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Knowledge, Attitude &Practice (KAP) study on Diabetes & its ocular complications among type II diabetic population in a tertiary care center from Southern India

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Abstract

Background: The significance of understanding the ocular manifestations of diabetes mellitus cannot be overstated, as this condition is likely to have a profound impact on vision, making it crucial for patients to be well-informed. The objective of this investigation was to evaluate the understanding and behaviours related to ocular health among individuals with Type 2 diabetes attending a tertiary care facility in South India.

Material and methods: This cross-sectional analysis involved 158 diabetic individuals from the outpatient department (OPD) of the institution. A questionnaire was employed to gather data regarding awareness and practices associated with diabetes mellitus, focusing specifically on ocular concerns. A predetermined score was utilized to classify levels of knowledge and practices as inadequate and satisfactory.

Results: Among the 158 individuals surveyed, 64.6% demonstrated awareness of the condition known as diabetes. In response to inquiries regarding possible ocular complications associated with diabetes, 10.8% cited cataracts, while 31.6% identified retinopathy. Additionally, 32.9% acknowledged the risk of infections in the eye, and defective vision was noted by 31.6%. Furthermore, 22.8% recognized glaucoma, Central Retinal Artery Occlusion (CRAO), or Central Retinal Vein Occlusion (CRVO) as potential complications. A total of 22.8% of the participants acknowledged their lack of awareness regarding the eye-related complications associated with diabetes. In terms of attitudes, 56.3% of the participants exhibited a negative perspective concerning eye health related to diabetes. In practical terms, merely 31% participated in optimal preventive measures for overseeing eye health related to diabetes. The correlation between the knowledge score and the practice score was found to be significant ($r = 0.862$, $p = 0.0001$).

Conclusion: The findings underscore the critical need for targeted educational approaches aimed at improving patient comprehension and proactive management of diabetic retinopathy and related ocular issues, leading to better clinical outcomes and reduced complications.

Keywords: Diabetes; Central Retinal Artery Occlusion (CRAO); Central Retinal Vein Occlusion (CRVO); Retinopathy

1. Introduction

Diabetes mellitus (DM) is a metabolic condition marked by persistently elevated blood glucose levels, referred to as hyperglycemia, resulting from either a relative deficiency of insulin or a complete lack of insulin production by the pancreas. [1] The International Diabetes Federation reported that over 74 million adults in India were diagnosed with diabetes in 2021, equating to one in every 12 adults. [2] This figure is anticipated to increase to over 123 million by 2040, positioning India as a central hub for diabetes prevalence. [3]

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The extended duration of diabetes mellitus correlates with ocular complications, leading to visual impairment and potential blindness. Understanding the prevention and risk factors associated with ocular complications is crucial for safeguarding vision in individuals with diabetes mellitus. While most individuals with diabetes recognize the potential for eye diseases associated with their condition, their attitudes and practices fall short of optimal standards, indicating a need for enhancement. [4]

To develop an effective approach for promoting health related to diabetes, it is essential to gather baseline information concerning knowledge, attitudes, and practices regarding eye complications and eye care among individuals with diabetes.

To the best of our knowledge, there has been no study conducted in a hospital setting in southern part of our country to explore the understanding and behaviours of diabetic patients concerning eye diseases. This study was conducted to evaluate the extent of ocular-related knowledge and practices among individuals with type 2 diabetes in our tertiary-care hospital located in Southern India.

2. Material and Methods

A cross-sectional study was conducted after taking approval of the institutional ethics committee (IEC – 098) at a hospital from March 2024 to December 2024, involving 158 adult patients with diabetes aged over 40 years, who were selected from the outpatient Department of Ophthalmology at Sri Siddhartha Medical College, Hospital & Research Centre with the help of non-probability purposive sampling. Comprehensive profiles of individuals with diabetes were gathered from the hospital's patient guidebook. Additionally, an ophthalmologist verified complications related to diabetes.

- **Study population:** All registered diabetic patients who attended the ophthalmic outpatient department were considered for inclusion in the study.

- **Sample-size:** For calculation of the sample size following formula was used

$$n = \frac{z^2\,(1 - \frac{\alpha}{2}) \times \sigma^2}{d^2}$$

Where,

- n: Sample size
- z: Z-score (1.96 for 95% confidence level)
- σ: Standard deviation -1.8
- d: Margin of error -0.28

From the above formula the sample size calculated for the study was of 158 diabetic patients. All participants completed the questionnaire on a voluntary basis, and confidentiality was upheld throughout the duration of the study. A direct interview was carried out by skilled interviewers utilizing a two-part semi-structured questionnaire. The initial section of the questionnaire gathered socio-demographic details, including age, gender, socioeconomic status, and education level of the patients, as well as the duration of diabetes mellitus and any complications arising from the condition. The second section comprised 34 inquiries, including 13 focused on patients' understanding of ocular complications resulting from diabetes mellitus, another 13 pertaining to patients' ocular self-care practices, and 8 aimed at assessing patients' attitudes towards the subject matter. Understanding was characterized as the comprehension of information pertaining to ocular knowledge, while practice was characterized as the comprehension of information related to ocular practice in the context of diabetes. The classification of knowledge levels was based on the scoring system, where poor knowledge was defined as a score at or below the Mean Score – 1 S.D. (standard deviation), while good knowledge was indicated by a score exceeding the Mean Score + 1 S.D. (standard deviation).

