

Frequency of Proteinuria in Newly Diagnosed Diabetic Patients

ADNAN RAHMAN¹, BAKHT BABAR², ALI SEBTAIN³, HIRA GUL⁴, MUHAMMAD QASIM⁵, SYED HASSAN MUSTAFA⁶, MAHNOOR, IRFAN ULLAH⁷

^{1,2,3}Fellow Endocrinology, Department of Endocrinology and Diabetes, Hayatabad Medical Complex, Peshawar.

⁴Demonstrator, Department of Biochemistry, Khyber Medical College, Peshawar.

⁵Fellow Endocrinology, Department of Endocrinology and Diabetes, Hayatabad Medical Complex, Peshawar.

⁶Registrar, Department of Rheumatology, Ayub Teaching Hospital, Abbottabad.

⁷Department of Life Sciences, School of Science, University of Management and Technology (UMT), Lahore, Pakistan

Corresponding author: Hira Gul, Email: hira.a.dhan93@gmail.com

ABSTRACT

Introduction: Diabetes mellitus is a huge global health issue, affecting more than 350 million people worldwide, and the number might rise to 439 million in 2030. Diabetes Mellitus is associated with many complications. Most of these complications usually develop after many years or even decades of exposure to chronic hyperglycemia. Diabetic Nephropathy is one of the most common and grave complication of diabetes mellitus and is associated with increased morbidity and mortality.

Study Design: A cross-sectional study was performed on 285 patients from August 2021 to February 2022 on all newly diabetic patients in Hayatabad Medical Complex, Peshawar. Their 24-hour urine for protein analysis was measured to screen them for proteinuria. After measuring the urine protein level in each patient, the study's total frequency was computed across all the patients who had been diagnosed. Data was recorded into a proforma.

Results: The age range in this study was from 15 to 70 years with a mean age of 43.01 ± 6.90 years, mean BMI was 27.67 ± 1.99 Kg/m², and mean proteinuria levels were 42.38 ± 34.14 mg/ dl. Males constituted the majority of the patient-group (62.1%). 34.7% of patients were also hypertensive. Proteinuria was seen in 114 patients (40%).

Conclusion: This study has concluded that screening for the complications of diabetic patients is beneficial in the preventive management of the disease.

Keywords: Diabetic patients, proteinuria

INTRODUCTION

Diabetes mellitus is a huge global health issue, affecting more than 350 million people worldwide, and the number might rise to 439 million in 2030.^[1,2] Type 2 makes up about 90% of the cases.^[3] It is defined as a collection of metabolic disorders due to increased peripheral resistance to insulin or reduced insulin secretion, leading to prolonged episodes of hyperglycemia. Thence, diabetes mellitus is divided into two main categories. Type 1 Diabetes is due to a reduction in or absence of insulin production, and Type 2 Diabetes mellitus, in which there is increased peripheral resistance to insulin action and its defective production.^[4]

Diabetes Mellitus is associated with many complications. Most of these complications usually develop after many years or even decades of exposure to chronic hyperglycemia. However, many complications, especially in type 2 diabetes, may be the presenting symptom in those patients who have otherwise not been diagnosed. Worldwide, Type 2 diabetes is one of the most common causes of cardiovascular disorders, stroke, blindness, chronic kidney disease, and hospitalizations.^[5]

One of the most common and long-term complications of DM is Diabetic Nephropathy (DN), affecting approximately 33% of patients, and it is known to be the leading cause of kidney failure, worldwide. One of the early manifestations of diabetic nephropathy is persistent albuminuria of more than 30 mg/d.^[6,7] In the 10 to 15 years following the diagnosis of diabetes in a patient, 20 to 40 percent of those individuals had developed microalbuminuria. 80–90% of which progresses to more advanced stages, including end-stage renal disease.^[7] Since many patients are diagnosed late; hence microalbuminuria screening is a standard practice worldwide. This is because microalbuminuria is an early sign of diabetic nephropathy. Therefore, if appropriate steps are taken, it can be reversed, and hence the future development of overt diabetic nephropathy can be significantly reduced.^[8]

MATERIAL AND METHOD

Between August 2021 and February 2022, cross-sectional research was conducted on all individuals with newly diagnosed diabetes. These individuals were hospitalized to Hayatabad Medical Complex's Endocrinology and Diabetes unit or OPD. A total of 285 patients participated in this study, and non-probability sampling was used. The hospital's ethical committee approved the study's conduct, and patients' or families' permission was also

obtained. The same biochemist conducted each of these tests in the central laboratory of the Hayatabad medical facility. In our study, each patient underwent a thorough medical examination, and their medical history was recorded. The body mass index (BMI) of every patient was calculated using their weight and height. The body mass index is determined by dividing the weight, which is expressed in kilograms, by the height, expressed in square meters. Following that, a 24-hour urine sample was taken from the diabetic patients and sent to the lab for analysis to determine the urine's 24-hour protein level. Following the measurement of the protein content of the urine in all of the newly diagnosed diabetes patients who participated in our study, the frequency was estimated. An expert then recorded all the data in a pro forma and confounded it according to a predetermined standard. The data were analyzed using SPSS 26. The age, the 24-hour urine protein level, and the BMI were all represented by the mean \pm standard deviation. The gender and hypertension were used to express the frequency and percentage. Age, BMI, and gender were used to examine the data in this study. The difference in the amount of protein in the urine by age, BMI, gender, and hypertension was determined using a chi-square test.

