

**ORIGINAL RESEARCH**

# To determine knowledge, attitude, and practice regarding diabetic retinopathy among diabetic patients in a Rural Hospital: A cross-sectional study

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## ABSTRACT

**Context:** Diabetic retinopathy (DR) is an important complication of diabetes mellitus (DM). DR accounts for 4.8% of the cases of blindness throughout the world. **Aims:** To assess the patients' awareness about DR and their attitude and practice patterns in a Medical college in rural Maharashtra. **Subjects and Methods:** A cross-sectional study was conducted in a tertiary care hospital, Jalna, Maharashtra from March 2019 to April 2020 after approval from institutional review board. Patients older than 18 years and who were diagnosed with type II DM were included. Data were entered into Excel and analyzed using the SPSS software version 20. **Results:** Only 28% of diabetic patients had good knowledge of DR, 82.5% were found to have positive attitude toward DR screening, and 27% had scored good in the practice score category. A significant association was found between DR knowledge with level of education ( $P \leq 0.001$ ). **Conclusions:** Better knowledge of DR influences a positive practice patterns in patients with diabetes. Onus lies on the healthcare professionals, particularly physicians as they are the first point of contact.

**Key words:** Attitude, diabetes mellitus, diabetic retinopathy, knowledge, practice

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## INTRODUCTION

Diabetes mellitus (DM) is a metabolic disease which has become a global epidemic. The number of patients living with diabetes in 2019 was 463 million and is expected to rise 700 million in 2045 worldwide. India is one of the epicenters of this pandemic as it hosts 77 million diabetics as of 2019. However, by 2030, India will be home to 101 million and by 2045, it will host 134.2 million people with diabetes<sup>[1]</sup>.

Over the past 20 years, DM has emerged as the common cause of blindness and ocular morbidity and is recently been placed at the sixth position from the seventeenth position among the causes of blindness in India as per the WHO NPCB surveys<sup>[2]</sup>. Diabetic retinopathy (DR) is an important complication of DM. The reported prevalence in India is from 7.3% to 25%<sup>[3-7]</sup>. DR accounts for 4.8% of the cases of blindness throughout the world<sup>[8]</sup>. High prevalence imposes burden on the economy and health care system of the country. It is necessary to diagnose DR in its early stages, but it is asymptomatic and thus, eye screening is the only way to diagnose DR and prevent the patients from going blind. In patients with no apparent

or mild non-proliferative DR, yearly eye examination is recommended<sup>[2]</sup>. In low economic countries, prevention through awareness and education of the community is the most cost-effective management of DM and related complications<sup>[9,10]</sup>.

Knowledge, attitude, and practice studies for DR have been carried out in various Indian states. However, there are no studies that record such data in the state of Maharashtra. This study addresses the issue and it was undertaken in patients with the intention to assess the awareness about DR and their attitude and practice patterns in a tertiary care system in urban Maharashtra. The data recorded in this study would prove to be useful to devise an effective intervention for the prevention of blindness due to DR in the future.

## SUBJECTS AND METHODS

A cross-sectional study was conducted in a tertiary care teaching hospital in Rural Medical College, Maharashtra from March 2019 to April 2020 and study was approved by the institutional review board.

All patients who were older than 18 years of age and diagnosed with type II DM who visited IIMSR Hospital outpatient department were included in the study after seeking their informed consent. The questionnaire used was validated first in a pilot study on 50 patients. After modifying the questionnaire suitably, a 31-item questionnaire was finalized. Of these, 13 questions (knowledge = 8, attitude = 4, and practice = 1) were analyzed for assessing the knowledge, attitude, and practice (KAP) of DR. Along with the 31-item questionnaire, the data collection form comprised of basic demographic details such as age, sex, education, economic status, and occupation. The questionnaire was administered by a trained interviewer to 200 diabetic patients.

**STATISTICAL ANALYSIS**

Descriptive statistics, Chi-square test, and Fisher exact test were applied as necessary.  $P < 0.001$  was considered statistically significant. Results were expressed in the form of text, figure and tables.

**RESULTS**

KAP questionnaire was administered in 200 patients with type II DM. It was found that 163/200 (81.5%) patients knew that diabetes could affect the eyes.

