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Prevalence and Potential Risk Factors of Diabetic Retinopathy among Type 2 Diabetics Patients in Diabetic Center, Taif City, KSA

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ABSTRACT

Background: diabetic retinopathy is the most common microvascular complication of diabetes mellitus (DM) and a primary leading cause of irreversible visual impairment. Timely risk based screening of DR progression is crucial**.**

Materials and Methods: a cross-sectional study was conducted between October-December 2016 at Diabetic Center, Taif city by assessing fundus photographs of type 2 Diabetics. Furthermore, we analysed the DR potential risk factors including demographic, duration of diabetes, [HbA1c], type of anti-diabetic drugs, dyslipidemia, [BMI].

Results: a total of 213 diabetic patient were included, 34 (16%) have DR with mean years of age 54.14 (13.12) and males were 19 (55.88%) and females 15 (44.12%). its mean of duration was 4.4 (4.5) months. DM duration's mean was 15.6 year and SD was (10.26). Also, HbA1c mean (SD) was 8.11 (1.99). HbA1c% mean (SD) was 8.57 (1.88). Insulin only was the management of DM in 8 (23.53%) while oral hypoglycemic drugs only were used by 6 (17.65%) and the use of both was the treatment of 19 (55.88%) patients. Systematic diseases as dyslipidemia, hypercholesteremia and hypertension were prevalent among 15 (44.12%), 5 (14.17%) and 11 (32.35%) patients; respectively. Nephropathy presented in 12 (35.29%) patients. There were no underweight patients, 4 (2.23%) normal, 19 (55.88%) obese and 11 (32.35%) overweight.

We conducted multivariate analysis of variance (MANOA) to compare the effect of age, duration of DM, HGA1c%, TRIGLYCERIDE (mg/dl), LDL-Cholesterol (mg/dl), diastolic blood pressure, systolic blood pressure and GFR on the prevalence of DR. Also , A univariate analysis of variances (two-way ANOVA) was also conducted for each dependent variable.

Conclusion: Among the participating patients , our study showed a high prevalence of diabetic retinopathy especially with male patints , high (HbA1c) and longer duration of diabetes. We have recommended a national plan for educational programs about diabetic retinopathy and important of Eye examination .Also,our study showed that certain risk factors may enhance the progression of DR. Furthermore, our study highlights the importance of risk based screening for DR.

Keywords: Diabetic retinopathy, Risk factors ,Visual impairment**,** Type 2 diabetes mellitus.

INTRODUCTION

The term diabetes mellitus describes a metabolic disorder of multiple etiologies characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, action, or both. Type 2 diabetes (called non-insulin-dependent) is characterized by combinations of decreased insulin secretion and decreased insulin sensitivity (insulin resistance), augmented by lifestyle habits [(1)].

The American Diabetes Association [(2)] criteria for the diagnosis of diabetes are any of the following: **1-** A hemoglobin A1c level of 6.5% or higher;, **2-** fasting plasma glucose level of 126 mg/dL or higher, **3-** an 2-hour plasma glucose level of 200 mg/dL (11.1 mmol/L) or higher during an (OGTT) or **4-**In a patient with classic symptoms of hyperglycemia or hyperglycemic crisis,a random plasma glucose ≥200 mg/dL (11.1 mmol/L). WHO [(3)] describes diabetes mellitus as most common endocrine disease in the World.. If the prevalence of diabetes mellitus type 2 (DMT2) continues to increase at the current rate, the global burden of this disease will swell between 2000 to 2030 from 171 million to 366 million patients [(4)]. In the Kingdom of Saudi Arabia (KSA), the rise in the prevalence of DMT2 started to gain attention years after rapid industrialization took place in the country[(5)]. Diabetes has emerged as a major public health problem that has reached an epidemic stage[(6)]. The crude prevalence of diabetes has been documented as

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23.7%, accounting for 37.8% of Saudis aged between 30 and 70 years [7].

