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The analysis of risk factors in term of its association and correlation with diabetic nephropathy progression

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Abstract

Background: Diabetic nephropathy is accounts for mortality and morbidity among more than 20% of patients with diabetes mellitus. This rising prevalence depends on various factors such as, sedentary lifestyles, rapid urbanization, unhealthy diets and substance use/abuse along with increasing life expectancy. Obesity and overweight are also the most important associated risk factors. The onset of diabetes can be prevented or delayed by life style and behavioral changes by taking healthy diet and routine physical activity. Material & Methods: The present case-control study was conducted at department of Department of Medicine of our tertiary care hospital. The study duration was of one year. Patients were enrolled from outdoor and from ward by simple random sampling. Clearance from Institutional Ethics Committee was taken before start of study. Written informed consent was taken from each study participant. Recently diagnosed (<3 months), adults (>18 years), T2DM patients were enrolled in the present study. Results In the present study, out of the total study participants on assessing multi-variate logistic regression for risk factors for diabetic nephropathy among newly diagnosed T2DM subjects we found that age (OR:0.34; P value >0.05), sex (OR:1.19; P value >0.05), smoking (OR:1.32; P value >0.05), BMI (OR:0.56; P value >0.05) and HbA1c levels (OR:2.04; P value >0.05) had statistically non-significant association. Hypertension (OR:2.98; P value <0.05), Family history of diabetes mellitus (OR:1.46; P value <0.05), presence of diabetic retinopathy (OR:2.12; P value <0.05) and Family history of diabetic nephropathy (OR:2.43; P value <0.05) had statistically significant association for diabetic nephropathy among newly diagnosed T2DM subjects.Conclusion: Hypertension, Family history of diabetes mellitus, presence of diabetic retinopathy and Family history of diabetic nephropathy had statistically significant association for diabetic nephropathy among newly diagnosed T2DM subjects.

Key words: diabetes mellitus, chronic kidney disease, diabetic nephropathy.

Introduction

The prevalence of non-communicable diseases is increasing compared to communicable diseases (1). Among the non-communicable diseases, diabetes mellitus is rapidly increasing globally and affecting all the age groups (2). Diabetes is a chronic disease in etiology and occurs when the pancreas does not produce enough amount of insulin or when there is resistance towards its action on the body (3). In 2014, WHO reports that 8.5% of adults who aged 18 years or above had diagnosed with diabetes (4). In 2016, WHO reports that diabetes was the directly responsible for 1.6 million mortality occurred worldwide. It was estimated that by the year 2030 diabetes will became seventh leading cause of mortality worldwide. Diabetes mellitus is most common leading cause of end stage renal disease (5).

Diabetic nephropathy is accounts for mortality and morbidity among more than 20% of patients with diabetes mellitus (6). This rising prevalence depends on various factors such as, sedentary lifestyles, rapid urbanization, unhealthy diets and substance use/abuse along with increasing life expectancy. Obesity and overweight are also the most important associated risk factors. The onset of diabetes can be prevented or delayed by life style and behavioral changes by taking healthy diet and routine physical activity (7). For this purpose, the current study was conducted to assess the association and correlation of risk factors for diabetic nephropathy among recently diagnosed T2DM subjects.

Materials & methods

The present case-control study was conducted at department of Department of Medicine of our tertiary care hospital. The study duration was of one year. Patients were enrolled from outdoor and from ward by simple random sampling. Clearance from Institutional Ethics Committee was taken before start of study. Written informed consent was taken from each study participant. Recently diagnosed (<3 months), adults (>18 years), T2DM patients were enrolled in the present study.

All study participants who went through test for urine albumin-to creatinine ratio, at least two times, at 6 weeks apart, in a period of 6-month, were enrolled for the study. Patients with already diagnosed kidney diseases or had features of glomerulonephritis, patients with systemic diseases like vasculitis or systemic lupus erythematosus, patients with history of recent fever and urinary tract infection and pregnancy were excluded from the study. Patients with urine albumin-to creatinine ratio ³30 mg/g in at least two of three (if done) samples were enrolled as cases and those with urine albumin-to creatinine ratio <30 mg/g were enrolled as controls. The test of significance of contrast between two groups) was utilized to decide the measurable centrality of the information by applying the t test at alpha 0.5 and 95% confidence interval.

