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*Original Article*

# Proteinuria Among the Patients with Diabetes Mellitus

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***Abstract***

***Introduction:*** *Diabetic nephropathy is one of the commonest microvascular diabetic complications. Nephropathy causes proteinuria in diabetic subjects.*

***Methods:*** *This present cross-sectional study was carried out to observe proteinuria among the patients of diabetes mellitus at medicine wards of Rajshahi Medical College Hospital, Rajshahi during the period of two years enrolling 60 diabetic subjects who were selected by nonrandom purposive sampling.*

***Results:*** *In this study mean age of female was 52.35 and of male was 53.33 years. Among sixty diabetic patients 34(56.67%) patients had significant proteinuria or microalbuminuria. Under 5 years durations there were 4 (6.67%) within 5-10 years 12 (20%) and above 10 years 18 (30%) cases were found to have significant proteinuria. Protein levels in urine were in the range of ≥500mg/24hrs-2.5gm/24hrs, in 25 (73.53%) patients, over 2.5gm/24 hrs in 6(17.65%).Only 3 (8.82%) cases had proteinuria ranging from 300mg/dl to 500 mg/24 hrs. Most of the eye complication developed in those with diabetes duration over 10 years, i.e.20 (33.33%) cases followed by 20% within 5-10 years.*

***Conclusion:*** *Diabetes mellitus has relation with development of nephropathy with the duration of disease. So, physician should pay attention with the subjects with diabetes mellitus for long time during treatment.*

***Key words:*** *Proteinuria, Diabetes mellitus.*

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## Introduction

In most Western countries, diabetic nephropathy (DN) has become the leading cause of End Stage Renal Disease (ESRD).[1] According to the United States Renal Data System (USRDS 2001), in 1999 DN was the primary diagnosis in 42.8 per cent (38,160 of 89,252) of incident patients (USRDS 2001), an increase by 23.8 per cent compared to 1990.[2]

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Nephropathy, characterized by proteinuria and a decreasing glomerular filtration rate, develops in about 35 percent of patients with insulin-dependent diabetes mellitus[3]. Renal disease in diabetes is predictably progressive in that the glomerular filtration declines linearly, at a rate of about 1 ml per minute per month. Thus, most patients reach end-stage renal failure within 10 years after the onset of proteinuria. The problem is so extensive that one third of new dialysis patients in the United States have diabetic nephropathy.[4] The creatinine clearance was found to be significantly different between without nephropathy and with nephropathy group and had associated with proteinuria. Once even microalbuminuria is present, creatinine clearance declines at the rate that widely vary from patients to patients, the average reduction is 10-12 ml/min/yr.[4]

**Materials and methods**

This hospital based cross-sectional study was carried out among the patients of diabetes mellitus at medicine wards of Rajshahi Medical College Hospital, Rajshahi during the period of June 2006 to February 2008.Total 60 diabetic cases were selected by purposive sampling. Detailed history was taken regarding duration and treatment of diabetes, co-morbid conditions, family history of diabetes, intercurrent illness. During hospitalized period all appropriate investigations were done. Thorough examination was carried out to find diabetic retinopathy, postural hypotension, neuropathy, peripheral pulses and related complications, i.e. infection, ulcer. Urine for microalbumin was done when routine urine examination is negative for albumin. History and physical examination, including relevant investigations of patients with hypertension were recorded on a predesigned proforma. Protein excretion rate of ≥300mg/24 hrs was considered having proteinuria. Patients were categorized based on duration as group A (diabetes duration <5 yrs), Group B (diabetes duration 5-10 yrs) and Group C (diabetes duration >10 yrs). Patients diagnosed as diabetic were included in the study irrespective of duration of diabetes or age of the patient. Those with RBS/Bl sugar 2ABF/PPBS ≥ 11.1 mmol/L or ≥200 mg/dl, FBS ≥7 mmol/L or ≥ 126 mg/dl and subjects on oral anti diabetic drug and / or on insulin were included. Subjects with co-morbid conditions that might cause significant proteinuria or confound the study independent of diabetes were excluded, i.e. high fever, severe hypertension, heart failure, pregnancy and UTI.

