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Research Article

THE PREVALENCE OF DIABETIC RETINOPATHY AND VISUAL IMPAIRMENT IN PATIENTS WITH DIABETES MELLITUS IN AL QASSIM REGION, SAUDI ARABIA. A DESCRIPTIVE RETROSPECTIVE STUDY

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Abstract:

Diabetic retinopathy (DR) is one of the serious potential complications. It occurs in approximately 77% of the type 2 diabetics within 10 years of the diabetes onset, and almost in all type 1 diabetics. This descriptive retrospective study was conducted by using simple random sample, where data was collected by the research team from patients records by using well designed questionnaire, so 240 patients medical records from King saud hospital in Onaizah at Al qassim region were selected randomly and critically reviewed to measure the prevalence of diabetic retinopathy and visual impairment in patients with diabetes mellitus. Data was collected by the research team from patients records by using well designed questionnaire. Collected data was analyzed using Statistical Package for Social Sciences (SPSS. Ver. 20) where descriptive and analytical statistics were conducted where applicable. This study indicated that the prevalence of diabetic retinopathy was 66% while 82% of patients had visual impairment. It also stated that there was statistically significant relationship between; patients ages in year, period of diabetes since diagnosed in years and the visual impairment and between; patients ages in year, and presence of Diabetic retinopathy, p value was less than 0.05

Keywords: *Diabetic retinopathy, visual impairment, diabetes mellitus, Al qassim , Saudi Arabia*

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INTRODUCTION:

The World Health Organization (WHO) describes diabetes mellitus (DM) as the most common endocrine disease in the World [1]. Approximately 25% of the population in the Kingdom of Saudi Arabia (Saudi Arabia) has been diagnosed with diabetes [2]. Over the last decade, there has been an 8% increase in the prevalence of DM in Saudi Arabia.² Previous studies on the Saudi population have reported rural –urban differences in the prevalence of diabetes mellitus [3].

The most common complication of DM is diabetic retinopathy (DR) [4,5]. Diabetic retinopathy is a leading cause of blindness among the working class populations of both developing and developed countries [4,5].

Diabetic retinopathy (DR) is the leading cause of visual impairment in the Western world, particularly among persons of working age [1,2]. It is estimated that DR develops in more than 75% of diabetic patients within 15 to 20 years of diagnosis of diabetes [3,4]. Several epidemiologic studies have provided valuable information on the prevalence of DR in Western countries that is useful for identifying subgroups at risk and for the planning of public health policies [5]. The Eye Diseases Prevalence Research Group collates data on eye diseases in the United States, and provides information on the health services burden due to eye diseases, including DR.⁵ However, there is a paucity of data on the prevalence of diabetes-related eye diseases in developing.

Problem Statement:

The Kingdom of Saudi (KSA) ranks seventh in the global burden of diabetes mellitus (DM), with an estimated prevalence of 23.5% for age groups 20-79 years [6]. Ocular complications are quite common among diabetic patients. It is well established that within 15 years of diabetes approximately 2% of diabetics may turn legally blind, and approximately 10% may develop severe visual impairment. Diabetic retinopathy (DR) is one of the serious potential complications. It occurs in approximately 77% of the type 2 diabetics within 10 years of the diabetes onset, and almost in all type 1 diabetics [7]. A global review of diabetic retinopathy reported that on average, 34.6% of all diabetic patients have some forms of DR [8]. Recent studies in KSA have reported a high prevalence of DR among diabetics in different regions of the country. A recent population based study in Taif [9] in the Western region of KSA reported that 33% of all diabetics have some form of DR; while another hospital based study in the

Madinah region reported the same estimate at 36% [10]. With this high burden of the disease, the Saudi Ministry of Health (MOH) in collaboration with the Saudi National Prevention of Blindness Committee (NPBC) commissioned more studies to determine the magnitude of the problem in other regions of the vast country.

Study Objectives:

- To measure the prevalence of diabetic retinopathy and visual impairment among adults diabetic patients.
- To assess if there is statistical relationship between diabetic retinopathy, visual impairment and age
- To assess if there is statistical relationship between diabetic retinopathy, visual impairment and duration of the diabetes.
- To assess if there is statistical relationship between diabetic retinopathy, visual impairment and management of the diabetes.

METHODS AND MATERIALS:**Type of the study:**

This descriptive retrospective study was conducted by using simple random sample, where the medical records from King saud hospital in Onaizah at Al qassim region were reviewed by research team.