In patients with type 2 diabetes previous prospective studies have shown an association between the degree of hyperglycaemia and increased risk of microvascular complications [8] the direct and indirect effects on the human vascular tree are the major source of morbidity and mortality diabetes. Macrovascular complications include (coronary artery disease, peripheral arterial disease, and stroke) while microvascular complications include (diabetic nephropathy, neuropathy, and retinopathy) [9].

The most common complication of DM is diabetic retinopathy (DR). Diabetic retinopathy is a leading cause of blindness among the working class populations of both developing and developed countries [10,11]. Diabetic retinopathy, a retinal vascular disorder that occurs as a complication of diabetes mellitus (DM), is a leading cause of blindness in the United States ,often affecting working-aged adults. It is characterized by signs of retinal ischemia (microaneurysms, hemorrhages, cotton-wool spots, intraretinal microvascular abnormalities, venous caliber abnormalities ,and neovascularization) and/or signs of increased retinal vascular permeability. Vision loss can result from several mechanisms, including neovascularization leading to vitreous hemorrhage and/or retinal detachment, macular edema, and retinal capillary nonperfusion[12].DR classified into 2 main groups: 1- Non-proliferative diabetic retinopathy (NPDR) which is asymptomatic or has mild symptoms and it is an early stage of the disease. In NPDR, microaneurysms formed because the blood vessels in the retina are weakened may leak fluid into the retina which lead to macula edema. 2- Proliferative diabetic retinopathy (PDR) is the more advanced form of the disease [32] .At this stage, new blood vessels begin to grow in the retina and called neovascularization. These fragile blood vessels can bleed into the vitreous and cause clouding vision another problem with these fragile blood vessels is retinal detachment which occur when fragile blood vessels form scar tissue. Retinopathy occurs in most persons with long-standing DM,[13]but its incidence rate can be reduced by aggressive control of hyperglycemia and hypertension[14,15]. Approximately 25% of the population in the Kingdom of Saudi Arabia (Saudi Arabia) has been diagnosed with diabetes, [16] The studies from different regions of Saudi Arabia also show variable prevalence: Al-Hassa (30%), Riyadh (31%) [17] ,Madinah (36.8%) [18] ,Aseer region (11.3%)[19] diabetic retinopathy (DR) in Taif, Saudi Arabia using the Rapid Assessment, DR was 36.8% (33.3% to 40.2%) and sight-threatening DR (STDR) was 17.5% (CI 15.1% to 20.0%) [20].The risk factors associated with this complication are also not uniform in all the studies from different geographical regions. The risk factors and epidemiological determinants mostly documented in various studies are age, gender, obesity, duration of disease, presence of hypertension, dyslipidemia, uncontrolled diabetes, and geographical area[21].

This study has the principal aim of describing the most recent prevalence of DR and to assess the commonest type of diabetic retinopathy in the type 2 diabetic patients attending the diabetes center in taif, KSA for follow-up. Also we will look to identify associated risk factors in these patients.

MATERIALS AND METHODS

The study was carried out at Diabetic Center in Taif, Makkah Region. The diabetic patients are referred to this center from King Abdulaziz Specialist Hospital in this region. A total of 213 type 2 diabetic patients were registered in this center from October 2016 to December 2016. The sample was elected based on the records of patients who were following up in the center to check if they have diabetic retinopathy.To maintain confidentiality; data were collected without referring to the identity of the patients with the approval of Diabetic Center. Also, ethical approval was obtained from the Institutional Review Board and informed written consent was taken from all participants. Data collected involved some demographic and clinical parameters. The demographic parameters were age and gender. Clinical parameters included: Duration of diabetes, control of blood sugar (hemoglobin A1c [HbA1c] ≤7% was considered as controlled, 7-9% as uncontrolled and >9% poorly controlled), use of anti-diabetic drugs, dyslipidemia, obesity (classified as underweight body mass index [BMI] <18.5 kg/m2, normal 18.5–24.9 kg/m2, overweight 25–30 kg/m2 and obese [BMI] >30.0 kg/m2). Also some associated conditions were collected such as dyslipidemia, hypercholesteremia, hypertension, hypothyroidism, hyperthyroidism and complications of diabetes included retinopathy and nephropathy (Glomerular Filtration Rate [GFR] = 186 ×[serum creatinine

(mg/dl) 1.154 ×age (years) -0.203 ×(0.742 if female)×(1.210 if African America).

