The Prevalence of Retinopathy Among Type 2 Diabetes Mellitus Patients in Al-hindeya City, Karbala, Iraq

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Abstract

Background: Diabetic retinopathy (DR) is the commonest cause of vision impairment in many countries. The global rising in diabetes mellitus incidence highlighted the importance of regular screening, early detection, and management of DR. **Objectives:** To estimate the prevalence of retinopathy in type 2 diabetes mellitus (T2DM) patients and to find the commonest types of retinopathy.**Methods:** Three years, cross sectional study evaluating 295 patients with T2DM older than 35 year for the presence of DR. The participants underwent full history record, thorough clinical examination, and laboratory screening for glycemic control. Each patient had detailed ophthalmological examination including best corrected visual acuity, dilated fundus examination and optical coherence tomography (OCT) for clinically suspected macular edema.**Results:** The cohort female to male ratio was 1.2:1, mean age was 54.8 ± 8.7 years, and mean duration of disease was 9.8 ± 5.7 years. Different grades of DR were diagnosed in 79 patients. Background, maculopathy, proliferative, and advanced retinopathy were reported in 20(25.3%), 41(51.9%), 8(10.1%), and 10(12.7%) patients, respectively.**Conclusions:** The prevalence of DR was 27% and maculopathy and background retinopathy were the commonest types accounting for 51.9% and 25.3% of all types of retinopathy, respectively.
Keywords: Type 2 diabetes mellitus, Diabetic retinopathy, Maculopathy.

Introduction

T2DM is a worldwide major metabolic health problem involving patients in all age groups (1). In the last decades, there is an increase in the number of people affected with diabetes mellitus (2). DR is a chronic microvascular complication associated with long term poor glycemic control resulting in visual impairment and blindness (3, 4). The major candidates of DR are the active working age groups in the range of 20-60 years of age (5).

Visual loss due to DR results from several mechanisms, diabetic macular edema and ischemia are the main causes of central vision impairment (6). Proliferative diabetic retinopathy leads to hemorrhages affecting the retina and vitreous followed by   tractional retinal detachment with irreversible loss of vision (7, 8).

The prevalence of retinopathy in diabetic patients varies substantially between studies and it is approximately about 40%, it is more common in type 1 (T1DM) mellitus diabetes than T2DM. Sight threatening complications is present in about 10% of diabetic patients (9).

As DR can progress irreversibly with relatively few or no visual symptoms (10), the importance of early and adequate screening and subsequent intervention for all patients with diabetes mellitus is imperative (6, 7). Screening and targeting modifiable risk factors can reduce the severity of diabetic retinopathy.

Regular dilated eye examinations are effective in detecting and treating a symptomatic   vision threatening complications (11).

The study aims to find the prevalence of retinopathy in T2DM patients and the percentage of each grade of DR.

Patients and methods

Study design: a cross-sectional study screening for the prevalence of retinopathy in T2DM patients newly registered to the diabetes clinic in Al-Hindeya general hospital, Karbala. Over the three years' time of the study, 295 patients (163 female and 132 male) were investigated from September 2015 to July 2018.
Inclusion and exclusion criteria: the study included data of patients with history of T2DM for more than 3 years, over 35 years of age, and using different types of anti- diabetes medications.
Patients with previous history of DR, gestational diabetes, corneal opacity, cataract, poor pupil dilatation, and non-diabetic retinal diseases were excluded from the study.
Screening procedure: an interview done to each patient after giving verbal consent to take part in the study. Details of the disease history were recorded using a list of inquire. The patient's demographic features including age, gender, occupation, duration of disease and type of anti-diabetes medications were reported. The patients underwent general examination including blood pressure assessment by mercury sphygmomanometer in sitting position. Each participant height and weight measured and the body mass index calculated using the equation of

weight in kilogram divided by squared height in meter. Screening for glycemic control was done by fasting blood sugar and glycated hemoglobin (HbA1c) testing.

Eye examination and retinopathy grading: All patients are subjected to initial visual acuity, refraction and intraocular pressure measurement at the ophthalmology department. Primary slit lamp examination done for all patients to exclude ocular media opacity. Dilatation with Tropicamide eye drop 1% was applied to each eye repeated after 10 minutes. After 30 minutes, the patients examined by slit lamp biomicroscopy with indirect non-contact lens (+90, +78) to detect and grade the retinopathy. Clinically detected macular edema sent for OCT macula view (ZEISS HD 5000 OCT system) to evaluate macular thickness and assess the type of edema (cystic, spongiform or associated with subretinal fluid).

