

Prevalence and Associated Risk Factors of Diabetic Retinopathy in Iraqi Patients

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ABSTRACT

It is a gradual malfunction of the retinal vasculature leading in structural damage to the neural retina caused by persistent hyperglycemia. The purpose of this research is to measure the severity of the diabetic retinopathy condition. In Iraqi diabetics, highlight the risk factors associated with this condition. From the 1st of February 2015 to the 31st of May 2015, a descriptive cross-sectional research was undertaken. The data was collected through direct interviews with each diabetic patient who consented to participate after the researcher explained the purpose of the study using a questionnaire form designed specifically for the study by the researcher and supervisor and approved by three senior community specialists. In the current research, 30% of the 250 diabetic patients had diabetic retinopathy (NPDR was present in 18.4% of the patients and PDR was present in 11.2% of the patients). Concerning socio-demographic variables, we discovered a substantial correlation between age and DR. We discovered no difference in the prevalence of diabetic retinopathy between men and women. 35% of patients with type 1 DM and 29% of patients with type 2 DM had retinopathy, however this difference is not statistically significant (p value = 0.554g). One-third of the patients in this research developed diabetic retinopathy. Gender, family history of D.M, long duration of diabetes, insulin usage, poorly managed hyperglycemia, presence of systemic hypertension and dyslipidemia, obesity, and physical inactivity were significant risk factors for DR. The findings of the current research indicate that prevention and education are inadequate for many diabetic individuals. The majority of patients in this research did not have routine ocular examinations, and the frequency of DR was greater among these individuals.



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1. Introduction

It is a gradual malfunction of the retinal vasculature leading in structural damage to the neural retina caused by persistent hyperglycemia [1].

The number of people with diabetes is projected to increase to 429 million by the year 2030 due to the prevalence of obesity and better identification of the condition. Diabetic retinopathy is the most common micro vascular complication among people with diabetes mellitus (D.M), resulting in more than 10,000 new cases of blindness each year. It develops slowly, and there is some evidence that it can begin to develop as early as seven years prior to the clinical diagnosis of type 2 diabetes [2]. A recent study of 35 population-based studies showed that 93 million individuals globally had diabetic retinopathy, with 17 million (18%) having proliferative DR, 21 million (23%) having diabetic macular edema (DME), and 28 million (20%) having sight-threatening DR [3].

This corresponds to a prevalence of 34.6% for any DR, 7.0% for proliferative DR, 6.8% for DME, and 10.2% for sight-threatening DR among individuals with diabetes (3). 25 percent of type 1 diabetics and 26 percent of type 2 diabetics have diabetic retinopathy in Iraq [4].

This research aims to estimate the extent of the diabetic retinopathy issue in light of the aforementioned considerations. In Iraqi diabetics, highlight the risk factors associated with this condition.

Direct hyper glycemc effects on retinal cells also likely play a role in the development of diabetic retinopathy [5].

RISK FACTORS FOR DIABETIC RETINOPATHY [6]

1. Immutable: genetic variables, gender, and diabetes duration

Hyperglycemia, blood pressure, and cholesterol levels are modifiable.

Carotid arterial disease, pregnancy, renal impairment, and smoking are additional risk factors [7].

This research attempts to evaluate the extent of the problem of diabetic retinopathy in Iraqi diabetics and highlight the risk factors associated with this issue.

2. Patients and method

Descriptive cross-sectional study that was conducted from 1st of February 2015 till 31 of May 2015 including 2 days a week and 4 hours a day (8.30 am -12.30pm). This study was conducted in AL-MUSTANSIRIYA UNIVERSITY NATIONAL DIABETIC CENTER In Baghdad.

A convenient sample included 250 diabetic patients attending the center the diagnosis was established by the specialists of the center. Each patient had a file that contains the medical and socio demographic information.