## Results

In present study, age range of the patients was 25-75 years. Mean age of female was 52.35 and of male was 53.33 years. Here 7 (11.67%) patients were below 40 years of age. And 13 (21.67%) were in age group 40 – 49 years, 20 (33.33%) were in age group 50 – 59 years, 15 (25%) were in age group 60–69 years and only 5 (8.33%) patients were in age group more than 70 years (Figure I).

Out of sixty diabetic patients, 20 (33.33%) were female and 40 (66.67%) were male.

Among sixty diabetic patients, 34 (56.67%) had significant proteinuria or microalbuminuria of which 23 (38.34%)

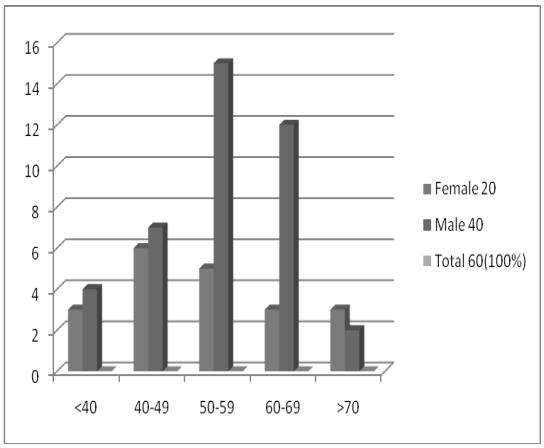


**Figure 1: Bar diagram showing age distribution of the study subjects.**

were males and 11 (18.33%) were females.(Table I). Under 5 years durations, there were 4 (6.67%), within 5-10 years duration 12 (20%) and above 10 years duration 18 (30%) were found to have significant proteinuria.

**Table I: Duration of diabetes (in year) among the proteinuric patients**

| Gender | Number of patients with duration of diabetes | | | | |
|---|---|---|---|---|---|
| | <5yrs | 5-10 yrs | > 70yrs | Total | |
| M | 3 | 8 | 12 | 23 | |
| F | 1 | 4 | 6 | 11 | |
| | 4 | 12 | 18 | 34 | 18(30%) |

Among the persons having proteinuria (≥300mg/24 hrs), majority were in the range of 60-69 years.i.e.12 cases (20%), followed by 9 cases (15%) in the range of 50-59 years age group. The least among over 70 years, only one case (1.67%) (Figure 2).

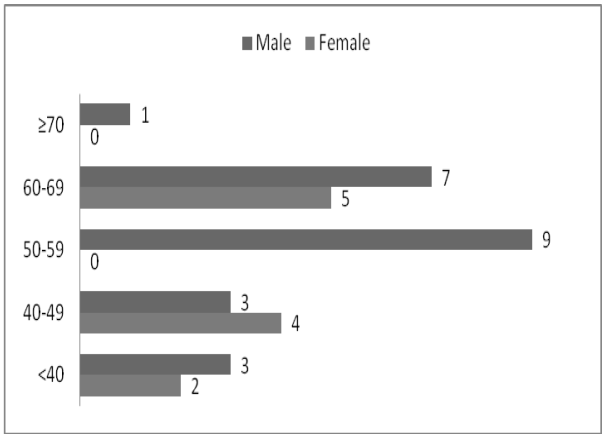


**Figure 2: Gender distribution of patients in different age groups with proteinuria.**

Protein levels were in the range of ≥500mg/24hrs-2.5gm/24hrs, in 25 patients

(73.53%), over 2.5gm/24 hrs in 6(17.65%). Only 3 cases (8.82%) were from 300mg/dl to 500 mg/dl in 24 hrs. (Table II)

**Table II: Level of proteinuria in study subjects**

| ≥300mg/24hrs-500mg/24hrs. | ≥501mg/24hrs-2.5gm/24hrs | ≥2.51gm/24hrs |
|---|---|---|
| 3(8.82%) | 25(73.53%) | 6(17.65%) |

