Association of Proteinuria in type 2 Diabetes Mellitus Patients in Kathmandu Medical College and Teaching Hospital, Duwakot, Bhaktapur

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Abstract
Introduction: *Diabetes Mellitus is one of the health burden in the world. It is a metabolic syndrome leading to many systemic complication. This present study was aimed to assess association of proteinuria in type 2 diabetes mellitus patients. Total 85 patients with age range of 40 to 90 years were taken randomly, from Kathmandu Medical College and Teaching Hospital, Duwakot.*
Objectives: *To find out the association of proteinuria in type 2 diabetic patients.*
Materials and Methods: *This cross-sectional, prospective study was done in 85 patients with age 40-90 years. All known case of type 2 diabetes were taken. The test for proteinuria was done by qualitative method (coagulation method), using reagent 3% sulphosalicylic acid. In this techniques, 1% reagent was mixed with 3% sample of urine. Grading of proteinuria was obtained by the colour and transparency of sample.*
Results: *The mean age of the patients were 61.74, standard deviation ±11.46 and maximum age was 90 years and minimum was 40 years. In total patients, 17.6% patients had proteinuria. In this study, female patient showed higher (10.70%) incidence of proteinuria than male (7.05%). But there was no significant relation of proteinuria with increased age.*
Conclusion: *This study showed 17.6% prevalence of proteinuria in type 2 diabetic cases. The incidence of proteinuria was more common in female than male. No significant relation of proteinuria with gender and age.*
Keywords: *Coagulation method, Proteinuria, 3% sulphosalicylic acid, Type 2 diabetes.*

Introduction

Type 2 Diabetes Mellitus is one of the burden in health sector in the world. It is a clinical syndrome characterised by hyperglycaemia due to absolute or relative deficiency of insulin. Lack of insulin affects the metabolism of carbohydrate, protein and fat result in disturbance of water and electrolytes homeostasis. The long-standing metabolic derangement is frequently associated with permanent and irreversible functional and structural changes in the cells of the body. These changes lead to the well-defined clinical complication. This characteristically affect the eyes, kidney and nervous system.[1]

The incidence of DM in the human population has reached epidemic proportions worldwide and it is

increasing in the rapid rate. In 2000, there were an estimated 150 million cases in the world; this number is projected to increase to 221 million by 2010. Ninety percent of the present cases are type 2, paralleling the increase in the incidence of obesity.[2]

In early stage type 2 diabetes can be managed by dietary modification and exercise. Exercise like, walking 5 days a week for about 30 minutes can be prevented 60% of type 2 diabetes. People at risk of type 2 diabetes can delay and even prevent this disease by following a healthy lifestyle. If blood sugars are not lowered by these measures, medications such as metformin.[3]

The American Diabetes Association recommends a post-meal glucose level of less than 10 m mol/L (180 mg/dl) and a pre-meal plasma glucose of 5 to 7.2 mmol/L (90–130 mg/dL).[4]

As the incidence of diabetes gradually increases, there is the possibility that more individuals will suffer from eye complications which, if not properly managed, may lead to permanent eye damage. Risk factors for diabetic retinopathy include duration of diabetes, level of glycaemia, presence of high blood pressure, dependence on insulin, pregnancy, levels of selected serum lipids, nutritional and genetic factors.[5]

As the incidence of diabetes gradually increases, there is the possibility that more individuals will suffer from eye, kidney and vascular disease. Proteinuria is also known as albuminuria or urine albumin is a condition in which urine contains an abnormal amount of protein. For a random urine sample, the normal values are approximately 0 to 8 mg/dl. For a 24-hour urine collection, the normal value is less than 80 mg per 24 hours. Normal value ranges may vary slightly among different laboratories.[6]

As blood passes through healthy kidneys, they filter out the waste products and important substances are absorbed by the body. Most proteins are too big to pass through the kidneys' filters into the urine. However, proteins from the blood can leak into the urine when the filters of the kidney, called glomeruli, are damaged. Proteinuria is a sign of Chronic Kidney Disease (CKD), which can result from diabetes, high blood pressure, and diseases that cause inflammation in the kidneys.[7]

Materials and Methodology

This is a cross sectional prospective study done in Kathmandu Medical College and teaching hospital, Duwakot, Bhaktapur. Study was done in March 2017 to October 2017. Total 85 patients were taken randomly. All diagnosed type 2 diabetic patients, above 40 years were taken. Type 1 diabetes case, patients with less than 40 years, chronic diseases, malignancy and pregnancy were excluded.

