

ADSTRACT Introduction:Diabetic nephropathy or Diabetic Kidney Disease is the leading cause of ESRD. Microalbuminuria has recently emerged as a marker of widespread vascular damage in type 2 diabetes mellitus. Its early detection helps in preventing or reversing the progression of renal damage by medical Intervention. This study aims to detect individuals having DM with undiagnosed chronic kidney disease i.e. to detect the incidence of diabetic nephropathy in type 2 DM, using the mellitus was carried out by estimating microalbuminuria (Micral test). RESULTS: 74% of Newly diagnosed patients had FBS value in the range of 120-200mg/dl, followed by 12% and 8% had FBS of 200-250 and 250-300mg/dl respectively. 46% of recently diagnosed diabetics had FBS value in the range of 120-200mg/dl, followed by 12% and 8% had FBS of 200-250 and 250-300mg/dl, followed by 16% and 10% had 7PBS values of 300-400 and <200mg/dl respectively. 32% of Recently diagnosed diabetics had PPBS in the range of 200-300mg/dl, followed by 26% each in the range of 300-400mg/dl and200mg/dl. Total prevalence of Microalbuminuria was 32% (32 patients), where in 20 patients were Newly diagnosed Diabetics and 12 patients were Recently diagnosed Diabetics. Conclusion: Microalbuminuria is not only an indicator of incipient Nephropathy but also a marker of severe disease with widespread vascular damage. Hence all the patients who have been newly diagnosed with Diabetes must be investigated for Microalbuminuria and appropriate treatment options or Preventive Strategies to be taken for the same.

INTRODUCTION

In 1997, 143 million diabetics were present worldwide 1997 and estimated to be 300 million by 2025(WHO). 1 The three countries with the largest number of diabetics are China, India and United States during 1995. 19.4 million of Indian population were diabetics and the number may rise to 57.2 million by 2025.²

Diabetic nephropathy or Diabetic Kidney Disease is the leading cause of End Stage Renal Disease (ESRD). Proteinuria in individuals with diabetes is associated with increased risk of cardiovascular disease. Microalbuminuria has recently emerged as a marker of widespread vascular damage in type 2 diabetes mellitus. Its early detection helps in preventing or reversing the progression of renal damage by medical Intervention.³⁴⁵

This study aims to detect individuals having DM with undiagnosed chronic kidney disease i.e. to detect the incidence of diabetic nephropathy in type 2 DM, using the Microalbuminuria method. Because nephrologists are focusing predominantly on renal replacement therapy programs for patients with ESRD, the International Society of Nephrology issued a call of action to pay attention to patients with earlier CKD and the most cost effective and preferred method right now is microalbuminuria method.

Aims and Objectives:

To find out the incidence of diabetic nephropathy at the time of diagnosis and recently diagnosed type —II DIABETES MELLITUS.

A study of incidence of diabetic nephropathy in patients with type II diabetes mellitus, attending in our hospital was carried

out in department of medicine from period of 15/9/2006 to 31/6/2008.

Inclusion Criteria: All male and female patients belonging to the age group of 30 to 75 years. Newly diagnosed are those who had no prior knowledge of their diabetic condition and diagnosed as diabetic for the first time. Recently diagnosed are those who know about their diabetic condition since past 6 months.

Exclusion Criteria: All the patients with Type I Diabetes Mellitus, who have impaired glucose tolerance, pregnant females with or without Gestational Diabetes Mellitus and/or Diabetes mellitus.

The selected patients were studied in detail with history and physical examination.

1. Patients characteristics age, sex, age of onset, whether newly diagnosed or recently diagnosed is noted.

2. All details regarding the presenting complaints were noted.

3. Past history of any other disease

4. The drugs the patients were taking if any and dosage were noted.

5. The family history regarding diabetes was taken.

6. Personal history like smoking, alcohol consumption, drug intake was noted.

7. Height and weight were measured in all cases and Body (BMI) was calculated by weight in kg/height in mt2.

8. Hypertension, peripheral Neuropathy present or absent.

9. Fundus examination was done in all patients for evidence of proliferative retinopathy.

Investigations:

Micral test (immunological rapid dip stick semi qualitative test)

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for microalbuminuria in all cases(Sensitivity of the kit was 0.4ng/ml and measuring range is 0.8 — to 10ng/ml). Fasting and Post Prandial Blood sugar, Blood urea, Serum creatinine, Urine (ketone and sugar) were estimated.

