

# Awareness and Referral Attitudes of Diabetic Retinopathy among Surgeons at a Tertiary Care Hospital in Pakistan

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## ABSTRACT

**Purpose:** To assess the awareness of diabetic retinopathy (DR) in surgeons and compare their referral practices from different specialities at a tertiary care center.

**Study Design:** Cross sectional survey.

**Place and Duration of Study:** Department of Surgery, Agha Khan University Hospital, Karachi.

**Methods:** A survey was created using Google Forms and the link to the survey was shared to 99 surgery faculty members on official university email addresses. We employed non-probability, convenience sampling technique and the total population of faculty under the Department of Surgery was sampled, including clinical fellows Residents, research associates and ophthalmology faculty were subsequently excluded. The survey contained questions in 4 categories; consent, relevant practices of Diabetes Mellitus (DM), knowledge regarding DR and referral practices to an ophthalmologist. Scoring was based on a 5-point Likert scale with 5 being the most rigorous practice. Data was entered into SPSS v.23. Qualitative data was reported as frequencies with percentages and quantitative data was reported as mean with standard deviation.

**Results:** Out of 40 participants, 87.5% had excellent practices of DM and 77.5% had excellent knowledge of DR. Referral practices to an ophthalmologist were graded fair in 75% and poor in 15% whereas, referral practices were fair or poor across all surgical specialities.

**Conclusion:** Our study indicates a gap between knowledge and practices of surgeons regarding DM. Hence, there is a strong need to enhance awareness about timely referrals to an ophthalmologist to prevent complications of diabetes related blindness.

**Key Words:** Blindness, diabetes mellitus, diabetic retinopathy, ophthalmologist, surgeon.

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## INTRODUCTION

Surgeons are well aware of vision threatening complications of diabetes. However, there is a huge gap between knowledge of diabetic retinopathy and

practice of referral to ophthalmologist among the surgeons. There is a need to build referral systems for diabetic patients to prevent blindness and other diabetes related complications.

Diabetes mellitus (DM) is a metabolic disorder in which insulin is either deficient or there is acquired resistance to its physiological function. This results in raised blood glucose levels which lead to micro and macrovascular abnormalities affecting multiple organs including the eyes.<sup>1</sup> Though, according to World Health Organization survey conducted in 2014, the global prevalence of diabetes among adults over 18

years of age was about 8.5% and it is estimated to be increased to approximately 630 million in 2045.<sup>2</sup> In a review article by Hakeem R et al, prevalence of diabetes in Pakistan has been quoted as 7.6% to 11%.<sup>3</sup> In another review article, prevalence of pre-diabetic patient was 10.91% and diabetics were 16.98%.<sup>4</sup> Uncontrolled diabetes, along with its complications, is one of the leading causes of death worldwide.<sup>5,6</sup>

In eye, uncontrolled DM causes DR, a microvascular complication.<sup>7</sup> Though prevalence of DR varies among diabetic patients from 28.5% to 39.6% in different parts of the world, data on diabetic retinopathy in Pakistan is limited.<sup>8</sup> One review study showed an estimated prevalence of 28.78%.<sup>9</sup> DR is declared as one of the foremost causes of moderate to severe visual impairment and preventable blindness.

The best possible way to decrease severity of visual impairment by DR is early intervention. This requires screening programs that are effective only as far as there is awareness among patients and health care workers. Screening of diabetic retinopathy is listed as one of the priorities of global plans for the elimination of preventable blindness.<sup>10</sup> Knowledge, attitudes, and practices of health professionals serving diabetic patients play a critical role in the prevention of blindness caused by it. Increasing referrals for eye care will help identify this complication of diabetes at a stage where vision loss is reversible. There are many studies conducted to assess awareness of DR among diabetic patients, but limited data is available regarding awareness of DR in health professionals in different specialties.<sup>11-13</sup> We aim to explore awareness and referral practices of DR among practicing surgeons of our surgery department.

