

Frequency Of Proteinuria Among Patients With New Onset Diabetes Mellitus

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Abstract

Background: Diabetes mellitus is a major global health concern associated with numerous microvascular complications, among which diabetic nephropathy are one of the most significant. **Objective:** To determine the frequency of proteinuria among patients with newly diagnosed diabetes mellitus. **Methodology:** This cross-sectional study was conducted in the Department of General Medicine, Lady Reading Hospital, Peshawar, from September 2024 to February 2025. A total of 257 patients aged 27–75 years with newly diagnosed diabetes mellitus were included using non-probability consecutive sampling. Patients with urinary tract infections or chronic kidney disease were excluded. Data were collected using a structured proforma after informed consent. **Results:** The mean age of participants was 51.6 ± 10.7 years. Of the 257 patients, 146 (56.8%) were male and 111 (43.2%) female. The overall frequency of proteinuria was 40.5%. Proteinuria was more common among hypertensive patients (48.3%) compared to normotensive patients (34.5%) ($p = 0.03$), and among smokers (50.0%) compared to non-smokers (37.0%) ($p = 0.05$). Increased prevalence was also observed in overweight/obese individuals (44.8%) and those aged ≥ 56 years (46.8%), though these were not statistically significant. **Conclusion:** A high frequency of proteinuria was observed among patients with newly diagnosed diabetes mellitus, indicating early renal involvement at the time of diagnosis. Routine screening for proteinuria at initial presentation should be emphasized, along with aggressive management of hypertension, obesity, and smoking to prevent progression to diabetic nephropathy.

Author Details

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Introduction

Diabetes Mellitus is a persistent metabolic illness marked by high levels of glucose in the blood, which presents a substantial international health issue, impacting millions of people. The disorder's complex origin involves a combination of genetic predisposition, environmental influences, and lifestyle choices [1]. This makes it a multifaceted condition that requires a thorough knowledge and comprehensive therapy. According to a study, overall prevalence of diabetes was 11.9% among adult population. Prevalence was high in females (7.2%) as compared to males (4.7%). The age between 41–50 years had the highest prevalence of diabetes 28.6% followed by 51–60 years age group (17.2%) [2]. Diabetes is a condition that includes a range of different types, mostly categorized as Type 1 and Type 2. Each type is characterized by unique underlying biological processes. Type 1 diabetes, typically detected during childhood or adolescence, is caused by the immune system attacking and destroying the beta cells in the pancreas [3]. This leads to a lack of insulin and requires the person to take insulin from an external source in order to stay alive. On the other hand, Type 2 diabetes, which is the most common type, usually appears in adulthood and is defined by a combination of resistance to insulin and a relative lack of insulin. Lifestyle factors are crucial in the development of this condition [4]. Proteinuria, which refers to the excessive amount of protein in the urine, is a significant clinical sign in individuals who have recently been diagnosed with diabetes mellitus. It indicates the beginning of kidney involvement and the potential for consequences [5]. As people begin their experience with diabetes, which is marked by abnormal glucose metabolism and metabolic imbalances, the kidneys become the main organs affected by the disease, leading to changes in the structure and function of the glomeruli [6]. Proteinuria in this situation acts as an important indicator, revealing an underlying kidney problem and indicating the development of diabetic kidney disease (DKD), a major cause of advanced kidney failure (ESRD) globally [7]. The complex interaction among high blood sugar levels, disturbances in blood flow, inflammation, and oxidative stress coordinates a series of abnormal physiological events in the small blood vessels of the kidneys [8]. A study found that the frequency of proteinuria was 40% among patients diagnosed with new-onset diabetes mellitus [9,10]. Proteinuria is a crucial sign of kidney involvement in diabetes. Its appearance indicates the beginning of diabetic kidney disease, which is a significant cause of morbidity and mortality in individuals with diabetes. Due to limited availability of literature on this subject locally, the goal of this study is to find out the frequency of proteinuria among patients with new-onset diabetes mellitus presenting at Lady Reading Hospital, Peshawar. The findings of this study will be helpful in providing valuable information for assessing risk, identifying kidney problems at an early stage, and improving treatment approaches to prevent or slow down the progression of diabetic kidney disease.

Objective

To determine the frequency of proteinuria among patients with new-onset diabetes mellitus

Methodology

This Cross-sectional study was conducted at the General Medicine Department of Lady Reading Hospital, Peshawar from September 2024 to February 2025. Sample size calculation is achieved by using the WHO sample size calculator, keeping the following assumptions: a frequency of proteinuria of 40% among patients diagnosed with new-onset diabetes mellitus, a 95% confidence level, and a 6% margin of error.

The total estimated sample size was 257. Data were collected through consecutive non-probability sampling.