2.1. Statistical analysis

The data were summarized with mean and standard deviation (SD) for continuous variables that followed a normal distribution, whereas median and interquartile range were applied for those that did not adhere to a normal distribution. Calculations were performed to determine frequencies and percentages for categorical variables, including socio-demographic factors. Pearson's correlation was employed to examine the relationship between knowledge and

practice outcomes. The Statistical Package for the Social Sciences (SPSS) (version 27, SPSS, IBM Corp., Armonk, NY, USA) was utilized for data entry and analysis. A p-value <0.05 (two-sided) was considered to be statistically significant.

3. Result

The study population comprised 158 participants. Among them, 82 (51.9%) were male, while 76 (48.1%) were female. In terms of age distribution, 50 participants (31.6%) were between 40 and 50 years old, 52 (32.9%) were aged 51 to 60 years, another 50 (31.6%) belonged to the 61 to 70 age group, and 6 (3.8%) were older than 70 years. Regarding occupation, 48 participants (30.4%) were self-employed, while 10 (6.3%) were retired. Additionally, 24 participants (15.2%) were unemployed, whereas the largest proportion, 76 participants (48.1%), were housewives. The study population had varying levels of monthly income. A total of 75 participants (47.5%) earned less than 30,000, while 54 (34.2%) had an income ranging between 30,000 and 70,000. Meanwhile, 29 participants (18.3%) reported earning more than 70,000. Regarding the duration of diabetes, 28 participants (17.7%) had been living with the condition for less than five years. A larger group of 56 participants (35.4%) had diabetes for a period of 6 to 10 years, while the highest proportion, 74 participants (46.8%), had been affected for more than 10 years. In terms of addictions, 76 participants (48.1%) reported smoking, while 74 (46.8%) consumed alcohol (Table 1).

Table 1 Demographic characteristics of the study population (n = 158)

Demographic Characteristics	Frequency	Percentage
Gender		
Male	82	51.9
Female	76	48.1
Age group (in years)		
40-50	50	31.6
51-60	52	32.9
61-70	50	31.6
>70	6	3.8
Occupation		
Self employed	48	30.4
Retired	10	6.3
Unemployed	24	15.2
Housewife	76	48.1
Monthly Income		
<30,000	75	47.5
30,000 - 70,000	54	34.2
>70,000	29	18.3
Duration of Diabetes (in years)		
<5	28	17.7
6 - 10	56	35.4
>10	74	46.8
Addictions		
Smoking	76	48.1
Alcohol consumption	74	46.8

Regarding knowledge about diabetes, 64.6% of the participants were aware of the condition. When asked about potential eye complications caused by diabetes, 17 participants identified cataracts, while 68 (31.6%) recognized retinopathy. Additionally, 11 participants (32.9%) acknowledged infections in the eye as a possible complication. Defective vision was mentioned by 22 participants (31.6%), while 10 (22.8%) identified glaucoma, CRAO (Central Retinal Artery Occlusion), or CRVO (Central Retinal Vein Occlusion). A total of 36 participants (22.8%) admitted they did not know about the eye-related complications of diabetes. Regarding attitudes, 56.3% of the participants demonstrated a negative attitude toward diabetes-related eye health, whereas 43.7% exhibited a positive attitude. In terms of practice, only 49 participants (31%) engaged in preventive ideal practices for managing diabetes-related eye health (Table 2).

Table 2 KAP and corelation characteristics of the study population (n = 158)

KAP Characteristics	**Frequency**	**Percentage**
Knowledge about		
Diabetes	102	64.6
Problems that can arise in the eyes due to diabetes		
Cataract	17	10.8
Retinopathy	68	31.6
Infections in the eye	11	32.9
Defective vision	22	31.6
Glaucoma, CRAO (Central retinal artery occlusion), CRVO (Central retinal vein occlusion)	10	22.8
Do not know	36	22.8
Attitude		
Negative	89	56.3
Positive	69	43.7
Practices		
Preventive Ideal Practices	49	31
Parameter	r coefficient	p value
Corelation between Knowledge Score and practices (r) coefficient	0.862	0.0001

The overall level of knowledge was poor in 35.4%, and poor attitude was seen in 43.7% of the patients and regarding practices, the poor practices observed in 69% of the participants. Pearson's correlation, a significant positive association ($r = 0.862$, $p = 0.0001$) was found between the knowledge and the practice score (Table 2).

