



FREQUENCY OF DIABETIC NEPHROPATHY AT TERTIARY CARE HOSPITAL

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ABSTRACT

Diabetic nephropathy (DN) is one of the most serious microvascular complication results due to chronic hyperglycemia of diabetes. Globally, Diabetic nephropathy is considered a topmost common cause of ESRD. Aim of the current study is to determine the frequency of Diabetic nephropathy (DN) among Type 2 diabetic patients visiting tertiary care center OPD. It is an observational cross-sectional study done at Diabetic OPD of Mayo Hospital Lahore. In this study, we evaluated 700 diagnosed diabetic patients through random sampling. All the patients were interrogated with the help of a preformed questionnaire. A brief history including sociodemographic details, duration of diabetes and its treatment, family history of Diabetes and kidney disease, Hypertension and Cardiac problems, etc. All necessary laboratory investigations were performed including a lipid profile, serum urea creatinine, urinary albumin levels, serum albumin, complete urine examination, and GFR estimation. Among total 700 patients, 364 (52%) were male and 336 (48%) female with male to female ratio of 1.08:1. Majority of the patients were in the age group of 50-59 years i.e. 252 (35%). Mean age of patients was 50 ± 5.42 years. 378 (54%) and 126 (18%) patients were having associated hypertension and smoking habit respectively. Only 252 (36%) patients were taking the medication with compliance. Educational status of 434 (62%) patients was below secondary education. Mean serum creatinine and HbA1c was 2.29 ± 1.81 and $9.1 \pm 2.6\%$ respectively. On fundoscopic examination 217 (31%) patients were having signs of diabetic retinopathy. In treatment plans patients were having oral hypoglycemic 336 (48%), Insulin injection 259 (37%) and combined therapy of 105 (15%). Out of 700 patients, we found that 168 (24%) were having Diabetic nephropathy. Urine analysis of patients was showing microalbuminuria in 110 (15.7%) and macroalbuminuria in 58 (8.2%). According to our study, the frequency of DN is very high in patients with type 2 DM especially in 50-59 years of age group. Duration of diabetes increases the risk of nephropathy.

KEYWORDS: Microalbuminuria, HbA1c, diabetes, Serum Creatinine, Diabetic nephropathy, Hypertension, Smoking.

INTRODUCTION

Diabetes mellitus is one of the most serious diseases, spreading like fire throughout the world. It is considered a "silent killer" which results in decreased life expectancy and increase morbidity due to its microvascular and macrovascular complications e.g. nephropathy, neuropathy, retinopathy, stroke, myocardial infarction, peripheral vascular disease, etc.^[1] According to International Diabetes Federation (IDF) in 2017, approximately 425 million people were having diabetes and it is estimated by the year 2045 this will rise to 635 million.^[2] About 40% of the patient with Type 2 diabetes

will die early due to its complication.^[3] Diabetic nephropathy can be defined as increased urine protein excretion or reduced GFR or both. Although DN is a life-threatening complication of type 2 DM, it often remains undiagnosed and untreated.^[4] Type 2 diabetes is found to have microalbuminuria and evident nephropathy shortly after they get diagnosed, which implies that diabetes may be there before the time of diagnosis. Prompt early intervention can prevent the progression of DN. Therefore all the diabetic patient must undergo routine investigation, so that timely therapeutic intervention can be started. The American Diabetes Association

recommended that Type 2 diabetic patients should do an annual screening test for DN.^[5] Without proper treatment patient will have 20-40% increase in their urinary albumin excretion per year and will lead manifested nephropathy (i.e. urine albumin concentration. $\geq 300\text{mg}$ per 24hour).^[6] Microalbuminuria is not only the indicator for nephropathy but also a marker of cardiovascular complications. Diabetic nephropathy is the most common cause of end-stage renal disease (ESRD).^[7] It is a common reason for renal replacement therapy.^[3] In the USA, almost 40% of newly end-stage renal disease cases are due to diabetic nephropathy.^[8] Information and knowledge regarding clinical profile patient with DN will be helpful for the physician in providing better management.

METHODOLOGY

Study pattern: Cross-sectional observational study.

Place of study: Mayo hospital Lahore.