DR was classified according to the National Screening Committee (UK) grading system (12):

Grade 0: no diabetic retinopathy

Grade 1: background diabetic retinopathy (includes microaneurysm, flame shaped hemorrhage, cotton wool spot and hard exudates)

Grade 2: clinically significant macular edema (documented clinically and by OCT images)

Grade 3: proliferative diabetic retinopathy (new vessels at optic disc or elsewhere in the retina which may be associated with localized retinal hemorrhage)

Grade 4: advanced diabetic retinopathy (includes persistent vitreous hemorrhage, tractional retinal detachment, iris neovascularization, and neovascular glaucoma)

We did not use Early Trial for Diabetic Retinopathy Study (ETDRS) classification for DR because there is overlapping between grades that may lead to confusion.

Statistical analysis: Using the SPSS (Statistical Package for the Social Sciences) software version 22, the variables under study related to socio-demographic data were categorized to multiple categories and then summarized and presented as numbers and percentages in appropriate table. The prevalence of DR was obtained as a number and percentage and presented in a pie chart graph. The grading of DR was summarized and presented in a bar chart graph.

Results

The study population was 295 patients with female preponderance and the female to male ratio is 1.2:1. The participants' age ranges from 35 to 85 years with a mean of 54.8 ± 8.7 years. The duration of disease ranges from 35 to 85 years with a mean of 9.8 ± 5.7 years and half of the patients have had type 2 diabetes for less than 10 years. Obesity and overweight accounted for 82.7% of the total study sample and 85.8% of the patients were on oral hypoglycemic drugs only (Table1).

Table-1: Socio-demographic characteristics of the study sample.

Variable	categories	No.	Percent
Gender	Male	132	44.7
	Female	163	55.3
Age (years)	<50	80	27.1
	50-59	114	38.6
	≥60	101	34.2
Duration of disease (years)	<10	152	51.5
	10-19	120	40.7
	>20	23	7.8
BMI	Underweight	1	0.3
	normal	50	16.9
	Overweight	134	45.4
	Obese	110	37.3
Type of treatment	Non	7	2.4
	Oral	253	85.8
	Mixed	22	7.5
	Insulin	13	4.4

Different grades of DR was noticed in 79 patients with a prevalence of 27% (Figure-1)
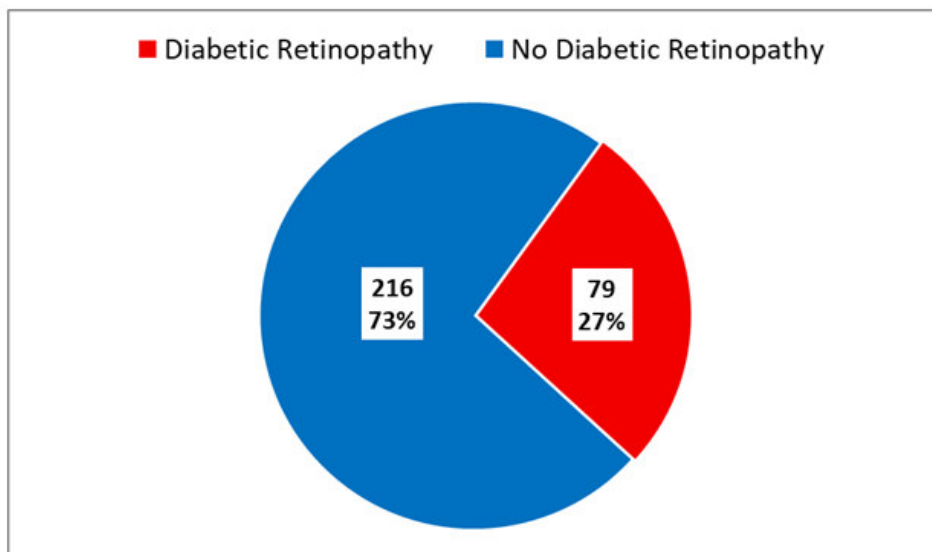
Figure-1: The prevalence of Diabetic Retinopathy.