4. Discussion

The tendency of individuals to overlook initial indicators of chronic illness, only to seek help in advanced stages, must be addressed. A systematic strategy is essential to prevent the severe complications associated with conditions such as diabetes. Diabetes represents a chronic condition that has reached epidemic levels in numerous nations. To mitigate the risk of mortality and serious complications associated with diabetes, individuals diagnosed with the condition must adhere to recommended preventive measures and seek timely medical attention. However, these are frequently not well comprehended by the patients and their families. Diabetes mellitus represents a significant public health challenge that has been facing society in the current century. [4] Timely management and regular eye examinations can reduce or postpone complications.

The most common age group of the participants was 51 to 60 years, which was similar to the previous studies by Priyanka Raj et al. [5] and Raheja BS et al. [6] Conversely, as discovered by Ahmed KR et al. [7] in their study the predominant age group was between 45 and 65 years. In the present study there was slight male preponderance

(51.9%). In a similar vein, the investigation conducted by Ahmed KR et al. [7] revealed a notable male preponderance, with 55% of the subjects being male. In contrast, Najmi H et al. [8] observed a higher prevalence of females (64.5%) in their findings.

In the present study majority of the participants had majority of the participants were having duration of 6 to 10 years.

The current investigation revealed that 64.6% of the participants had knowledge of diabetes. In response to inquiries regarding possible ocular issues linked to diabetes, 17 participants noted cataracts, whereas 68 (31.6%) acknowledged retinopathy. Furthermore, 11 participants (32.9%) recognized infections in the eye as a potential complication. A total of 22 participants (31.6%) reported issues with defective vision, whereas 10 participants (22.8%) noted conditions such as glaucoma, CRAO (Central Retinal Artery Occlusion), or CRVO (Central Retinal Vein Occlusion). However, in a study by Ahmed KR et al. [7] it was found in their study that significant portion (63%) of the participants identified blindness as a complication related to diabetes, with diabetic retinopathy noted by 55% and other eye complications also mentioned. Forty-nine percent understood the importance of regular eye screening. In response to an inquiry regarding the testing frequency, 35% indicated that it should be conducted every 6–12 months. El-Bab et al. [8] conducted their research in the city of Al-Madinah, revealing that 36.1% of participants possessed knowledge regarding diabetic eye diseases, a result that aligns with the findings of our study. Additionally, Al-Hargan MH et al. [9] conducted a study in Riyadh, revealing that 88% of participants recognized the potential impact of diabetes mellitus on the retina. Furthermore, 76% understood that managing blood sugar levels can reduce the risk of diabetic retinopathy, while 66% were aware that diabetic eye disease could result in blindness. A separate investigation conducted in Riyadh by Al Rashed WA et al. [11] found that 88.6% of participants exhibited a strong awareness of eye issues related to diabetes, with 81.2% recognizing ocular trauma and 91.3% acknowledging other general eye diseases. The findings of a comparable investigation conducted in Oman indicated that 72.9% of individuals with diabetes possessed sufficient understanding of eye-related complications.[12]

In terms of attitudes, 56.3% of the participants showed a negative perspective on diabetes-related eye health, while 43.7% displayed a positive perspective. A study conducted in the UK revealed that the Asian population exhibited a less favorable attitude towards eye care in comparison to Caucasians.

In practice, in the present study, merely 49 participants (31%) adopted optimal strategies for managing eye health related to diabetes. In the investigation carried out by Ahmed KR et al. [7] it was found that merely 37% of the patients sought the services of health professionals (physician and ophthalmologist) for annual eye examinations, while 52% consulted an eye specialist solely when experiencing a vision issue. This indicates that a significant number of diabetic patients remain unaware that eye complications may exist without any symptoms, especially during the initial phases of the condition [18]. This perspective is bolstered by findings from an additional study indicating that merely 19.5% of individuals with diabetes underwent their most recent eye examinations within the past year, while 34.5% had not received any eye examination since their diabetes diagnosis. [14] The findings align closely with those documented in Tanzania [15] and South Africa. [16]

This discovery indicates that insufficient understanding serves as a significant obstacle to eye care. This study observed a positive correlation between knowledge and practices, consistent with findings from the research conducted by Ahmed KR et al. [7]

The lack of understanding regarding eye diseases can be linked to insufficient awareness of ocular complications and inadequate eye-care practices concerning the examination of eye complications associated with diabetes mellitus. The findings from our investigation indicated that most patients recognized the importance of eye screening; however, their eye-care practices fell short of the expected standards. In light of the findings from this study, it is advisable for diabetic patients to undergo a comprehensive eye examination at least once a year. This practice will aid in the early diagnosis and management of visual disorders linked to their condition, ultimately helping to prevent visual impairment and blindness.

5. Conclusion

The results highlight the essential requirement for focused educational strategies to enhance patient understanding and active management of diabetic retinopathy and associated eye conditions, which will ultimately contribute to improved clinical results and fewer complications.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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