

# Awareness, knowledge, and practice regarding to diabetic retinopathy among KKU students besides medical students in Abha, Saudi Arabia

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## ABSTRACT

**Background:** Diabetes mellitus (DM) is a global public health problem. Global prevalence of diabetes is 8.5% in adult population. The prevalence of diabetic retinopathy (DR) is increasing day by day, the number of persons with diabetes will double by 2030. It is a serious cause of irreversible blindness and is the most common complication of diabetes. Annual fundus examination for diabetics aids in the prevention of blindness and allows intervening at a timely manner. This study's intent to estimate and improve level of awareness (A), knowledge (K), and practice (P) among all King Khalid University (KKU) students besides medical students in Abha, Saudi Arabia. **Methods and Materials:** This is a cross-sectional survey that targets all KKU students besides medical students in Abha, Saudi Arabia. The researchers will use closed-end questions for awareness (A), knowledge (K), and practice (P). The data and the questionnaires will be sent to the sample by social media. The data will be analyzed by statistical package for the social sciences program (SPSS). **Results:** A total of 635 KKU students completed the questionnaire. Female students were more than male students, 334 (52.6%) for females and 301 (47.4%) for males, respectively. Ages ranged from 18 to 24 years with a mean  $23 \pm 2$  years. There was a good awareness for some of the factors related to the DR which is noted in the results. Awareness of smoking and pregnancy rate is extremely low compared to the rest of the factors related to the DR. **Conclusion:** There was high awareness regarding DR and its risk factors among KKU students but low awareness regarding smoking and pregnancy relationship with DR. Improvement is required for smoking and pregnancy with the progression DR.

**Keywords:** Awareness, diabetes mellitus, diabetic retinopathy, knowledge

## Introduction

Diabetes mellitus (DM) is a metabolic disorder with an expanding commonness and high death rate.<sup>[1]</sup> Diabetic retinopathy (DR) is a typical visual intricacy of DM and is viewed as one of the main sources of vision misfortune and vision disability in grown-ups.<sup>[2]</sup>

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With the movement of DR, the personal satisfaction of patients diminishes, and the money-related weight on society increments, both in the DR screening and treatment bunches.<sup>[3,4]</sup>

Diabetes is an incessant, metabolic illness described by raised degrees of blood glucose (or glucose), which leads after some time to genuine harm to the heart, veins, eyes, kidneys, and nerves. The most well-known is type 2 diabetes, typically in grown-ups, which happens when the body gets impervious to insulin or

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does not make enough insulin. In the previous 3 decades the predominance of type 2 diabetes has risen drastically in nations of all pay levels.<sup>[5]</sup>

DR is one of the microvascular complexities for DM. It can influence 24% of diabetic patients who have had the infection for 10–15 years.<sup>[6]</sup>

DR is the main source of visual deficiency among working-matured grown-ups far and wide.<sup>[7]</sup>

In Saudi Arabia, the pervasiveness for DR was seen as 28%–36% among diabetic patients in concentrates from various regions of the nation.<sup>[8-11]</sup>

Controlling the blood sugar and the blood pressure can prevent and delay the progression of DR as was shown in many previous studies.<sup>[12,13]</sup> Tight glucose control diminished the beginning of DR by 76% and eased back the movement of DR by 54%.<sup>[13]</sup> Likewise, an ideal laser photocoagulation when demonstrated guides in the counteraction of visual impairment in early-distinguished cases.<sup>[14,15]</sup> However, because of the quiet idea of the infection, most of patients present late with irreversible propelled stages.<sup>[15,16]</sup> Thus, customary screening is extremely vital in early discovery of DR changes.

Awareness of DM and DR, along with their health impacts and treatment, can be considered vital in motivating patients to pursue appropriate eye care and may, therefore, assist in dealing with visual impairment. In addition, for early diagnosis and treatment of DR, it is crucial to have a strong awareness of DR and its risk factors<sup>[17]</sup>

Delays in referral and presentation with advanced DR,<sup>[18]</sup> all of which may impact the patient's quality of life and the financial costs to health systems.<sup>[19]</sup> Despite the well-documented importance and magnitude of the issue in the literature, limited studies have explored the awareness of DR among college students in the developing world,<sup>[20-22]</sup> and the same dilemma exists in Saudi Arabia.

AS, DM (Diabetes Mellitus), and DR (Diabetic retinopathy) are emerging rapidly and a continuous health problems in the Saudi population and cause socioeconomic burdens for the healthcare system, this study aimed to assess the level of awareness of DR and its related risk factors among KKU students in Abha, Saudi Arabia.