Figure-2 demonstrates the number of patients affected with each grade of DR and as shown grade 2 (clinically significant macular edema) accounted for the highest percentage of DR followed by grade 1 (background DR), while the least grade of DR was for grade 3 (proliferative DR).
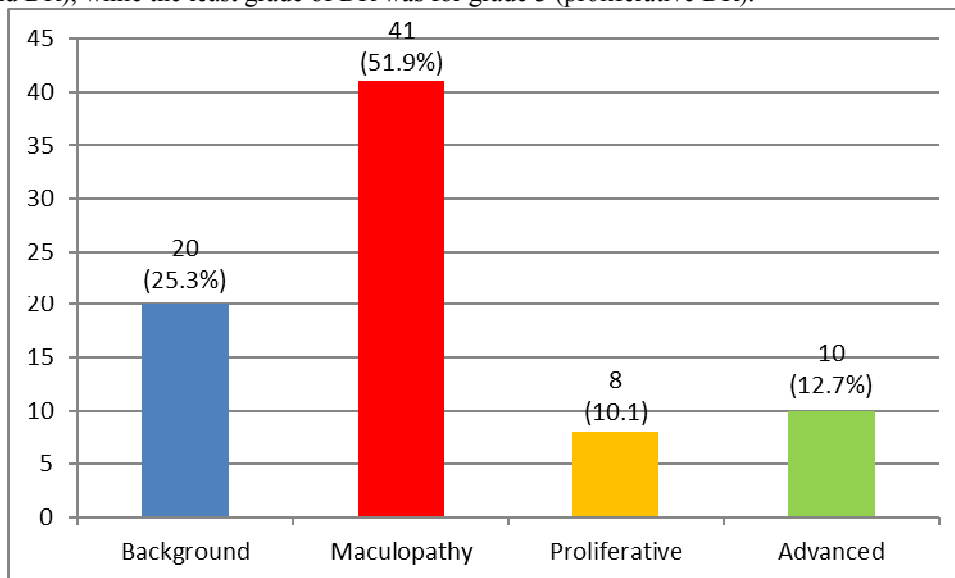

Figure-2: The Grading of Diabetic Retinopathy.

Discussion

The prevalence of DR was the subject of many studies done in local and international centers. In our study the prevalence was 27%. While, in another two Iraqi studies done in Baghdad and Mosul the prevalence were 33% and 32%, respectively (13, 14). The differences in sample size, social circumstances, and inclusion criteria explain the variance between our figure and the others.

Other studies dealing with DR from India (15, 16), Pakistan (17), Iran (18), and United Arab Emirates (UAE) (6) showed a prevalence of 18-20.9%, 16-23%, 37%, and 19%, respectively. Our higher result as compared with the aforementioned studies, except the Iranian᾽s which included T1DM and T2DM, is due to poor glycemic control of our patients manifested by the elevated mean HbA1c (10.68 ± 2.46). The participants poor glycemic control were attributed to lack of regular follow up, noncompliance to treatment, bad dietary habits, and consuming improper treatment as most of the patients that require insulin prefer oral hypoglycemic agents instead.

We found clinically significant macular edema is the commonest type of retinopathy (51.9%) which is consistent with the Mosul's study (60%) while, the Indian study showed lower result (7.7%). Higher prevalence of background retinopathy was reported by the Indian and UAE studies (15.4% and 72.6%, respectively) as compared to ours (25.3%) (6,15). This difference indicate that our patients seek medical advice because of drop

in central vision due to macular edema, but in other countries people attend diabetes clinics and do regular eye screening before any visual complain since background retinopathy is the early stage of DR.

Conclusions
DR was reported in 27% of the sample population and maculopathy (51.9%) followed by background retinopathy (25.3%) were the commonest types retinopathy.

Recommendation
Regular eye screening is a fundamental tool in preventing blindness in T2DM patients. During the course of the study 61 patients with clinically significant macular edema, proliferative, and advanced retinopathy were exposed for emergency interventions including intravitreal injections or macular laser and panretinal photocoagulation to interrupt the progress of the disease and save their vision. Such emergency procedures can be avoided by regular follow up.

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