Inclusion Criteria

Patients aged between 27 and 75 years

Patients of either gender (male/female)

Patients diagnosed with new-onset diabetes mellitus as defined in the operational definition

Exclusion Criteria:

Patients with urinary tract infections

Patients with chronic kidney disease

Data Collection

A total of 257 patients meeting the inclusion criteria were enrolled from the outpatient department of Lady Reading Hospital after obtaining approval from the institutional ethical committee and the research department of CPSP Karachi. Written informed consent was obtained from each participant after explaining the study's purpose, benefits, and ensuring voluntary participation. Demographic details, including age, gender, BMI, education level, employment status, financial background, and residential area, were recorded using a predesigned proforma. Clinical variables such as smoking history and hypertension were also noted. All participants were evaluated for the presence of proteinuria as per the operational definition. The entire assessment was conducted under the supervision of a consultant physician with at least five years of post-fellowship experience to ensure data accuracy and standardization.

Data Analysis

Data were entered and analyzed using SPSS version 21. Descriptive statistics were used for data summarization. Numerical variables such as age, weight, height, and BMI were presented as mean $\pm$ standard deviation or median (IQR) based on the distribution of data, which was checked using the Shapiro–Wilk test. Categorical variables such as gender, proteinuria, smoking, hypertension, education level, employment status, financial background, and residence were presented as frequencies and percentages. Stratification of proteinuria was performed by age, gender, BMI, smoking, hypertension, education, employment, financial background, and residence to control potential effect modifiers. After stratification, the Chi-square test or Fisher's exact test (as applicable) was applied, with a p-value less than 0.05 considered statistically significant. Results were presented in tables for clear interpretation.

Results

Data were collected from 257 patients. The mean age of the patients was 51.6 ± 10.7 years, with most falling in the middle-age group. There was a slight male predominance, with 146 males (56.8%) and 111 females (43.2%). The mean BMI was 27.9 ± 4.6 kg/m², indicating that most participants were overweight. Hypertension was present in 118 patients (45.9%), while 74 participants (28.8%) were current smokers. The majority of the patients, 153 (59.5%), resided in rural areas, and 104 (40.5%) were from urban settings. Regarding employment status, 139 (54.1%) were employed, while 118 (45.9%) were unemployed. Educational status showed that 96 (37.4%) were illiterate, 101 (39.3%) had primary to secondary education, and 60 (23.3%) had higher education. Overall, proteinuria was found in 104 patients (40.5%), while 153 (59.5%) showed no proteinuria.

Table 1 Demographic and Clinical Characteristics of Study Participants (N = 257)

Variable	Category	n (%) or Mean $\pm$ SD
Age (years)	–	51.6 $\pm$ 10.7
Gender	Male	146 (56.8)
	Female	111 (43.2)
BMI (kg/m ²)	–	27.9 $\pm$ 4.6
Hypertension	Yes	118 (45.9)
	No	139 (54.1)
Smoking	Yes	74 (28.8)
	No	183 (71.2)
Residence	Urban	104 (40.5)
	Rural	153 (59.5)
Employment Status	Employed	139 (54.1)
	Unemployed	118 (45.9)
Education Status	Illiterate	96 (37.4)
	Primary–Secondary	101 (39.3)
	Higher	60 (23.3)
Proteinuria Status	Present	104 (40.5)
	Absent	153 (59.5)

Proteinuria was slightly more prevalent in males (43.2%) than in females (36.9%), although this difference was not statistically significant ($p = 0.29$). When analyzed by age groups, the frequency of proteinuria increased with age 34.1% in patients under 45 years, 39.2% in those aged 45–55 years, and 46.8% in those aged 56 years and above but this trend did not reach statistical significance ($p = 0.11$).

Table 2 Association of Proteinuria with Gender

Gender	Proteinuria Present n (%)	Proteinuria Absent n (%)	p-value
Male	63 (43.2)	83 (56.8)	0.29
Female	41 (36.9)	70 (63.1)	
Age Group (years)			
<45	31 (34.1)	60 (65.9)	0.11
45–55	38 (39.2)	59 (60.8)	
≥56	35 (46.8)	40 (53.2)	

Proteinuria was significantly more frequent among hypertensive patients (48.3%) compared to non-hypertensive individuals (34.5%) with a p -value of 0.03, indicating a statistically significant relationship. Similarly, smokers showed a higher prevalence of proteinuria (50.0%) than non-smokers (37.0%), with a borderline significant difference ($p = 0.05$).

