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Research Article

AWARENESS AND KNOWLEDGE OF DIABETIC RETINOPATHY AMONG DIABETIC PATIENTS

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A B S T R A C T

Background: Diabetes is one of the major chronic health problems around the world. Diabetic eye diseasesspecially diabetes retinopathy is one of the most common complication.This study is carried out to assess the level of awareness, knowledge and attitude towards diabetic retinopathy among diabetic patients.

Method: A cross sectional study was conducted among diabetic patients who attend three health care centers in Jeddah, Saudi Arabia, by distributing a questionnaire consisting of 4 parts.

Results: Three hundred patients responded to the questionnaire 175 (58.3%) were female and 125 (41.7%) were male, with age mean score 45.90±14.89. Almost third quarter 215 (71.7%) recorded regular follow ups with an endocrinologist, and 210 (70.0%) stated family history of diabetes. The majority 247 (82.3 %) reported that diabetes affected their eyes. More than half 177 (59.0%) follow up with an ophthalmologist and more than third quarter reported visiting an ophthalmologistat least once per year.

Conclusion: The health care professionals and media need to increase diabetic patients awareness about the complications of diabetes mellitus on patients health particularly diabetic retinopathy to reduce the risk of blindness.

INTRODUCTION

Diabetes is one of the majorchronic health problems around the world, WHO estimated that the number of diabetes patients will increased to 438million by 2030, most of them are type 2, several factors affect the growing numbers of diabetic patients such as longevity, civilization, obesity and physical inactivity.(Mwangi MW *et al* 2011, Minderhoud J, *et al* 2016)in Saudi Arabia the prevalence of DM is 23.7% between ages 30-70. (Abdullah M *et al* 2011)

Diabetes mellitus (DM) is a metabolic disorder described by an increase in blood sugar levels which is related to disorders of protein and lipid metabolism as well as carbohydrate metabolism, this make diabetes mellitus one of the chronic diseases effecting several body systems and increasing the morbidity and mortality of several diseases (stroke, myocardial infarction, and coronary artery disease) and microvascular diseases (retinopathy, nephropathy and neuropathy) with variation in the rate of prevalence.(Abdullah M *et al* 2011,Prabhu M *et al* 2016)

There are four types of DM: Type 1 (severe insulin deficiency hence insulin administration), Type 2 (tissue resistance to the action of insulin combined with deficiency in insulin secretion), Type 3 (multiple other causes of increased blood sugar, non-pancreatic disease, drug therapy etc), Type 4 (gestational diabetes which occurs during pregnancy). (Mwangi MW *et al* 2011)

One of the major complications of DM is Diabetic eye diseaseswhich refers to a group of eye problems induced as a complication to DM particularly type 2 DM (Diabetic retinopathy, Glaucoma and cataract). (Mwangi MW *et al* 2011)

Diabetic retinopathy (DR) is one of the major and common ocular complications of DM affecting more than one third of diabetes patients and reported as the 4th cause of blindness, it causes damage tothe walls of small blood vessels &changing the structure and function of the retina, its prevalence increases in middle age patients (more than 40), duration of DM more than 5 years and low control of blood sugar. (Addoor KR 2011 ,Tajunisah I 2011, Ramasamy K 2013, Al Wadaani FA 2013, Prabhu M *et al* 2016)

It is not a preventable disease but its sight-threatening complications can be reduced by regular eye screening and treatment,(Al-Adsani AM 2007, Rani PK 2008)several studies refer to the lack of awareness of DM complications

on eyes which causes late presentation to the clinic and treatment failure. (Mwangi MW *et al* 2011, Addoor KR 2011, Thapa R 2014)

This study was carried out to assess the level of awareness, knowledge and attitude towards diabetic retinopathy among diabetic patients.

METHOD

This cross sectional study was conducted among diabetic patients who attend clinics in King Abdulaziz University Hospital and another 2 primary healthcare centers in Jeddah, Saudi Arabia, during the period between January 2016 and August 2016.

Sample size was calculated using (http://www.calculator.net) with confidence level of 95%, and it was for 385 patients, however due to time factors only 300 responses were collected.

The patients were chosen randomly from the clinics and were asked to file the questionnairesand for the people who couldn't fill it by themselves the investigators filled the questionnaire on their behalf.

