients, 20 in Diabetic group and 2+0 in Non-Diabetic group participated in the study and completed their Visual acuity testing. We observed that maximum number of diabetic eyes have best corrected visual acuity 6/12. In contrast to this, maximum no. of non-diabetic eyes has best corrected visual acuity 6/9. These results were statistically significant. **Conclusion**: Visual acuity is significantly compromised in diabetic patients as compared to non-diabetic patients.
Keywords: diabetic patients, visual acuity, diabetic retinopathy.

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INTRODUCTION:

Diabetic retinopathy (DR) is a priority disease in the 'VISION 2020' initiative for the global elimination of avoidable blindness. The World Health Organization (WHO) has recommended its member countries to integrate a program approach for DR within their prevention of blindness programs. In industrialized countries, the magnitude of DR is high and it is the leading cause of blindness.[1,2]

Diabetic retinopathy (DR) is emerging globally as one of the main causes of avoidable blindness and a leading cause of blindness in low and middle income countries. This might be due to industrialization, mobilization of population and changing life styles.[3-5]

Diabetic retinopathy, one of the most common microvascular complications of diabetes, is considered to be one of the major causes of blindness and low vision. Legal blindness accounts for 83% of visual impairment among persons with youth-onset diabetes, and 33% among persons with older age onset diabetes.[1] Diabetes alone can increase the risk of blindness 25 times.[2] Diabetic retinopathy occurs in approximately 7–29% of patients attending general medical practices.[3]

Visual acuity testing is the "highest quality level" for essential results of clinical trials. Hence, we planned the study to assess the visual acuity among diabetic patients

MATERIALS AND METHODS:

The study was carried on eyes of 40 patients, 20 diabetic and 20 non-diabetic visiting the outpatient department. After explaining the nature of the study, a written informed consent was obtained from every participant. Patients with history of diabetes for 6 years or more for patients in Diabetic group were included in study.

Any abnormality of cornea such as keratoconus, keratopathy, glaucoma, corneal and intraocular surgeries, Systemic collagen related diseases, Soft and hard contact lens wearer were excluded from study.

DM was defined as a person having fasting glucose level of ≥ 7 mmol /liter. If a patient was already taking medicine to control hyperglycemia, he/she was labeled as a case of 'previously physician-diagnosed' diabetes.[6]

There are various diagrams utilized for visual sharpness testing, however the most well-known graphs are the Snellen outlines. The outline has letters of various sizes organized from biggest at the top to littlest at the base, which is perused, one eye at any given moment, at a separation of 6 meters (20 feet). Each letter on the outline subtends a point of 5 minutes (min) of bend at the proper testing separation, and each letter part subtends an edge of 1 min of curve.

Acknowledged tradition does not indicate Snellen acuity in precise terms; rather, Snellen acuities are for

the most part communicated as a division with the numerator equivalent to the separate from the outline and the denominator being the size of the littlest line that can be perused. The equal of the part levels with the point, in min of arc, that the stroke of the letter subtends on the patient's eye and is called the minimum angle of resolution (MAR). The refractive status of the patients was measured by automated refractometer, and then refraction was done subjectively by means of Snellen's test type charts. The Visual acuity scores for all the patients were recorded and were subject for analysis. The demographic data (age, sex) of the patients participating in the study were also recorded.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistically significant.

RESULTS:

A total of 40 patients, 20 in Diabetic group and 20 in Non-Diabetic group participated in the study and completed their Visual acuity testing. In diabetic patient group, 11 patients were males and 9 patients were females. In Non-diabetic patients group 10 were males and 10 were females. The highest number of patients belong to the age group 61-70 years. Table 2 shows distribution of best corrected visual acuity. We observed that maximum number of diabetic eyes have best corrected visual acuity 6/12. In contrast to this, maximum no. of non-diabetic eyes has best corrected visual acuity 6/9. These results were statistically significant. ($p<0.001$).