All the old and new cases of type 2 diabetes were screened which include through history and examination as per the performa. Name, age, sex, address and contact number of patients were obtained from the patient information. The patient were taken from Out Patient Department (OPD) by random sampling method. Both verbal and written consent were taken from the patient and their attendance.

The test for proteinuria was done by qualitative method, using reagent 3% sulphosalicylic acid.

It is a coagulation method of proteinuria test. In this techniques, 1% reagent was mixed with 3% sample of urine. Grading of proteinuria was obtained by the colour and transparency of sample.

The variables like age and gender were obtained and analyzed in SPSS (Statistical Package for the Social Sciences) 16 version. To find the association of proteinuria chi-square test was done and P-value <0.05 was considered significant and <0.005 was considered highly significance. '

Result

The mean age of the patients were 61.74, st. deviation ±11.46 and maximum age was 90 years and minimum was 40 year.
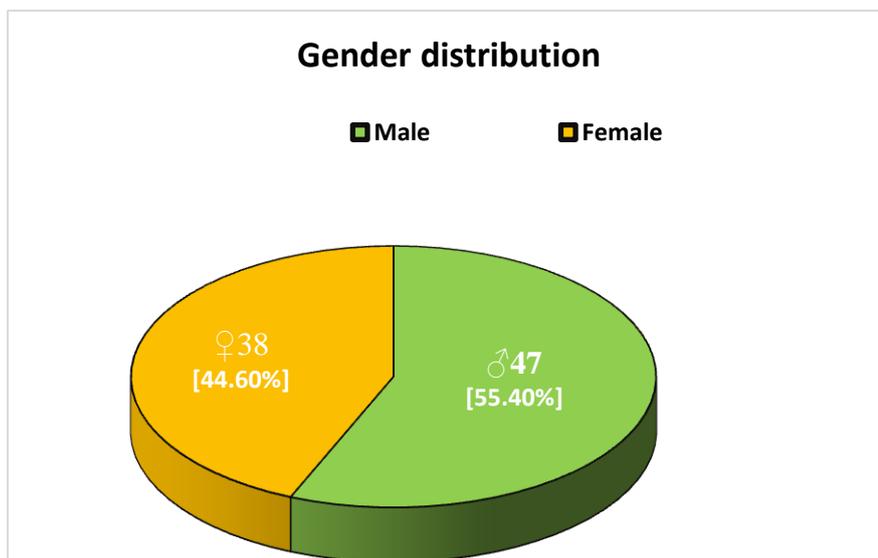
Figure1: Gender distribution in N (Total Number of patients)=85 number of patients.

Above figure shows, the number of male 47(55.40%) and female 38 (44.60%). So, figure represent the number of male patients were more than the female patients.
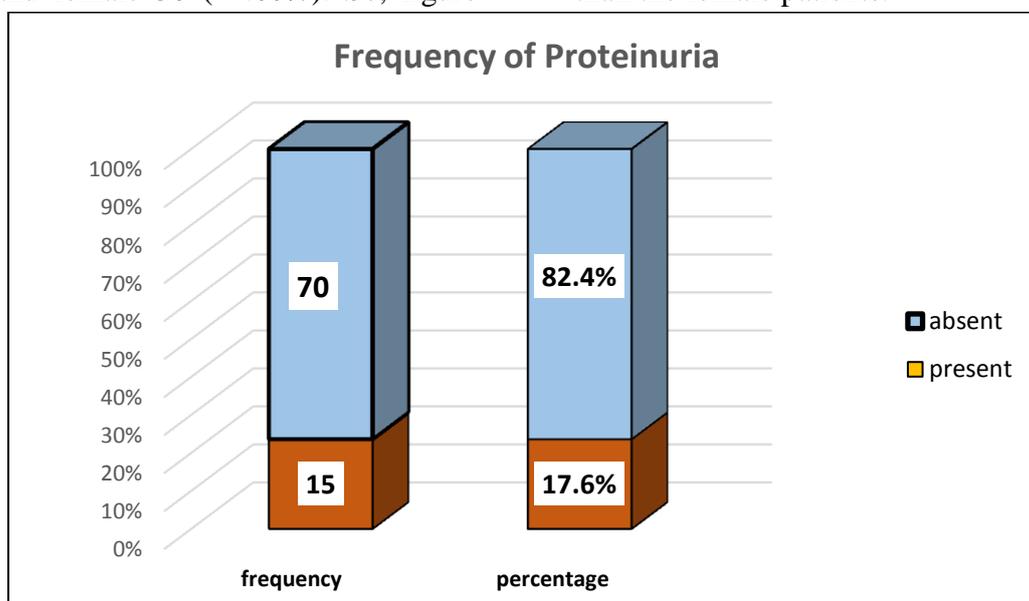

Figure 2: Frequency diagram of presence of proteinuria in total (N=85) number of patient

Above table shows that the frequency of proteinuria in total number of patients. The 15 patients had proteinuria and the percentage were17.6%. About 82.4% (70) patients did not showed the presence of proteinuria.

