

Assessing the Risk Factors for Diabetes Retinopathy Patients in Al-Nasiriya City, Iraq

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ABSTRACT

Context: The World Health Organization estimates that by 2030, Iraq will have 2,009,000 new case of diabetes.

Aim: To assess the risk of diabetic retinopathy (DR) among diabetes patients in Al-Nasiriya city, Southern Iraq.

Methodology: A study of cases and controls was presented with a total of 220, of them 110 cases and 110 control. Patients with Diabetics mellitus (DM) attending follow-up check-ups regularly at diabetes and endocrinology center in Nasiriya city from the period March1, 2018 to May 31, 2018 were considered as our study population. Chi-square tests is applied to analyze the association between visual impairment and risk factors, in addition multivariate logistic regression is used to explore odds ratio and 95% confidence interval for the association among visual impairment and risk factors. $p < 0.05$, identified as statistically significant.

Results: Factors such as age, gender, educational level, BMI, family history, hypertension, treatment type and glycemic control which showed a significant association between cases and control on DR. The significant factors influencing DR were analyzed in multivariate logistic regression. We observed secondary education level, BMI, family history, treatment type and glycemic control occurred as significant independent risk factors for the incidence of DR.

Conclusion: Our analysis reflect the necessity of prevention of the identified risk factors, which appears in our findings. Our study endorsed that a population based study can be conducted in future to examine the risk factors in different parts of Iraq to provide accurate data on the cause of DR and predict the correct result.

Keywords: Association, Diabetics Mellitus, Diabetic Retinopathy, Risk Factors, Visual Impairment

Introduction

In 2035 worldwide it is estimated that 592 million of people with diabetics mellitus (DM) were observed under the age group 20-79.^[1] The general pervasiveness of diabetes in Iraq was 21.8 for each 1000 in 2007. The

World Health Organization (WHO) estimates that by 2030, Iraq will have 2,009,000 new case of diabetes.^[2] In 1999, WHO organized a vision 2020 program to reduce the preventable blindness globally by 2020 and discussed the cause and trends of visual impairment.^[3] By 2020 it has been estimated that the prevalence of visual impairment would be double, if the necessary actions to reduce about 80% reasons of preventable visual impairment are not taken.^[4] From late 1970's, only very few literature revealed the incidence and prevalence of diabetic retinopathy (DR) in persons with DM.^[5]

One of the major feared disabilities that a common person can suffer is visual impairment. Persons with DM observe DR and visual impairment as the most awful problem of diabetes, since they cannot achieve or

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complete their work by them self.^[6] A study focused to understand the DR patients view,^[7] has concluded that a risk factor to the quality of life with type 1 or 2 diabetes, in their later stages of life and explained the various psychometric properties of the commonly used scales which leading to different results.

DM patients are at higher risk of developing ocular impairment which changes the retina and blindness that leads to an eye complication i.e. DR.^[8] It's a microvascular complications of DM influence the small blood vessels that connect eye's veins to arteries, it occur secondary due to elevation of blood sugar and consider as the most important cause for impairment of vision and blindness in diabetes patients. Over one third of DM patients will develop some form of DR in their lifetime and the risk increase with duration and uncontrolled diabetes.^[9,10] Management of DM should not only depended on reduction of blood glucose level but also should concentrate on monitoring and treatment of any associated risk factors such as hyperlipidemias, smoking, obesity and treatment hypertension. The prime motifs of diabetes treatment are identified as diet with exercise, oral hypoglycemic therapy and insulin treatment because the previous factors have an important role on the occurrence of DR.^[11,12] Therefore, this research aim to assess the risk of DR among diabetes patients in Al-Nasiriya city, Southern Iraq.

Materials and Method

A study of cases and controls was presented with a total of 220, of them 110 cases (with eye diseases related to diabetes) and 110 control (without eye diseases related to diabetes). Patients with DM (Type 1 or Type 2) attending follow up check-ups regularly at diabetes and endocrinology center in Nasiriya city from the period of 1 March 2018 to 31 May 2018 were considered as our study population. Among the study population, those who suffered from DM with the age group of 35 years and above were included in this study. Besides, an ethical clearness and approval were taken from each patient prior to the commencement of the study.