The diagnosis and grading of DR were done by fundoscopic examination by a trained ophthalmologist in the diabetic center and results were recorded in patients' files. Retinopathy was classified into NPDR and PDR, NPDR was further subdivided into mild (microaneurysms confined mainly to the area temporal to the fovea), moderate (vascular changes seen in one to two quadrants of the retina), and severe (vascular changes seen in more than two quadrants) and normal retina. Data were analyzed using the SPSS software version 20. Frequency and percentage were used for each variable. The chi square test was used to study the relationship between variables, and the T-test was used for comparison between means. A p value ≤0.05 was considered statically significant.

We conducted multivariate analysis of variance (MANOA) to compare the effect of age, duration of DM, HGA1c%, TRIGLYCERIDE (mg/dl), LDL-Cholesterol (mg/dl), diastolic blood pressure, systolic blood pressure and GFR on the prevalence of DR, there were no statistically significant difference between them, Wilk's ƛ = 0.707, F (8, 13) =0.672, P= 0.708, Partial ŋ2 = 0.293.A univariate analysis of variances (two-way ANOVA) was also conducted for each dependent variable. There was a no significant difference between variables and their effect on DR (Table 4). Multivariate analysis of variance (MANOA) was conducted to compare the effect of age, duration of DM, HGA1c%, TRIGLYCERIDE (mg/dl), LDL-Cholesterol (mg/dl), diastolic blood pressure, systolic blood pressure, GFR and DR duration on the prevalence on different types of DR, there were no statistically significant difference between them, Wilk's ƛ = 0 .284, F (24, 32.5) = 0.737, P= 0.778, Partial ŋ2 = 0 .343. We also performed a univariate analysis of variances (two-way ANOVA) for each dependent variable. There was a no significant difference between variables and their effect on DR except DR duration was found to have a statistically significant difference on the type (p-value =0.043)

The study was done after approval of ethical board of Taif university.

RESULTS

(Table 1) We included 213 patients suffer from DM with mean years of age 52 and SD=35.53. Males were 102 and females 111. DM duration's mean was 9.92 year and SD was 7.98. On the other hand, HbA1c mean (SD) was 8.11 (1.99), the mean (SD) of GFR was 77.55 (38.23). Insulin only was the management of DM in 64 while oral hypoglycemic drugs only were used by 79 and the use of both was the treatment of 63 patients. Systematic diseases as dyslipidemia, hypercholesteremia and hypertension were prevalent among 89, 26 and 44 patients respectively. One patient suffered from hyperthyroidism while 21 suffered from hypothyroidism. Nephropathy presented in 70 patients. Diabetic retinopathy's (DR) prevalence was 16% and its mean of duration was 4.28 (4.4) months. DR grades varied from proliferative among 10 patients to Non-proliferative, mild in 19 patients, Non-proliferative, moderate among 4 and Non-proliferative, sever among only 1 patient. There were 4 underweight patients, 30 normal, 107 obese and 72 overweight .

