*Original Article*

# Study of Renal Profile In Diabetic Patient at Nobel Medical College Teaching Hospital, Biratnagar

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## Abstract
### Background
Diabetes Mellitus (DM) is one of the most common health problem characterizd by hyperglycemia. Type II Diabetes Mellitus is the most common one. Diabetic nephropathy is the most common clinical condition arises with in these patients which progressively leads to impairment in kidney's function. Measurement of microalbumin in urine is the earliest dectactable stage of diabetic kidney disease.
### Material and Methods
The total of 200 diabetic patients (112 males and 88 females) were enrolled and biochemical estimations including blood glucose level, serum creatinine, blood urea, urine albumin was conducted.
### Results
Prevalance of microalbuminuria was 26 % in type II diabetic patients.Renal functions parameters like blood urea and serum ceratinine were higher in patients with positive microalbuminuria.60 % of diabetic patients are normoalbuminrics and rests 14%  are proteinurics.
### Conclusion
Various factors like increasing age, duration of diabetics, blood sugar level,blood urea, serum creatinine are the causes for microalbuminuria and proteinuria. Therefore, to rule out the early screening of diabetic kidney disease, DM patients should get routinely checked up with blood sugar level as well as renal profile test like serum creatinine, blood urea and albumin level in urine.
**Key Words:** *Diabities Mellitus, Diabetic Nephropathy, Microalbuminuria, proteinuria.*

## Introduction
Diabetes mellitus (DM) is a clinical syndrome characterized by hyperglycemia due to insufficient or inefficient production of insulin in the body [1]. It is the most common health problem in this century. Around 6-7% (millions of people) of world population is affected by Diabetes Mellitus and the number will rise to 370 million people by 2030 [2,3]. Type II Diabetes Mellitus is most common which constitute about 85-95% of all Diabetes Mellitus cases. India will be listed top 10 amongst world's population suffering from Diabetes Mellitus [4].

Diabetes is also one of the major cause of kidney failure [5]. Diabetic Nephropathy is the most common clinical condition in diabetic patients which progressively impaired renal functions during their life time [6,7]. Microalbuminuria (albumin in urine) predicts the risk of Diabetes Mellitus [8]. Microalbumineria is the excretion of 30-300 mg of albumin in urine per day, which

represents the intermediatory stages between normal albumin excretion (2.5-30 mg/day) and macroalbuminuria (> 300 mg/day), even though the small increase in albumin excretion predicts the impairment in renal function in diabetic patients [9]. If urinary albumin excretion crosses 300 mg/day it is then to be considered as overt proteinuria and it is hall mark of diabetic nephropathy. Clinically Proteinuria is the phase after microalbuminuria [10].

## Materials and Methods

The study was carried out in clinical laboratory services of Nobel Medical College Teaching Hospital, Biratnagar, Nepal for a period of one year ie from April 2013 to March 2014. The Study includes both the indoor and outdoor patients mostly from the eastern part of Nepal.

Total of 200 patients of Diabetes Mellitus diagnosed were included in the study. Blood samples as well as urine samples of these patients for followng parameters were studied.

To make study Convinent only few parameters of Renal function test were studied. Those were Microalbuminuria, urea and creatinine with related to Blood sugar level (BSL).

Microalbuminuria was estimated using immunmetric assay method using random spot urine sample, blood sugar levels by GOD-POD (glucose oxidase - peroxidase) end point essay method, blood urea by urease method, serum creatinine by Jaffe's method (alkaline picrate method).

The normal range for urine albumin is < 30 µg/ml (up to 30 mg/24 hrs). For blood sugar level (BSL), fasting is 60-110mg/dl, post parandial (PP) is < 140 mg/dl. similarly, the normal range for blood urea and serum creatinine is 20-30 mg/dl, 0.9-1.4 mg/dl respectively.

## Statical Analysis

Mean value and standard deviation were calculated using student's two tailed t-test. Data was analysed using a student T-test.

Results are considered statically significant if p 0.05.

## Results

A total of 200 cases of diabetic's patients' blood and urine sample were studied. Out of total 112 were males and 88 females. The male to female ratio is 1.27:1. The age of the patients ranged from 40 years to 70 years. The mean age of patients was 55 years.