Table 1: Age and Sex wise distribution of patients

Age-group	MALE		FEMALE		TOTAL
	Diabetic Patients	Non-Diabetic Patients	Diabetic Patients	Non-Diabetic Patients	
31-40	1	1	1	1	4
41-50	2	2	1	1	6
51-60	3	2	2	3	10
61-70	4	3	3	3	13
71-80	1	2	2	2	7
Total	**11**	**10**	**9**	**10**	**40**

Table 2: Distribution of Best Corrected Visual Acuity

Best corrected visual acuity	No. of diabetic eyes	No. of non diabetic eyes	p-value
6/60	1	-	<0.05
6/36	3	-	
6/24	2	2	
6/18	5	6	
6/12	14	12	
6/9	11	15	
6/6	4	5	
TOTAL	**40**	**40**	

DISCUSSION:

Prevalence of diabetes is rising worldwide. In the course of the last 20 years, blindness and low vision due to diabetic eye complications have increased in large regions in Eastern Europe, North Africa/Middle East, Asia, Latin America, and Oceania.[3,4]

In the present study, we tested visual acuity of 20 diabetic and 20 non-diabetic patients. It was observed that the most common visual acuity for diabetic patients' eyes was 6/12. Similarly, for non-diabetic eyes, common visual acuity was 6/9. The results on comparison were found to be statistically significant. The results were compared with previous studies from the literature.

Philip MC et al ascertained quality-of-life measures and utility values associated with visual acuity in type 2 diabetes. The therapeutic Outcome Study Short Form with 36 things (SF-36) was managed to 4,051 people with type 2 diabetes who were selected in the Lipids in Diabetes Study, and their best feasible vision was resolved utilizing an Early Treatment of Diabetic Retinopathy Study graph, communicated as a LogMAR score. Eight area scores and a utility esteem speaking to a general personal satisfaction score were ascertained utilizing predefined calculations. The affiliations between personal satisfaction measured and best-eye visual keenness were surveyed graphically and by relapse investigation. Each of the eight SF-36 area

scores were adversely related with lessened visual sharpness. The effect of lower levels of visual keenness gone from a decrease of 1.3 units for a 0.1-LogMAR increment for physical working and 0.6 units in emotional wellness. Relapse examination showed a negative relationship amongst utility and lessened visual sharpness in the wake of controlling for sex, BMI, smoking status, and history of diabetes inconveniences. Patients whose LogMAR scores compared to legally blind had, on average, 0.054 lower utility compared with patients with normal visual acuity. The authors concluded that the reduced visual acuity is negatively associated with quality of life.[4]

Lövestam-Adrian M et al described the rate and movement of diabetic retinopathy in connection to therapeutic hazard markers and additionally visual sharpness result after a consistent follow-up time of 10 years in a Type 1 diabetic populace treated under routine care. The frequency and movement of retinopathy and their relationship to HbA(1c), pulse, urinary albumin levels, serum creatinine levels, and insulin measurement were considered tentatively out of 452 Type 1 diabetic patients. In 2% (6/335), visual acuity dropped to < or =0.1. Patients who built up any retinopathy and patients who advanced to locate debilitating retinopathy had higher mean HbA(1c) levels after some time contrasted with the individuals who stayed stable. Patients who built up any retinopathy had more elevated amounts of mean diastolic circulatory strain (P=.036), while no distinctions were seen in systolic pulse levels between the gatherings.

Olivarius et al analysed a broad range of possible ocular and non-ocular predictors of visual impairment prospectively in patients newly diagnosed with clinical type 2 diabetes. At diabetes diagnosis median age was 65.5 years. Over 6 years, the prevalence of blindness (visual acuity of best seeing eye ≤ 0.1) rose from 0.9% (11/1,241) to 2.4% (19/807) and the prevalence of moderate visual impairment (> 0.1; < 0.5) rose from 5.4% (67/1,241) to 6.7% (54/807). The incidence (95% confidence interval) of blindness was 40.2 (25.3-63.8) per 10,000 patient-years. Baseline predictors of level of visual acuity (age, age-related macular degeneration (AMD), cataract, living alone, low self-rated health, and sedentary life-style) and speed of continued visual loss (age, AMD, diabetic retinopathy (DR), cataract, living alone, and high fasting triglycerides) were identified.

They concluded that in a comprehensive assessment of predictors of visual impairment, even in a health care system allowing self-referral to free eye examinations, treatable eye pathologies such as DR and cataract emerge together with age as the most notable predictors of continued visual loss after diabetes diagnosis. Our results underline the importance of eliminating barriers to efficient eye care by increasing patients' and primary care practitioners' awareness of the necessity of regular eye examinations and timely surgical treatment.[7]

CONCLUSION:

Visual acuity is significantly compromised in diabetic patients as compared to non-diabetic patients.

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