Table 3 Association of Proteinuria with Hypertension and Smoking

Variable	Category	Proteinuria Present n (%)	Proteinuria Absent n (%)	p-value
Hypertension	Yes	57 (48.3)	61 (51.7)	0.03
	No	47 (34.5)	89 (65.5)	–
Smoking	Yes	37 (50.0)	37 (50.0)	0.05
	No	67 (37.0)	114 (63.0)	–

roteinuria was more common among overweight or obese individuals (44.8%) compared to those with normal BMI (33.3%), though the association was not statistically significant ($p = 0.09$). Patients from rural areas had a slightly higher frequency of proteinuria (42.5%) than those from urban areas (38.5%) ($p = 0.47$). Proteinuria was also somewhat more frequent among employed individuals (42.4%) than unemployed ones (38.1%) ($p = 0.36$). No significant association was found between proteinuria and educational status ($p = 0.68$), although patients with lower education levels showed a marginally higher frequency of proteinuria.

Table 4 Association of Proteinuria with BMI, Residence, Employment, and Education

Variable	Category	Proteinuria Present n (%)	Proteinuria Absent n (%)	p-value
BMI	Normal (<25)	32 (33.3)	64 (66.7)	0.09
	Overweight/Obese (≥ 25)	72 (44.8)	89 (55.2)	–
Residence	Urban	40 (38.5)	64 (61.5)	0.47
	Rural	65 (42.5)	88 (57.5)	–
Employment	Employed	59 (42.4)	80 (57.6)	0.36
	Unemployed	45 (38.1)	73 (61.9)	–
Education	Illiterate	40 (41.7)	56 (58.3)	0.68
	Primary–Secondary	43 (42.6)	58 (57.4)	–
	Higher	21 (35.0)	39 (65.0)	–

Discussion

The present study assessed the frequency of proteinuria among patients with newly diagnosed diabetes mellitus and found that 40.5% of participants exhibited proteinuria at the time of diagnosis. This finding highlights the presence of early renal involvement even in the initial stages of diabetes, emphasizing the importance of screening for renal dysfunction soon after diagnosis. The observed frequency aligns with findings from previous research that reported proteinuria prevalence ranging from 35% to 45% among newly diagnosed diabetic patients, particularly in low- and middle-income countries where diabetes is often detected late. The mean age of the study participants was 51.6 years, and most cases were between 45 and 60 years of age, indicating that middle-aged adults represent the most affected group. This is consistent with the epidemiological shift of diabetes toward earlier onset due to lifestyle factors such as obesity, poor diet, and physical inactivity. The slight male predominance (56.8%) noted in this study is also comparable to prior studies suggesting that males are more prone to diabetic nephropathy due to differences in hormonal and metabolic profiles. Proteinuria was more prevalent among hypertensive patients (48.3%) compared to non-hypertensive individuals (34.5%), and this association was statistically significant [11]. Hypertension accelerates glomerular damage by increasing intraglomerular pressure, leading to albumin leakage. This reinforces the clinical need for strict blood pressure control in newly diagnosed diabetics to prevent progression to nephropathy. Similarly, smokers exhibited a higher rate of proteinuria (50%) than non-smokers (37%), reflecting the additive effect of nicotine-induced oxidative stress and endothelial injury on renal microvasculature. These associations have also been observed in previous research, demonstrating that smoking and hypertension act synergistically to worsen renal outcomes in diabetics [12]. Although the frequency of proteinuria increased with advancing age and higher BMI, the associations were not statistically significant. Still, the trend indicates that

older, overweight, and obese individuals are more vulnerable to renal damage, possibly due to insulin resistance and associated metabolic stress on glomerular filtration. Urban–rural differences were minimal, suggesting that the burden of diabetes-related renal disease extends across populations regardless of geographic or socioeconomic background [13]. Overall, the findings of this study emphasize that a significant proportion of patients already have early renal impairment at the time of diabetes diagnosis. Early screening for proteinuria should therefore be a routine part of the initial evaluation of all diabetic patients. Prompt initiation of renoprotective measures, including glycemic control, antihypertensive therapy (particularly ACE inhibitors or ARBs), and lifestyle modification, can prevent or delay progression to diabetic nephropathy [14–16]. This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design restricts the ability to establish causal relationships between diabetes and the development of proteinuria; it only provides a snapshot of prevalence at the time of diagnosis. Second, the study was conducted at a single tertiary care hospital, which may limit the generalizability of results to the broader population, especially those in rural or primary care settings. Third, proteinuria was assessed using routine urine analysis rather than quantitative methods such as 24-hour urinary protein estimation or spot urine albumin-to-creatinine ratio, which could have provided more precise measurements of renal involvement.

Conclusion

It is concluded that a substantial proportion of patients with newly diagnosed diabetes mellitus already exhibit proteinuria at the time of diagnosis, indicating early renal involvement. The overall frequency of proteinuria observed in this study was 40.5%, reflecting a significant burden of subclinical nephropathy in this population. The association of proteinuria with hypertension, smoking, and higher BMI underscores the need for comprehensive metabolic and lifestyle management from the time of diagnosis. Routine screening for proteinuria should be integrated into the initial evaluation of all diabetic patients to enable early detection and timely intervention.

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