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FREQUENCY OF MICROALBUMINURIA IN PATIENTS WITH TYPE-2 DIABETES MELLITUS HAVING DIABETIC RETINOPATHY

DR. MAIRA MALIK, MBBS
DEPARTMENT OF MEDICINE, NISHTAR HOSPITAL, MULTAN, PAKISTAN.

DR. MUHAMMAD ISHFAQ HUSSAIN, MBBS
MEDICAL OFFICER, THQ HOSPITAL, MAILISI, PAKISTAN.

DR. SIDRA BILAL, MBBS
DEPARTMENT OF MEDICINE, BAHAWAL VICTORIA HOSPITAL, BAHAWALPUR, PAKISTAN.

ABSTRACT
Objective; To determine the frequency of microalbuminuria in patients with type 2 diabetes mellitus with retinopathy.
Methodology:- This descriptive study was carried out in the Out Patient Department Nishtar Hospital Multan from June 2017 to December 2018. Sample size of 296 was calculated according to formula.
Results:- Of these 300 study cases, 179 (59.7%) were male while 121 (40.3%) were female patients. Mean age of our study cases was 52.10 ± 5.65 years (with minimum age was 42 years while maximum age was 60 years). Majority of our study cases had low educational level such as illiterate i.e. 60 (20%), primary education in 71 (23.7%) secondary education53% while only 3 % had bachelors degree or above. Mean duration of diabetes was 14.18 ± 2.73 years (with minimum duration of disease 10 years and 19 years was maximum duration of the disease). Among these patients Grade III diabetic retinopathy was more prevalent i.e. 149 (49.7%) followed by grade IV retinopathy i.e. 100 (33.3%) and grade11 retinopathy (17%). Diabetes was controlled (HbA1c<7%) in only 81 (27%) of our study cases and obesity(BMI>30kg/m2) was present in 101 (33.7%) of our study cases. Microalbuminuria was present in 121(40.3% of our study cases. **Conclusion:-** Very high frequency of microalbuminuria was noted in patients with diabetic retinopathy in our study.
Keywords; Microalbuminuria, Diabetic Retinopathy, Frequency,

INTRODUCTION

Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Diabetes prevalence and its complications are increasing worldwide affecting Asia more than other region of the world. This rising trend of diabetes is posing equal threats to Pakistan,10th leading nations of the world for the diabetes by the year 2030[1,2]. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of different organs, especially eyes; kidneys, nerves, heart, and blood vessels[3]. There are different types of diabetes mellitus (DM): Type-I, Type II, gestationl and secondary diabetes[4].

The multisystem complications of diabetes such as retinopathy, nephropathy, neuropathy and cardiovascular diseases are considered important, impinging heavy burden on public health[5]. Diabetic nephropathy (DN) and diabetic retinopathy (DR) are two most dreaded complications of diabetes. Together they contribute to serious morbidity and mortality. As they progress to end-stage renal disease (ESRD) and blindness, they impose enormous medical, economic, and social costs on both the patient and the health care system. Because nephropathy and retinopathy are frequently linked in diabetes mellitus[6].

Both ESRD and blindness are preventable through early detection and treatment.The concordance of microalbuminuria and diabetic retinopathy has been well reported in persons with type 1 diabetes[7,8]. However for type 2 diabetes, there is paucity of data especially from population-based studies regarding the association of microalbuminuria with diabetic retinopathy[9]. In a study done by Manaviat MR et al[10], positive correlation was seen between microalbiminuria and diabetic retinopathy and 25.9% patients of diabetic retinopathy had shown microalbuminuria (resence of albumin to creatinine ratios between 30–300 mg/g was indicative of microalbuminuria).

As these are dreadful complications of diabetes mellitus and contribute to serious morbidity and mortality,the rationale of our study is to determine the frequency of micoalbuminuria in different grades of retinopathy in patients with type 2 diabetic mellitus in our population so that we may take early therapeutic measures to prevent morbidity and mortality in these particular patients.

