



Relationship of Visual Acuity with Systolic Blood Pressure in Diabetic Retinopathy (Type-II) On the Population of Malwa Region - A Cross Sectional Study

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KEYWORDS

Ophthalmologist,
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ABSTRACT:

Background : Roughly half of people with diabetes mellitus have some degree of diabetic retinopathy at any given moment, accounting for approximately 4% of the global population. In Asia, diabetic retinopathy accounts for 3-7% of all cases of blindness, according to WHO. In India, 3.5% of the general population has diabetic retinopathy. Moreover, 18.0% of people with diabetes mellitus have diabetic retinopathy. Diabetic retinopathy was found in 1.78% of the diabetic individuals examined in a population-based research conducted in South India. About 51 million individuals with diabetes are expected to live in India, according to the World Diabetes Atlas. 7. Concern over Asia being the region with the highest rate of diabetes epidemic is rising.

Aim : To correlate the Visual acuity with the systolic blood pressure in Diabetic Retinopathy (Type-II)

Materials and Methods : About 200 patients of Diabetic Retinopathy were asked for evaluation which attend in the Index Medical College & Hospital, Indore (M.P.) after measurement of the blood pressure the procedures of measuring the disease done by ophthalmoscope and the observation were noted.

Result : It was found that the visual acuity in both the eye were significantly positive and the best corrected visual acuity were also significant.

Conclusion : The present study is useful for ophthalmologists in making a plan for the treatment of patients with diabetic retinopathy and also useful for definite data for physiologist while teaching the students.

INTRODUCTION

The American Diabetes Association (ADA) reports that more than 25.8 million adults and children or 8.3% of the country's population have diabetes [1]. Its detrimental effects on the kidneys, eyes, heart, and nervous system cause diabetic retinopathy, nephropathy, and microangiopathy-related neuropathy. Maculopathy, proliferative diabetic retinopathy, and non-proliferative diabetic retinopathy are possible manifestations of this microangiopathy. Venules, capillaries, and precapillary arterioles are all impacted. It has been extensively studied and shown that early therapy, fast intervention to halt the advancement of the

retinopathy, appropriate glycemic management, and routine follow-up can delay and often manage the onset of moderate to severe vision loss due to diabetic retinopathy. The development of microangiopathy is slowed down by the effective control of risk factors, such as hyperglycemia, hyperlipidemia, and high blood pressure. The capacity of ophthalmology to treat severe non-proliferative and proliferative diabetic retinopathy has been transformed by the use of lasers in the field [2].

MATERIAL & METHODS

200 subjects were taken for the present study which was cross-sectional in the Department of Physiology with



association with Ophthalmology Department after obtaining Ethics Committee Approval Certificate in Index Medical College & Hospital, Indore (M.P.)

OBSERVATION & RESULTS

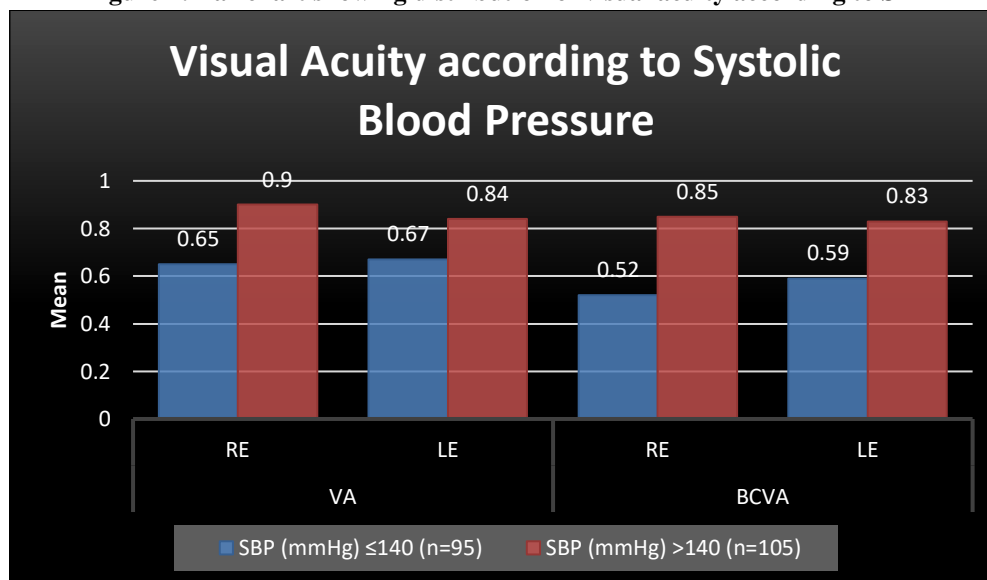
The following table shows the association of visual acuity with Systolic blood pressure and it was found that patients with high SBP causes significant increase in VA and BCVA ($p < 0.05$). That is visual acuity was least for ≤ 140 SBP and maximum for cases with $SBP > 140$ mmHg.