Definition of DM: DM is a metabolic trouble characterized by entire (Type 1) or proportional (Type 2) insulin deficiency.^[13] Type 1, DM is known as insulin-dependent DM or adolescent beginning diabetes. It represents around 5% of all cases of diabetes. Type 2, DM also named as non-insulin dependent DM or adult-

onset diabetes is the most widely recognized type of DM, which accounts for 90% to 95% of every diabetic patient.^[14]

Data Collection

A closed questionnaire method was investigated by the first author. We collected the information on socio-demographic (age, gender, education level) which is first part of data collection. Associated conditions of DR (smoking, Body mass index (BMI), diabetic type, family history, duration, hypertension, treatment type, glycemic control) constitutes the second part of data collection. BMI was measured as weight kg/height m². The patients were classified into subgroups according to WHO BMI measures as underweight (<18.5 kg/m²); normal weight (18.5-25 kg/m²) and overweight (25.00-29.99 kg/m²).^[15]

Statistical Analysis: In this study, Chi-square tests is analyze the association between visual impairment and risk factors (age, gender, education, smoking, BMI, diabetic type, family history, duration, hypertension, treatment type and glycemic control). In addition, multivariate logistic regression analysis is used to explore odds ratio (OR) and 95% confidence interval (CI) among visual impairment (dependent variable) and risk factors. $p < 0.05$ (two tailed), identified as statistically significant. All statistical tests were done using the software Statistical Package of Social Science (SPSS) IBM version 20.

Results

The results on descriptive characteristics of study sample and chi-square tests were reviewed and described as follows. With regard to age group, 41.8% of cases and 43.6% of control are observed between the age of 55-64 years. A significant association ($p < 0.05$) was observed between cases and control with regard to age group. The gender wise distribution indicated that 46.4% of cases and 67.3% of control are males. The association between cases and control is found statistically significant with respect to gender ($p < 0.05$). The Majority of study sample from control 60% are belonged to university group and 40% from case are illiterate. Furthermore, there is a significant association between education level and DR ($p < 0.05$). In case of smoking status, no statistical association ($p > 0.05$) is observed between cases and control. Besides, 61.8% of cases 67.3% of

control are observed non-smokers. When reviewing the results related to BMI, the majority of study cases group was observed as normal weight (53.6%) whereas the majority of control group observed as overweight (75.5%), a significant association between BMI and DR is observed ($p<0.05$).

Moreover, a significant association ($p>0.05$) is found between cases and control with respect to the type of diabetics and 91.2% cases and 85.5% control were presented under type 2 diabetic. With regard to family history of DR 73.6% of cases and 50.9% of control had family history of DR. There is a statistical significant association between cases and control ($p<0.05$). The duration of DR reveal that higher percentage of 57.3% cases and 51.8% control were found with above 10 years, while lower percentage was observed in patient having less than 5 years. However, the association between duration type and DR was found as non-significant ($p>0.05$). In case of hypertension 50.9% of cases and 66.4% of control had no hypertension. There is a statistical significant association between cases and control ($p<0.05$). Oral intake of insulin as treatment was observed in 65.5% of cases and 85.5% control. Results showed that there is a statistically significant association between cases and control ($p<0.05$). Results on glycemetic control showed that 75.5% of cases and 50.9% of control were observed with poor glycemetic control. In addition, the chi-square test indicated there is a statistically significant association between cases and control ($p<0.05$).