(Table 2) We included 213 patients suffer from DM, 34 have DR with mean years of age 54.14 (13.12) and males were 19 and females 15, its mean of duration was 4.4 (4.5) months. DM duration's mean was 15.6 year and SD was (10.26). Insulin only was the management of DM in 8 while oral hypoglycemic drugs only were used by 6 and the use of both was the treatment of 19 patients. Systematic diseases as dyslipidemia, hypercholesteremia and hypertension were prevalent among 15, 5 and 11 patients respectively. No patient suffered from hyperthyroidism while 3 suffered from hypothyroidism. Nephropathy presented in 12 patients. There were no underweight patients, 4 normal, 19 obese and 11 overweight. While there were 174 patients without DR, with mean years of age 51.59 and males were 83 and females 96. Its mean of duration was 2 months. DM duration's mean was 8.88 year . On the other hand, HGA1c % mean was 8.02 . Insulin only was the management of DM in 56 while Oral hypoglycemic drugs was used by 73 and the use of both was the treatment of 44 patients. Systematic diseases as dyslipidemia, hypercholesteremia and hypertension were prevalent among 74, 21 and 13 patients respectively. One patient suffered from hyperthyroidism while 18 suffered from hypothyroidism. Nephropathy presented in 58 patients. There were 4 underweight patients, 26 normal, 88 obese and 61 overweight.

(Table 3)We included 213 diabetic patients.174 patients without DR, with mean years of age 51.59 and males were 83 and females 96. its

mean of duration was 2 months. DM duration's mean was 8.88 year . on the other hand, HGA1c % mean (SD) was 8.02 (2). While there were 19 patients suffered from mild non-proliferative DR, 4 with moderate non-proliferative, 1 with sever non-proliferative and 10 with proliferative DR (Table 3).

(Table 4) We conducted multivariate analysis of variance (MANOA) to compare the effect of age, duration of DM, HGA1c%, Triglycerides (mg/dl), LDL-Cholesterol (mg/dl), diastolic blood pressure, systolic blood pressure and GFR on the prevalence of DR, there were no statistically significant difference between them, Wilk's $\lambda = 0.707$, F (8, 13) =0.672, P= 0.708, Partial $\eta 2 = 0.293$. A univariate analysis of variances (two-way ANOVA) was also conducted for each dependent variable. There was a no significant difference between variables and their effect on DR .

(Table 5) Multivariate analysis of variance (MANOA) was conducted to compare the effect of age, duration of DM, HGA1c%, Ttriglycerides (mg/dl), LDL-Cholesterol (mg/dl), diastolic blood pressure, systolic blood pressure, GFR and DR duration on the prevalence on different types of DR, there were no statistically significant difference between them, Wilk's $\lambda = 0.284$, F (24, 32.5) = 0.737, P= 0.778, Partial $\eta 2 = 0.343$.We also performed a univariate analysis of variances (two-way ANOVA) for each dependent variable. There was a no significant difference between variables and their effect on DR except DR duration was found to have a statistically significant difference on the type (p-value =0.043)

(Table 1) Describe the socio-demographics of study population .

Variable	Value
Total	213
Age in years mean (SD)	52 (35.53)
Gender (m/f)	102 (47.9%)/111(52.1%)
Duration of DM in years: mean (SD):	9.92 (7.98)
Management of DM: Insulin only Oral hypoglycemic drugs only Both	 64 (30.6%) 79 (31.1%) 63 (38.3%)
HGA1c %	8.11 (1.99)
Systematic diseases:	
Dyslipidemia	89 (41.8%)
Hypercholesteremia	26 (12.2%)
Hypertension	44 (20.7%)
Thyroids (hypothyroidism/hyperthyroidism)	21 (9.9%)/1 (0.5%)
Nephropathy	70 (32.86%)
GFR mean (SD)	77.55 (38.23)
DR	
Prevalence (%)	34 (16%)
Duration in months: mean (SD)	4.28 (4.4)
Grades: proliferative. Non-proliferative, mild Non-proliferative, moderate Non-proliferative, sever	 10 (4.7%) 19(8.9%) 4(1.9%) 1(0.5%)
BMI grades: Underweight Normal Obese	 4 (1.9%) 30 (14.1%) 107(50.2%)

Overweight	72(33.8%)