Results

In present study, we enrolled 60 study participants, out of them 30 were cases and 30 were controls. The age of study participants was ranged from 34 years to 76 years. The mean age of cases was 48.4 ± 2.9 years and mean age of controls was 44.4 ± 2.1 years. Males 54% were likely affected more than females 46% in cases while among controls 48% were males and 52% were females. The mean BMI of cases was 26.6 ± 3.47 and mean BMI of controls was 24.6 ± 2.41. Family history of diabetes mellitus was present in all 30 cases and in 20 controls. Family history of diabetic nephropathy was found in 16 patients and in 4 controls. hypertension was present as risk factor among 22 cases and among 22 controls. Dyslipidemia was present as risk factor among 24 cases and among 9 controls. Smoking was present as risk factor among 11 cases and among 8 controls. Mean fasting blood glucose was 9.90±1.89 mmol/L among cases and 8.43±3.28 mmol/L among controls. Mean blood glucose after 2 hours (mmol/L) was 15.11±2.52 among cases and 12.61±4.72 mmol/L among controls. Mean HbA1c (%) was 8.18±1.11among

cases and 6.95±1.44 among controls.

In the present study, out of the total study participants on assessing the association of risk factors for diabetic nephropathy among newly diagnosed T2DM subjects we found that age (OR:0.52; P value >0.05), sex (OR:1.12; P value >0.05), smoking (OR:1.56; P value >0.05), BMI (OR:0.34; P value >0.05), presence of diabetic retinopathy (OR:2.12; P value >0.05) and HbA1c levels (OR:2.09; P value >0.05) had statistically non-significant association. Hypertension (OR:3.23; P value <0.05), Family history of diabetes mellitus (OR:1.59; P value <0.05) and Family history of diabetic nephropathy (OR:1.59; P value <0.05) had statistically significant association for diabetic nephropathy among newly diagnosed T2DM subjects. (Table 1)

Table 1: Risk factors for diabetic nephropathy among newly diagnosed T2DM subjects

Study parameters	Odds ratio	P value
Age	0.52	>0.05
Sex	1.12	>0.05
Hypertension	3.23	<0.05
Smoker	1.56	>0.05
Family history of diabetes mellitus	1.59	<0.05
Family history of diabetic nephropathy	2.53	<0.05
BMI	0.34	>0.05
Presence of diabetic retinopathy	2.12	>0.05
HbA1c	2.09	>0.05

In the present study, out of the total study participants on assessing multi-variate logistic regression for risk factors for diabetic nephropathy among newly diagnosed T2DM subjects we found that age (OR:0.34; P value >0.05), sex (OR:1.19; P value >0.05), smoking (OR:1.32; P value >0.05), BMI (OR:0.56; P value >0.05) and HbA1c levels (OR:2.04; P value >0.05) had statistically non-significant association. Hypertension (OR:2.98; P value <0.05), Family history of diabetes mellitus (OR:1.46; P value <0.05), presence of diabetic retinopathy (OR:2.12; P value <0.05) and Family history of diabetic nephropathy (OR:2.43; P value <0.05) had statistically significant association for diabetic nephropathy among newly diagnosed T2DM subjects. (Table 2)

Table 2: Multi-variate logistic regression for risk factors for diabetic nephropathy among newly diagnosed T2DM subjects

Study parameters	Odds ratio	P value
Age	0.34	>0.05
Sex	1.19	>0.05
Hypertension	2.98	<0.05
Smoker	1.32	>0.05
Family history of diabetes mellitus	1.46	<0.05
Family history of diabetic Nephropathy	2.43	<0.05
BMI	0.56	>0.05
Presence of diabetic retinopathy	2.12	<0.05
HbA1c	2.04	>0.05

