

A study of prevalence of chronic kidney disease in type II diabetes mellitus patients at a tertiary health care centre

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Abstract

Background: CKD is seen in majority of the patients of diabetes mellitus. CKD increases the frequency of cardiovascular disease episodes and progresses to end-stage renal disease (ESRD). **Aim and objective:** To study the prevalence of chronic kidney disease in type II diabetes mellitus patients at a tertiary health care centre. **Methodology:** Present study was a prospective study carried out in diabetic clinic at tertiary health care centre. Study population was diagnosed cases of type II diabetes mellitus visiting diabetic clinic at a tertiary health care centre. Data was collected with pre tested questionnaire. Patients were considered as having CKD when they have low eGFR (<60 ml/min/1.73 m²) and/or increased ACR (≥ 30 mg/g or ≥ 3 mg/mmol). Stages of CKD were determined according to KDQOI (Kidney Disease Outcomes Quality Initiative) guidelines. **Results:** Mean age of the patient in our study was 48.25 ± 4.6 years. Male to female ratio in our study was 1.17:1. Mean serum creatinine was 1.2 ± 0.4 mg/dl Mean urine creatinine was 98.6 ± 13.27 mg/dl and Mean urine albumin was 134.5 ± 68.31 mg/l. In our study we found that prevalence of CKD in type II diabetes mellitus was 51.3%. Mean GFR of the patient was 78.41 ± 17.11 ml/min/1.73 m². Mean ACR of the patient was 113 ± 24.5 mg/g.

Key Word: chronic kidney disease, DM.

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INTRODUCTION

Diabetes mellitus is an endocrine disorder affecting multiple organs. Type II diabetes mellitus commonly seen in persons above 40 years. It is known as non insulin dependent diabetes mellitus. Chronic kidney disease is a slow and progressive loss of kidney function over a

period of several years. CKD patients usually have few or no symptoms, especially in the earlier stages, so many of the patients are not aware that they have the disease. Risk factors for CKD include diabetes, hypertension and specific kidney diseases like polycystic kidney disease. Diabetes and hypertension, are responsible for up to two-thirds of the cases. CKD is classified into five stages based on the level of GFR.¹ Stage 1 refers to the mildest stage of CKD while stage 5 indicates kidney failure. Kidney damage is assessed using albuminuria and using the albumin-to-creatinine ratio (ACR) Various studies in past indicate Diabetes mellitus and hypertension as important risk factors in development of CKD. In a study conducted in the USA, diabetes and hypertension were responsible for more than 50% of cases of End Stage Renal Disease², and in a study conducted in Khuzestan, Iran, diabetes was the most common cause of disease and glomerulonephritis was responsible for about 10% of

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cases.³ Due to higher prevalence and lack of symptoms in earlier phase early detection of CKD is very important. This study was conducted to find the prevalence of CKD in type II Diabetes mellitus patients

METHODOLOGY

Present study was a prospective study carried out in diabetic clinic at tertiary health care centre. Study population was diagnosed cases of type II diabetes mellitus visiting diabetic clinic at a tertiary health care centre. **Inclusion criteria:** 1. Patients diagnosed as type II diabetes mellitus. 2. Patients above 18 years **Exclusion criteria:** 1. Patients below 18 years 2. Pregnant woman 3. Patients with type I diabetes mellitus, acute kidney injury 4. Patients with renal transplant or patients on dialysis 5. Patients not willing to participate Present study was approved by ethical committee. A written valid consent was taken from the patients after explaining study to them. Data was collected with pre tested questionnaire. Data included sociodemographic data like age, sex, socioeconomic status. Detailed history of the patient was taken. Through clinical examination was done. All patients underwent laboratory investigations like HbA1c, kidney function tests and routine urine analysis. Patients were considered as having CKD when they have low eGFR (<60 ml/min/1.73 m²) and /or increased ACR (≥ 30 mg/g or ≥ 3 mg/mmol). Stages of CKD were determined according to KDQOI (Kidney Disease Outcomes Quality Initiative) guidelines.⁴ ACR was calculated from creatinine in urine and microalbuminuria result. GFR was calculated by Modification of Diet in Renal Disease (MDRD) equation.⁵ Data was analysed with appropriate statistical tests.

RESULTS

We studied 1000 patients. Table 1 shows distribution of patients according to age group. Majority of the patients were in the age group of 51-60 years (37%) followed by 41-50 years. In the age group of 31-40 years there were 11% patients. Patients above age of 60 years contributed 22% of all. Mean age of the patient in our study was 48.25 ± 4.6 years. In our study we found that out of total 1000 patients 540 were males and 460 were females. Male to female ration in our study was 1.17:1. Table 2 shows baseline characteristics of the enrolled patients. mean weight of the patients was 72.3 ± 4.2 kgs. Mean waist circumference was 98 ± 7.4 cm and mean BMI was 29.3 ± 2.8 kg/m². Duration of diabetes varies in our patients. Mean duration of diabetes was 8.3 ± 2.1 years. Duration ranged from 10 months to 20 years. We carried out blood investigations like HBA1c (glycated hemoglobin) and serum creatinine to assess the blood sugar level and renal status. Mean HBA1c was 8.7 ± 1.1 .

