Assessment of Visual Acuity among Diabetic Patients

Ajay Jurangal[1], Ankur Singh[1], Ramandeep Kaur Dhaliwal[2]

ABSTRACT

Introduction : Diabetes is as yet a noteworthy reason for visual hindrance and visual deficiency in individuals of working age. As the pervasiveness of diabetes is rising, visual impairment among these patients speaks to a developing worldwide medical issue. The present study was planned to assess the visual acuity among diabetic patients.

Material and methods: The present study was conducted in the department of Anesthesia, Government Medical College, Amritsar. The study was conducted on eyes of 50 patients, 25 diabetic and 25 non diabetic visiting the outpatient department. 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.

Results: In diabetic patients group, 15 patients were male and 10 patients were females. In Non-diabetic patients group 13 were males and 12 were females. Maximum numbers of diabetic patients, both male (n=10) and female (n=8) are in group 51-60 years age group. The maximum no. of diabetic eyes (30%) had best corrected visual acuity 6/18. In contrast to this, maximum no. of non-diabetic eyes (38%) had best corrected visual acuity 6/9.

Conclusion: Based on the findings of present study, we conclude that non-diabetic eyes are found to be having better best corrected visual acuity than diabetic.

Keywords: Diabetes Mellitus, Snelen's Chart, Visual Acuity

INTRODUCTION

Diabetes is as yet a noteworthy reason for visual hindrance and visual deficiency in individuals of working age. As the pervasiveness of diabetes is rising, visual impairment among these patients speaks to a developing worldwide medical issue.[1,2] Loss of vision, because of retinopathy, will probably be related with macular edema in sort 2 diabetes mellitus and with proliferative retinopathy in sort 1 diabetes. Many reviews have demonstrated that early identification and treatment of diabetes can diminish the danger of diabetic entanglements, for example, visual debilitation.[3,4] It is additionally notable that the occurrence and predominance of diabetic visual blindness is lower in populaces where screening for diabetic eye infection is performed regularly as compared to populaces without screening.

The most well-known estimation of visual capacity is visual acuity in light of the fact that the test is effortlessly regulated with straightforward hardware. Visual keenness is characterized as the "spatial settling limit" of the eye or, put another way, the span of a protest that can be settled with an eye. It can be measured by distinguishing the point subtended at the eye by the littlest unmistakable optotype.[5,6] Hypothetically, this speaks to macular work; all things considered it speaks to the condition of the whole visual framework, including the visual pathways. Practically speaking, estimation of visual acuity is performed utilizing specific eye outlines.[7] These graphs for the most part comprise of capitalized letters orchestrated in columns with the biggest letters at the highest point of the outline and continuously littler letters down the diagram. 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. So the present study was planned to assess the visual acuity among diabetic patients.

MATERIAL AND METHODS

The present study was conducted in the department of Anesthesia, Government Medical College, Amritsar. The study was conducted on eyes of 50 patients, 25 diabetic and 25 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

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Age-group	Male		Female		Total
	No. of Diabetic Patients	No. of Non-Diabetic Patients	No. of Diabetic Patients	No. of Non-Diabetic Patients	
31-40	1	3	-	2	6 (12%)
41-50	4	4	2	4	14(28%)
51-60	6	4	5	3	18 (36%)
61-70	3	1	2	3	9 (18%)
71-80	1	1	1	-	3 (6%)
Total	15	13	10	12	100%

Table-1: Age and Sex wise distribution of patients

Best corrected visual acuity	No. of diabetic eyes	No. of non diabetic eyes	p-value
6/60	1	-	<0.001
6/36	4	-	
6/24	5	-	
6/18	15	3	
6/12	10	15	
6/9	10	20	
6/6	5	12	
Total	50	50	

Table-2: Distribution of Best Corrected Visual Acuity

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.

STATISTICAL ANALYSIS

The statistical analysis of the data was done using SPSS version 11.0 for windows. The statistical significance of the data was done using Chi-square test and Student's t-test. A p-value of 0.05 and less were predetermined for statistical significance.

RESULTS

A total of 50 patients, 25 in Diabetic group and 25 in Non-Diabetic group participated in the study and completed their Visual acuity testing. In diabetic patients group, 15 patients were male and 10 patients were females. In Non-diabetic patients group 13 were males and 12 were females. As shown in Table 1, maximum numbers of diabetic patients, both male (n=10) and female (n=8) are in group 51-60 years age group which was not found to be statistically significant (P >0.05). [Figure 1]

Table 2 shows distribution of best corrected visual acuity. We observed that maximum number of diabetic eyes (30%) have best corrected visual acuity 6/18. In contrast to this, maximum no. of non-diabetic eyes (38%) has best corrected visual acuity 6/9. These results were statistically significant. (p<0.001). [Figure 2]