Table 1:Blood sugar level (BSL) status in Type II DM

| Parameters (mg/dl) | Male(n=112) | Female(n=88) | Total(n=200) |
|---|---|---|---|
| BSL fasting | 170 ± 48 | 150 ± 50 | 160 ± 49 |
| BSL post parandial (PP) | 55 ± 67 | 39 ± 85 | 247 ± 76 |

Data are Mean ± SD

Table 2: Renal Function Test (RFT) in Type II DM

| Parameters (mg/dl) | Male(n=112) | Female(n=88) | Total(n=200) |
|---|---|---|---|
| Blood Urea | 39 ± 28 | 32 ± 26 | 36 ± 27 |
| Serum Creatinine | 2.0 ± 2.45 | 1.28 ± 1.19 | 1.64 ± 2.22 |

Data are Mean ± SD

Table-3:
Biochemical parameters of normoalbuminuric and microalbuminuric.

| Biochemical Parameters(mg/dl) | Urine Albumin <30 µg/ml (normoalbuminuria) (n=120) | Urine Albumin 30 & <300 µg/ml (microalbuminuria) (n=52) |
|---|---|---|
| BSL Fasting | 145± 27 | 160 ± 20* |
| BSL PP | 220 ± 71 | 265 ± 78 |
| Blood Urea | 24 ± 7 | 40 ± 30* |
| Serum Creatinine | 0.97 ± 0.16 | 1.90 ± 2.28* |

Data are Mean ± SD
Significantly different from normoalbuminurics   *p<0.05

Table-4: Duration of diabetics and protein excretion in Type 2 DM

| Duration (years) | Mean Age | <30 µg/ml | >30&<300 µg/ml | proteinuria | Total |
|---|---|---|---|---|---|
| 0-5 Years | 53 | 86 | 32 | 15 | 133 |
| 5-10 years | 52 | 22 | 11 | 7 | 40 |
| 10-15 Years | 58 | 12 | 9 | 6 | 27 |

## Discussion

Our study suggest that the value of fasting and postparandial blood sugar lavel is higher in case of male than female, which indicates the poor glycemic control in male,suggesting the future risk of diabetic nephropathy. Controlled BSL decreases the risk of nephropathy and of other diabetic complications. Our studied is based on kidney's function parameters like microalbuminuria,serum creatinine and blood urea. Serum creatinine as well as blood urea were higher in males and in patients with positive Microalbuminuria (table-2 and 3). This increase in blood urea and creatinine can be compare and correlated with poor BSL in both these groups. In our study some of the diabetic nephropathy patient and some of the diabetic pateints who were already on dialysis, the serum creatinine level and blood urea level of these pateients were very high and that was the one of the significant reason for high standard deviation of the values of blood urea and serum creatinine. High BSL damages nephrons - tiny filtering units of kidney so that kidneys are unable to maintain the fluid and electrolyte balances of body. As we know that Creatinine is filtered by glomerulus therefore, serum creatinine level indirect measures glomerulus filtration rate (GFR). As GFR diminishes, there is markddly increase in plasma concentrations of serum creatinine and urea. Furthermore, this increase in the level of urea and creatinine indicates the progression towards diabetic nephropathy and estimation of serum creatinine has greater prognostic ability compared with that of urea for predicting the adverse outcomes [11]. Therefore, incresad serum urea and creatinine levels in diabetics clearly indicate prolonged hyperglycaemia which irreversiblly causes damage to nephrons [12]. Elevated serum creatinine and decreased GFR has become firmly entrenched as fairly reliable indicators of kidney dysfunction [13]. The prevalence of Microalbuminuria according to our study was 26%. Increasing age, duration of diabetes, BSL, blood urea and serum creatinine are the most important risk factors for the development of Microalbuminuria [14]. Most of the diabetic patients are not microalbuminurics(60% normoalbuminurics) and show normal renal profile test like urea and creatinine . As the mean sugar level increases normoalbuminurics proceeds to microalbuminurics and shows elevated urea and creatinine level (Table-3). 14% of the DM patients are proteinurics.(Table-4). So in one of the study that is conducted in Nepal it has been seen that diabetic nephropathy is one of the major cause that develop chronic renal failure later on [15].

## Conclusion

Renal function of diabetics has been investigated through this study. Most of the diabetics were having kidney dysfunction due to their elevated blood urea and creatinine. Our study has found higher prevalence of microalbuminuria in type-2 diabetes mellitus, which predicts the risk for the later development of diabetic nephropathy. Incidence of microalbuminuria increases with age as well as with increased duration of diabetes mellitus.Our study suggest that diabetic patient should routinely get cheked up with renal profile parameters like microalbuminuria ,urea and creatinine in order to minimise the risk from DM.

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