The minimum sample size was estimated by $n = (Z \& 2)^2 [P (1-P)]/E^2$, N = Number of sample, Z= (1096) for 95% C I (i.e. $\alpha = 0.05$), P=Best guess for prevalence (e.g. ± 0.5), E =Maximum tolerance error for prevalence estimate (e.g. ± 0.5)

Inclusion criteria of sample include patients: Patients with D.M TYPE 1 and type 2, Had disease duration of 5 years and more, should have file with complete information.

Patients who have been diagnosed with D.M for less than five years, as well as those with insufficient laboratory data.

Permission was received from the executive office of the Arabic board of medical specialities via an administration order sent to the national center for diabetes at AL Mustansiriya University and agreement

from the center in order to simplify our job.

The respondent's consent was sought before to the interview by asking each participant whether he or she want to complete the questionnaire after a short description of the study's overall goal and objective. The data was collected through direct interviews with each diabetic patient who consented to participate after the researcher explained the purpose of the study using a questionnaire form designed specifically for the study by the researcher and supervisor and approved by three senior community specialists. The questionnaire was prepared in English, however the interview was conducted in Arabic.

1. socio-demographic information: this comprises the patient's name, age, gender, employment, location of residence (urban or rural), and level of education (illiterate, elementary school, and higher education).

2. The type of D M either type 1 or 2 by asking about the age of the onset of D.M , Type of treatment which is either insulin or oral hypoglycemic or mixed, Duration of D.M from the time of diagnosis, Family history of D.M up to 2nd degree family relatives, History of smoking patient were classified as not smokers (either never smoker or ceased smoking before two years) and smokers (either current smoker, or ceased smoking before less than two years), history of obesity: the weight and height of each patient present in his file we repeat the measurement of the weight to calculate the body mass index as it equal to weight in KG divided by height squared in meter .Patient with B.M.I of > 30 KG /m² considered obese and patients with B.M.I of <30Kg/m² considered not obese, Hypertension: patient considered hypertensive if they are already diagnosed and receiving antihypertensive treatment, control of hyperglycemia: in each visit the patient did fasting blood sugar to determine whether the patient had good or poor controlled blood glucose level we take the mean of previous 3 visit fasting blood glucose level the normal level should be from 80-130mg/dl(4.4 -7.2 mmol/L), Dyslipidemia: patient with cholesterol level equal to or >200mg/dl, triglycerides >150 mg/dl, low density lipoprotein LDL > or =160 mg/dl, high density lipoprotein cholesterol HDL < or = to 40 were defined as having dyslipidemia, Physical activity either active or inactive the patient considered active if the Physical activity perform at least 150 min/week of moderate intensity aerobic physical activity (50–70% of maximum heart rate), spread over at least 3 days/week with no more than 2 consecutive days without exercise. Examination of 500 eyes was performed by experienced ophthalmologist by using slit lamp bio microscopy and retinal examination using 90 d aspheric condensing lens (volk).

The finding was graded as no retinopathy or presence of diabetic retinopathy which be either proliferative or non-proliferative.

Limitation of the study

Limitation during data collection were short duration, we do our study in one center because the others were not cooperative with us, not all physicians had time to help us to diagnosed our patients because the centers were crowded, we hope in this study to use Hba1c blood investigation as an predictor of glycemic control but this test not present in the above center and we cannot ask the patients to do it on their account.

2.1 Statistical analysis

The statistical analysis of this cross-sectional study performed with the statistical package for social sciences (SPSS) 21.0 and Microsoft Excel 2013. Categorical data formulated as count and percentage. Chi-square test and Fisher exact test used to describe the association of these data. The lower level of accepted statistically significant difference is bellow or equal to 0.05.

3. Results

Table (4-1) displays the distribution of participants according to sociodemographic characteristic a total sample studied was (250) patients; the age of participating diabetic patients range from 30years and above, the majority of them aged more than 50 years (67.6%).

The highest proportion of participants were female (54.8%), unemployed (40.8%), illiterate (31.2%), married (91.6%) and all the sample participants were from urban area.