DISCUSSION

Vision is one of our most vital faculties. The estimation of vision is the essential result of most clinical trials and all

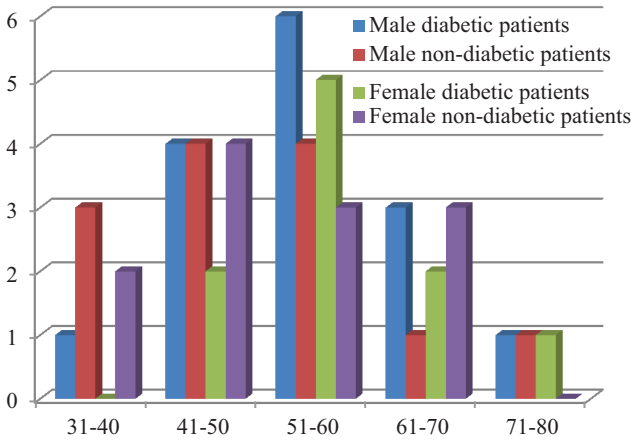

Figure-1: Bar diagram representing Age and Sex wise distribution of patients

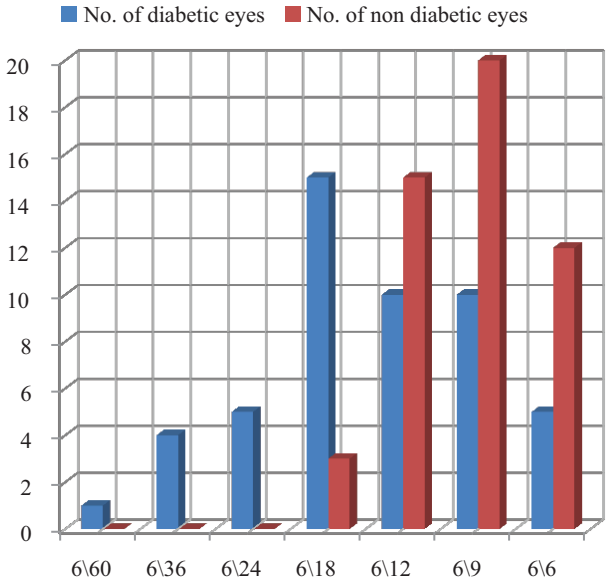

Figure-2: Bar diagram showing distribution of Best Corrected Visual Acuity

FDA enrollment trials, and assumes an imperative part in our capacity to perform day by day assignments, for example, driving. However, for all its significance, our estimation of visual sharpness is moderately unrefined.[8] This is critical since visual acuity is utilized to gauge both infection and change. Not occasionally, we gladly report to patients that their vision has enhanced by 1 or 2 Snellen lines, yet what does that mean and is this change clinically pertinent? Is this distinction even genuine or just changeability natural to the testing technique? Visual sharpness is fundamental for clinical trials to quantify treatment reaction.[9,10]

The present study was carried out for the assessment of visual acuity among diabetic patients. A total of 50 patients, 25 diabetic and 25 non-diabetics were included in the study. It was observed that maximum number of patients (both male and female) was present in the age –group 51-60 years but this result was found to be non-significant. From the assessment of visual acuity of patients of both groups, we observed that best visual acuity of non-diabetic patients was higher as compared to diabetic patients and the result was statistically significant. These results are in agreement with previous similar studies conducted by various authors. 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. 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 <0.5 and in less than 1% (3/340) 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 (P<.001 in both cases). 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. Cox relapse examination, including all patients, demonstrated mean HbA(1c) to be a free hazard pointer for both improvement and movement of retinopathy, though mean diastolic pulse was just a hazard marker for the rate of retinopathy. Metabolic control is a critical hazard pointer for both advancement and movement of retinopathy, though diastolic pulse is imperative for the improvement of retinopathy in Type 1 diabetes. The quantity of patients who ended up plainly daze amid 10 years of follow-up was low.[11,12]