## METHODS

We designed a descriptive cross-sectional survey at the Department of Surgery in our tertiary care hospital in Karachi, Pakistan. Since no direct patient care was involved, we applied for a formal exemption from the Ethical Review Committee (ERC) of Agha Khan University (ERC no: 2020-5448 – 14441). We used non-probability, convenience sampling technique and total population of faculty under the Department of Surgery was sampled, including clinical fellows.<sup>14</sup> Residents, research associates and ophthalmology faculty were subsequently excluded. After obtaining formal exemption from ERC, a survey was created using Google Forms and the link was shared with 99 surgery faculty members on official university email

addresses. The survey contained questions in 4 categories; consent to participate and identification of specialty, relevant practices of DM, knowledge regarding DR, and referral practices to an ophthalmologist (Table 1). Q1, Q2, and Q3 tested the routine practices of DM and were scored based on a 5-point Likert scale with 5 being the most rigorous practice of always asking the patient about their diabetes status and investigating blood glucose levels. Q4, Q5, Q6, and Q7 tested the participants on their knowledge about DR, including yes-no factual statements about DR. Q8 asked participants about the frequency of referral to an ophthalmologist. A time period of 2 months was given, which was extended due to an initial low response rate. Subsequent reminder emails were sent to each section separately, thereby increasing the response rate to fulfill an adequately representative sample size. Since the total sample population was small, we kept all data confidential regarding surgeon's identity, age and gender.

Data was entered into SPSS v.23 (IBM Corp, Armonk, NY). Qualitative data (grading of scores) was reported as frequencies with percentages, and quantitative data (mean scores) was reported as mean with standard deviation. We assigned a variable score to each question depending upon its relevance to each category and a total score was generated. Mean scores were further classified into 4 grades; > 80% were graded excellent, 60 – 80% were graded good, 40 – 60% were graded fair and < 40% were poor. The primary objective was to assess awareness of DR and compare referral practices among surgeons from different specialties at our hospital.

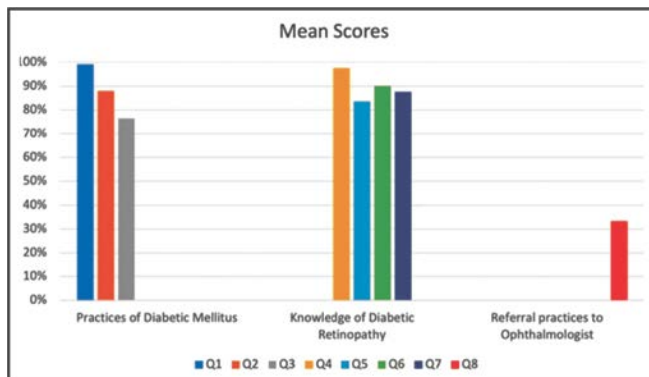
## RESULTS

We listed out a total of 116 faculty members from the Department of Surgery, of which 17 were excluded for being research associates and Ophthalmology faculty. An online link was sent to the remaining 99 faculty, of which 8 were fellows. Forty-one participants filled the survey, one of whom refused consent (Response rate 41.4%). Table 1 shows the survey questions and mean scores achieved by the participants in each question. The pooled mean score of the first 3 questions under the category of routine practices of DM was 13.18/15 (87.9%). The pooled mean score of questions under knowledge of DR was 12.44/14 (88.85%). The mean score for referrals was 2.0/6 (33.33%).