Discussion

In present study, we enrolled 60 study participants, out of them 30 were cases and 30 were controls. The age of study participants was ranged from 34 years to 76 years. The mean age of cases was 48.4 ± 2.9 years and mean age of controls was 44.4 ± 2.1 years. Males 54% were likely affected more than females 46% in cases while among controls 48% were males and 52% were females. The mean BMI of cases was 26.6 ± 3.47 and mean BMI of controls was 24.6 ± 2.41. Family history of diabetes mellitus was present in all 30 cases and in 20 controls. Family history of diabetic nephropathy was found in 16 patients and in 4 controls. hypertension was present as risk factor among 22 cases and among 22 controls. Dyslipidemia was present as risk factor among 24 cases and among 9 controls. Smoking was present as risk factor among 11 cases and among 8 controls. Mean fasting blood glucose was 9.90±1.89 mmol/L among cases and 8.43±3.28 mmol/L among controls. Mean blood glucose after 2 hours (mmol/L) was 15.11±2.52 among cases and 12.61±4.72 mmol/L among controls. Mean HbA1c (%) was 8.18±1.11among cases and 6.95±1.44 among controls. Similar result was found in a study conducted by Rahim M et al among 100 patients of diabetic nephropathy. They reported Mean age was 46.6 years and there was female predominance. 25% patients were smokers, 50% were hypertensive and 40% had dyslipidemia. 60% of the study participants had positive family history of diabetes and 40% had family history of diabetic nephropathy. Mean body mass index (BMI) was 26.26±2.97 kg/m2 (8).

In the present study, out of the total study participants on assessing the association of risk factors for diabetic nephropathy among newly diagnosed T2DM subjects we found that age (OR:0.52; P value >0.05), sex (OR:1.12; P value >0.05), smoking (OR:1.56; P value >0.05), BMI (OR:0.34; P

value >0.05), presence of diabetic retinopathy (OR:2.12; P value >0.05) and HbA1c levels (OR:2.09; P value >0.05) had statistically non-significant association. Hypertension (OR:3.23; P value <0.05), Family history of diabetes mellitus (OR:1.59; P value <0.05) and Family history of diabetic nephropathy (OR:1.59; P value <0.05) had statistically significant association for diabetic nephropathy among newly diagnosed T2DM subjects. Similar result was found in a study conducted by Deepa DV et al among 100 patients of diabetic nephropathy. They reported Mean age was 54.05 ± 13.24 years with male to female ratio of 1.6:1. The prevalence of diabetic nephropathy, neuropathy was 37% (9).

In the present study, out of the total study participants on assessing multi-variate logistic regression for risk factors for diabetic nephropathy among newly diagnosed T2DM subjects we found that age (OR:0.34; P value >0.05), sex (OR:1.19; P value >0.05), smoking (OR:1.32; P value >0.05), BMI (OR:0.56; P value >0.05) and HbA1c levels (OR:2.04; P value >0.05) had statistically non-significant association. Hypertension (OR:2.98; P value <0.05), Family history of diabetes mellitus (OR:1.46; P value <0.05), presence of diabetic retinopathy (OR:2.12; P value <0.05) and Family history of diabetic nephropathy (OR:2.43; P value <0.05) had statistically significant association for diabetic nephropathy among newly diagnosed T2DM subjects. Similar result to present study was obtained in a study conducted by Iraj H et al among 200 patients of diabetic mellitus. They reported Mean age was 48.05 ± 8.24 years with male to female ratio of 1.8:1. The prevalence of diabetic nephropathy, neuropathy was 52% (10). Similar result to present study was obtained in a study conducted by Aravind S et al among patients of diabetic mellitus. They reported of the total 4,600 (males 67%, females 33%) patients with T2D, majority were from the age group 41-50 years (40%). 13.15% of newly detected India T2D had 1.06% had nephropathy. Risk factors of macro vascular complication such as hypertension, obesity, and dyslipidemia were observed in 23.3%, 26%, and 27% of patients respectively (11).

Conclusion

We concluded from the present study that Hypertension, Family history of diabetes mellitus, presence of diabetic retinopathy and Family history of diabetic nephropathy had statistically significant association for diabetic nephropathy among newly diagnosed T2DM subjects. However, for the generalization of present study results large multicentric studies required with larger sample size.

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