Table (4-1) socio-demographic characteristics of 250 diabetic patients (studied sample)

		Frequency	Percent
Age	<50 years	81	32.4
	> 50 years	169	67.6
	Total	250	100.
Occupation	Employee	58	23.2
	free work	51	20.4
	unemployed	102	40.8
	Retired	39	15.6
	Total	250	100.0
Level of education	Illiterate	78	31.2
	Primary	37	13
	Secondary	67	26.8
	College	68	27
	Total	250	100.
Marital status	Married	229	91.6
	Un married	21	8.4
	Total	250	100.
Gender type	Male	113	45.2
	Female	137	54.8
	Total	250	100.
Residence	urban	250	100

Diabetic retinopathy was detected in 74 (30%) of the 250 diabetic patients. non proliferative diabetic retinopathy (NPDR) was present in 46

(18.4%), proliferative diabetic retinopathy (PDR) was present in 28 (11.2%) of the total sample studied

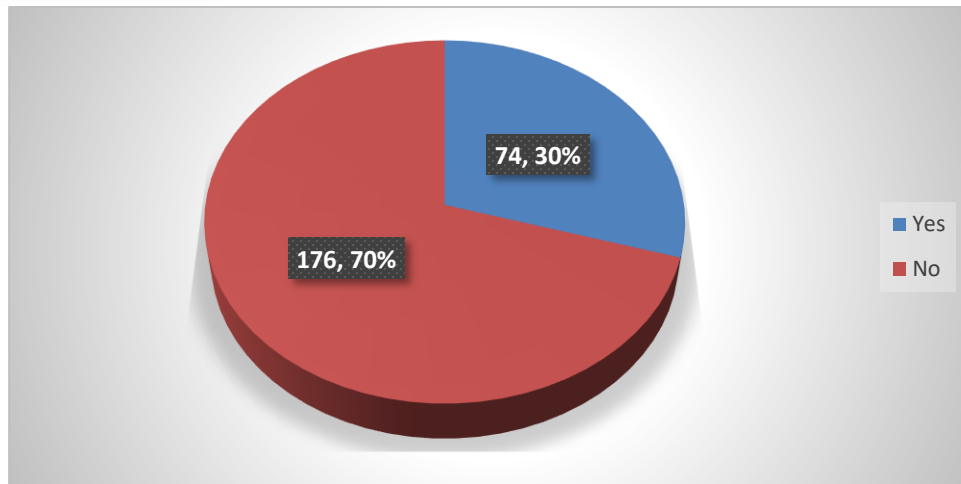


Figure (1) show the distribution of participants according to the presence and absence of diabetic retinopathy

Table number (4-2) shows the Distribution of diabetic patients according to presence of retinopathy in relation to socio-demographic (non- modifiable factors).

		Yes		no			
		N	%	N	%		
Age	<50 years	21	26	60	74	0.776	0.023
	> 50 years	53	31	6	69		
Gender	Male	38	34	75	66	1.66	0.205
	Female	36	26	1	74		
Occupation	Employee	14	24	44	76	4.561	0.207
	free work	19	37	32	63		
	house wife	26	25	76	75		
	Retired	15	38	24	62		
Education	Illiterate	29	37	49	63	5.382	0.146
	Primary	6	16	31	84		
	secondary	19	28	48	72		
	College	20	29	48	71		

Marital	Married	68	30	16	70	0.012	0.914
	Un married	6	29	15	71		

It show a significant statistical association between age and development of retinopathy ($p=0.023$) while no statistical significant association found between DR and gender, occupation, education and marital state, $p=(0.205,0.207,0.146,0.914)$ respectively.

Table number (4-2) shows the Distribution of diabetic patients according to presence of retinopathy in relation to socio-demographic (non- modifiable factors).

Table (4-3) depicts the distribution of diabetic patients based on the occurrence of retinopathy in relation to several diabetes-related factors. Patients with diabetes mellitus for more than 10 years are at the greatest risk of developing retinopathy ($p 0.001$).