RESULTS

285 newly diagnosed diabetics of either sex who have diabetes mellitus make up the study population. The youngest study participant was 15 years old, and the age of the oldest study participant was 70 years, with mean \pm SD age of the study participants was 43.01 ± 6.90 (Table 1). There were 177 males (62.1%) and 108 females (37.9%). Mean BMI was 27.68 ± 1.99 Kg/m², and mean proteinuria levels were 42.39 ± 34.14 mg/ day. Ninety-nine patients were hypertensive (34.7%), while 186 patients were non-hypertensive (65.3%).

Table 1: Demographic characteristic of patients

Variable	N (Percent %) or Mean \pm S.D.	
Age	43.01 \pm 6.90	
BMI in Kg/m ²	27.68 \pm 1.99	
Proteinuria in mg/ day	42.39 \pm 34.14	
Gender	Male	177 (62.1%)
	Female	108 (37.9%)
Hypertension	Present	99 (34.7%)
	Absent	186 (65.3%)

Frequencies of patients according to proteinuria are shown in Table 2.

Table- 2: Frequency and Percentage of patients according to proteinuria (> 30 mg/day)n=285

Proteinuria	No of Patients	%age
Yes	114	40%
No	171	60%

Age wise distribution of proteinuria levels are shown in Table 3.

Table- 3: Stratification of proteinuria levels concerning age groups.

Age (years)	Proteinuria Levels (mg/day)		p-value
	> 30	≤ 30	
15-40	36(41.4%)	51(58.6%)	0.856
41-70	78(39.4%)	120(60.6%)	
Total	114(40%)	171(60%)	

Gender wise distribution of proteinuria levels are shown in Table 4.

Table- 4: Stratification of proteinuria levels concerning gender.

Gender	Proteinuria Levels (mg/day)		p-value
	> 30	≤ 30	
Male	72(40.7%)	105(59.3%)	0.863
Female	42(38.9%)	66(61.1%)	
Total	114(40%)	171(60%)	

BMI wise distribution of proteinuria levels are shown in Table 5

Table 5: Stratification of proteinuria levels concerning BMI.

BMI	Proteinuria Levels (mg/day)		p-value
	> 30	≤ 30	
≤ 25	21(43.8%)	27(56.2%)	0.737
>25	93(39.2%)	144(60.8%)	
Total	114(40%)	171(60%)	

Hypertension wise distribution of proteinuria levels are shown in Table 6

Table 6: Stratification of proteinuria levels concerning hypertension.

Hypertension	Proteinuria Levels (mg/day)		p-value
	> 30	≤ 30	
Yes	87(87.9%)	12(12.1%)	<0.05*
No	27(14.5%)	159(85.5%)	
Total	114(40%)	171(60%)	

DISCUSSION

We evaluated the proteinuria profile of newly diagnosed DM patients. This study's age range was from 15 to 70 years, with a mean age of 43.052±6.87 years. Thus in our study, DM was diagnosed at a younger age compared to developed countries where diabetes is diagnosed at a higher age (>65 years).^[9, 10] However, this may be because of the possibility that in our study, both T1DM and T2DM were included in the sample. Two hundred eighty-five patients were evaluated in our research, and proteinuria was seen in 114 patients (40%). This is per other studies, which have also shown proteinuria as a common complication.^[11-15] Multiple studies have been performed worldwide to know the exact prevalence of proteinuria in diabetic patients at the time of presentations. In one study, it appeared to be 25.6%^[16] while in another study, it was 57.44%.^[17] In 2 studies conducted in Pakistan, it was seen as 24.2%^[18] and 44.4%^[19].

Our results were comparable to two studies in which proteinuria was found in 36% and 46% of patients at presentation, respectively.^[20, 21] However, other studies found proteinuria only in 9%, 14%, and 13.5% patients, respectively.^[22-24]

Presently, microalbuminuria is defined as 30 – 300mg/24hours (20 - 200µg/min) of albumin in the urine is equivalent to 0.46 to 4.6 µmol/24-h.^[25] Urine samples should not be

taken from patients in diabetic ketoacidosis, hyperosmolar state, or from patients having poor control until adequate glycemic control is established, and should ideally be collected in resting position. A urinary albumin excretion of less than 20µg/min is considered to be normal. Similarly, macroalbuminuria or overt albuminuria is when the albumin excretion in urine is higher than 200 µg/min. Microalbuminuria is confirmed if more than 200µg/min is confirmed on at least 2 occasions 1 – 2 months apart.^[26, 27]

It was widely believed in the 1960s that most of the patients have some degree of structural changes present in their kidneys at the time of diagnosis of diabetes mellitus. These structural changes in the glomeruli were known as diabetic glomerulopathy, and it includes several changes which depend upon its stage. Some of these changes include an increased thickness of the glomerular basement membrane and mesangial expansion with an accumulation of the matrix. This depends on duration of the hyperglycemia. Similarly, glomerular hypertrophy is also present in the initial stage of diabetes nephropathy. The kidneys' size is usually normal or increased, which distinguishes it from most other forms of chronic kidney disease. As the disease advances, there is an associated enlargement of the kidney sizes which are compensatory in nature, that accompanies the advancing glomerulopathy.^[28]

CONCLUSION

Our study has concluded that a large proportion of patients are diagnosed very late. Therefore, screening for the complications of diabetic patients is beneficial in the preventive management of the disease.

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