Mean serum creatinine was 1.2 ± 0.4 mg/dl. To analyse the CKD stage we performed urine creatinine and urine albumin. Mean urine creatinine was 98.6 ± 13.27 mg/dl and Mean urine albumin was 134.5 ± 68.31 mg/l. In our study we found that prevalence of CKD in type II diabetes mellitus was 51.3%. Table 3 shows distribution of patients according to categories of CKD. CKD was categorized according to GFR (Glomerular Filtration Rate) and ACR (albumin creatinine ratio). GFR values considered for categorization were G1- ≥ 90 ml/min/1.73 m², G2-60-89 ml/min/1.73 m², G3a - 45-59 ml/min/1.73 m², G3b-30-44 ml/min/1.73 m², G4 - 15-29 ml/min/1.73 m² and G5 - <15 ml/min/1.73 m². ACR values according to category were A1 - <30 mg/g, A2 - 30-300 mg/g and A3 - >300 mg/g. Mean GFR of the patient was 78.41 ± 17.11 ml/min/1.73 m². Mean ACR of the patient was 113 ± 24.5 mg/g. In our study GFR was mildly decreased in 46.2% patients. It was normal to high in 29.7% individuals and mild to moderately decreased in 12.7% individuals. Kidney failure was observed in 9 patients (0.9%). ACR was normal to mildly increased in 61.8% patients. it was moderately increased in 27.4% patients and severely increased in 10.8% patients.

Table 1: Distribution of type II diabetes mellitus patients according to age group

Sr no	Age group (years)	No of patients	Percentage
1	18-30	70	7
2	31-40	110	11
3	41-50	230	23
4	51-60	370	37
5	>60	220	22

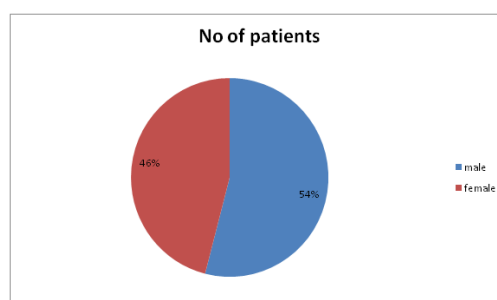


Figure 1: distribution of type II diabetes mellitus patients according to sex

Table 2: Baseline characteristics of the patients with type II diabetes mellitus

Sr No	Parameters	Mean \pm SD
1	Weight (kg)	72.3 ± 4.2
2	Waist circumference (cm)	98 ± 7.4
3	BMI (kg/m ²)	29.3 ± 2.8
4	Duration of diabetes (years)	8.3 ± 2.1
5	HBA1c	8.7 ± 1.1
6	Serum creatinine (mg/dl)	1.2 ± 0.4
7	Urine creatinine (mg/dl)	98.6 ± 13.27
8	Urine albumin (mg/l)	134.5 ± 68.31

Table 3: Distribution of diabetic patients according to categories of CKD

Sr no	Categories in CKD	No of patients (1000)	Percentage (100%)
1	GFR categories in CKD		
2	G1 (Normal or High)	297	29.7%
3	G2 (Mildly decreased)	462	46.2%
4	G3a (Mild to moderately decreased)	127	12.7%
5	G3b (moderately to severely decreased)	74	7.4%
	G4 (Severely decreased)	31	3.1%
6	G5 (Kidney Failure)	09	0.9%
7	ACR categories in CKD		
8	A1 (Normal to mildly increased)	618	61.8%
9	A2 (Moderately increased)	274	27.4%
10	A3 (Severely increased)	108	10.8%

DISCUSSION

We studied 1000 patients. Majority of the patients were in the age group of 51-60 years (37%) followed by 41-50 years. Male to female ration in our study was 1.17:1. Mean urine creatinine was 98.6±13.27 mg/dl and Mean urine albumin was 134.5±68.31 mg/l. Mean GFR of the patient was 78.41±17.11 ml/min/1.73 m². Mean ACR of the patient was 113±24.5 mg/g. In our study we found that prevalence of CKD in type II diabetes mellitus was 51.3%. In our study GFR was mildly decreased in 46.2% patients. It was normal to high in 29.7% individuals and mild to moderately decreased in 12.7% individuals. Kidney failure was observed in 9 patients (0.9%). ACR was normal to mildly increased in 61.8% patients. it was moderately increased in 27.4% patients and severely increased in 10.8% patients. Previous studies showed different prevalence of CKD in type II diabetes mellitus. In a study by Vinagre *et al* they found prevalence of 20% for RI and 16.7% for albuminuria.⁶ In a study by van der Meer *et al*⁷ observed that 27.6% of DM2 patients had CKD and that 13.6% of these DM2 patients had albuminuria. In a study by Plantinga *et al*⁸ it was observed that 32.9% of U.S population had CKD and that 19.4% of these patients had albuminuria. In another study by Lou Arnal *et al*⁹ they found 34.5% of the patients with diabetes mellitus have CKD. 16.1% of patients had albuminuria. and 9.4% of the patients with eGFR ≥ 60 ml/min/1.73 m² had albuminuria. In a study by New JP *et al*¹⁰ it was seen that 31% of diabetic patients had a GFR<60ml/min/1.73 m² and 37% of these patients had albuminuria. Thomas *et al*.¹¹ observed that 23.1% of DM2 patients had a GFR < 60 ml/min/ 1.73 m² and that 34.6% of these patients had albuminuria (27.3% microalbuminuria and 7.3% macroalbuminuria). Pugliese

*et al*¹² found that the prevalence of RI was 18.7% and CKD 37.5% with the MDRD Study equation.

CONCLUSION

Higher prevalence of CKD in type II diabetes mellitus patients signifies early screening of renal function tests in diabetic patients.

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