More information is needed regarding the awareness, knowledge, and practices from KKU students about DR as the incidence and prevalence rate of diabetes is increasing in Saudi Arabia. This study aimed to assess the awareness, knowledge level, and practice toward DR.

## Method

This study is cross-sectional which was conducted from 4 April 2020 to 30 June 2020. The Study was performed on KKU students At Abha city, Saudi Arabia. The sample size was 635 from different specializations in KKU. The researchers used closed-end questions.

The data and the questionnaires sent to the sample by social media. The structured questionnaire used in the study was prepared after a thorough literature review of papers relevant to the awareness of DR.

The final questionnaire included three parts: (a) sociodemographic characteristics (i.e. age, gender, specialty, and education level); (b) DM-related characteristics (e.g. DM duration, type of DM, etc.); (c) DR awareness (e.g. diabetes can affect the eyes, can DR result in blindness, factor that can cause DR, regular eye screening for diabetic patient is necessary to prevent DR, etc.)

SPSS program version 20 was used for statistical analysis, number and percent were used for qualitative variables, whereas mean and standard deviation were used for quantitative variables, the Chi-square test was used to find the association of awareness that DM can affect eyes with general DR awareness.

Ethical approval was conducted by the Ethical Committee of the Scientific Research, King Khalid University. Confidentiality was maintained and written or verbal consent was obtained from all the participants.

## Results

A total of 635 KKU students completed the questionnaire. Female students were more than male students, 334 (52.6%) for females and 301 (47.4%) for males, respectively. Ages ranged from 18 to 24 years with a mean  $23 \pm 2$  years. The students who answered the questionnaire were 73 (11.5%) of dentistry students, 50 (7.9%) of computer science students, 55 (8.7%) of pharmacy students, 42 (6.6%) of physical therapy, 44 (6.9%) physics, 35 (5.5%) chemistry, 35 (5.5%) medical lab, 45 (7.1%) media and communication, 29 (4.6%) of public health students, 29 (4.6%) of English, 23 (3.6%) of learning difficulties, 18 (2.8%) of engineering students, 14 (2.2%) of accounting students, 19 (3%) of radiology students, 10 (1.6%) of business administration, 8 (1.3) of biology students, 5 (0.8%) of history students, 7 (1.1%) of nursing students, 17 (2.7%) of Islamic studies students, 12 (1.9%) of kindergarten students, 18 (2.8%) of math students, 3 (0.5%) of designing students, 3 (0.5%) of psychology since students, 5 (0.8%) of law students, 19 (3%) of Arabic language students, 2 (0.3%) of human resources students, 3 (0.5%) of home economics students, 11 (1.8) of Geography students as shown in Table 1.

The students' responses about the knowledge question of DR showed more than half of the study participants did not know

the DR causing. There were 281 (44.3%) who were aware that DM can affect the retina. While 158 (24.9%) did not know about the causing of DR.

About 139 (21.9%) of study participants thought that the DR is caused by increased intraocular pressure. And 57 (9%) thought that the DR causing is damaged optic nerve. as shown in Table 2.

When we asked the study participants about “If they know about the leading factors of DR which may increase the possibility of the disease?”

The responds were 183 (28.8%) answered “yes”, 228 (35.9%) answered “no”, 224 (35.3%) answered “I don’t know” as shown in Table 3.

The results reveal that we found high awareness for duration of diabetes 439 (69.1%) answered “yes”, 72 (11.3%) answered “no”, 124 (19.5%) answered “I dont know” as shown in Table 4.

We asked the study participants about “Did they think the type of diabetes (type 1 - type 2) might be a factor affecting the possibility of retinopathy?”

And 385 (60.6%) thought the type of diabetes is a factor that may affect the risk of retinopathy, 91 (14.3%) thought that the type of diabetes does not affect the risk of retinopathy, 159 (25%) answered “I don’t know”. as shown in Table 5.

The results also show when we asked about “Did they think the irregular high blood pressure might be a factor affecting the possibility of retinopathy?”

And 351 (55.3%) thought the high blood pressure is a factor that may affect the risk of retinopathy, 115 (18.1%) thought that the high blood pressure does not affect the risk of retinopathy, 169 (26.6%) answered “I don’t know”. as shown in Table 6.

Also, we asked the study participants about “Did they think the smoking might be a factor affecting the possibility of developing retinopathy?”

Less than half of the study participants 221 (34.8%) did have the awareness of the effect of smoking on progression of DR, 181 (28.5%) did not think that there’s a relationship between smoking and DR, 233 (36.7%) answered “ I don’t know”. as shown in Table 7.

The results also show when we asked the study participants about “ Did they think the family history might be a factor affecting the possibility of developing retinopathy?”