**Table 1:** Survey questions and scores.

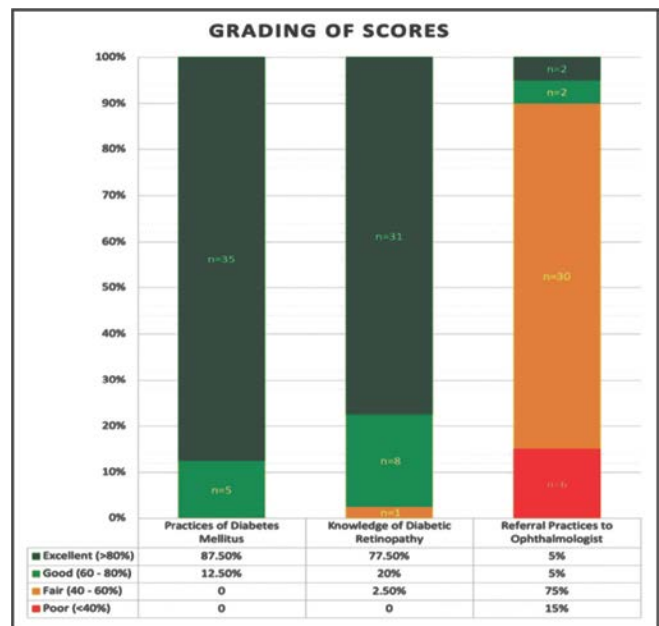
Question Number (Maximum Score)	Survey Question	Most Common Answer	Mean +/-SD	Numerical Range (Categorical Range)
Q1. (5/5)	While taking history, do you ask your patients if they are suffering from diabetes mellitus?	Always	4.95±0.22	4–5 (usually -always)
Q2. (5/5)	Among your diabetic patients, do you ask if they are under care of a physician for their diabetes mellitus management?	Always	4.40±0.81	2–5(rarely–always)
Q3. (5/5)	Do you routinely perform blood sugar levels/HbA1C among your patients?	Usually	3.83±0.90	1 – 5(never – always)
Q4. (3/3)	Are you aware that diabetes mellitus induces vision threatening effects on the eye?	Yes	2.93±0.47	0 – 3 (no – yes)
Q5. (5/5)	Are you familiar with the term “Diabetic Retinopathy”?	Very familiar	4.18±0.59	3 – 5(somewhat familiar – very familiar)
Q6. (3/3)	“Diabetic retinopathy occurs only in Type 1 diabetes mellitus” - is this statement correct?	No	2.70±0.91	0 – 3(yes – no)
Q7. (3/3)	“Diabetic retinopathy rarely causes decreased vision” - is this statement correct?	No	2.63±1.00	0 – 3(yes – no)
Q8. (6/6)	Do you refer your diabetic patients to an ophthalmologist to rule out diabetic retinopathy?	Rarely	2.00±1.28	0 – 6(never – on each visit)

**Table 1:** Survey questions and scores. Column 1: Question number (with maximum score), Column 2: Survey Question, Column 3: Most common answer, Column 4: Mean score ± standard deviation, Column 5: Numerical range (categorical range).



**Figure 1:** Shows the individual mean scores in percentage form, arranged according to the category of practices, knowledge, and referrals.

Figure 2 shows the grading of the scores according to each category. Grading showed that the majority of the participants 87.5% (n = 35) had excellent routine practices of DM and a majority, 77.5% (n = 31) had excellent knowledge of DR. Overall DM practices were slightly better than knowledge of DR. In sharp contrast to excellent practices and excellent knowledge, referral practices to an ophthalmologist were fair in the majority of our participants (n = 30, 75%) and a sizable number (n = 6, 15%) were graded poorly which translates to ‘never’ or ‘rare’ referrals to an ophthalmologist.



**Figure 2:** Grading of achieved scores according to category. Excellent:>80%, Good:60–80%, Fair:40–60%, Poor: < 40%

We further report referral practices across specialties (Figure 3). Overall, practices were fair or poor across all specialties, with poor referral scores in ENT, general surgery, cardiothoracic surgery and neurosurgery. Only one individual in urology and one in cardiothoracic were graded good or above. Fifteen participants chose to remain anonymous with regards to specialty; however, most of them also had fair referral scores.

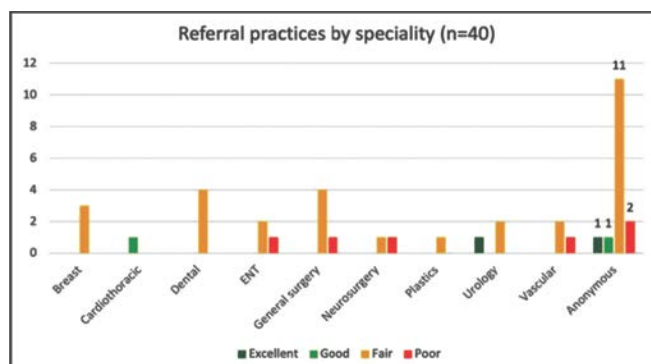


Figure 3: Referral practices according to speciality.