Table 1: Distribution of visual acuity according to Systolic Blood Pressure

| | | SBP (mmHg) | | t value | P value |
|------|----|-------------------|-----------------|---------|---------|
| | | ≤ 140 (n=95) | > 140 (n=105) | | |
| VA | RE | 0.65±0.37 | 0.90±0.40 | 4.518 | <0.001 |
| | LE | 0.67±0.41 | 0.84±0.39 | 3.071 | 0.002 |
| BCVA | RE | 0.52±0.36 | 0.85±0.42 | 5.955 | <0.001 |
| | LE | 0.59±0.46 | 0.83±0.39 | 3.933 | <0.001 |

*Independent Sample t test

Figure 1: Bar chart showing distribution of visual acuity according to SBP



DISCUSSION

Our study found the mean systolic blood pressure and diastolic blood pressure of the studied cases was 145.56 ± 17.66 mmHg and 89.40 ± 10.98 mmHg. Patients with high blood pressure significant increase in VA and BCVA ($p < 0.05$). A cross-sectional study by **Rani PK et al [3]** conducted in India involving rural population showed similar significant associations between SBP and presence and severity of any-DR. Another cross-sectional study by **Raman R et al [4]** involving urban participants in India, showed increasing SBP to be

associated with any-DR in newly diagnosed type 2 diabetes patients. Similarly, **Zheng Y et al [5]** reported the higher SBP was also an independent risk factor for both any-DR and VTDR in Indians who migrated to an urbanised country such as Singapore. In two cross-sectional studies by **Cui J et al [6]** and **Liu Y et al [7]** in China, higher SBP was also an independent risk factor for both any-DR and sight-threatening DR.



CONCLUSION

This study concluded that there is significant difference found in the visual acuity of right eye while in the best corrected visual acuity in both the eye were significantly noted which will helpful to the ophthalmologist for their diagnostic purpose.

CONFLICT OF INTEREST : NONE

REFERENCES

1. Boles, S.F. and A.A.E. Center, Diabetic Retinopathy: What You Should Know. 2020;1-20.
2. System of Ophthalmology. Steward Duke Elder vol X diseases of retina © Mosby1967; 409 – 408.
3. Rani PK, Raman R, Chandrakantan A, Pal SS, Perumal GM, Sharma T. Risk factors for diabetic retinopathy in self-reported rural population with diabetes. *J Postgrad Med.* 2009;55(2):92–6.
4. Raman R, Gupta A, Krishna S, Kulothungan V, Sharma T. Prevalence and risk factors for diabetic microvascular complications in newly diagnosed type II diabetes mellitus. Sankara Nethralaya Diabetic Retinopathy Epidemiology and Molecular Genetic Study (SN-DREAMS, report 27). *J Diabetes Complications.* 2012;26(2):123–8.
5. Zheng Y, Lamoureux EL, Lavanya R, Wu R, Ikram MK, Wang JJ, et al. Prevalence and risk factors of diabetic retinopathy in migrant Indians in an urbanized society in Asia: the Singapore Indian eye study. *Ophthalmology.* 2012;119(10):2119–24.
6. Cui J, Ren JP, Chen DN, Xin Z, Yuan MX, Xu J, et al. Prevalence and associated factors of diabetic retinopathy in Beijing, China: a cross-sectional study. *BMJ Open.* 2017;7(8):e015473.
7. Liu Y, Yang J, Tao L, Lv H, Jiang X, Zhang M, et al. Risk factors of diabetic retinopathy and sight-threatening diabetic retinopathy: a cross-sectional study of 13 473 patients with type 2 diabetes mellitus in mainland China. *BMJ Open.* 2017;7(9):e016280.