And 386 (60.8%) thought the family history is a factor that may affect the risk of retinopathy, 100 (15.7%) thought that the family history does not affect the risk of retinopathy, 149 (23.5%) answered “ I don’t know”. as shown in Table 8.

**Table 1: Gender wise distribution of specialties**

Demographic characteristics	n	%
Gender		
Female	334	52.6
Male	301	47.4
Specialty		
Dentistry	73	11.5
Computer Science	50	7.9
Pharmacy	55	8.7
Physical therapy	42	6.6
Physics	44	6.9
Chemistry	35	5.5
Medical labs	35	5.5
Media and communication	45	7.1
Public health	29	4.6
English	29	4.6
Learning difficulties	23	3.6
Engineering	18	2.8
Accounting	14	2.2
Radiology	19	3
Business Administration	10	1.6
Biology	8	1.3
History	5	0.8
Nursing	7	1.1
Islamic studies	17	2.7
Kindergarten	12	1.9
Math	18	2.8
Designing	3	0.5
Psychology	3	0.5
Law	5	0.8
Arabic Language	19	3
Human resources	2	0.3
Home economics	3	0.5
Geography	11	1.8
Total	635	100

**Table 2: Diabetic retinopathy is caused by**

Causing	n	%
Increased intraocular pressure	139	21.9
Damage to the blood vessels in the retina	281	44.3
The optic nerve is damaged	57	9
Don't know	158	24.9
Total	635	100

**Table 3: Did you know what are the factors that lead to diabetic retinopathy, which may increase the possibility of the disease?**

The answer	n	%
Yes	183	28.8
No	228	35.9
Don't know	224	35.3
Total	635	100

The calculation in this search suggest that the study participants “Did they think the increased cholesterol in the blood might be a factor affecting the possibility of affecting retinopathy?”

While 313 (49.3%) thought the high cholesterol is a factor that may affect the risk of retinopathy, 124 (19.5%)

thought that the high cholesterol does not affect the risk of retinopathy, 198 (31.2%) answered “I don’t know” as shown in Table 9.

This study indicates that when we asked the study participants about “Did they think the pregnancy might be a factor increasing the incidence of retinopathy?”

And 209 (32.9%) thought that pregnancy is a factor that may increase the risk of retinopathy, 197 (31%) thought that the pregnancy does not affect the risk of retinopathy, 229 (36.1%) answered “I don’t know”. as shown in Table 10.

The findings suggest that 418 (65.8%) thought that high blood sugar may increase the risk of possibility of developing DR. And 63 (9.9%) did not think that there’s relationship between high blood sugar and the risk of developing DR. And 154 (24.3%) answered “I don’t know” as shown in Table 11.

Our finding revealed that 379 (59.7%) thought that DR may lead to increased eye pressure. And 82 (12.9%) did not think that there’s a relation between DR and high eye pressure. And 174 (27.4%) answered “I don’t know”. as shown in Table 12.

The results also show that 385 (60.6%) of the study participants thought that DR may lead to blindness. 93 (14.6%) did not think that DR may lead to blindness. And 157 (24.7%) answered “I don’t know”. as shown in Table 13.

Also, it was found that 462 (72.8%) of study participants had awareness regarding the relationship between DR and distorted vision. While 53 (8.3%) did not think that there’s a relationship between DR and distorted vision. 120 (18.9%) answered “I don’t know” as shown in Table 14.

Based on the results 486 (76.5%) had good awareness regarding if they think regular screening for diabetic patient is necessary to prevent DR. While 42 (6.6%) did not think screening

**Table 4: Do you think that the prolonged duration of diabetes may be one of the factors that may increase the possibility of retinopathy?**

The answer	n	%
Yes	439	69.1
No	72	11.3
Don't know	124	19.5
Total	635	100

**Table 5: Do you think that diabetes type (type 1-type 2) might be a factor affecting the possibility of retinopathy?**

The answer	n	%
Yes	385	60.6
No	91	14.3
Don't know	159	25
Total	635	100

**Table 6: Do you think that irregular high blood pressure may be a factor affecting the possibility of diabetic retinopathy?**

The answer	n	%
Yes	351	55.3
No	115	18.1
Don't know	169	26.6
Total	635	100

**Table 7: Do you think smoking may be a factor affecting the possibility of developing diabetic retinopathy?**

The answer	n	%
Yes	221	34.8
No	181	28.5
Don't know	233	36.7
Total	635	100

**Table 8: Do you think that having a family history can affect your risk of developing diabetic retinopathy?**

The answer	n	%
Yes	386	60.8
No	100	15.7
Don't know	149	15.7
Total	635	100

**Table 9: Do you think that increased cholesterol in the blood may be a factor affecting the possibility of developing diabetic retinopathy?**

