



Original Research Article

Color vision abnormalities in type 2 diabetes mellitus

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ABSTRACT

Purpose: To assess color vision abnormalities in type 2 diabetes mellitus patients and associated risk factors.**Materials and Methods:** A prospective study was conducted for 3 months. Patients who is a known case of type 2 diabetes mellitus who presented to our OPD were included in our study. All patients underwent complete ophthalmologic examination which included visual acuity, color vision assessment using Pseudoisochromatic Ishihara chart, slit-lamp biomicroscopy, IOP and fundoscopy. Statistical analyses were performed using the statistical software SPSS for Windows, ver. 16.0. The results were expressed as mean \pm standard deviation if the variables were continuous and as percentages if categorical.**Results:** The prevalence of color vision abnormalities among diabetics and associated risk factors was assessed.**Conclusion:** Various studies have been done to know the color vision abnormalities. We evaluated on the associated risk factors as well.© 2020 Published by Innovative Publication. This is an open access article under the CC BY-NC-ND license (<https://creativecommons.org/licenses/by/4.0/>)

1. Introduction

Color vision examination is of great clinical importance since any changes in color vision is an indication of pathological conditions. Diabetic retinopathy (DR) remains the leading cause of legal blindness despite effective treatment and moderate visual impairment among the working age group individuals.¹⁻⁴ Tritan like acquired color vision defects have been reported to occur in diabetes mellitus⁵⁻⁸ Hence color vision assessment is a useful method for screening and monitoring diabetic retinopathy. The aim of our study was to assess color vision abnormalities in type 2 diabetics and to elucidate the risk factors associated.

2. Materials and Methods

A prospective cross-sectional study was conducted from November 2018 to July 2019. Patients aged >

45 years who is a known case of diabetes mellitus who present during the time period to our OPD was included in our study. 167 patients were screened during this time for color vision assessment and status of diabetic retinopathy. All patients underwent complete systemic examination and ophthalmologic examination which included assessing the visual acuity, color vision assessment using Pseudoisochromatic Ishihara chart, slit-lamp biomicroscopy, IOP and fundoscopy. Statistical analyses was performed using the SPSS ver. 16.0. The results were expressed as mean \pm and as percentages.

The Ethical Clearance was obtained from Institutional Ethics Committee, AIMS.

Table 1: Color vision impairment among diabetics with and without retinopathy

	DR+	DR-
Color vision normal	51 (64%)	49 (69%)
Color vision abnormal	33 (36%)	34 (31%)
Total	84	83

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Table 2: Risk factors and impaired color vision

Risk factors	Number of patients	Color vision normal	Color vision impaired
HbA1c>7	90	31	59 (65.55%)
Anemia	33	23	10(30.33%)
Altered serum lipid profile	92	34	58(63.04%)
Hypertension	106	45	59(55.66%)
Nephropathy	20	13	7(35%)
Increased IOP	15	6	9(60%)
Neuropathy	24	17	7(29.16%)
High heart rate	68	49	19(27.9%)
CSME(clinically significant macular edema)	35	-	35(100%)

3. Results

The prevalence of color vision abnormalities among diabetics and associated risk factors was assessed in our study. Of 167 cases, mean color vision loss increased in diabetes mellitus than in normal. Further degree of color vision error increased with the severity of diabetic retinopathy. Color vision was impaired among 31% of patients without diabetic retinopathy as compared to 36% with diabetic retinopathy (Table 1) Also associate risk factors were noted among the study subjects. Among the risk factors, people with HbA1c >7(65.5%), altered serum lipid profile(63%) and hypertensives (55.66%), patients with CSME(100%) had higher impaired color vision.(Table 2)

4. Discussion

Various studies have shown that color vision is impaired among diabetics.^{6–9} Green et al reported prevalence of Impaired color vision (ICV) among the patients with no retinopathy (24%)⁶ In a study conducted by Ong et al, patients had worse tritan contrast threshold despite normal BCVA.⁸ Laxmi Gella et al in 2019 studied 673 eyes of 343 subjects and observed that prevalence of impaired color vision was 43%. With subjects with clinically significant macular edema had thrice the risk of having color vision impaired in them.⁹

We found that even with no diabetic retinopathy, patients were found to have impaired color vision.

5. Conclusion

We undertook this study to know the prevalence of impaired color vision among the diabetics in early stages and hence color vision testing is to be considered as a routine test in diabetics.

6. Source of Funding

None.

7. Conflict of Interest

None.

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