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Comparison of Non-albuminuric and Microalbuminuric Diabetic Patients

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Abstract

Introduction with Objective: *The aim of the present study was to compare the Non-albuminuric and microalbuminuric Diabetic Patients.* ***Materials and Methods:*** *This comparative study was conducted in the Department of Laboratory Medicine, BSMMU, Shahbagh, Dhaka. The duration of the study was from June 2022 to February 2023. Diagnosed patients with diabetes mellitus who fulfill the inclusion and exclusion criteria were selected as the study population. After data collection and processing, all statistical analysis was done by SPSS software windows version 26.* ***Result:*** *Majority of microalbuminuric subjects (n=17, 37%) were 60-69 years. Male patients were suffering from more microalbuminuria. Mean (±SD) BMI of non-albuminuric and microalbuminuric subjects were 23.76±4.18 kg/m² and 23.90±3.50 kg/m² respectively. Mean(±SD) disease duration was 6.63±1.37 years in non-albuminuric and 7.41±1.73 years in microalbuminuric subjects. The difference of disease duration was statistically significant between non-albuminuric & microalbuminuric subjects (p<0.018). Mean value of HbA1c was 6.92±1.77 in non-albuminuric and 7.27±1.58 in microalbuminuric study subjects which was statistically not significant. Mean serum creatinine level in non-albuminuric and microalbuminuric subjects were 1.33±0.33 and 1.45±0.37 respectively and e-GFR level in non-albuminuric and microalbuminuric subjects were 57.4±21.3 and 55.8±24.1 respectively. Serum creatinine and e-GFR level between the non-albuminuric and microalbuminuric study subjects were statistically significant.* ***Conclusion:*** *Prevalence of microalbuminuria showed statistically significant association with age, duration of diabetes, serum creatinine and e-GFR level.*

Keywords: *Comparison, Non-albuminuric, Microalbuminuric Diabetic Patients.*

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Introduction:

Diabetes mellitus is the chronic disorder emerging as a major world health problem which increases the rate of morbidity and mortality. The prevalence of diabetes mellitus is growing rapidly worldwide and is reaching epidemic proportions[1]. It is estimated that there are currently 422 million people with diabetes worldwide and this number is set to double in the next 20 years (World health day, 2016)[2]. Because of the progressive nature of the disease, an evolving treatment strategy is necessary to maintain both fasting and postprandial

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glycemic control. If left untreated diabetes can cause many complications. Major complications are diabetic neuropathy, diabetic kidney disease and diabetic retinopathy. Diabetic Kidney Disease (DKD) is defined as elevated urine albumin excretion or reduced glomerular filtration rate or both in diabetics[3]. Approximately 20% to 40% of DM patients develop DKD[4]. The presence of moderate amount of albumin in urine is known as microalbuminuria (30-300mg/dl). Clinicaliy, microvascular damage of kidney in diabetes is diagnosed by microalbuminuria[5]. It can detect renal damage and the progression of overt diabetic nephropathy. The epidemiology of DKD shows significant regional and international variation. Only 1% of diabetic patients who have been diagnosed for 20 to 25 years but have less chance to develop DKD. After 15 years of having the condition, about one-third of diabetic patients developed microalbuminuria and less than half actually developed nephropathy[4].

Materials & Methods:

This comparative study was conducted in the Department of Laboratory Medicine, BSMMU, Shahbagh, Dhaka. The duration of the study was from June 2022 to February 2023. If any comorbid condition present with diabetes mellitus were excluded from the study. Five ml urine was collected for the estimation of spot urinary albumin level. The collected data were entered into the computer and analyzed by using SPSS (version 26) to compare the Non-albuminuric and microalbuminuric Diabetic Patients. The study was approved by the institutional ethical committee.

Results:

Table I reveals that maximum portion of non-albuminuric subjects (n=21, 45.7%) were belonging to age group 40-49 years and majority of microalbuminuric subjects (n=17, 37%) were 60-69 years. Differences of mean age between the groups were statistically significant (p<0.001).

