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Original Research

Assessment of visual acuity among diabetic patients

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***ABSTRACT*:**

Background: Visual impairments secondary to diabetic retinopathy represent a major public health problem. Diabetes alone can increase the risk of blindness 25 times. Diabetic retinopathy occurs in approximately 7–29% of patients attending general medical practices. 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. **Aim of the study:** To assess visual acuity among diabetic patients. **Materials and methods:** The present study was conducted in the Department of Ophthalmology of the Medical institution. The study was conducted on eyes of 80 patients, 40 diabetic and 40 non-diabetic visiting the outpatient department. 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. **Results:** A total of 80 patients, 40 in Diabetic group and 40 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**: Within the limitations of the present study, it can be concluded that 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:

Visual impairments secondary to diabetic retinopathy represent a major public health problem.[1,2] 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] 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. [4, 5] Blindness from DR can be prevented by early diagnosis, optimisation of associated risk factors and timely ocular treatment, but systematic screening for DR is rarely done in low and middle income countries (LMIC) like Nepal. [6] Hence, the present study was conducted to assess visual acuity among diabetic patients.

MATERIALS AND METHODS:

The present study was conducted in the Department of Ophthalmology of the Medical institution. The ethical clearance for the study was approved from the ethical committee of the hospital. The study was conducted on eyes of 80 patients, 40 diabetic and 40 non-diabetic visiting the outpatient department. After explaining the nature of the study, a written informed consent was obtained from every participant. The protocol of the

study was approved from the ethical committee of institute before beginning the study. The inclusion criteria for patients to participate in the study were:

- History of diabetes for 6 years or more for patients in Diabetic group
- Negative history of diabetes for patients in Non-diabetic group

Exclusion criteria were:

- Any abnormality of cornea such as keratoconus, keratopathy, glaucoma, corneal and intraocular surgeries
- Systemic collagen related diseases
- Soft and hard contact lens wearer
- Systemic diseases such as hypertension, arthritis, and thyroid disease.

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 80 patients, 40 in Diabetic group and 40 in Non-Diabetic group participated in the study and completed their Visual acuity testing. In diabetic patient group, 22 patients were males and 18 patients were females. In Non-diabetic patients group 21 were males and 19 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	2	3	2	3	10
41-50	4	5	2	2	13
51-60	5	4	4	5	18
61-70	8	5	7	6	26
71-80	3	4	3	3	13
Total	**22**	**21**	**18**	**19**	**80**

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	-	<0.03
6/36	6	-	
6/24	4	4	
6/18	11	10	
6/12	28	25	
6/9	22	30	
6/6	8	11	
TOTAL	**80**	**80**	

DISCUSSION:

In the present study, we tested visual acuity of 40 diabetic and 40 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. Shrestha GS et al [7] performed study to find correlations between visual functions and visual disabilities in patients with diabetic retinopathy. Study was performed on 38 visually impaired diabetic retinopathy subjects at the Low Vision Clinic of B.P. Koirala Lions Centre for Ophthalmic Studies, Kathmandu. The subjects underwent assessment of distance and near visual acuity, objective and subjective refraction, contrast sensitivity, color vision, and central and peripheral visual fields. The majority of subjects (42.1%) were of the age group 60–70 years. Best corrected visual acuity was found to be 0.73 ± 0.2 in the better eye and 0.93 ± 0.27 in the worse eye, which was significantly different at p = 0.002. Visual disability scores were significantly higher for legibility of letters (1.2 ± 0.3) and sentences (1.4 ± 0.4), and least for clothing (0.7 ± 0.3). Visual disability index for legibility of letters and sentences was significantly correlated with near visual acuity and peripheral visual field. Contrast sensitivity was also significantly correlated with the visual disability index, and total scores. They concluded that impairment of near visual acuity, contrast sensitivity, and peripheral visual field correlated significantly with different types of visual disability. Pandey A et al [8] assessed visual morbidity in patients with DR at a peripheral tertiary eye care center of Nepal. DR was classified according to Early Treatment Diabetic Retinopathy Study Research Group - report no. 10 Table A5–1 (Modified Airlie House Classification). Total number of patients included in this study was 50. Commonest age group was 50–69 years comprising 80% of the total population (n = 50) and the predominant population was male (76%). Non proliferative diabetic retinopathy (NPDR) was found in 69%, proliferative diabetic retinopathy (PDR) in 31% and advanced diabetic eye disease (ADED) in 3%. They concluded that all the stages of DR were present at significant proportions in this study, noteworthy was the percentage of PDR.

Lartey SY et al [9] determined the prevalence of diabetic retinopathy maculopathy and cataract amongst diabetics and the prevalence of visual impairment amongst diabetics attending the Komfo Anokye Teaching Hospital eye unit. Subjects were diabetic patients attending the diabetic clinic. Non -insulin dependent diabetics constituted 97.1% whilst 2.9% were insulin dependent diabetics. The prevalence of the outcomes measures was: Cataract (23.7%) mild and moderate retinopathy (13.7%) severe proliferative retinopathy (1.8%) maculopathy (6.8%). Prevalence of low vision and blindness was 18.4%. Amongst diabetics 59.1% had no previous eye evaluation. Impaired vision due to cataract was 24.0 % representing a 40% decline in a decade. They concluded that the prevalence of visual impairment was high at 18.4%. The reduction in impaired vision due to cataract over a decade is suggestive of either an improved cataract surgical rate or improved diabetic care or both. Majority of the diabetic patients 59.1% had not received prior ocular evaluation. Siersma V et al [10] evaluated whether visual acuity impairment was an independent predictor of mortality in patients with type 2 diabetes. This was a 19-year follow-up of a cohort of 1241 patients newly diagnosed with type 2 diabetes and aged 40 years or over. Visual acuity was assessed by practicing ophthalmologists both at diabetes diagnosis and after 6 years. Visual impairment at diabetes diagnosis was robustly associated with subsequent 6-year all-cause mortality. Per 1 unit reduced logMAR acuity the incidence rate of all-cause mortality increased with 51% and of fractures/trauma with 59%, but visual acuity was not associated with diabetes-related mortality. After censoring for fractures/trauma, visual acuity was still an independent risk factor for all-cause mortality. In contrast, visual acuity 6 years after diabetes diagnosis was not associated with the subsequent 13 years' incidence of any of the outcomes, as an apparent association with all-cause mortality and diabetes-related mortality was explained by confounding from comorbidity. They concluded that visual acuity measured by ophthalmologists in patients newly diagnosed with type 2 diabetes was an independent predictor of mortality in the short term.

CONCLUSION:

Within the limitations of the present study, it can be concluded that visual acuity is significantly compromised in diabetic patients as compared to non-diabetic patients.

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