Time and duration: Study was performed in 1 month duration from January 2018 to March 2019.

Sample size: We enrolled 700

Sampling Technique: Random sampling

Inclusion criteria

All co-operative patients who gave consent were included.

Patients with Type 2 Diabetes mellitus.

Patients having age above 30 years.

Exclusion criteria

Patients with Type 1 Diabetes.

Criteria for diagnosing Diabetic nephropathy

Usually for the diagnosis of diabetic nephropathy biopsy is not performed as it is an invasive procedure. Diagnosis is usually made based on albuminuria, creatinine clearance/GFR estimation or renal parameters as done by us. We performed spot urine analysis for albumin rather than 24 hours of urine sampling.

Informed consent was taken from all the patients. All the patients were interrogated with the help of a preformed questionnaire. A brief history including socio-demographic details, duration of diabetes and its treatment, family history of Diabetes and kidney disease, Hypertension and Cardiac problems, etc. All necessary laboratory investigations were performed including a lipid profile, Serum urea creatinine, urinary albumin levels, serum albumin, complete urine examination, and GFR estimation.

RESULTS

There were a total of 700 diagnosed cases of Type 2 Diabetes in our study, out of which 364 (52%) were male and 336 (48%) female with male to female ratio of 1.08:1. Majority of the patients were in the age group of 50-59 years i.e. 252 (35%). Mean age of patients was 50 ± 5.42 years with a minimum age of 31 years and a maximum of 81 years. Out of seven hundred cases, 378

(54%) and 126 (18%) were having associated hypertension and smoking habit respectively. Only 252 (36%) patients were taking the medication with compliance. Educational status of 434 (62%) patients were below secondary education. Demographic trends depicted that, 413 (59%) patients belong to the urban area. Mean serum creatinine and HbA1c was 2.29 ± 1.81 and $9.1 \pm 2.6\%$ respectively. On fundoscopic examination 217 (31%) patients were having signs of diabetic retinopathy. In treatment plans, patients were having oral hypoglycemic 336 (48%), Insulin injection 259 (37%) and combined therapy 105 (15%). Out of 700 patients, we found that 168 (24%) were having Diabetic nephropathy. Urine analysis of patients was showing microalbuminuria in 110 (15.7%) and macroalbuminuria in 58 (8.2%).

Table 1: Social and demographic details of the patients. n=700.

	Frequency	Percentage
Age (years)		
30-39	126	18
40-49	229	32
50-59	252	35
60-69	70	10
70 and above	28	4
Gender		
Male	364	52
Female	336	48
Educational status		
Illiterate	203	29
Primary	231	33
Secondary	126	18
Higher secondary	70	10
Graduation	49	7
Post-graduation	21	3
Monthly income		
less than 10000	259	37
10000-20000	357	51
More than 20000	84	12
Residence		
Rural areas	287	41
Urban areas	413	59
Smokers	126	18

Table 2: Parameters specifically related to the disease. n=700

Hypertension status		
Hypertensive	378	54
Normotensive	322	46
Treatment compliance		
Yes	252	36
No	448	64
Type of treatment		
Oral hypoglycemic	336	48
Insulin	259	37
Combined therapy	105	15
Signs of diabetic retinopathy on fundoscopy		
Positive	217	31
Negative	483	69
Urine analysis		
Micro albuminuria	110	15.7
Macro albuminuria	58	8.2
Duration of Diabetes mellitus		
Diagnosed at the time of study	82	11.71
Within last 1 year	164	23.28
Old follow up cases	454	64.85
Diabetic Nephropathy		
Yes	168	24
No	532	76

Table 3: Distribution of diabetic nephropathy for age and gender. n=700

Age (years)	Frequency	Percentage
30-39	4	2.3
40-49	49	7
50-59	78	11.1
60-69	30	4.2
70 and above	7	0.1
Gender		
Male	94	13.4
Female	74	44.1

