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# Microalbuminuria in Newly Diabetes Mellitus Patients: Diagnosis, Screening and Increasing Public Awareness

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## Abstract

**Objective:** To promote public awareness about preventing chronic kidney disease by determining the prevalence and diagnosis of microalbuminuria in people with newly diagnosed diabetes.
**Methodology:** Cross Sectional Survey and analysis study was conducted in Department of Medicine PAF Hospital Islamabad from 1st January 2021 to 30th June 2021. A total of 111 newly diagnosed diabetic patients of both genders were included. All patients were sent to same hospital laboratory for urine test by Pathologist aiming microalbuminuria status. Data was collected regarding microalbuminuria from all patients and was noted as per operational definition.
**Results:** The Age range in this study was from 18 to 50 years with mean age of 42.504± 5.19 years and mean weight was 82.063±9.37 Kg. Majority of the patients were of male gender (81.1%). 71.2% patients had family history of diabetes. Microalbuminuria was observed in 47.7% patients. Due to a lack of screening and education, a considerable number of individuals with newly diagnosed diabetic patients already had microalbuminuria.
**Conclusion:** Prevalence of microalbuminuria was high in this patient population of newly diagnosed diabetes mellitus. These findings suggest that healthcare policy or research efforts may focus on reversing microalbuminuria in hopes of improving the prognosis of diabetic patients and preventing chronic kidney disease. Good glycemic control has been proved time and again in preventing cerebrovascular diseases and chronic kidney diseases.
**Keywords:** Diabetes, Newly Diagnosed, Microalbuminuria, Chronic Kidney Disease

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## Introduction

One of the leading causes of mortality and disability among diabetics is renal failure due to diabetes.[1] In fact, the increased risk of death from diabetes is mostly seen in people with both diabetes and proteinuria. This is due to both end-stage renal disease (ESRD) and cardiovascular disease, with the latter being more prevalent in population with type 2 diabetes.[2] Diabetic kidney disease is defined clinically by gradual kidney damage, as seen by rising albuminuria, high blood pressure, impaired renal function (reduction in glomerular filtration rate [GFR]) alongwith an increase in the risk of death from cardiovascular complications.[3]

People suffering from type 1 diabetes almost never develop diabetic kidney disease in the first decade after diagnosis, but It is estimated that roughly 3% of people who have just been diagnosed with type 2 diabetes already have overt nephropathy[4].In many regions of the world, such as Europe, Japan, and the United States, diabetic kidney disease is the leading cause of end-stage renal disease (ESRD), and patients with diabetes make up 25% to 45% of all patients participating in ESRD programmes.[5] Screening for relevant complications has become an important element of diabetes care because not all people with diabetes will experience every complication. A more targeted approach to prevention or early intervention that slows

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the development of a problem is made possible by early detection.

Preventing the onset of micro- and macrovascular problems is the primary goal of diabetes treatment[6]. The screening, diagnosis, and treatment of diabetic kidney disease have come a long way in the previous three decades, increasing both the speed with which the disease is detected and the number of healthy years added to a patient's life.

Microalbuminuria is found in 20.19 percent of people with diabetes who are newly diagnosed, according to a study by Debbarma B, et al[7]. One other study found that 49.2% of people with newly diagnosed diabetes had microalbuminuria. This study was conducted by Agaba EI, et al.[8] Despite some progress, Pakistan is still far from meeting the suggested targets for the introduction of routine screening for kidney illness. Microalbuminuria and its connections to the clinical characteristics of newly diagnosed cases of Type 2 Diabetes mellitus in our population are poorly studied. Therefore, the purpose of the current study is to attempt to evaluate the amounts of albumin excretion (microalbuminuria) in people with a recent diagnosis of type 2 diabetes mellitus. Microalbuminuria is a sign of diabetes, and by identifying it early, doctors can stop the progression of renal impairment and the need for dialysis or kidney transplantation in many of their patients.