The validation of the questionnaire was done by two experts with a content of 4 parts: demographic data, general knowledge of diabetes, knowledge about diabetes retinopathy, and finally the attitude towards diabetes retinopathy.The study was approved by the research ethics committee in the faculty of medicine, King Abdul-Aziz University.The statistical Package for Social Sciences (SPSS version 20) was used. Data was presented as number (percentage).The categorical variables between groups was compared using Chi–square test, and considered significant (P) <0.05.

RESULTS

Three hundred participants responded to the questionnaire in the current cross sectional study, of which 175 (58.3%) were female and 125 (41.7%) were male, the majority were Saudi 211 (70.6%).The mea age was 45.90±14.89 (15-85 years).

Table 1 Demographic data

Variables	Mean ± SD	Rang (Min-Max)
Age	**45.90±14.89**	**(10/85)**
Variables	**N**	**%**
Gender of participant		
male	125	41.7
female	175	58.3
Nationality of participant		
Saudi	211	70.6
non Saudi	88	29.4
Occupation of participant		
Employed	90	30.0
Private business	23	7.7
Student	30	10.0
Unemployed	107	35.7
Retired	50	16.7
The income of participant		
excellent	66	22.7
good	102	35.1
average	**88**	**30.2**
low	**35**	**12.0**
Educational level of participant		
Intermediate school or lower	**77**	**25.7**
High school	**73**	**24.3**
University	**133**	**44.3**
Postgraduate	**17**	**5.7**

The first third were from groups younger than 34 years, second third were between ages 35-50 and the third were aged more than 50 years.

More than one third were employed 113 (37.7%), 50 (16.7%) were retired, 107 (35.2%) were unemployed, and only 30(10%) were students. 66 (22.6%) reported excellent monthly income, 35 (12.0%) reported low monthly income and almost two thirds 190 (65.3%) reported a good average monthly income. Half of the participants 150 carried a university degree or higher. (Table 1)

One third 100 (33.3%) reported 1-5 years of diabetes duration, 82 (27.3%) stated 6-10 years, 37 (12.4%) reported 11-15 years and 81 (37.0%) stated more than 16 years. The majority received medical treatment, 139 (46.3%) oral and 120 (40.0%) Insulin injections. Almost third quarter 215 (71.7%) recorded regular follow up with an endocrinologist, and 210 (70.0%) stated family history of diabetes. (Table 2)& (Figures 1& 2)

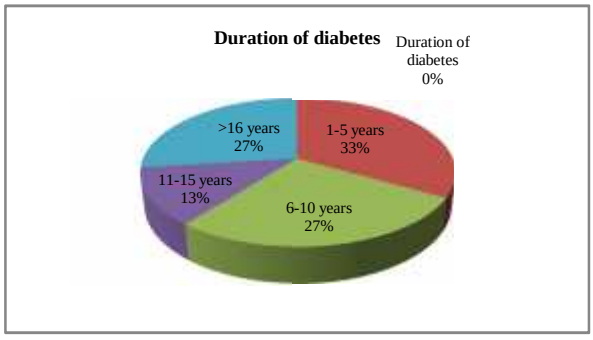

Figure 1 Duration of diabetes

Table 2 General diabetic information

Variables	N	%
Duration of diabetes		
1-5 years	100	33.3
6-10 years	82	27.3
11-15 years	37	12.4
>16 years	81	27.0
type of treatment that diabetic take		
Not take his medication	27	9.7
Non pharmacological treatment (exercises and diet).	14	4.7
Diabetes pills.	139	46.3
Insulin injections	120	40.0
The follow up regularly with endocrine doctor		
yes	215	71.7
no	85	28.3
family history of diabetes		
yes	210	70.0
no	90	30.0