Sample size:

By reviewing some similar and previous studies; the prevalence of diabetic retinopathy among adults was 30%.¹¹, therefore accordingly sample size was calculated with following equation: $n = \frac{z^2 p q}{m^2}$

where:

$z = z$ value (1.96 for 95% confidence level)

$p =$ assumed proportion = 30%

$q = 1-p$ (complementary) = 70%

$m =$ margin of error = 0.05

$n =$ sample size

so the sample size was equal: $(1.69)^2 * 0.30 * 0.70 / (0.05)^2 = 239.9 = 240$

Methods of Data Collection:

Data was collected by the research team from patients records by using well designed questionnaire.

Statistical Data Analysis

Statistical analysis was conducted using Statistical Package for Social Sciences (SPSS. Ver. 20). Collected data was analyzed using descriptive and analytical statistics, where descriptive statistics such as frequencies, percentages, mean and SD were used for demographic variables; such as: gender, age in years, area of resident, educational level, marital

status, body mass index, period of diabetes since diagnosed in years, types of medication, diabetes management procedures and suffering other chronic diseases such as heart diseases, hypertension, renal diseases, diabetic retinopathy and visual impairment.

While Independent t test were used to compare if there were any statistically significant relationship between patients ages in year, Period since diagnosed in year, status of Diabetic retinopathy and visual impairment.

Reliability test using Alpha Cronbach's

Item	Cronbach's Alpha if Item Deleted
Age in year	0.60
Gender	0.62
Period since diagnosed in year	0.61
Weight in kg	0.46
Height in cm	0.54
BMI	0.55
Did your DM under control	0.62
Have any chronic diseases	0.62
Heart diseases	0.62
Hypertension	0.62
Renal diseases	0.62
Diabetic retinopathy	0.62
Visual impairment	0.62
BMI	0.55
BMI group	0.61
Period of diabetes	0.62
Overall Cronbach's Alpha for 16 item	0.61

** The overall reliability test was 0.6 which was acceptable.

Inclusion criteria:

- Diabetic patients
- Age 40 years or old

Exclusion criteria:

- Non Diabetic patients
- Age less than 40 years

Ethical Approval:

This study was approved by King saud hospital scientific research ethical committee and all ethical issues were considered during the process of this study.

RESULTS:

As mentioned in table No. 1 a total number of 240 diabetic patient records were selected by using simple random sample, the age of participants arranged from 40 to 90 with the mean age equal 57 and SD equal 1 years. About 41% were male, 59% were female, 94% were Saudi, majority of patients finished intermediate and secondary schools or diploma and university level, 58% and 40% respectively.

Table 1: Shows demographic characteristics of the participants

Variable	Sub Variable	Fr.	%
Gender	Male	99	41.2
	Female	141	58.8
Nationality	Saudi	226	94.2
	Non Saudi	14	5.8
Educational level	Illiterate	6	2.5
	Secondary or below	138	57.5
	Diploma / university	96	40.0
Marital Status	Married	211	87.9
	Single	29	12
Age group in years	40 - 50	86	35.8
	50 - 60	66	27.5
	60- 70	50	20.8
	70 - 80	29	12.1
	> 80	9	3.8

* Mean age is 57 and SD equal 1 years.

Table 2. Indicated that most of participants were overweight or obese according to their BMI where 45% were overweight, 22% suffering obesity level 1 and 15% suffer obesity level 2. Also this table shows the period of diabetes since diagnosed so 44% had less than 10 years, 30% from 10 to 20 years and 6% more than 30 years. Majority of participants 87% used medication rather than insulin injection to manage their problem and finally 79% of cases properly control their diabetes.

Table 2: Diabetic history and body mass index of participants

Variable	Sub Variable	Fr.	%
Body Mass Index	< 19	5	2.1
	19 - 24	38	15.8
	24 -29	109	45.4
	29 - 34	53	22.1
	> 34	35	14.6
Period of diabetes since diagnosed in years	< 10	105	43.8
	10 - 20	73	30.4
	20 - 30	48	20.0
	30- 40	12	5.0
	> 40	2	.8
Types of medication	Insulin injection	31	12.9
	other	209	87.1
Did your diabetes under control	Yes	189	78.8
	No	46	19.2

As reflected in table No. 3 where demonstrate the participants history of other chronic diseases; 18% had heart diseases, 55% hypertension, 22% and renal diseases, while patients with diabetic retinopathy and visual impairment represented 66% and 82% respectively.