(Table 2) Baseline characteristic of participants with and without diabetic retinopathy

Variable	With retinopathy	Without retinopathy
Total	34 (16%)	179 (84%)
Age in years mean (SD)	54.14 (13.12)	51.59 (38.35)
Age: ≤45 46-55 >55	 8 (23.53%) 11 (32.35%) 15 (44.12%)	 70 (39.1%) 49 (27.37%) 60 (33.52%)
Gender (m/f)	19(55.88%)/15(44.12%)	83(46.37%)/96(53.63%)
p-value:0.309		
Duration of DM in years: mean (SD):	15.6 (10.26)	8.88 (7)
Duration of DM in years: ≤5 6-15 >15	 5 (14.17%) 17 (50%) 11 (32.35%)	 69(38.55%) 77(43.02%) 28(15.64%)
HGA1c %mean (SD)	8.57 (1.88)	8.02 (2)
HbA1c: Controlled ≤7 Uncontrolled 701-9 Poor control >9	 7 (20.59%) 15 (44.12%) 12 (35.29%)	 69(38.55%) 77(43.02%) 28(15.64%)
p-value: 0.237		
Management of DM: Insulin only Oral hypoglycemic drugs only Both	 8 (23.53%) 6(17.65%) 19 (55.88%)	 56 (31.28%) 73 (40.78%) 44 (24.58%)
p-value:0.001**		
Systematic diseases:		
Dyslipidemia	15(44.12%)	74 (41.34%)
Hypercholesteremia	5 (14.17%)	21 (11.73%)
Hypertension	11 (32.35%)	13 (7.26%)
Thyroids (hypothyroidism/hyperthyroidism)	3/0 (0%)	18 (10.1%)/1 (0.6%)
p-value: 1.0		
Nephropathy: Present Absent	 12 (35.29%) 22 (64.71%)	 58 (32.4%) 119 (67.6%)
p-value: 0.775		
Duration of DR in months: mean (SD)	4.4 (4.5)	2
GFR mean (SD)	99.9 (±24.6)	86.1 (±28.9)
BMI grades: Underweight Normal Obese Overweight	 0 (0%) 4 19 (55.88%)11 11 (32.35%)	 4 (2.23%) 26 (14.53%) 88 (49.16%) 61 (34.08%)
p-value: 0.936		

Table 3: Baseline characteristic of participant with different grade of diabetic retinopathy