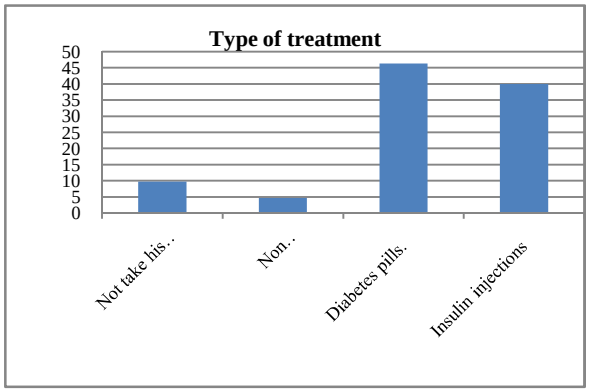

Figure 2 Type of treatment

Regarding Participants' knowledge about diabetes, almost two thirds 196 (65.3%) reported that diabetes affects the kidneys, 176 (58.7%) affected nerves, and 79 (26.3%) affected skin. The majority 247 (82.3 %) reported that diabetes affects eyes and 283 (94.3%) heard about diabetic eye diseases and 177 (59.0%) reported hearing this from their doctors.From the total number 239 (79.7%) reported knowing of Diabetic eye disease types, 86 (62.0%) reported reduced vision, 119 (39.7%) blindness, 82 (27.3%) glaucoma & 122 (40%) cataracts.While 192 (62.0%) stated that duration of diabetes is not a risk factor for diabetic retinopathy, 265 (88.3%) stated that blood sugar control is a risk factor, less than the half reported the following risk factors hypertension 124 (41.3%),smoking 62 (20.7%), cholesterol 67 (22.3%) & obesity 50 (16.7%).

Table 3 Participants' knowledge about diabetic retinopathy

Variables	N	%
Affected DM eye	247	82.3
Affected DM kidney	196	65.3
Affected DM nerves	176	58.7
Affected DM skin	79	26.3
If they heard about diabetic eye disease (DED)	283	94.3
Knowledge about diseases that affect eye due to diabetes	239	79.7
problems can individuals with diabetes		
Reduced vision	186	62.0
Blindness	119	39.7
Glaucoma	82	27.3
Cataracts	122	40.7
Risk factors for diabetic retinopathy		
duration of diabetes	108	36.0
Lack of blood sugar control	265	88.3
Hypertension	124	41.3
Smoking	62	20.7
high cholesterol	67	22.3
Obesity	50	16.7
Treatment for diabetic eye diseases		
Laser	75	25.2
Surgery	63	21.0
Good control of diabetes	150	50.0

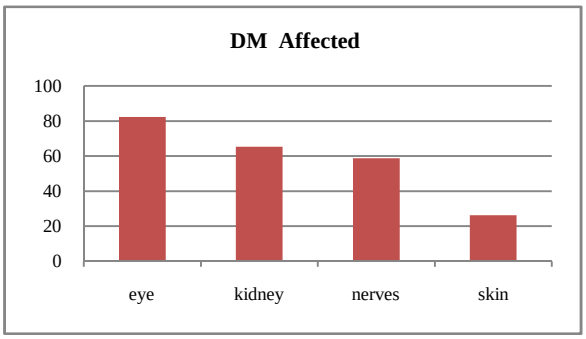

Figure 3 DM Affected

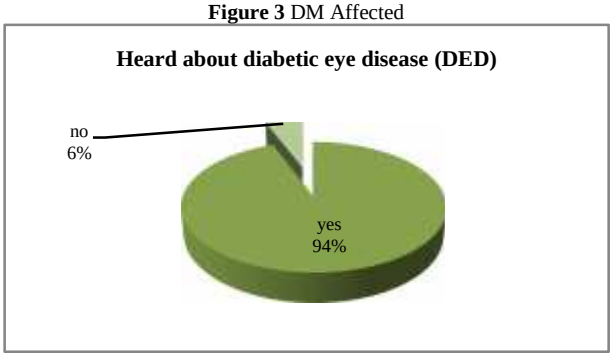

Figure 4 Heard about diabetic eye disease (DED

Third quarter of the participants 224 (74.7%) thought that there is treatment for diabetic retinopathy such as laser 75 (25.2%), surgery 73 (21.0%), good control of diabetes 150 (50%) and Others (drugs, injection) 50 (16.7%). (Table 3) & (Figures 3 & 4)

Concerning Participants' attitude towards diabetic retinopathy, 120 (40%) reported diabetic eye disease. More than half 177 (59.0%) follow up with an ophthalmologist. More than third quarter reported visiting an ophthalmologist at least once per year, 16 (6.7%) reported this visit every 2-3 years while 27 (13.0%) reported that they never visited an ophthalmologist. (Table 4)& (Figures 5&6)

Table 4 Participants' attitude towards diabetic retinopathy

Variables	N	%
following up with ophthalmology doctor	177	59.0
how often the participant go to ophthalmology doctor		
more than one per a year.	62	32.0
once per year	89	45.9
once per 2 years	11	5.7
once per3 years	5	2.6
never	27	13.9
having eye disease due to diabetes	120	40.0