## Material and Methods

After receiving approval from the ethical committee, 111 patients from the Department of Medicine at the Pakistan Armed Forces in Islamabad who met the inclusion criteria were enrolled in the study. The participation of each patient in this study was contingent on obtaining their informed consent, which served to guarantee both the patients' right to privacy and the absence of any risk for them. Data was collected for basic demographics like age, gender and weight on weighing machine. All patients were sent to same hospital laboratory for urine test which was tested by pathologist aiming microalbuminuria status. Data was collected regarding microalbuminuria from all patients and was noted on especially designed proforma.

BM's SPSS version 23 was used for the statistical analysis. Calculations were carried out to determine the frequency and percentage for each factor, including gender, family history, and microalbuminuria. Quantitative factors such as age and weight were represented by means and standard deviations. Using stratification, we were able to manage confounding factors such as age, gender, family history of diabetes, and body mass index. A post-stratification chi-square test was performed, and a value of p 0.05 was taken to denote statistical significance.

## Results

Age range in this study was from 18 to 50 years with mean age of 42.504± 5.19 years. Mean weight was 82.063±9.37 Kg. Majority of the patients were of male gender (81.1%). 71.2% patients had family history of diabetes. Microalbuminuria was seen in 47.7% patients. Comparison of Microalbuminuria by Age, Gender, Diabetes Family History, and Body Weight are shown in Table-II

**Table I. Demographics of patients**

| Gender | Number of patients | % |
|---|---|---|
| Male | 90 | 81.1% |
| Female | 21 | 18.9% |
| **Family History of Diabetes** | | |
| Yes | 79 | 71.2% |
| No | 32 | 28.8% |
| **Microalbuminuria** | | |
| Yes | 53 | 47.7% |
| No | 58 | 52.3% |
| Total | 111 | 100% |

**Table II: Comparison of Microalbuminuria by Age, Gender, Diabetes Family History, and Body Weight (N = 111)**

| Age (Years) | | Microalbuminuria | | p-value |
|---|---|---|---|---|
| | | Yes | No | |
| 1 | 18-30 | 7(46.7%) | 8(53.3%) | 0.928 |
| 2 | 31-50 | 46(47.9%) | 50(52.1%) | |
| Total | | 53(47.7%) | 58(52.3%) | |
| **Gender** | | **Microalbuminuria** | | **p-value** |
| | | **Yes** | **No** | |
| 1 | Male | 43(47.8%) | 47(52.2%) | 0.990 |
| 2 | Female | 10(47.6%) | 11(52.4%) | |
| Total | | 53(47.7%) | 58(52.3%) | |
| **Family History of Diabetes** | | **Microalbuminuria** | | **p-value** |
| | | **Yes** | **No** | |
| 1 | Yes | 47(59.5%) | 32(40.5%) | 0.000 |
| 2 | No | 6(18.8%) | 26(81.2%) | |
| Total | | 53(47.7%) | 58(52.3%) | |
| **Weight (Kg)** | | **Microalbuminuria** | | **p-value** |
| | | **Yes** | **No** | |
| 1 | ≤75 | 19(47.5%) | 21(52.5%) | 0.969 |
| 2 | >75 | 34(47.9%) | 37(52.1%) | |
| Total | | 53(47.7%) | 58(52.3%) | |