**SOCIODEMOGRAPHIC**

Sociodemographic characteristics details are shown in Table 1.

We have cross tabulated KAP score with socio-economic and education group (Table not included). A positive association was found between knowledge and education ( $P < 0.001$ ). As Graduate/post graduate had better knowledge than those educated upto 12th standard. While worst knowledge was seen among Illiterate and educated upto 4th standard. There was no statistical association

when the below BPL and above BPL groups were compared for KAP.

**KNOWLEDGE ABOUT DIABETIC RETINOPATHY**

The number of patients who had heard about DR were 92/200 (46%). When the overall knowledge scores were calculated, it was seen that 28% patients had good knowledge (scores ranging from 7 to 10 points), 13.5% had average knowledge (scores ranging from 4 to 6 points), and 58.5% had poor knowledge (scores ranging from 0 to 3 points). The scoring system for knowledge is shown in Table 2.

**DR SYMPTOMS**

Out of the patients who had heard about DR ( $n = 92$ ), 58 (63%) said that they were aware of the symptoms of DR. Out of these, 42 (72.4%) could correctly identify “diminished vision” and “floaters” as symptoms of DR. A majority of patients 71/92 (77.2%) knew that DR could lead to blindness. However, none of the patients knew that DR could be asymptomatic [Figure 1].

**DR TREATMENT**

Out of the population who knew about DR, just over half of them (48/92, 52.2%) knew that the disease is treatable [Figure 1].

DR screening: A huge majority of patients knew that diabetics need to screen for DR (77/92, 83.7%) [Figure 1].

**DR AWARENESS**

Less than half of the patients (48.9%, 45/92) had heard about DR from their physicians. This constituted 22.5% (45/200) of the total sample. No association was found between the duration of diabetes and awareness about DR ( $P = 0.128$ ). Level

**Table 1: Sociodemographic Characteristics of Patients**

| Variables  | Frequency (%)     |
|--|-------------------|
| Age groups (years) ( $n=200$ ), mean ( $\pm$ SD) | 64 ( $\pm$ 10.79) |
| <40  | 6(3)              |
| 41-70  | 142 (71)          |
| >70  | 52 (26)           |
| Gender( $n=200$ )                                |                   |
| Male   | 101 (50.5)        |
| Female   | 99 (49.5)         |
| Education ( $n=200$ )                            |                   |
| Graduateorpostgraduate                           | 95 (47.5)         |
| Up to12 <sup>th</sup> standard                   | 86 (43)           |
| Upto4 <sup>th</sup> standard                     | 9(4.5)            |
| Illiterate                                       | 10 (5)            |
| Occupation ( $n=200$ )                           |                   |
| Professional                                     | 17 (8.5)          |
| Service/self-employed                            | 15 (7.5)          |
| Retired/house-wife                               | 168(84)           |
| Duration of diabetes (years) ( $n=200$ )         |                   |
| $\leq$ 5   | 63 (31.5)         |

|                         |            |
|-------------------------|------------|
| >5                      | 137 (68.5) |
| Economic status (n=200) |            |
| BPL                     | 13 (6.5)   |
| Non-BPL                 | 187 (93.5) |

BPL: Below poverty line, SD: Standard deviation

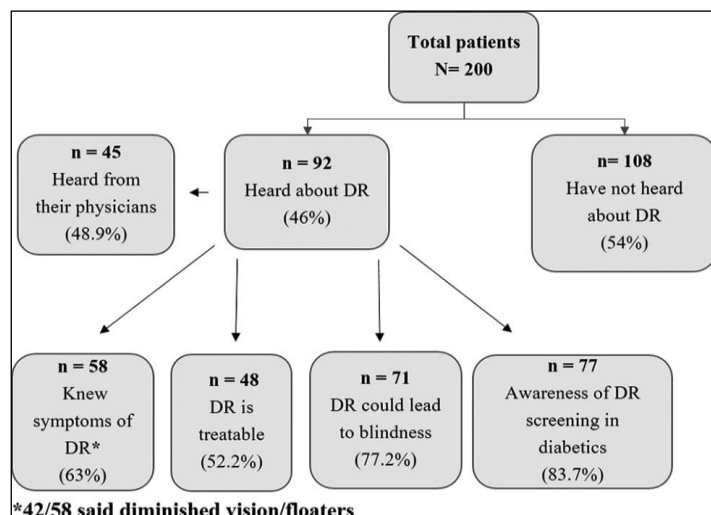


Fig 1: Knowledge about diabetic retinopathy

of education was found to be significantly associated with knowledge about DR (P < 0.001). A majority of patients with graduate/postgraduate education had good knowledge (39/56, 69.6%) about DR, followed by patients with higher secondary education (17/56, 30.4%). None of the illiterate patients or those with

primary education had good knowledge.