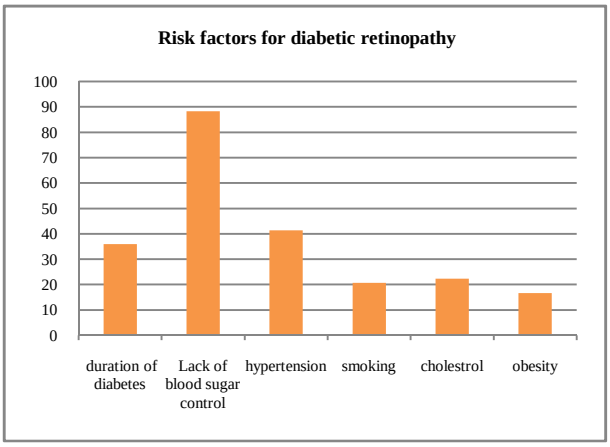

Figure 5 Risk factors for diabetic retinopathy

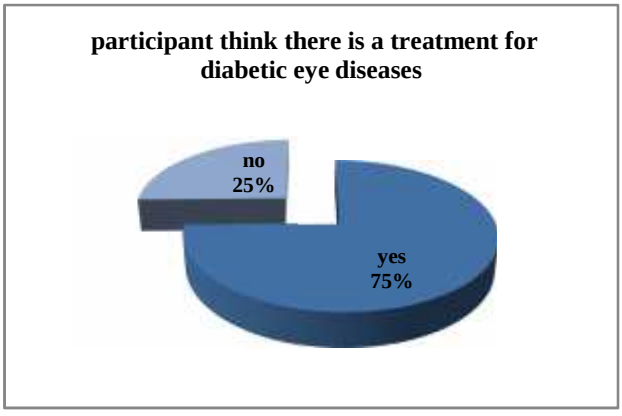

Figure 6 participant think there is a treatment for diabetic eye diseases

Table (5) shows the results of comparing participants' knowledge & attitude towards diabetic retinopathy regarding gender, there was significant difference in three items, where female were more aware about cataracts as result to diabetes (41(32.8%) males vs 81(46.3%)females, P =0.013), and the role of lack of blood sugar control in causing eye diseases (105(84.0%)male vs 160(91.4%)female, P =0.037), also

existence of eye diseases were more in female than male (40(32.0%) male vs 80(45.7%) female , P =0.011). (Table 5)
Also the results of comparing participants' knowledge & attitude towards diabetic retinopathy regarding monthly income, showed that there were significant differences between monthly income groups in the following items: (Knowledge about diseases that affect the eye due to diabetes, cataracts, follow up with an ophthalmologist, existence of eye diseases) (p= 00.1, p-0.18, p=0.002, & p=0.022) respectively, excellent monthly income group showed higher level of knowledge than others groups.(Table 5)

also positive family history group hearingabout diabetic eye disease more than negative family history group (P =0.036).(Table 5)

DISCUSSION

Once diagnosed with diabetes type II , the doctor must advise the patient to run the fundus examination and insist on that to confirm the presence or absence of retinopathydisease, also doctors need to the patients with all the fundamental

Table 5 Comparing participants' knowledge & attitude towards diabetic retinopathy regarding selected variables

Variables	Knowledge about diseases that affect eye due to diabetes		following up with ophthalmology doctor		having eye disease due to diabetes	
Gender						
Male	--------	--------	--------	--------	40(32.0%)	**0.01***
Female	--------		--------		80(45.7%)	
Monthly income						
excellent	60(90.9%)		43(65.2%)		20(30.3%)	
good	83(81.4%)		69(67.6%)		40(39.2%)	
average	64(72.7%)	**0.01***	44(50.0%)	**0.002***	37(42.0%)	**0.02***
low	24(68.6%)		14(40.0%)		19(54.3%)	
Educational level	57(74.0%)		--------		43(55.8%)	
Intermediate	54(74.0%)		--------		28(38.4%)	
High school	114(85.7%)	**0.03***	--------	--------	42(31.6%)	**0.003***
University	14(82.4%)		--------		91(68.4%)	
Postgraduate						
Diabetes Duration	74(74.0%)		44(44.0%)		31(31.0%)	
1-5 years	61(74.4%)		49(59.8%)		33(40.2%)	
6-10 years	29(77.8%)	**0.03***	23(61.1%)	**0.003***	15(38.9%)	**0.01***
11-15 years	75(92.6%)		61(75.3%)		41(50.6%)	
>16 years						