Table 1: Distribution of proteinuria in both gender

Gender	Proteinuria		
	Present	Absent	Total
Male	6 (7.05%)	32 (37.55%)	38 (44.60)
Female	9 (10.70%)	38 (44.70%)	47 (55.40%)
Total	15 (17.75%)	70 (82.25%)	85 (100%)

In total, female patient had more (10.70%) incidence of proteinuria than male (7.05%).
Distribution of different grade of proteinuria in different age group.

Table 2: Distribution of different grade of proteinuria in different age group

Different age group in Years	Nil	Trace	1+	2+	3+	Total	Chi-square test
40-50	16 (18.82%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	16 (18.82%)	
51-60	20 (23.52%)	1 (1.17)	1 (1.17)	0 (0.00%)	1 (1.17)	23 (27.05%)	
61-70	22 (25.88%)	3 (3.52%)	1 (1.17%)	1 (1.17%)	1 (1.17%)	28 (32.94%)	0.27
71-80	8 (9.41%)	2 (2.35%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	10 (11.76%)	
81-90	6 (7.05%)	2 (2.35%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	8 (9.41%)	
Total	72 (84.70%)	8 (9.41%)	2 (2.35%)	1 (1.17%)	2 (2.35%)	85 (100%)	

Above table showed no incidence of proteinuria in age group 40-50 years. Maximum proteinuria was found in age group 61-70 years and there was no incidence of proteinuria in age group 40-50 years. This study showed statistically insignificant (0.27) relation of proteinuria with increased age.

Discussion

Aim of this study was to assess the association of proteinuria in type 2 diabetes mellitus cases.

The mean age of the patients were 61.74, standard deviation ±11.46 and maximum age was 90 years and minimum was 40 years.

In total 85 patients, more 47(55.40%) were male and female 38 (44.60%). All are known type 2 diabetes. This indicates male has higher incidence of type 2 diabetes than female. A study done in UK by Gale EA had shown similar result.[8]

As compared to this study regarding gender, Rahmanian K et al. had done a study in Iran and this study was contrast to present study. They found that the prevalence of diabetes mellitus was 11.1% in men and 12.1% in women with no significant difference between them.[9]

Proteinuria is one of the complication of DM. The excess protein in the urine often causes the urine to become foamy. Up to 150 mg a day of protein may be excreted by a normal person. In diabetes mellitus a breakdown of the glomerular capillary-blood barrier with the development of proteinuria is usually accepted as marking the onset of clinical diabetic nephropathy.[10]

In this study, about 15(17.6%) patients had proteinuria and about 82.4% (70) patients did not showed the incidence of proteinuria. A study done by Mohan V. in Southern India, showed a total of 127(6.9%) patients had evidence of macro-proteinuria and 49(2.5%) patients had micro-proteinuria.[11] A study done in South India, prevalence of micro-albuminuria was 36.3% (95% confidence interval 33.8 to 38.9). The prevalence of micro-albuminuria increased with the increase in duration of diabetes.[12] Liang H had found the prevalence of proteinuria 12.3% of patients.[13] A study in Om Hospital and Research Center Kathmandu, Nepal showed 23% prevalence of proteinuria in type 2 diabetic case.[14]

In present study the severity and grading of proteinuria does not depend open age factors. Similar result was seen in a research done in Phoenix, Arizona, USA.[15] A study done in Rochester, Minnesota showed different result. Proteinuria is significantly related with fasting blood glucose and age, younger the age incidence of proteinuria was more.[16]

Summary and Conclusion

The present study was conducted in Kathmandu Medical College and Teaching Hospital, Duwakot, Bhaktapur. In this study, total 85 type 2 diabetes mellitus patients were taken, among them 47 were male and 38 were female. Total 15 patients had proteinuria and the percentage were 17.6%. About 82.4% (70) patients did not showed the case proteinuria. In total, female patient had more (10.70%) incidence of proteinuria than male (7.05%). This study showed statistically insignificant (0.27) relation of proteinuria with increased age.

Limitation of study

The present study has some limitations. This cross sectional study was conducted in small sample size, 85 patients. Qualitative method for proteinuria test was used rather than quantitative.

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