Table- I: Age distribution of the study subjects (N=92)

Age (Years)	Non-albuminuria (n=46)	Microalbuminuria (n=46)
20-29	03 (6.5%)	02 (4.3%)
30-39	07 (15.2%)	02 (4.3%)
40-49	21 (45.7%)	13 (28.3%)
50-59	14 (30.4%)	12 (26.1%)
60-69	01 (2.2%)	17 (37.0%)
Mean±SD	45.13±8.62	52.76±10.32

Table-II shows male were 25(54.3%) in non-albuminuric subjects and 33(71.7%) were in microalbuminuric subjects. It is also observed that females were 21(45.7%) in non-albuminuric subjects and 13(28.3%) were in microalbuminuric subjects. Male patients suffering from more microalbuminuria. The difference between the subjects were statistically not significant (p=0.780).

Table-II: Gender distribution of the study subjects (N=92)

Gender	Non-albuminuria (n=46)	Microalbuminuria (n=46)
Male	25 (54.3%)	33 (71.7%)
Female	21 (45.7%)	13 (28.3%)
Total	46 (100%)	46 (100%)

Table-III shows mean (±SD) BMI of non-albuminuric and microalbuminuric subjects were 23.76±4.18 kg/m^2 and 23.90±3.50 kg/m^2 respectively which was statistically not significant. Mean (±SD) disease duration was 6.63±1.37 years in non-albuminuric and 7.41±1.73 years in microalbuminuric subjects. The difference of disease duration was statistically significant between non-albuminuric & microalbuminuric subjects (p<0.018).

Table-III: Comparison of variable parameter among study subjects (N=92)

Parameter	Non-albuminuria (n=46) Mean±SD	Microalbuminuria (n=46) Mean±SD
Weight (kg)	59.98±11.71	60.67±10.41
Height (m)	1.59±0.08	1.59±0.08
BMI (kg/m^2)	23.76±4.18	23.90±3.50
Duration of disease (years)	6.63±1.37	7.41±1.73

Figure-1 shows mean value of HbA1c was 6.92±1.77 in non-albuminuric and 7.27±1.58 in microalbuminuric study subjects which was statistically not significant (p>0.05).

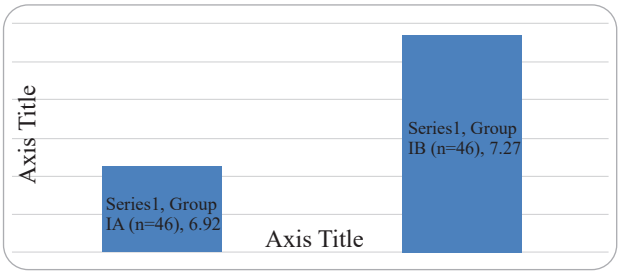

Figure-1: Comparison of HbA1c between non-albuminuria and microalbuminuria (N=92)

Table-IV shows mean serum creatinine level in non-albuminuric and microalbuminuric subjects were 1.33±0.33 and 1.45±0.37 respectively and e-GFR level in non-albuminuric and microalbuminuric subjects were 57.4±21.3 and 55.8±24.1 respectively. Serum creatinine and e-GFR level between the non-albuminuric and microalbuminuric study subjects were statistically significant(p<0.001).

Table-IV: Comparison of serum creatinine and e-GFR level in study subject (n=92)

Parameter	Non-albuminuria (n=46) Mean±SD	Microalbuminuria (n=46) Mean±SD	p-value
serum creatinine	1.33±0.33	1.45±0.37	<0.001s
e-GFR	57.4±21.3	55.8±24.1	<0.001s

Discussion:

This study observed that mean age was 45.13±8.62 years in non-albuminuric and 52.76±10.32 years in microalbuminuric. Differences of mean age between the groups were statistically significant (p<0.001). Mahfouz et al., 2016 reported that mean age of normoalbuminuric was 55.7±6.2 years, in microalbuminuric it was 53.4±6.9 years and in healthy individual, it was 45.1±4.8 years[6]. Our result was consistent with their study. This study showed majority of the respondents were male. It was observed that male and female were 54.3% & 45.7% in non-albuminuric subjects, 71.7% & 28.3% in microalbuminuric subjects. Kaul et al., (2018) also found that male was predominance which closely resembled with the finding of present study. They found that 22 male & 14 females were in non-albuminuric subjects; 34 male & 25 females were in microalbuminuric subjects. The difference between the subjects were statistically not significant (p=0.780). Our finding was consistent with their study[7]. In present study, it was found that whose disease duration was more, those subjects were prone to develop microalbuminuria. In this study, the mean disease duration was 6.63±1.37 years in non-albuminuric and 7.41±1.73 years in microalbuminuric subjects (p<0.18). Mahfouz et al., (2016) found that the mean disease duration in non-albuminuric subjects were 3.9±1.2 years and in microalbuminuric subjects were 6.9±2.14 years which was statistically significant (p< 0.001)[6]. In this study, the mean serum creatinine level in non-albuminuric and microalbuminuric subjects were 1.33±0.33mg/dl and 1.45±0.37mg/dl (p<0.001). Bolignano et al., (2009) found that the mean serum creatinine level was 0.9±0.5mg/dl in non-albuminuric and 1.0±0.4 in microalbuminuric subjects which were statistically significant (p<0.01). These findings were consistent with our study[8]. Present study e-GFR was 57.4±21ml/min/1.73m² in non-albuminuric subjects and 55.8±24.1 ml/ min/ 1.73m² in microalbuminuric subjects which were statistically significant (p<0.001). Kaul at el., 2018 reported that e-GFR was 95.39±59.58 ml/mi n/1.73m² in non-albuminuric subjects and 83.36±22 ml/ min/ 1.73m² in microalbuminuric subjects respectively which were statistically significant (p<0.001)[7]. The results are consistent with the current study. As per my knowledge no study was done to compare HbA1c between non-albuminuric and microalbuminuric study subjects.

Conclusion:

In our study male patients were suffering from more microalbuminria. Prevalence of microalbuminuria showed statistically significant association with age, duration of diabetes, Serum creatinine and e-GFR level. However, no significant statistical relation was found in Gender, HbA1c level and BMI level in the present study. Larger trials with bigger sample size should be carried out to confirm this finding from our study.

Conflict of Interest: None.

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Reference:

1. Sajith, M., Pankaj, M., Pawar, A., et al. Medication adherence to anti-diabetic therapy in patients with type 2 diabetes mellitus. International jounal of pharmacy and pharmaceutical science. 2014; 6(2):564-570.

2. World Health Day 2016: Beat diabetes, Available from: http://www.who.int/campaigns/world-health-day/2016

3. Hussain, S., Chand Jamali, M., Habib, A., et al. Diabetic kidney disease: An overview of prevalence, risk factors, and biomarkers. Clinical Epidemiology and Global Health. 2021; 9:2-6.

https://doi.org/10.1016/j.cegh.2020.05.016

4. Gheith O, Farouk N, Nampoory N, Halim MA, Al-Otaibi T. Diabetic kidney disease: world wide difference of prevalence and risk factors. J Nephropharmacol. 2015;5(1): 49-56.

5. Merel E. Hellemons, Petra Denig, Dick de Zeeuw, Jaco Voorham, Hiddo J. Lambers Heerspink, Is albuminuria screening and treatment optimal in patients with type 2 diabetes in primary care? Observational data of the GIANTT cohort, Nephrology Dialysis Transplantation. March 2013; 28, I(3):706-715.

https://doi.org/10.1093/ndt/gfs567

PMid:23262433

6. Mahfouz, M.H., Assiri, A.M. and Mukhtar, M.H. Assessment of neutrophil gelatinase-associated lipocalin (NGAL) and retinol-binding protein 4 (RBP4) in type 2 diabetic patients with nephropathy. Biomarker insights. 2016;11:31-40.

https://doi.org/10.4137/BMI.S33191

PMid:26917947 PMCid:PMC4756860

7. Kaul, A., Behera, M., Rai, M., et al. Neutrophil gelatinase-associated lipocalin: As a predictor of early diabetic nephropathy in Type 2 diabetes mellitus. Indian Journal of Nephrology. 2018; 28(1): 53.

https://doi.org/10.4103/ijn.IJN_96_17

PMid:29515302 PMCid:PMC5830810

8. Bolignano, D., Lacquaniti, A., Coppolino, G., et al. Neutrophil gelatinase-associated lipocalin reflects the severity of renal impairment in subjects affected by chronic kidney disease. Kidney and Blood Pressure Research. 2008;31(4):255-258.

https://doi.org/10.1159/000143726

PMid:18600028