Regarding the results of comparing participants' knowledge & attitude towards diabetic retinopathy regarding educational level, there were significant differences in the following items: (Knowledge about diseases that affect the eye due to diabetes, blindness, glaucoma, availability of treatment, laser treatment, and eye disease existence)(p=0.037, p=0.009, p=0.006, p=0.032,p=0.002, and p=0.003) respectively, the rate of knowledge level and attitude were higher in University and postgraduate groups than high school and lower groups in four items while in two items the rate was higher in high school and lower groups than University and postgraduate groups (blindness and eye disease existence). (Table 5)

According to the results of comparing participants' knowledge & attitude towards diabetic retinopathy regarding diabetes duration, there were significant differences in the following items: Knowledge about diseases affecting the eye due to diabetes, glaucoma, cataract, smoking, cholesterol level, obesity, follow up with an ophthalmologist, and eye disease existence. (p=0.031, p=0.002, p=0.010, p=0.033,p=0.016, p= 0.015 , p=0.003 and p=0.0 14) respectively. The rate of knowledge level and attitude were higher in >16 years and 11-15 years groups than 6-10 years & 1-5 years groups in five items, while in three items the rate was higher in 11-15 years and 6-10 years groups than >16 years and 1-5 years groups (smoking, cholesterol and obesity).(Table 5)

At last the results of comparing participants' knowledge & attitude towards diabetic retinopathy regarding family history of diabetes.There was significant differences in three items, where people with positive family history were more aware about cataracts as result to diabetes (P =0.002), smokingas a risk factor (P =0.03) than people with negative family history,

information about the disease , refer them to education clinic , advise them to increase their awareness level of diabetes and its complications by attending workshops and seminars . (Rani PK *et al* 2008)

The results of the study showed that the majority (94.3%) of the participants had good level of knowledge and awareness about diabetes complication particularly eye diseases including DRD, which was higher than other studies' results (75.6%) AlJouf, (40.0%) India, (52%) USA, Malysia (77.9%). and Oman (72%) While it was less than that of Japan (98%) and in Australia (96%) , (Addoor KR *et al* 2013, Al Zarea BK *et al* 2016, Hussain R *et al* 2016)and even with this good level of knowledge only 59.0% stated regular following up with ophthalmologist even that 40% reported eye diseases which reflect low level of interesting and commitment due to gapping between theoretical and practical sites , in contrast to that the results from Aljouf study showed that 95% reported regular eye screening , (Al Zarea BK *et al* 2016) while similar result to the current study was found in Malaysia and India studies where the authors linked this gap to the lack of commitment from medical staff to provide diabetes patients with necessary information , recommendation and precautions and also to the lake of education materials in their hands , which prompt authors to suggest holding training workshop for doctors and all health providers to provide them with the latest developments in this subject , making them more qualified to provide assistance for patients. (Huang OS *et al* 2009, Addoor KR *et al* 2013,Al Zarea BK *et al* 2016, Hussain R *et al* 2016)

Several studies were conduct to determine the main risk factors associated with DRD and the level of awareness

among diabetes patients about these factors, long duration of being diabetes, uncontrolled blood sugar, treatment type (insulin orsulphonyl urea) and nephropathy were the main risk factors in Kuwait study, (Al-Adsani AM *et al* 2007)long duration of being diabetes treatment type (insulin orsulphonyl urea) were the risk factors in Suriname study, (Minderhoud J, *et al* 2016) while long duration and hypertension were the main risk factors in Nepal and Saudi Arabia studies. (Abdullah M *et al* 2011, Thapa R *et al* 2014)On the other hand smoking, gender and obesity didn't showed significant association as a risk factors in the three studies. (Al-Adsani AM *et al* 2007, Abdullah M *et al* 2011, Thapa R *et al* 2014)In Singapore study the authors addressed the relation between DRD patients who were unaware with their condition and lack of control for their blood sugar and blood pressure (Huang OS *et al* 2009,)In the current study the result showed that the majority of the participants know the relation between lake of blood sugar control and DRD , while less than half know the relation between other risk factors and DRD such as long duration and hypertension , similar result was found in Kenya study where the patients aware about DRD in general but with very little amount of information about associated risk factors, (Mwangi MW *et al* 2011)which indicate the needs for more educational program to raise the level of awareness.