METHODOLOGY

This descriptive study was carried out in the Out Patient Department Nishtar Hospital Multan from June 2017 to December 2018. Sample size of 296 was calculated according to formula ($n= z^2 p (1-p)/e^2$ p= 25.9 % [8] (frequency of microalbuminuria in type II diabetics with retinopathy) e=margin of error=5% $n= (1.96)^2 0.26(1-0.26)/ (0.05)^2$, so 300 patients were included in the study. All the patients with type 2 diabetes mellitus, either taking oral hypoglycemics or on insulin therapy initially on oral drugs were examined with Non-Mydriatic Fundus Camera (NIDEK® Model # AFC-330) and urine sample was collected ,sent to pathology department for measurement of microaibumiuria. All patients with diabetic retinopathy, both male and female, with Type 2 diabetes mellitus and age 40-60 years were selected.

RESULTS

Out of 300 patients, 179 (59.7%) were male and 121 (40.3%) were female. As regards age 120 (40%) patients had age from 40-50 years and 180 (60%) were in age group from 51-60 year. Duration of disease was 10-15 years in 171 (57%) patients and more than 15 years in 129 (43%) patients. Frequency of microalbuminuria was present in 121 (40.3%) patients and absent in 179 (59.7%) patients.

Table-3: Educational status of study population (n=30)

Status	No. of patients	%age
Illiterate	60	20.0
Primary	71	23.7
Elementary	50	16.7
Matriculation	58	19.3
Intermediate	52	17.3
Graduate & \abo	09	3.0

Table-5: Grades of diabetic retinopathy among study cases. (n=300)

Grade	No. of patients	Percentage
II	51	17.0
III	149	49.7
IV	100	33.3

Table-7: Frequency of microalbuminuria with regards to sex. (n=300)

Sex	Microalbuminuria	
	Present (n=121)	Absent (n-179)
Male	60	119
Female	61	60

Table-8: Frequency of microalbuminuria with regards to age. (n=300)

Age group	Microalbuminuria	
	Present (n=121)	Absent (n-179)
41-50	40	80
51-60	81	99

P-value = 0.054

Table-9: Frequency of microalbuminuria with regards to level of education. (n=300)

Level	Microalbuminuria	
	Present (n=121)	Absent (n-179)
Illiterate	31	29
Primary	31	40
Elementary	10	40
Matric	19	39
Intermediate	21	31
Bachelor and above	09	-

P-value = 0.000

Table-10: Frequency of microalbuminuria with regards to Disease duration. (n=300)

Disease duration	Microalbuminuria	
	Present (n=121)	Absent (n-179)
10-15	42	129
> 15	79	50

P-value = 0.000

Table-11: Frequency of microalbuminuria with regards to grades of retinopathy. (n=300)

Grade	Microalbuminuria	
	Present (n=121)	Absent (n-179)
II	12	39
III	39	110
IV	70	30

P-value = 0.000

Table-12: Frequency of microalbuminuria with regards to mean disease duration. (n=300)

Microalbuminuria	Disease duration (years)	
	Mean	SD
Yes (n=121)	15.36	2.75
No (179)	13.39	2.42
Total	14.18 + 2.73 years	

P-value = 0.000

DISCUSSION

In the year 2000, there were around 171 million people with diabetes globally, and by 2035, it is estimated that this number would increase to 580 millions. As the number of persons with diabetes increases, the development of microvascular complications like retinopathy, nephropathy and neuropathy also rises. These microvascular complications are linked to the duration of diabetes mellitus, poor glycemic control and systolic hypertension. The magnitude of damage caused by these microvascular complications of diabetes stresses the need for sensitive markers of screening for retinopathy and nephropathy. The sensitive marker for the detection of diabetic nephropathy is to estimate excretion of microalbumin in urine; and for the detection of diabetic retinopathy, to have a fundus evaluation[11]. According to a report by the World Health Organization, the prevalence rates of nephropathy after 15 years of diabetes ranged between 17.7 and 56.6% in men and between 11.9 and 71% in women. Diabetic Retinopathy is responsible for 4.8% of the 37 million cases of blindness throughout the world. The concordance of microalbuminuria and diabetic retinopathy has been well reported in persons with type-1 diabetes; however, for type-2 diabetes, there is paucity of data especially from population-based studies regarding the association of microalbuminuria with diabetic retinopathy[12]. Microalbuminuria is measured by 24 hours collection of urine or by measuring albumin creatinine ratio,

Microalbuminuria is widely accepted as the first clinical sign of diabetic nephropathy. Current knowledge about the natural course of diabetic kidney disease is mostly derived from studies of patients with type-1 diabetes. As diabetic nephropathy progresses, the development of microalbuminuria eventually leads to macroalbuminuria and then to progressive loss of glomerular filtration rate (GFR). Among type-1 diabetic patients who have nephropathy,

more than 95% will already have diabetic retinopathy. However, things are more complicated for patients with type 2 diabetes, because they are also susceptible to parenchymal renal disease other than classic diabetic glomerulosclerosis, which might include hypertensive atherosclerosis and lipid toxicity.