Table 3: Medical history of participants

Variable	Sub Variable	Fr.	%
Heart Diseases	Yes	44	18.3
	No	196	81.7
Hypertension	Yes	133	55.4
	No	107	44.6
Renal Diseases	Yes	52	21.7
	No	188	78.3
Diabetic retinopathy	Yes	158	65.8
	No	82	34.2
Visual impairment	Yes	196	81.7
	No	44	18.3

Table No. 4 and 5 illustrated the relationship between patients ages in year, Period of diabetes since diagnosed in year and the presence of Diabetic retinopathy and visual impairment. In these two tables our finding stated that there was statistically significant relationship between; patient's ages in year, period of diabetes since diagnosed in years and the visual impairment. i.e. p value was less than 0.05. It also showed that there was statistically significant relationship between; patients ages in year, and presence of Diabetic retinopathy. i.e. p value was less than 0.05 while there was no statistically significant relationship between Period since diabetes diagnosed in years, and presence of Diabetic retinopathy. i.e. p value was greater than 0.05.

Table 4: independent t test to compare patient's ages in year, Period of diabetes since diagnosed in year and the presence of Diabetic retinopathy

N = 240

	Diabetic retinopathy	N	Mean	Std. Deviation	P Value
Age in Years	Yes	158	60.58	11.89	0.04
	No	82	50.81	10.07	
Period since diabetes diagnosed in years	Yes	194	14.86	8.94	0.2
	No	44	12.88	11.93	

Table 5: independent t test to compare patients ages in year and status of visual impairment
N = 240

	Visual impairment	N	Mean	Std. Deviation	P Value
Age in Years	Yes	196	57.73	12.17	0.05
	No	44	55.04	12.23	
Period since diagnosed in year	Yes	156	17.14	9.76	0.001
	No	82	9.46	6.80	

DISCUSSION:

This study was conducted at King Saud hospital in Onaizah at Al qassim region from September to October 2018 to measure the prevalence of diabetic retinopathy and visual impairment in patients with diabetes mellitus.

The dramatic increase in prevalence of type 2 diabetes among population, with increase in obesity and observational reducing physical activity, might increase the occurrence of diabetic retinopathy [12].

Diabetic retinopathy is the dominant cause of visual impairment in the developed countries. Lifestyle changes have dramatically increased the risk of diabetes as well as diabetic retinopathy in many developing countries [13], and it is important that organized efforts are undertaken to address eye complications of diabetes. Diabetes period, type of diabetes and medications used, management and control of blood sugar, age and sex are found to be strongly associated with retinopathy and its development [14].

This study showed that the prevalence of diabetic retinopathy was 66% while 82% had visual impairment. Different number of studies show marked variations in the prevalence of retinopathy. i.e. one similar study conducted at Al Hasa Region of Saudi Arabia prevailed that 64.8% had mild non-proliferative diabetic retinopathy, 23.9% had moderate non-proliferative diabetic retinopathy, while another two previous studies conducted in Oman indicated lower prevalence rate (14% and 42%) of diabetic retinopathy among patients [15,16].

Another similar study in United States showed that almost all individuals with type 1 diabetes and more than 60% of those with type II diabetes develop diabetic retinopathy during the first 2 decades of the disease [13].

This variation in the reported prevalence of DR in our study and other previous studies may be due to the variation in the study methodology, target population, or the differences in the age of the participants.

The positive association between diabetic retinopathy and duration of diabetes is noted in the literature and the duration of diabetes since diagnosed is an important risk factor and most closely related with occurrence of DR. Our study stated that there was statistically significant relationship between; patient's ages in year, period of diabetes since diagnosed in years and the visual impairment. i.e. p value was less than 0.05. It also showed that there was statistically significant relationship between; patients ages in year, and presence of Diabetic retinopathy. i.e. p value was less than 0.05. Many studies reflected the positive association between age, period of diabetic onset and diabetic retinopathy and visual impairment. This finding was consistent with previous findings [17-21].

CONCLUSION:

Our findings show that a high prevalence of diabetic retinopathy and vision impairment diabetic retinopathy in the Saudi Arabia exists. Male sex, higher hemoglobin A1C level, longer duration of diabetes, insulin use, and higher systolic blood pressure were independently associated with the presence of diabetic retinopathy. These findings provide decision makers updated information for use in planning eye care policies and rehabilitation services.

Conflicts of interest

There are no conflicts of interest.

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