There is a substantial correlation between the prevalence of retinopathy and poor glycemic management, as shown by high fasting glucose levels. Those with poor management of their diabetes had a significantly increased prevalence of diabetic retinopathy, $p 0.001$. Type of therapy seems to be a significant risk factor for the development of diabetic retinopathy ($p = 0.002$)

Patients with family history of diabetes had high risk for development of retinopathy than those with no family history and it is statistically significant 0.023

Table 4-3 shows that 35% of patients with type 1 DM were have retinopathy, and 29% of type 2 diabetic patients got retinopathy, but this difference was not found to be significant statistically ($p \text{ value}= 0.554$).

Table (4-3) Distribution of diabetic patients according to presence of retinopathy in relation to different characteristics of diabetes condition

		DRP				X ²	p-value
		yes		No			
		N	%	N	%		
Type	Type 1	9	35	17	65	0.350	0.554
	Type 2	65	29	159	71		
Duration	< 10 years	18	13	126	87	47.65	<0.001
	> 10 years	56	53	50	47		
treatment	Insulin	25	48	27	52	12.359	0.002
	Oral treatment	41	23	135	77		

	Mixed	8	36	14	64		
Control	NO	64	39	101	61	19.65	<0.001
	YES	10	12	75	88		
Family history of DM	Yes	58	34	112	66	5.20	0.023
	No	16	20	64	80		

Table (4-4) shows Distribution of diabetic patients according to retinopathy in relation to modifiable factors So according to the result in table 4

Obesity has significant role in development diabetic retinopathy p 0.011

Being physically inactive is a significant risk factor for retinopathy in diabetic patient's p=0.036
Hypertension plays significant role in the prevalence of retinopathy in diabetic patients p=0.043
Dyslipidemias has statistically significant effect on the presence of diabetic retinopathy p=0.029
Smoking has no effect on occurrence of retinopathy in diabetic patients p=0.513

Table (4 -4) Distribution of diabetic patients according to the presence of retinopathy in relation to modifiable factors

		DRP				X ²	p-value
		yes		no			
		N	%	N	%		
Smoking	yes	9	25	27	75	0.427	0.513
	no	65	30	149	70		
Obesity	yes	38	39	60	61	6.512	0.011
	No	36	24	116	76		
hypertension	yes	24	40	36	60	4.098	0.043
	no	50	26	140	74		
Dyslipidemia	yes	30	23	98	77	4.780	0.029
	no	44	36	78	64		
Physical activity	active	8	17	39	83	4.395	0.036
	Not active	66	33	137	67		

	no	46	27	125	73	
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4. Discussion

The most prevalent diabetic eye illness, diabetic retinopathy, arises when blood vessels in the retina alter. Occasionally, these vessels enlarge and leak fluid or even shut off. In other instances, aberrant new blood vessels form on the retina's surface [1].

NPDR was characterized as the presence of at least one definite retinal hemorrhage and/or micro aneurysm. clinically significant Hard exudate within one disc diameter of the center of the macula was characterized as macular edema. The presence of proliferative retinopathy or macular edema characterized vision-threatening retinopathy [1]. In the current research, 30% of the 250 diabetic patients had diabetic retinopathy (NPDR was present in 18.4% of the patients and PDR was present in 11.2% of the patients).

By comparing this result with those of other studies, it was discovered that the prevalence of diabetic retinopathy varied. Some studies had the same result of 30 percent, as seen in the study conducted in the kingdom of Saudi Arabia in 2014 [2], while others had a higher prevalence rate, such as the study conducted in Tehran province in 2007 [3] and the study conducted in northern Jordan in 2015 [4], [5]. In our study, the prevalence of diabetic retinopathy is relatively high, which can be explained by the lack of preventive efforts among diabetic patients, such as regular screenings and patient counseling about diabetic retinopathy and its prevention and control. This may be due to the unstable political situation and its effect on both the health system and the Iraqi people. Differences in the prevalence of DR between studies may be attributable to differences in sample size, differing time periods, and/or differences in study populations (imaging vs. clinical).