## Discussion

A high rate of microalbuminuria was seen in this study among newly diagnosed diabetics. Microalbuminuria was significantly present in 47.7% of the study

population. In comparison to what Mi Kyung et al. found, this prevalence is significantly higher.[9] Microalbuminuria was shown to have a prevalence of 17% among people with type 1 diabetes. Our population's mean age was 42.5045.19 years old, while the median age of the teenagers evaluated was 18.9 years old; the effect of age could explain this discrepancy. This high rate of incidence may be attributable to a diagnostic lag time for those with type 2 diabetes. One-third of people with type 1 diabetes, according to Alleyn's research, also have microalbuminuria.[10] Our patient population was significantly older than Alleyn's adolescent sample, which may explain why we reported a higher prevalence. According to Chowta, microalbuminuria affects between 8 and 47% of people with type 2 diabetes.[11] Our own research on people with type 2 diabetes found similar results. Jean Jacques provided supporting data for the observation that roughly one-third to one-half of DM patients experience renal problems.[12] Similar to what we found, Clinical severity of microalbuminuria (MA) was not influenced by patient age, as determined by Lampropoulou.. Our observation that microalbuminuria was more common in participants aged 40 and above is consistent with previous research showing that both age and diabetes duration of more than 10 years are risk factors that increase the likelihood of diabetic nephropathy. As we found, and as Okpere et al. reported in their research of Nigerian teenagers, microalbuminuria is more prevalent in females than males. Central obesity was associated with a higher prevalence of MA in our sample, as reported by Okpere.[13] The 47.7% prevalence of microalbuminuria we observed is three times greater than the indicated frequency in the general population of 10- 15%.[14] However, the vast majority of these studies were conducted in industrialised nations; data on the incidence of microalbuminuria in the African population at large and in people with diabetes is scarce. Microalbuminuria is a reliable indicator of full-blown diabetic nephropathy in patients with diabetes. As a result, the high prevalence we observed ($p = 0.079$) suggests a substantial burden of renal disease for our patient population, excluding any efforts to reduce it. People with microalbuminuria are at a higher risk of developing overt proteinuria, renal failure, and ESRD in the future.[15] Primary prevention of ESRD necessitates early diagnosis of microalbuminuria in asymptomatic persons so that relevant therapies can begin early. Similar to the findings of Chowta, et al., we discovered that microalbuminuria was not significantly associated with body mass index. Similarly, there was no statistically significant link between sex and microalbuminuria. Microalbuminuria was less common in patients who engaged in light to moderate exercise on the job. As a result, physical activity may help diabetics avoid developing microalbuminuria. Microalbuminuria was not linked to improved glycemic control (as determined by HbA1C levels) in our analysis. Contrary to the results obtained by Alleyn et al. Having microalbuminuria was linked to poor glycemic management and high blood pressure in their research. In addition, contrary to Alleyn's findings, we found no evidence of a connection between hypertension and 80 microalbuminuria. The ages of the two populations may account for the discrepancies. While Alleyn et al. evaluated a cohort of young people with type 1 diabetes, we evaluated a group with a mean age of 42.5045.19. Furthermore, Alleyn et al. followed up their group for 2 years whereas our study was a cross sectional analysis. Despite a higher prevalence of microalbuminuria in females than in males, this difference was not statistically significant in the current investigation. Similar results were observed by Chowta et al. microalbuminuria in T2DM was independent of gender. Our results contradict those of Western studies that found a link between microalbuminuria and hypertension and obesity.[16] If caught 10-14 years before the onset of full-blown diabetic nephropathy, microalbuminuria can be reversed and the disease stopped in its tracks.[17] Intense glycemic management, the use of ACE medications, and blood pressure control are all therapeutic approaches that reverse microalbuminuria.[18] Patients in Africa have a higher prevalence of DN than those in the industrialized world.[19] Possible causes include late diagnosis, a lack of available screening and diagnostic tools, uncontrolled blood sugar and blood pressure, and insufficient early therapy. Nonetheless, there is still very little solid data on the prevalence of renal disease among Africans who have diabetes.

## Conclusion

In this group of people with newly diagnosed diabetes mellitus, microalbuminuria was very common. These results highlight the importance of reversing microalbuminuria in healthcare policy or research to improve the prognosis of diabetes patients and avoid the development of chronic kidney disease. In addition,

microalbuminuria was present in a sizable percentage of people with a new diagnosis of diabetes because of inadequate screening and education.

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