Patients with positive family history of DM, long duration of being DM patients, high level of education (university level) and highly monthly income showed good level of knowledge about DM in general, this results consistent with other study. (Rani PK *et al* 2008, Addoor KR *et al* 2013)

Regarding gender factors , the result of this study showed that female were more aware about DM and its complications than male particularly the role of lacking control of blood sugar in developing eye complication, similar result was found in Malaysia (81.6%) and India (51.7%) and Suriname studies, this well help during preparing for educational campingtargeting increasing awareness level of DM complications due to the influence of women on their family and their ability to transfer information to them , (Rani PK *et al* 2008,Addoor KR *et al* 2013, Minderhoud J, *et al* 2016 ,Hussain R *et al* 2016) while in second Malaysia study there was no significant difference regarding gender. (Tajunisah I *et al* 2011)

Concerning Educational level as a factor influenced the level of awareness and attitude towards diabetes diseases , the result of the current study showed that patients with high level of education were more aware about diabetes complication on eye and the ability to treat DRD by laser and had lower incidence rate of eye diseases than lower educators , while no significant difference was found regarding risk factors, practice and attitude , similar result was found in Malaysia study where the authors reported high level of awareness among higher education patients (95.8%) and low rate of incidence (25%), (Addoor KR *et al* 2013) and in both India studies the authors reported good level of knowledge , attitude and practice among Literate patients with significant difference , (Rani PK *et al* 2008,Hussain R *et al* 2016)also in study 96.3% of participants who had good level of knowledge were from higher education group, (Tajunisah I *et al* 2011) all of this finding support the suggestion that good level of education is one of the main factor helps in increasing level of awareness and improve attitude and practice.

One of the most important factor influenced diabetes patients attitude towards taking care of themselves is monthly income, the results of current study showed significant relationbetween high monthly income and good level of knowledge about diabetes complication specially eye diseases and high commitment on following up with ophthalmologist even that the incidence of eye diseases between them were lower than patients from low monthly income group who showed lower level of commitment in following up with ophthalmologist, similar result was found in Suriname , India & Kuwait studies where the authors indicated that DRD rate are more in lower & middle income countries and the level of knowledge is lower . (Rani PK *et al* 2008, Thapa R *et al* 2014, Minderhoud J, *et al* 2016)

Another main factor influenced the level of awareness and attitude towards diabetes diseases and its complication is duration of diabetes diseases, where several studies demonstrated the long duration of diabetes as a risk factor for DRD, (Abdullah M *et al* 2011, Minderhoud J, *et al* 2016)in the current study patients with long duration had eye diseases incidence rate more thanpatients with short duration , and showed higher level of awareness about diabetes eye diseases and associated risk factors than patients with short duration , also they showed more commitments to follow up with ophthalmologist, similar result was found in Malaysia, Singapore and India studies where the authors reported increasing in the awareness about DM complication and DRD, (Huang OS *et al* 2009, Addoor KR *et al* 2013,Prabhu M *et al* 2016) this could be due to the fact that there is significant association between long duration of DM and developing DRD , where patients over 40 years with more than 5 years duration have more ability to develop DRD, (Al-Adsani AM *et al* 2007,Tajunisah I *et al* 2011, Thapa R *et al* 2014,Minderhoud J, *et al* 2016) however this not mean that only older patients with long duration developed diabetes retinopathy , also young patients with short duration (5 years or less) developed the same diseases , which necessary means the importance of emphasis on this group of patients to be commitment to periodic eye screening. (Huang OS *et al* 2009, Tajunisah I *et al* 2011)

CONCLUSION

There is a difference in the level of knowledge about diabetes mellitus among patients, the patients were more familiar with general thanspecific information about diabetes retinopathy, this leads to gaps between knowing andacting, the current study concludes that more awareness campaignsneed to be conducted to target DM complications and the appropriate attitude towards this disease, the information must be more inclusive & easy for thegeneral public to understand and include it inthe importance topics that doctors must inform DM patients about, It can also be included in the high school activities, hanging awareness posters with the main information in the waiting areas of all hospitals and health care centers. More research needs to be conducted about the awareness levels & the appropriate ways to deliver this information.

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