**Attitude toward DR**

When the overall attitude scores were calculated, 165/200 (82.5%) patients were found to have a positive attitude

Table 2: Score sheet for calculating knowledge scores

|   | Points |
|---|--------|
| Knowledge Questions   |        |
| 1. Do you know whether control of diabetes affects degree/severity of eye disease? Answer: Yes  | 1      |
| 2. Do patients with diabetes require regular eye check-up or not? Answer: Require   | 1      |
| 3. Have you heard about diabetic retinopathy? Answer: Yes   | 1      |
| 4. Are you aware about symptoms of diabetic retinopathy? Answer: Yes  | 1      |
| 5. If yes to Q5, what are the symptoms of DR you know? Answer: Diminished vision/floaters/nosymptoms  | 1      |
| 6. Is vision in DR necessarily affected? Answer: No   | 1      |
| 7. Diabetic retinopathy can lead to blindness? Answer: True   | 1      |
| 8. Is diabetic retinopathy treatable? Answer: Yes   | 1      |
| 9. Can patient diagnosed with DR still have normal vision? Answer: Yes  | 1      |
| 10. Are you aware that diabetic patients should undergo screening for DR? Answer: Yes   | 1      |
| Total   | 10     |
| Attitude Questions  |        |
| I am willing to have regular eye check-up irrespective of sugar control. Answer: Yes  | 1      |
| In view of my diabetes, I would be willing for regular eye check-up if advised by my doctor even in absence of any eye complaint/problem. Answer: Yes | 1      |
| I would be willing to get information about diabetic retinopathy. Answer: Yes   | 1      |
| I would be willing to get myself screened for DR. Answer: Yes   | 1      |
| Total   | 4      |
| Practice Questions  |        |
| Have you ever undergone screening for diabetic retinopathy? Answer: Yes   | 1      |
| Total   | 1      |

Score: 0-3: Poor knowledge, 4-6: Average knowledge, 7-10: Good knowledge, 0-2: Negative attitude, 3-4: Positive attitude, 0: Poor practice, 1: Good practice. DR: Diabetic retinopathy

toward DR screening. Scoring system for attitude scores is shown in Table 2.

### REGULAR EYE-CHECK-UP

Out of 200 diabetic patients, 167 (83.5%) were willing to get their eyes checked irrespective of their blood sugar status. This number increased to 190/200 (95%) if they were advised by their physician even in the absence of a complaint.

Receiving information: We found that a majority of patients (83.5%, 167/200) were willing to know more about DR. Patients who preferred receiving the information through a pamphlet were 85.6% followed by a talk by an ophthalmologist which was 77.8%. Furthermore, a majority, that is, 84.3% (91/108) of the patients who had not heard DR ( $n = 33/200$ ), 36.4% believed they would be informed by their physician when necessary.

### DR SCREENING

When asked if they were willing to get themselves screened for DR, 74.5% (149/200) replied positively. Of those who were not willing to get screened (51/200, 25.5%), time constraints and lack of family support were the prominent reasons cited. When asked if they would be willing to attend a free DR screening camp, 65.5% (131/200) patients expressed their willingness. Almost all of the patients BPL (12/13, 92.3%) and 63.6% (119/187) of the non-BPL patients were found willing to attend a free camp.

**ATTITUDE WITH RESPECT TO AGE AND EDUCATION:** It was observed that 80% (8/10) of illiterate patients had a positive attitude toward DR screening. Out of patients with higher secondary and graduate education, those with a positive attitude were 86% (74/86) and 81% (77/95), respectively. Out of those with primary education (up to 4th standard), positive attitude was found in 66.7% (6/9) patients. This association with education was not significant ( $P = 0.477$ ). The proportion of patients more than 70 years of age who showed a positive attitude toward DR screening was slightly less (40/52, 76.9%) as compared to those in the age range of 41-70 years (121/142, 85.2%). This difference was not found to be significant ( $P = 0.238$ ).