Furthermore, the factors such as age, gender, educational level, BMI, family history, hypertension, treatment type and glycemetic control which showed a statistically association between cases and control were analyzed to find out their statistical significant influence on DR using multivariate logistic regression model. The significant factors influencing DR were identified based on the values of odd ratio (OR), confidence interval (CI), Wald value and p-value in multivariate logistic regression model [Table 1]. Results showed that age group of 45-54 years (CI of 0.005-1.637) had 0.086 times of higher risk of prevalence evolving DR (Wald=2.664, $p>0.05$) when compared to other age groups, however all age groups showed non-significant. In education level, primary education showed 17.324 (CI of 3.264-69.436) times of higher risk of evolving DR (Wald=6.913, $p>0.05$), but only secondary education is found to be significant on evolving DR. BMI and Family history were identified as the main risk factor with ($p<0.005$), the OR showed a high risk value in multiple logistic regression. Treatment type and glycemetic control seemed to be a statistically significant risk factor for the incidence of DR. The OR was very less with statistically significant. However, the gender showed no statistical significance on evolving DR (Wald=0.622, $p>0.05$) with OR=0.377 (CI of 0.033-4.261). Likewise, hypertension was not found to produce statistically significance on evolving DR (Wald=0.045, $p>0.05$). Therefore, secondary education level, BMI, family history, treatment type and glycemetic control occurred as significant independent risk factors for the incidence of DR.

Table 1: Demographic characteristics and other attributes: Multivariate logistic regression analysis

Variable	Group	Odds ratio (95%CI)	Wald	p
Age	35-44	.012 (0.009-1.537)	3.187	0.74
	45-54	.086 (0.005-1.637)	2.664	0.103
	55-64	.079 (0.006-1.127)	3.505	0.061
	Above 65	References		
Gender	Male	.377 (0.033-4.261)	0.622	0.430
	Female	References		
Education level	Illiterate	5.994 (0.534-67.346)	2.105	0.147
	Primary	17.324 (3.264-69.436)	6.913	0.269
	Secondary	9.444 (1.099-81.152)	4.186	0.041*
	University	References		
BMI	Under weight	22618.5 (187.12-2734100.78)	16.798	0.000*
	Normal weight	6462.56 (109.85-380199.21)	17.811	0.000*
	Over weight	References		

Conted...

Family History	Yes	10.486 (1.250-87.979)	4.689	0.030*
	No	References		
Hypertension	Yes	1.195 (0.231-6.186)	0.045	0.831
	No	References		
Treatment type	Oral	.062 (0.009-0.422)	8.062	0.005*
	Insulin	References		
Glycemic control	Optimal	.012 (0.001-0.115)	14.667	0.000*
	Acceptable	.055 (0.007-0.459)	7.199	0.007*
	Poor	References		

*Statistically significant at 0.05 level

Discussion

In this study the factors influencing the prevalence of DR such as age, gender, educational level, smoking, BMI, diabetic type, family history, duration, hypertension, treatment type and glycemic control were examined. In our study age, gender and hypertension were not found as significant risk factor for DR. Our study revealed that prevalence of DR tend to increase with increasing level of education ($p < 0.05$). It is observed that the patients having secondary education are more likely to have retinopathy when compared to those who are illiterate and having primary education and these patients are also likely to be unemployed, thereby unable to afford the eye care service. The findings of our study is consistent with the results of previous studies.^[16,17] In our study, BMI showed a significant association with DR as underweight and normal weight are the main risk factors for DR. Likewise, several other studies have found an association between DR and BMI presence.^[18,19] Karter *et al.*^[20] identified in north California that the majority of population had a family history of DM. In our study, family history showed a statistically significant association with DR, this findings is consistent with the study by Le *et al.*^[21] Treatment type with oral and insulin showed a significant association with DR, which agreed with the results of El-Haddad and Saad.^[22] Our study showed that the 14.5% of control had the insulin injection, this result is in accord with the results of McCarty *et al.*^[23] A study by Katulanda *et al.*^[24] in Sri Lanka stated that the prolonged coverage of population with hyperglycemia as a risk factor for complications in DR. This could explain the significant association between glycemic control and DR observed in our present study, and the previous studies also highlighted the same association.^[25,26]

Conclusion

Our analysis reflect the necessity of prevention of the identified risk factors, which appears in our findings as education level, BMI, family history, treatment type and glycemic control. Our results focused the growing urgency of DR prevention in the study area as well as the necessity for awareness. Our study endorsed that a population based study can be conducted in future to examine the risk factors in different parts of Iraq to provide accurate data on the cause of DR and predict the correct result.

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