Specimen collection:

Afebrile patients first morning mid stream urine sample collected. Test strip was immersed in urine such that fluid level was between two black bars for 5 seconds. Strip was placed horizontally across the urine vessel and color change in test zone was compared with color scale after 1 minute.

RESULTS

Age & sex distribution:

Total numbers of 100 Diabetic patients were selected. Out of which 50 were Newly diagnosed and the rest 50 were Recently diagnosed Type II Diabetic patients. Their age ranged from 30 to 75.

Table 1: Age and Sex Distribution

Age in Years	Male	Female	Total	Percent
30 to 40	9	5	14	14
41 to 50	15	14	29	29
51 to 60	25	08	33	33
61 TO 70	13	08	21	21
Above 70	03	0	03	03
Total	65	36	100	100

Out of 100 Diabetic patients, majority (33 patients) was in the age group of 51 -60 followed by 29 patients in the age group of 41-50 and 21 patients were in the age group of 30-40 and least number of patients was above 70 years. Out of 100 Diabetics majority i.e., 65 were males and 35 were females.

Table 2: Age and Sex Distribution (Newly Diagnosed)

Age in Years	Male	Female	Total
30 to 40	6	5	11
41 to 50	12	6	18
51 to 60	6	5	11
61 TO 70	7	1	8
Above 70	2	0	2
Total	33	17	50

Out of 50 newly diagnosed diabetics, 18 were in the range of 41-50 years, 11 in 31—40 and 51—60 years each, followed by 8 patients in 61—70 and 2 were above 70 years. Out of these 50 patients 33 were males and 17 females.

Table 3: Age and Sex Distribution (Recently Diagnosed)

Age in Years	Male	Female	Total
30 to 40	3	0	03
41 to 50	3	8	11
51 to 60	19	3	22
61 TO 70	6	7	13
Above 70	1	0	01
Total	32	18	50

Out of 50 recently diagnosed diabetics 22 were in the age group of 51-60, followed by 13 and 11 in 61-70 years and 41-

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50 years age group respectively. Out of these 50 patients 32 were males and 18 were females.

Family history:

Table 4: Family History

Family history of diabetes	No of patients
Present	42
Absent	58
Total	100

It was found out in our study that 58 patients had no Family history of Diabetes.

Symptomatology:

Table 5: The Presenting symptoms

Symptoms	Male	Female	Total
Polyuria	32	32	53
Polydipsia	10	07	17
Polyphagia	15	09	24
Gen Weakness	24	10	34
Dim Vision	16	10	26
Giddiness	13	06	19
Paresthesia	11	08	19
Others	21	09	30

The most common complaint was Polyuria (53 patients), followed by Generalized weakness (34 patients) and Dimness of vision (24 patients).

Biochemical values:

Table 6: The Fasting Blood Sugar Levels

Blood Sugar	Newly	Percent	Recently	Percent
Levels	Diagnosed		Diagnosed	
< 120	00	00%	05	10%
120-200	37	74\$	23	46%
200-250	06	12%	12	24%
250-300	04	08%	07	14%
300-350	03	06%	03	06%
Total	50	100%	50	100%

74% of newly diagnosed patients had FBS value in the range of 120-200mg/dl, followed by 12% and 8% had FBS of 200-250 and 250-300mg/dl respectively. 46% of recently diagnosed diabetics had FBS value in the range of 120-200mg/dl, followed by 24% and 14% had FBS of 200-250 and 250-300mg/dl respectively.