The answer	n	%
Yes	313	49.3
No	124	19.5
Don't know	198	31.2
Total	635	100

**Table 10: Do you think that pregnancy may increase the incidence of diabetic retinopathy?**

The answer	n	%
Yes	209	32.9
No	197	32.9
Don't know	229	36.1
Total	635	100

**Table 11: Do you think that increased blood sugar may be one of the factors that may increase the possibility of developing diabetic retinopathy?**

The answer	n	%
Yes	418	65.8
No	63	9.9
Don't know	154	24.3
Total	635	100

is necessary to prevent DR. And 107 (16.6%) answered “I don’t know” as shown in Table 15.

## Discussion

The aim of this study was to evaluate the level of diabetic patients’ awareness, knowledge, and practice of Students in KKU toward DR. DR is a leading cause of avoidable visual impairment and blindness. Patients awareness and knowledge play a significant role in the anticipation of DR.<sup>[23]</sup>

Our study found that students there was good knowledge and awareness about the DR causing 281 (44.3%) who aware that DM can affect the retina, whereas 439 (69.1%) also had good awareness to that the duration of DM is an important factor in DR.<sup>[24]</sup> 385 (60.6%) believed that the type of DM is a factor that may increase the risk of DR.<sup>[25,26]</sup>

In our study, 351 (55.3%) of student’s have high level of awareness to high blood pressure with DR in past investigations have revealed hypertension it has been one of the most explored foundational factors known to be straightforwardly identified with retinopathy.<sup>[24]</sup>

Family ancestry likewise can influence the developing of DR. In our investigation we have observed that about 386 (60.8%) of respondents accepted there is connection between them. Various specialists have revealed family ancestry of diabetes is highlighting a potential hereditary and epigenetic reason for DR.<sup>[27]</sup>

And 313 (49.3%) had a good awareness about the level of cholesterol. More studies have confirmed the severity of retinopathy is associated with high triglyceride levels.<sup>[24]</sup>

Also, 418 (65.8%) had a great awareness to the importance of the level of sugar in blood must be controlled to decrease the progression of DR. Recent evidence suggests that patients with diabetes who can better control their blood sugar levels will slow the onset and progression of DR.<sup>[28]</sup>

Inline with other studies 379 (59.7%) of study participant has a high level of knowledge in advanced DR complication. Several studies have revealed that can damage the optic nerve leading to glaucoma.<sup>[29]</sup>

We have found around 462 (72.8%) have a good awareness that in early symptoms of DR include having floaters, blurry vision, or distorted vision.<sup>[30]</sup> Around 385 (60.6%) of the study participants thought that DR may lead to blindness which true because DR patients over time can get worse and cause vision loss in both eye.<sup>[25]</sup>

The greater part of our respondents 486 (76.5%) have great information and attention to the significance of standard screening for diabetic patients is fundamental forestall DR. In view of some published investigates there’s a solid connection among smoking and pregnancy with respect to DR as indicated by that we discovered just 221 (34.8%) who knew that smoking may expand the chance of creating DR, whereas 209 (32.9%) realized the pregnancy may influence movement of DR. With a similar goal, study directed on smoking along with DM one of the principle chance components of insulin obstruction and degenerative difficulties including DR.<sup>[31]</sup>

The research study also found women with diabetes who become pregnant — or women who develop gestational diabetes — are at high risk for getting DR.

## Conclusion

The study found a good awareness about risk factors of DR among KKU students from different specialties. However, the awareness of the relationship between smoking and pregnancy with DR are low, but the awareness of practice for regular screening for diabetic patients was high.

The medical doctors and medical students can be the best source for providing information about the DR risk factors and how to prevent the progression DR.

**Table 12: Do you think diabetic retinopathy may lead to glaucoma?**

The answer	n	%
Yes	379	59.7
No	82	12.9
Don't know	174	27.4
Total	635	100

**Table 13: Do you think diabetic retinopathy may lead to blindness?**

The answer	n	%
Yes	385	60.6
No	93	14.6
Don't know	157	24.7
Total	635	100

**Table 14: Do you think diabetic retinopathy may lead to distorted vision?**

The answer	n	%
Yes	462	72.8
No	53	8.3
Don't know	120	18.9
Total	635	100

**Table 15: Do you think regular screening for a diabetic patient is necessary to prevent DR?**

The answer	n	%
Yes	486	76.5
No	42	6.6
Don't know	107	16.9
Total	635	100



## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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