Regarding socio-demographic variables, we discovered a significant association between age and DR. This result is consistent with the Singapore Malay Eye Study, 2008 [6], but contradicts the study conducted in Beijing, China, 2010 [7], which found an association between diabetic retinopathy and a younger age. Diabetic people are more likely to develop DR as they age; aging also adds considerably to the severity of DR [8].

We discovered no difference in the frequency of diabetic retinopathy between men and women, which is consistent with a 2004 research conducted in the United States [9].

Our research reveals that 35% of patients with type 1 DM and 29% of patients with type 2 DM had retinopathy, although this difference was not statistically significant (p value = 0.554g), which is consistent with the province of Armenia study from 2015 [10].

Being treated with insulin was a significant risk factor for DR among the participants of this trial; the risk is greater among those treated with insulin than among those treated with other glucose- controlling medications.

This research demonstrates that a higher total blood cholesterol level is connected with a greater incidence of DR. in line with the 2008 Singapore Malay Eye Study [6]. It was proposed that serum lipids are implicated in the later, more severe phases of DR than in the early, less severe stages; ethnicity may also account for the differential.

The findings of our investigation also indicated the existence of a correlation between BMI and the development of diabetic retinopathy. Although the relationship between BMI and DR has been investigated in a number of epidemiologic studies, the results have been conflicting.

Numerous pieces of evidence indicate that smoking raises the risk of diabetic retinopathy. However, we were startled to find in our research that smoking seemed to have no impact in the development of this problem. This finding is comparable to that of a research conducted by the American Diabetes Association, which concluded that smoking is probably not a significant risk factor for diabetic retinopathy [11]. This disparity may be attributable to the fact that the majority of patients, particularly females, lie about smoking since it is stigmatized in our culture, as well as the variable proportions of smokers in different research. There is some evidence that exercise or physical activity helps protect against diabetic retinopathy [12]. In our research, physical activity is significantly associated with the development of diabetic retinopathy.

5. Conclusion

In this study one third of the patient had diabetic retinopathy. Significant risk factors for DR were: gender, family history of D.M, long duration of diabetes, insulin use, poor controlled hyperglycemia, presence of systemic hypertension and dyslipidemia, obesity and physically in active. The results of the present study show that prevention and education for many of patients with diabetes is insufficient. Most of the patients in this study had no regular ophthalmic assessments and the prevalence of DR was found to be higher in these patients.

6. Recommendations

1. All diabetic patients should have good glycemic control, although high levels of FBS associated with a higher incidence of diabetic retinopathy, many studies have shown that glycosylated Hb is more reflective of the glycemic control, we hope in m the near future this important investigation will be available in all primary health care center and hospitals.
2. Blood pressure should be controlled in diabetic patients since it is significant risk factors in development of diabetic retinopathy.
3. Blood level of triglycerides and cholesterol should be checked in the diabetic patients and kept within the normal range because they are significantly associated with the development of diabetic retinopathy.
4. Early diagnosis and treatment of diabetic retinopathy of high importance this cannot be achieved without the proper cooperation between the physicians who are dealing with diabetic patients and ophthalmologist, and all diabetic patients should have regular checkup to exclude diabetic retinopathy specially those who have the disease for more than 10 years. The program of diabetic screening that present in PHCC should completed by periodical examination program to each new or old diagnosed diabetic patient which include ophthalmological examination for diabetic retinopathy. We suggest training session for doctors in primary health care center about diabetic retinopathy sign and symptoms and diagnosis for early detection of diabetic retinopathy
5. The number of endocrine centers in Iraq should be increased with adequate medical staff and provide considerable laboratory test such as glycosylated Hb
6. The patient should educate about the importance of life style changes and the importance of physical activity and weight reduction in prevention of diabetic retinopathy.
7. Population-based educational programs on diabetes and diabetic retinopathy and continuous medical education trainings in diabetes management given as lectures and group cession in primary health care center and hospitals for increase public awareness can improve diabetes care and self-management and prevent eye complications.

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