Scanlon PH et al assessed the connection between best corrected visual acuity (BCVA), age, kind of diabetes, sight-threatening diabetic retinopathy (STDR) and visual co-dreariness. 1549 arbitrarily chose individuals with diabetes mellitus (DM) from a countywide computerized photographic screening program had institutionalized logarithm of least edge of determination BCVA estimation, trailed by opening light biomicroscopy examination by an accomplished ophthalmologist. Subnormal vision and visual impairment in the better-seeing eye were found in 9.0% and 0.45%. The affectability, specificity and positive and negative prescient benefits of utilizing subnormal vision to screen for STDR in an individual eye were 33.4%, 85.9%, 18.6% and 93.0%, separately. Critical contributory reasons for direct visual misfortune (logMAR 0.50 to 0.98, Snellen 6/18 or more terrible however superior to 6/60) and of Acuity Blindness (logMAR > or =1.0, Snellen 6/60 or more regrettable) in an individual eye were lenticular mistiness (counting capsular opacification) 49%, macular degeneration (counting nearsighted degeneration) 29%, diabetic maculopathy 15%, other media causes (counting corneal haziness) 13% and amblyopia 10%. It was reasoned that the dominant part of visual misfortune in a populace with diabetes is because of causes other than diabetic retinopathy. BCVA alone is not a dependable rule in foreseeing STDR. R Serban et al conducted a study with a purpose to follow up visual acuity in patients diagnosed with clinically significant macular edema and treated by an intravitreal injection of triamcinolone acetonide or in combination with bevacizumab. Based on the selectivity criteria they involved 295 patients (460 eyes), divided into 2 groups according to the treatment administered and one control group. The results showed a better preservation of the functional parameter for the group of patients treated with intravitreal injection of triamcinolone acetonide and bevacizumab.[13-16]

CONCLUSION

Based on the findings of present study, we conclude that non-diabetic eyes are found to be having better best corrected visual acuity than diabetic.

REFERENCES

1. Sinclair AJ, Bayer AJ, Girling AJ, Woodhouse KW: Older adults, diabetes mellitus and visual acuity: a community-based case-control study. Age Ageing. 2000;29:335–339.
2. Klein R, Klein BEK: Vision disorders in diabetes. In Diabetes in America. 2nd ed.
3. Harris MI, Cowie CC, Stern MP, Boyko EJ, Reiber GE, Bennett PH, Eds. Washington, DC, U.S. Govt. Printing Office, 1995
4. Leinonen J, Laakkonen E, Laatikainen L. Random measurement error in visual acuity measurement in clinical settings. Acta Ophthalmol Scand. 2005;83:328–332.
5. Rosser DA, Laidlaw DA, Murdoch IE. The development of a "reduced logMAR" visual acuity chart for use in routine clinical practice. Br J Ophthalmol. 2001;85:432–436.
6. Knudsen LL. Visual acuity testing in diabetic subjects: the decimal progression chart versus the Freiburg visual acuity test. Graefes Arch Clin Exp Ophthalmol. 2003;241:615–618.
7. Bandello F, Pognuz DR, Pirracchio A, Polito A. Intravitreal triamcinolone acetonide for florid proliferative diabetic retinopathy. Graefes Arch Clin Exp Ophthalmol.

2004;242:1024–1027.
8. Ciardella AP, Klancnik J, Schiff W, Barile G, Langton K, Chang S. Intravitreal triamcinolone for the treatment of refractory diabetic macular oedema with hard exudates: an optical coherence tomography study. Br J Ophthalmol. 2004;88:1131–1136.
9. Kumagai K, Furukawa M, Ogino N, et al. Long-term follow-up of vitrectomy for diffuse nontractional diabetic macular edema. Retina. 2009;29:464–72.
10. Song SJ, Sohn JH, Park KH. Evaluation of the efficacy of vitrectomy for persistent diabetic macular edema and associated factors predicting outcome. Korean J Ophthalmol. 2007;21:146–50.
11. Globe DR, Varma R, Torres M, et al. Los Angeles Latino Eye Study Group. Self-reported comorbidities and visual function in a population-based study: the Los Angeles Latino Eye Study. Arch Ophthalmol. 2005;123:815–821.
12. Philip MC, Judit S, Carole AC, Rury RH. Assessing the Impact of Visual Acuity on Quality of Life in Individuals With Type 2 Diabetes Using the Short Form-36.Diabetes Care. 2006:29:1506-11.
13. Lövestam-Adrian M, Agardh CD, Torffvit O, Agardh E. Diabetic retinopathy, visual acuity, and medical risk indicators: a continuous 10-year follow-up study in Type 1 diabetic patients under routine care. J Diabetes Complications. 2001;15:287-94.
14. Scanlon PH, Foy C, Chen FK. Visual acuity measurement and ocular co-morbidity in diabetic retinopathy screening. Br J Ophthalmol. 2008;92:775-8.
15. R Serban, M Cioboata, C Chiotan, C Cornăcel, R Liora, A Anghelie. Visual acuity outcome in patients with diabetic maculopathy. J Med Life. 2014;7:71–75.
16. K. Ravinder, M. Venu Madhav, J. Archana, Jadhav Pandurang. Clinical evaluation of corneal ulcer among patients attending teaching hospital. International Journal of Contemporary Medical Research. 2016;3:949-952.
17. Vaggu. Sree Kumar, Ramya. B, Soujanya. T. A clinical study of fundus changes in diabetic patients. International Journal of Contemporary Medical Research. 2016;3:2260-2263.

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