Variable	No DR	Non-proliferative, mild	Non-proliferative, moderate	Non-proliferative, sever	proliferative
Total	179 (84%)	19 (8.9%)	4(1.9%)	1 (0.5%)	10 (4.7%)
Age in years mean (SD)	51.59 (38.35)	53.16 (14.51)	55.75 (5.32)	55 (27.8)	55.3(14.02)
Age:					
≤45	70(39.1%)	6 (31.6%)	0	0	2 (20%)
46-55	49(27.37%)	5 (26.32%)	2 (50%)	1 (100%)	3 (30%)
>55	60(33.52%)	8 (42.1%)	2 (50%)	0	5 (50%)
Gender:					
Males	83 (46.4)	8 (42.1%)	3 (75%)	1 (100%)	7 (70%)
Females	96 (53.6%)	11 (57.9%)	1 (25%)	0	3 (30%)
p-value: 0.329					
Duration of DM in years: mean (SD):	8.88 (7)	16.42 (10.57)	12 (10.98)	12	14.5 (11.04)
Duration of DM in years:					
≤5	69(38.55%)	3 (15.79%)	1 (25%)	0	2 (20%)
6-15	77(43.02%)	9 (47.37%)	2 (50%)	1 (100%)	5 (50%)
>15	28(15.64%)	7 (36.84%)	1 (25%)	0	3 (30%)
HGA1c %	8.02 (2)	9.16 (2.08)	8.37 (1.56)	8.8	7.9 (1.5)
HbA1c:					
Controlled ≤7	7 (20.59%)	2 (10.53%)	0	0	4 (40%)
Uncontrolled 701-9	15(44.12%)	9 (47.37%)	2 (50%)	1 (100%)	3 (30%)
Poor control >9	12(35.29%)	8 (42.1%)	2 (50%)	0	3 (30%)
p-value: 0.237					
Management of DM:					
Insulin only	56(31.28%)	4 (21.05%)	0	0	4 (40%)
Oral hypoglycemic drugs only	73(40.78%)	2 (10.53%)	1 (25%)	0	3 (30%)
Both	44(24.58%)	13(68.42%)	3 (75%)	1 (100%)	3 (30%)
p-value: 0.0001**					
Systematic diseases:					
Dyslipidemia	74(41.34%)	12 (63.16%)	2 (50%)	0	1 (10%)
Hypercholesteremia	21(11.73%)	4 (21.05%)	1 (25%)	0	0
Hypertension	13 (7.26%)	8 (42.11%)	0	0	3 (30%)
Thyroids:					
hypothyroidism	18(10.1%)	3 (15.79%)	0	0	0
hyperthyroidism	1 (0.6%)	0	0	0	0
p-value: 0.77					
Nephropathy:					
Present	58 (32.4%)	13 (68.42%)	3 (75%)	1 (100%)	5 (50%)
Absent	119(67.6%)	6 (31.6%)	1 (255)	0	5 (50%)
p-value: 0.802					
GFR mean (SD)	86.1(±28.9)	100 (±26.4)	92.0 (±35.7)	113	97 (±15.7)
Duration of DR in months: mean (SD)	2	4.76 (5.15)	1.75 (0.96)	4	5 (1.73)
BMI grades:					
Underweight	4 (2.23%)	0	0	0	0
Normal	25(14.53%)	2 (10.53%)	1 (25%)	0	2 (20%)
Obese	88(49.16%)	13 (68.42%)	2 (50%)	1 (100%)	3 (30%)

Overweight	61(34.08%)	4 (21.05%)	1 (25%)	0	5 (50%)
p-value: 0.746					

Table 4: 95% Confidence Interval for risk factors of diabetic retinopathy

Variable	With retinopathy	Without retinopathy	p-value	95% Confidence Interval	
				lower bound	Upper bound
Age in years mean (SD)	54.14 (13.12)	51.59 (38.35)	0.406	34.91	48.84
Duration of DM in years: mean (SD):	15.6 (10.26)	8.88 (7)	0.140	0.795	2.35
HGA1c %: mean (SD)	8.57 (1.88)	8.02 (2)	0.119	8.14	11.69
TRIGLYCERIDE (mg/dl): mean (SD)	130.97 (70.03)	150.06 (95.42)	0.515	84.8	198.9
LDL-Cholesterol (mg/dl): mean (SD)	106.64 (51.94)	114.18 (92.02)	0.702	53.04	126.67
systolic blood pressure: mean (SD)	139.4 (24.57)	134.71 (24.52)	0.651	104.8	164.3
diastolic blood pressure: mean (SD)	79.83 (11.32)	79.71 (15.0)	0.818	68.6	94.54
GFR (mL/min/1.73 m2): mean (SD)	99.25 (25.3)	97.94 (19.7)	0.54	53.04	104.8

(Table 5) 95% Confidence Interval for risk factors of different types of diabetic retinopathy.