Twenty nine patients (48.33%) had retinopathy. Eight cases (13.33%) had proliferative retinopathy and twenty one (35%) had non-proliferative retinopathy. Of the retinopathy cases, 19 (65.5%) were male and 10 (34.5%) were female. Under 5 year's duration of diabetes there were five cases, within 5-10 years, twelve cases and above 10 years twenty cases having eye complications. 27 (45%) cases had neuropathy, of which 19 (31.67%) were male and 8 (13.33%) were female. 7 cases (11.66%) had cataract; 3 patients (5%) had diabetic foot. One case (1.6%) had glaucoma and 1 (1.6%) case had cellulitis. Among neuropathic patients 19 (31.67%) were male and 8(13.33%) were female. 19 cases had combined retinopathy and neuropathy comprising 31.67%. Most of the eye complication developed in those with diabetes duration over 10 years, i.e.20 cases (33.33%) followed by 20% within 5-10 years.

**Discussion**

In current study, majority (30.33%) of the patients were of age between 50-59 years. That means maximum number of patient was found in the 6th decade, followed by 7th decade (60-69) which comprised 25%. Extremes of age i.e. below 40 years and above 70 years were relatively small 7 cases (11.67%) and 5 cases (8.3%) respectively. Likely explanation is that, most cases below 40 years were type 1 diabetes mellitus DM that rarely presents with chronic complication. And in case of above seventy, mortality is high due to co-morbidity. It is known that type 1 DM does not present with complication at presentation in contrast to that of type 2 DM that frequently presents with complications due to long asymptomatic period before diagnosis.[3] In our study, 34 (56.67%) patients were found to have significant proteinuria ≥300mg/dl, or albumin ≥200µg/L and/or microalbuminuria (20-200µg/L). 25 cases were male (41.67%) and 11 (18.33%) patients were female among the study population. This study does not match that seen at a diabetes centre in southern India. They measured 24 hours urinary protein excretion in frequency of proteinuria in type 2 DM. Proteinuria was diagnosed in 28% of the diabetic patients. The discrepancy probably resulted as we have conducted this study in hospital in patients those have frequent co-morbidities. Moreover, they included patients with ≥500mg/24 hrs protein excretion. We have studied ≥300mg/24 hrs protein excretion instead.

Retinopathy and other eye diseases (glaucoma, early cataracts) are an important cause of vision loss all over the world. Retinopathy virtually never appears within 3-5 years of type 1 diabetes or before puberty. Whereas up to 20% of patients with type 2 diabetes has retinopathy at the time of diagnosis. Among diabetics 37 cases having some sort of eye complications including 29 cases of retinopathy (48.33%). 8 (13.33%)

cases had proliferative retinopathy and 21 (35%) have non-proliferative retinopathy. 19 (65.5%) were male and 10 (34.5%) cases were female. Under 5 years duration of diabetes there were five cases: within 5-10 years 12 cases and above 10 years twenty cases having eye complications. 9 cases had significant eye diseases without significant proteinuria. Neuropathy was present in the form of bilateral loss of ankle jerks, or loss of vibration sense; or postural hypotension. Postural hypotension was not considered as neuropathy those receiving higher dose of diuretics or vasodilator antihypertensive. The Rochester Diabetic Neuropathy Study revealed 54% and 45% polyneuropathy in case of IDDM and NIDDM respectively. In our study, 27 (45%) of which males 19 (31.67%) and female 8 (13.33%) is consistent.

**Conclusion**

This study of sixty cases of diabetes mellitus may not reflect the exact situation in the community but its proximity to the reality cannot be underestimated. As Diabetes mellitus has relation with development of nephropathy with the course of duration of disease, therefore, physician should pay attention with the subjects with diabetes mellitus for long time during treatment.

**Contribution of the authors:**

First author was the main researcher, second author was the guide of the research work and third author did the statistical analysis of the research.

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