Table 7: The Post Prandial Blood Sugar Levels

Blood Sugar	Newly	Percent	Recently	Percent
Levels	Diagnosed		Diagnosed	
< 200	05	10%	14	28%
200-300	34	68%	16	32%
300-400	08	16%	14	28%
>400	03	06%	06	12%
Total	50	100%	50	100%

68% of newly diagnosed diabetics had PPBS in the range of 200—300mg/dl, followed by 16% and 10% had PPBS values of 300-400 and <200mg/dl respectively. 32% of recently diagnosed diabetics had PPBS in the range of 200-300mg/dl,

followed by 28% each in the range of 300-400mg/dl and 200mg/dl.

Table 8: Prevalence of Microalbuminuria

Microalbuminuria	Newly diagnosed Diabetics	Recer	ntly diagn	osed
	Number	Percent	Number	Percent
Absent	30	60%	38	76%
Present	20	40%	12	24%
Total	50	100%	50	100%

Table 9. Pearson Chi-Square value - 2.941(b). p value is .086. (Not significant)

Diabete s Status	Newly diagnosed		Recent	ly diag	Inosed	
	Male	Female	Total	Male	Female	Total
MICRO	12	8	20	5	7	12
INUKA						

Out of 50 newly diagnosed Diabetics, 20 patients i.e. 40% had Microalbuminuria, among which 12 were Males and 8 were Females. Out of 50 recently diagnosed Diabetics, 12 patients i.e. 24% had Microalbuminuria, among which 5 were Males and 7 were Females.

Table 10: Glomerular filtration rate (GFR) STATUS

GFR Status (mL/Min/1.73 m2	No of patients
>60	88
51 to 60	06
41to50	03
<40	03
Total	100

Out of 100 Diabetics, 88 patients had normal GFR of >60 ml/min/1.73 m2, 6 patients had GFR in the range of 51-60 and 3 patients were in the range of 41-60 and 3 patients had GFR below 40.

Discusssion:

Diabetic Nephropathy is an important cause of ESRD in India and it was found that diabetic nephropathy constituted about 70.2% of all causes of CKD.6 A clinical profile of 100 patients (50 newly diagnosed and 50 recently diagnosed) of type II DM which includes age, sex, family history, biochemical investigations like FBS, PPBS, RFT, Microalbuminuria were compiled and the data compared with available literature.

AGE:

According to a Karachi based study by Ahmedani et al (2005).7mean age of subjects was 53.1 years +/- 11.9 years. Wanjohi et al (2002) in a study in Kenya showed in their subjects a mean age of 53.7 years. 8 There were no patients of diabetic nephropathy in 30-40 age groups in our study. The prevalence of microalbuminuria was high in the age group of 50-60 years (44%) and in 40-50 years (34%) It was found to decline with age. 15% were in 60-70 years group.

SEX:

Vishwanathan et al observed male preponderance in the subjects having microalbuminuria male 32%, female 15.3%.9 However, no genetic or immunological studies have shown conclusive evidence for the male preponderance in subjects

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with diabetic nephropathy. Our study shows significant male preponderance (male 53% Vs female 47%]. This high male: female ratio in our study may be due to inclusion of hospital inpatients, rather than population based. We did not find significant difference body mass index in microalbuminuric and normoalbuminuric patients.

Blood Pressure:

Several studies show a close association of hypertension in the natural history of nephropathy. 10 In our study 40% were hypertensive, while 60% were normotensive. Mogensen et al did not observe any statistical difference in blood pressure levels in normo & microalbuminuric patients of type II diabetes.11

Prevalence of Microalbuminuria:

In our Study we found out that out of 100 diabetic patients, 32 patients (32%) had Microalbuminuria, out of which 20 were newly diagnosed diabetics and 12 were recently diagnosed diabetics. There was no significant difference between the two set of groups (p-value: 0.086). Agaba El, et al (2004) in his study in a teaching hospital in jos Nigeria showed that prevalence of Microalbuminuria in Newly diagnosed patients was as high as 49.2%.12 Wanjohi FW, et al (2002) in his study in Nairobi, Kenya showed that the prevalence of microalbuminuria in Recently diagnosed patients was around 26%.8 Whereas Ahmedani et al (2005) in Karachi showed an overall prevalence of microalbuminuria was about 34%.7

Table showing prevalence of Microalbuminuria in NIDDM patients in various studies:

Study	Prevalence	Method of Estimation
Our Study	32%	Micral Test II
Ahmedani et al (2005)7	34%	Micral Test II
Agaba El, et al (2004)12	49.2%	Micral Test II
Wanjohi FW,et al (2002)8	26%	Micral Test II
V.Mohan et al (2001)13	36.3%	Immunoturbodimetric assay
Patel et al (1999)14	28.6%	Radioimmuno assay
Erasmus RT & et al (1999)15	42%	Radioimmuno assay

Correlation of microalbuminuria to glycemic control:

It was observed that albumin excretion ratio increased linearly with the deterioration of glycemic control.16The presence of microalbuminuria in poorly controlled patients and fairly controlled patients were significantly high compared to that of well controlled patients in our study. The observation shows that the glycemic control is an important determinant of microalbuminuria. Various other studies by Klien et al16 found significant relationship between glycemia and microalbuminuria. Our results concur with these studies. But however other studies by Parving et al17 did not find significant relationship.

Creatinine Clearance:

Mogensen et al concluded that incipient diabetic nephropathy as a precursor of overt diabetic nephropathy.5 Vijay viswanathan et al observed that the stage of hyperfiltration could be seen in some type II DM patients with long duration of diabetes and also in the presence of nephropathy.1 In our study we did not find significant relationship in Blood Urea and Serum Creatinine in Microalbuminuric patients. Out of 100 diabetic patients only 12 patients had GFR of less than 60ml/min/1.73m2. Rest 88 patients had a GFR of more than 60. Out of these 12 patients, 4 had microalbuminuria as well, and 8

were normoalbuminuric patients.

Limitations of the study:

This study would have been better if a quantitative analysis of microalbuminuria was done, instead of semi-quantitative Micral test II. Even though Micral test II is highly sensitive in detecting microalbuminuria (sensitivity - 92% and specificity - 80%), false positivity is high.

Summary & Conclusions

Majority of the Diabetics (33%) were in the age group of 51-60 years, followed by 29% in 41-50 age group. There was Male preponderance among the Diabetics (65%). 42% patients had a positive family history of Diabetes. Commonest symptom of presentation was Polyuria, followed by Generalized weakness and Dimness of vision. 74% of Newly diagnosed patients had FBS value in the range of 120-200mg/dl, followed by 12% and 8% had FBS of 200-250 and 250-300mg/dl respectively. 46% of recently diagnosed diabetics had FBS value in the range of 120-200mg/dl, followed by 24% and 14% had FBS of 200-250 and 250-300mg/dl respectively. 68% of Newly diagnosed diabetics had PPBS in the range of 200-300mg/dl, followed by 16% and 10% had PPBS values of 300-400 and <200mg/dl respectively. 32% of Recently diagnosed diabetics had PPBS in the range of 200- 300mg/dl, followed by 28% each in the range of 300-400mg/dl and200mg/dl. Total prevalence of Microalbuminuria was 32% (32 patients), where in 20 patients were Newly diagnosed Diabetics and 12 patients were Recently diagnosed Diabetics. There was significant relationship between poorly controlled diabetes and Microalbuminuria. There was no significant relationship in Body mass index, Blood Urea, serum Creatinine in Microalbuminuria patients. About 12 patients had a GFR of below 60ml/min/1.73m2, out of which 8 were normoalbuminuric and only 4 were Microalbuminuric. Hence the total incidence of diabetic nephropathy in our study was found out to be 40% (32 patients with Microalbuminuria and 8 patients with Normoalbuminuria but abnormal GFR of less than 60ml/min/1.73m2.

We conclude that in Indian populations, the incidence of diabetic Kidney disease is significantly high even at the time of diagnosis of Diabetes. They are mostly in middle age group and most of them are normotensive. Degree of Microalbuminuria was directly proportional to poor Glycemic control. We also conclude that Microalbuminuria is not only an indicator of incipient Nephropathy but also a marker of severe disease with widespread vascular damage. Hence all the patients who have been newly diagnosed with Diabetes must be investigated for Mircoalbuminuria and appropriate treatment options or Preventive Strategies to be taken for the same.

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