Variable	Non-proliferative, mild	Non-proliferative, moderate	Non-proliferative, severe	proliferative	p-value	95% Confidence Interval	
						lower bound	Upper bound
Age in years mean (SD)	53.16 (14.51)	55.75 (5.32)	55 (27.8)	55.3(14.02)	0.49	43.48	60.83
Duration of DM in years: mean (SD):	16.42 (10.57)	12 (10.98)	12	14.5 (11.04)	0.983	1.49	2.58
HGA1c %: mean (SD)	9.16 (2.08)	8.37 (1.56)	8.8	7.9 (1.5)	0.654	7.26	9.67
TRIGLYCERIDE (mg/dl): mean (SD)	130.76 (47.34)	139.75 (30.83)	53	149 (113.76)	0.487	71.83	143.88
LDL-Cholesterol (mg/dl): mean (SD)	110.78 (66.39)	95.58 (34.75)	70	106.07 (20.49)	0.767	69.1	116.9
systolic blood pressure: mean (SD)	144.39 (25.54)	139.75 (33.0)	133	126 (15.96)	0.469	115.58	152.84
diastolic blood pressure: mean (SD)	79.94 (12.24)	80.5 (15.42)	86	78.57 (8.3)	0.973	72.88	90.14
GFR (mL/min/1.73 m2): mean (SD)	93.55 (22.6)	101.63 (33.5)	86.56	112.8 (25.3)	0.23	76.32	124.7

Duration of DR in months: mean (SD)	2 (2.16)	4.76 (5.15)	1.75 (0.96)	4(4.31)	0.043*	2.61	4.48

DISCUSSION

Diabetes is a disease having many complications which can lead to disabilities like blindness and death .23.7% of population in Saudi Arabia has diabetes [(22)] which is very high. This high percentage makes us anxious and terrified about its complications as well .One of its main complications which can lead to blindness and we are considering in our research is Diabetic retinopathy .

In our study the prevalence of DR is 16% which is closely the same in some countries : 19% UAE [(23)], 8-12% in two different studies in Kuwait [(31)] and 18% in India [(24)]. But it's much lower than Oman 42.4% [(25)], Jordan 64% [(26)], Egypt 42% [(27)] and the global prevalence 34.6% [(28)] and lower than other regions in Saudi Arabia :Riyadh 31%,Al-Hassa30% and Madina 36.8 % [(29,30,31).] The prevalence of DR in Taif in another study is 36.8% [[20]] which is much higher than our study the reason is that in our study we had a small sample size 213 diabetic patient but in that study (Taif,2012) they have used 980 diabetic patient this variation of prevalence due to they used clinical examination while we used the data in diabetic patients files and because of the limited data in their files in the Taif diabetic center we had a small sample size.

The mild grade of DR was the most common one which is the same result in the most of the studies ;AL-Hassa [(21)] .The sever grade wasn't common. The result in our study showed that as the duration of diabetes is increased the prevalence of DR increases as well and that what most of studies have documented [(18,21,23,25,29,30)] .DR was more common in patient uses oral hypoglycemic drugs only and least in patient uses both insulin and oral hypoglycemic drugs.

Once the diabetes is controlled which is known by HBA1C the chance of having DR is less than what has been found in our study .BMI in our study showed that obesity is a significant risk factor for DR and that's the same as the studies in UAE and Tehran [(23,30)].

Comorbidities: hypercholesterolemia ,dyslipidemia and thyroid disorders have no positive association with DR that what has documented in Riyadh[(29)]. In our study these comorbidities are more common in mild grade of PDR. In studies from Jordan and Oman have found hypertension as a risk factor for DR .but in this study it wasn't significant risk factor. And a study in Oman has found nephropathy as a significant risk factor . but in our study it wasn't significant risk factor[(25,26)].

In this study the development of DR is mainly because poor control, longer duration of diabetes and using insulin. The limitation of our study is that data in patient files is incomplete even that we used all the complete files which are available in the determined period.

CONCLUSION

Among the participating patients , our study showed a high prevalence of diabetic retinopathy especially with male patints , high (HbA1c) and longer duration of diabetes. we have recommended a national plan for educational programs about diabetic retinopathy and important of Eye examination andOur study showed that certain risk factors may enhance the progression of DR and there control may play a significant role in the prevention of visual impairment . Furthermore, our study highlights the importance of risk based screening for DR.

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