## DISCUSSION

Diabetes Mellitus is a prevalent multiorgan disease. The eye is a sensory organ in which DM causes DR, which, if not identified and controlled in proper time, causes loss of vision which can be irreversible. However, it is preventable by timely referral to an ophthalmologist. WHO has identified diabetic retinopathy as one of the leading causes of blindness.<sup>15</sup> World Diabetes Day aims at creating awareness of diabetes and prevention of its complications, one of which is DR.<sup>15</sup> In developing world with limited access to health care systems, a single visit to a local clinic or hospital may be the only visit for a patient in a long while. This is especially true for females due to gender bias in the distribution of health care usually by the family.<sup>16</sup> Therefore it becomes imperative at all levels of a health care system in the developing world to identify patients with diabetes and inform them of the implications of diabetes, along with timely referrals. Many studies have been conducted amongst patients to assess their level of awareness and their attitudes toward DR.<sup>17,18</sup> However, limited studies are available on physicians, especially non-ophthalmic surgeons.

The main objective of our study was to assess the awareness of diabetic retinopathy and practices of referral to ophthalmologists amongst non-ophthalmic surgeons. A short preliminary survey was carried out at our tertiary care hospital in Pakistan.

Our results showed that the majority of participants who were non-ophthalmic surgeons, (n = 35, 87.5%) had excellent routine practices of DM. This was in contrast to a study by Trepp et al, which showed lower scores in diabetes-related knowledge for physicians in surgery (48%) and gynecology (47%) in comparison to the scores of internal medicine physicians (62%).<sup>19</sup> Their study also showed low

scores for knowledge of diabetes amongst medical and nursing staff. Similar results were seen in a pretest evaluation by Emami et al, where they assessed the impact of continuing medical education on physicians' knowledge of DM management.<sup>20</sup> Local literature concurred with the need for improvement in the practices of family physicians for treating and educating diabetics.<sup>21</sup> In our study an excellent practice score of DM may be due to the limitation that our questionnaire was based on basic practice and awareness of diabetes and only one of its complications of DR rather than a detailed assessment.

Furthermore, our study demonstrated good scores on awareness of DR amongst the non-ophthalmic surgeons. However, this did not co-relate with referral practices. Practice of referral to ophthalmologists was graded fair in a majority of participants (n = 30, 75%), and poor in 15% (n = 6), which translated to 'never' or 'rare' referrals. These results were similar to a multicenter cross-sectional study by Thirunavukkarasu et al, which revealed a suboptimal knowledge of DR amongst primary care physicians.<sup>22</sup> Similar results were seen in a study conducted by Ahmed et al, which showed a lack of awareness of timely referrals to ophthalmologists amongst primary care providers.<sup>23</sup> Other studies which showed lack of knowledge on DR amongst physicians included a study by Nyonsavye et al.<sup>24</sup> Similarly, in local literature conducted in Pakistan, primary care physicians showed inadequate knowledge on referral systems for DR, leading to late presentation.<sup>25</sup>

Our study was conducted at a tertiary care hospital in the biggest city of Pakistan; this is one limitation of our study that it cannot be generalized to other health setups in the country. Referral attitudes may be higher or lower, but in the author's opinion are probably lower than ours. A multicenter study or multi-system level study should be done to assess further accuracy of DR and referral attitudes in the country. Furthermore, convenience sampling is based upon judgment and access of researcher. The results of the study may or may not be generalizable to the population. Researchers who use this technique carefully select subjects based on study purpose with the expectation that each participant will provide unique and rich information of value to the study.

## CONCLUSION

Our study shows a huge gap between knowledge of DR and referral practices to ophthalmologist, hence there

is a strong need to build timely referral systems for diabetic patients to prevent the grave complication of diabetes induced blindness. A timely referral can prevent the devastating effects of DR in most patients, hence decreasing the overall burden on the health care system. It is also important to implement awareness and timely referrals at all levels of the health care system to improve management of DR.

**Conflict of Interest:** Authors declared no conflict of interest.

### Ethical Approval

The study was approved by the Institutional review board/Ethical review board (2020-5448-14441).

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### Author's Designation and Contribution

Muhammad Bilal Malik; Resident: *Literature Search, Data Acquisition, Data Analysis, Statistical Analysis, Manuscript Preparation, Manuscript Editing, Manuscript Review.*

Shaukat Ali Chippa; Associate Professor: *Manuscript Preparation, Manuscript Editing, Manuscript Review.*

Asma Rashid; Medical Officer: *Concepts, Design, Literature Search, Manuscript Preparation.*

Sharmeen Akram; Assistant Professor: *Concepts, Design, Literature Search, Manuscript Preparation, Manuscript Editing, Manuscript Review.*