Despite many researchers suggesting the superior role of microalbuminuria in predicting adverse outcomes, including all-cause mortality, cardiovascular end-points and renal failure even among patients without diabetes, few studies have investigated the potential association of microalbuminuria and retinopathy in type 2 diabetic patients[13].

Our study comprised of 300 patients having diabetic retinopathy, out of these 300 study cases, 179 (59.7%) were male while 121 (40.3%) were female patients. Out of these, 121 were having microalbuminuria, 61(51.42%) were female and60(49.58%) were male. A study conducted in India by Thakkar et al[14] reported 57% male patients with diabetes had microalbuminuria, these findings are slightly higher than our study results. Saleem et al[15] reported slight male gender predominance over female patients i.e. 54.14% male patients. Rani et al[11] reported 52.2% male patients which is near to our study results. Various studies have reported frequency of diabetic retinopathy increases with increasing age. Mean age of our study cases was 52.10 ± 5.65 years (with minimum age was 42 years while maximum age was 60 years). Rani et al[85] reported 58.6 ± 9.6 mean age of diabetic patients with retinopathy, these findings are higher than of our study results. Nisar et al[16] reported 52.18 ± 8.99 years which is similar to that of our study results. Jamil et al[17] reported 50.95 ± 10.12 years mean age for the newly diagnosed diabetic patients having retinopathy, these findings are similar to our study results. Thakkar et al[14] 61.91 ± 9.16 which is quite higher than our study results, the reason for this difference is that we included patients having age in between 40-60 years.

Mean age of the male patients was 52.07 ± 5.49 years while that of female patients was 52.15 ± 5.89 years. Our study results have indicated that majority of our study cases i.e. 180 (605) belonged to age group of 51 – 60 years of age. Similar results have been reported by Jamil et al[17] and Nisar et al[16].

Most of our study cases were from poor socioeconomic background i.e. 170 (56.7%) while only 13.3 % belonged to the higher socio-economic status. Majority of our study cases had low educational level such as illiterate i.e. 60 (20%), primary education in 71 (23.7%), secondary education 170(53.3%) while only 9(3%) had bachelor degrees or above.

Mean duration of diabetes was 14.18 ± 2.73 years (with minimum duration of disease was 10 years while 19 years was maximum duration of the disease). Our study results have indicated that majority of our study cases i.e. 171 (57%) had disease duration ranging from 10 to 15 years. Crimi et al[92] reported 14.7 ± 7.1 years mean duration of diabetes in diabetic retinopathy, these results are close to that of our study results. Rani et al 6.6 years mean disease duration among targeted population[11]. These findings are quite lower than that of our study results which can be demonstrated in terms that our inclusion criteria only registered patients with duration of diabetes equal or more than 10 years. Among these patients Grade-III diabetic retinopathy was more prevalent i.e. 149 (49.7%) followed by grade-IV retinopathy i.e. 100 (33.3%). Diabetes was controlled in only 81 (27%) of our study cases and obesity was present in 101 (33.7%) of our study cases. Similar results have by reported[11,14].

Microalbuminuria was present in 121 (40.3%) of our study cases. Nisar et al[16] from Lahore reported 45.4% frequency of microalbuminuria in patients with diabetic retinopathy, these findings are close to our study results. Crimi et al[16] reported 23 % micoalbuminuria in diabetic retinopathy. Manaviat et al[8] reported 25.9% frequency of microalbuminuria in patients with diabetic retinopathy. Thakkar et al[14] reported as high as 100% microalbuminuria in patients with diabetic retinopathy which is much higher than our study results.

CONCLUSION

Very high frequencies of microalbuminuria were noted in patients with diabetic retinopathy in our study. Microalbuminuria was significantly associated with female gender, increasing age, lower socio-economic status, low educational level, disease severity, disease duration and obesity.

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