### PRACTICE PATTERNS OF DR

Majority patients (146/200, 73%) were found to score poorly in the practice score category. The scoring system is shown in Table 2.

### REGULAR EYE-CHECK-UP

The practice of going for a regular eye check-up was observed in 65% (130/200) of the patients. Out of these, a majority, that is, 74.6% (97/130) regularly went for an eye check-up in spite about DR were interested in getting more information about it. Out of the patients who refused to get information about absence of any eye complaints. There were 25.5%

(51/200) patients with eye complaints. Of these 51, 33 (64.7%) went for a regular eye check-up. An interesting statistic was observed that 65.1% (97/149) patients who did not have any eye complaints also went for an eye check-up regularly.

### DR SCREENING

As low as 25% (50/200) of the diabetic patients in our study had ever undergone screening for DR. When asked about the reasons for screening for DR, a majority, that is, 42% screened because their physician advised them, followed by 26% who said that they were self-motivated. A large majority of patients (75%, 150/200) did not go for DR screening ever. Half of them, 50.4%, did not go because they were unaware of the need for regular DR screening. The other half of the patients (42.7%) thought their vision was good, and hence, felt that they did not need it. To compare the knowledge and practice of patients regarding DR screening, we cross-tabulated responses of 'Are you aware that diabetic patients should undergo screening for DR?' and 'Have you ever undergone DR screening?' and we found out that 45.5% (35/77) of patients were aware that diabetic patients should undergo screening for DR but had not undergone screening ever.

### DR TREATMENT

We found that, 83.3% (10/12) of the patients who were advised treatment for DR had undergone treatment and out of these, 80% (8/10) were compliant with the post-treatment follow up. Reasons for not undergoing treatment (2/12) were fear, and some patients did not think it was important.

We assessed the association between the attitude of patients and their practice pattern and observed that although patients had a positive attitude, a majority had practice patterns in the "poor" category [Table 3]. Similarly, when knowledge and practice scores were compared, it was seen that irrespective of the level of knowledge of DR, practice patterns were observed to be in the "poor" category [Table 4].

Although not significant ( $P = 0.146$ ), the proportion of patients with good practice was higher among graduates and postgraduate patients (33.7%, 32/54) when compared to those with higher secondary education (23.3% 20/54), primary education (11.1%, 1/54) and illiterate patients (10%, 1/54).

### DISCUSSION

This was a cross-sectional study conducted at a tertiary care hospital to assess KAP about DR in type II diabetic patients attending the out-patient department of physicians and endocrinologists. We found that 81.5% patients knew that diabetes affected the eye. When compared with other studies carried out in the various states of India, we found that this awareness was the highest (Tamil Nadu 71.9%; Karnataka 58.7%; Bagalkot 45.3%,

**Table 3: Association of practice and attitude scores**

| Attitude scores           | Practice scores     |                     | P     |
|---------------------------|---------------------|---------------------|-------|
|                           | Poor practice,n (%) | Good practice,n (%) |       |
| Negative attitude (n=35)  | 23 (65.7)           | 12 (34.3)           | 0.194 |
| Positive attitude (n=165) | 123 (74.5)          | 42 (25.5)           |       |
| Total (n=200)             | 146 (73)            | 54 (27)             |       |

**Table 4: Cross-tabulation of practice scores and knowledge scores**

| Attitude scores          | Practice scores    |                     | P     |
|--------------------------|--------------------|---------------------|-------|
|                          | Poor practice,n(%) | Good practice,n (%) |       |
| Good knowledge (n=56)    | 29 (51.8)          | 27 (48.2)           | 0.001 |
| Average knowledge (n=27) | 16 (59.3)          | 11 (40.7)           |       |
| Poor knowledge (n=117)   | 101 (86.3)         | 16 (13.7)           |       |
| Total (n=200)            | 146 (73)           | 54 (27)             |       |

d Chennai 37.1%) [2, 11-13]. However, when specific questions based on knowledge of DR were asked, only 28% had good knowledge. In other studies, good knowledge was found to range from 9.9% to 55.6% [11, 14, 15].