DISCUSSION

Diabetic Nephropathy is a microvascular complication of diabetes and is the most common cause of ESRD. It is defined as a clinical syndrome characterized by proteinuria or decreasing Glomerular filtration rate. Diabetic Nephropathy progress as hyper filtration, microalbuminuria, overt nephropathy and ultimately leads to ESRD.^[9] Microalbuminuria is the first clinical sign that shows renal involvement by diabetes. Once microalbuminuria encountered, on an average, it declines renal function (GFR) approximately at the rate of 10-12ml/min/year.^[10] Screening for microalbuminuria can be done by different methods e.g. measuring albumin/creatinine ratio in random sampling, 24 hours urine protein, Dipstick test, a standard assay for detecting proteinuria is not easily available in Pakistan. An easy and accurate method which we also followed in our study is spot urine protein/creatinine ratio. In the year 2030 diabetes mellitus will be the seventh leading cause of death worldwide.^[11] CKD plays a significant role in

morbidity and mortality of patient with diabetes. In developing countries like Pakistan, diabetes has been a major health problem and burden on the health system. The prevalence rate of diabetes mellitus among rural and urban areas ranges from 5% to 15%.^[12] the frequency of DN in our study is 24%. In a study done in the UK showed the prevalence rate of DN in Type 2 DM patient was 30.8%.^[13] Studies conducted in Asian countries reported variable results in the prevalence of microalbuminuria i.e. Iran 14.2%, Pakistan 24.2%, India 36.3%, and Thailand 11.2%.^[14-15] A multicenter study was performed in Asia reported 39.8% of the selected patients were having proteinuria.^[16] In another study done in Rawalpindi reported 57% of the diabetic patients were diagnosed DN.^[17] These variations in the prevalence rate of proteinuria may be due to differences in several factors e.g. Study pattern, sample selection, age, sex, ethnicity, type of population, diagnostic criteria, treatment options, and associated co-morbidities.

We evaluated 700 diabetic patients, out of this 52 % were male and 48% were female. Azim et al^[18] reported a similar result concerning gender i.e. 60% male. Mean age of patients in our study was 50±5.42 years, similar to another study done in Pakistan.^[19] We found that 18% of our patients were smoker and DN was more common in the smoker as compared to nonsmoker diabetic patients. Nilsson et al,^[20] also have shown a strong association of smoking with microalbuminuria and HbA1c in diabetic. In our study, 54% of patients were having hypertension as comorbidity. Similarly, Muzaffar et al,^[21] reported 58% of the patients were hypertensive.

We observed the frequency of DN increases with increase in the duration of diabetes. A similar association has been reported by different studies done previously.^[22-23] We reported that patients with microalbuminuria were also having other diabetes microvascular complication like retinopathy in 31% of patients. This association of diabetic retinopathy and proteinuria has been reported by other studies also.^[24-25] In our study many patients who were diagnosed with diabetes were unaware of its renal and other complication. Therefore, it is recommended that routine screening for DN should be performed. We studied some other factors which were not studied in any study performed in Pakistan in past i.e. educational, financial and residential status. These factors are important as they indirectly affect the complication of Diabetes Mellitus and patients compliance with treatment. In our study, the majority of patients with low Socio-economic status were more prone to the progression of disease and noncompliance with treatment. The reason for the higher frequency of DN can be attributed to a variety of factors.

- Poor compliance with the treatment protocol and poor glycemic control.
- Low public health awareness.
- The attitude of the general public to “bear through the problem” for as long as possible.

- Ayurveda, Hakeem, and Quacks are falsely trying to relieve the earlier symptoms of Diabetes, thus delaying the actual diagnosis of Diabetes.
- Negligence regarding the importance of screening for Diabetes/Diabetic nephropathy in high-risk patients.

CONCLUSION

According to our study, the frequency of DN is very high in patients with type 2 DM especially in 50-59 years of age group. Duration of diabetes increases the risk of nephropathy. There is a strong association between smoking and Diabetic Nephropathy. It is recommended that diabetic patients should be screened for microalbuminuria, so that timely therapeutic interventions can be done to slow the progression of the disease towards ESRD. Physicians and Consultants should also educate diabetic patients regarding DM complications and how to prevent them.

Authors declare no conflict of interest.

Abbreviations: Diabetes mellitus (DM), Diabetic Nephropathy (DN), End Stage Renal Disease (ESRD), Microalbuminuria (MA), Chronic Kidney Disease (CKD), Glomerular Filtration Rate (GFR)

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