DR is one of the leading causes of blindness. Although only 46% patients had heard about DR, majority of patients 77.2% knew that DR could lead to blindness. A study by Hussain *et al.*, 66.6% knew that DR could lead to blindness [15]. 47.1% patients did not undergo screening for DR. The causes for that were the lack of awareness for screening or because they had good vision.

Looking at knowledge and practice scores, it was seen that the poor practice pattern being showed by the patient with poor knowledge was higher than that of patients with good knowledge.

Out of all the demographic factors studied, a significant association was found between DR knowledge with level of education ( $P \leq 0.001$ ). A study from Eastern India [13] also found that literacy contributed to a higher percentage of good knowledge of DR among patients and is in congruence with the data recorded in our study. Out of patients who knew about DR, 47.8% were not aware that it is treatable. This could be one of the reasons why they felt that there was no need for screening, highlighting the lacunae in knowledge that need to be addressed.

Only 22.5% of the patients had heard about DR from their physician. A study carried out by Hussain *et al.* [15] also recorded a percentage as low as 36% and 22% in a study by Murugesan *et al.* [16] A majority of patients believed that they would get information from their physician. We also observed that the attitude of patients toward screening was positively seen when recommended by their physician even in the absence of any complaint (95%). Furthermore, 36.4% of patients refused to get information about DR, because they thought that they would be informed by their physician when necessary, strengthening the need for physician's recommendation. Doctors constituted the most important source of information (71.4%) for the patients who were aware of DR in a study carried out

by Srinivasan *et al.* [11]. The patients are either not aware of it or have misconceptions like examination is required only if symptomatic and are waiting for the physician to guide them.

Attitude has a relatively low impact on practice patterns of patients than that of knowledge. Poor practice pattern was seen in patients in spite of good attitude as was also noted by Rani *et al.* and Lingam *et al.* [13, 17]. In our study, although not significant, we found that positive attitude of patients is the least in the age group of patients above 70 years of age.

Patients who were diagnosed with DR and were advised treatment showed good compliance. About 17% of patients who were advised treatment did not take it as they were afraid of it or they thought it was not necessary. These reasons shed light on some misconceptions that patients have which need to be addressed by health care practitioners. Imparting knowledge about DR by physicians will help clear misconceptions about the disease in patients ultimately aiming at improving their practice patterns. It is necessary to educate patients about DR, as knowledge influences the practice patterns of patients. DR awareness camps at a number of locations in the city can play a major role in overcoming this issue as it can be used as a vehicle to provide important information of the disease in a comprehensible manner. A focused group discussion among physicians can be conducted to assess the current situation and protocol. Strategies can be defined during the discussions and protocols would be revised to provide a better system for diabetic patients and their ocular complications. Policies to educate patients need to be defined. Onus lies on the healthcare professionals, particularly physicians as they are the first point of contact.

Efforts should be made to motivate older patients by promoting free DR screening in areas close to their place of residence or by providing transport and care takers during the trip to the nearest health center.

We also want to highlight observations of our institute's unpublished data on KAP rural study conducted in rural hospital in western India. We found

that 96% patients had (192/200) poor knowledge, 98% (192/200) had positive attitude, and 100% (200/200) had poor practice patterns. Looking at these results, it is necessary to educate the rural population regarding the knowledge of diabetes and its complications, i.e., DR through awareness camps, pamphlets, health educations, and policies and this awareness will motivate the population with diabetics to visit health care professionals.

### CONCLUSIONS

Better knowledge of DR influences a positive practice patterns in patients with diabetes. Patients who are illiterate or have attained only basic level of education should be the primary focus in camps and awareness projects. Onus lies on the healthcare professionals to define new policies to educate patients, particularly physicians, as they are the first point of contact.

### LIMITATIONS

A small sample size of 200 limits the responses in the population. This was a hospital-based study in one part of Pune city, so the population that attended the outpatient department was limited. As the study population was urban, the results cannot be extrapolated to the whole state.

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### CONFLICTS OF INTEREST

There are no conflicts of interest.

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