# The Prevalence of Renal Complications in NIDDM

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**Background:** Diabetic nephropathy is a specific micro vascular disease occurring commonly in diabetes and may sometimes be in very severe form.
**Material and Method:** The aim of this study was to determine the severity of Nephropathy with progressive diabetes. A cross-sectional study of 100 patients attending the diabetic clinic, Mayo Hospital, Lahore was carried out in which blood urea; serum creatinine & albuminuria were evaluated by standard methods.
**Results:** The number of patients having their test values in control range was 34 while the rest 66 patients were grouped according to the severity of nephropathy.
**Conclusion:** The study data analysis leads to the conclusion that nephropathy, prevalent in 66% of study sample, indicated progressive complications with advancement in diabetic history.
**Keywords:** Diabetic nephropathy.

## Introduction

Diabetic Nephropathy, associated with NIDDM and IDDM is a specific micro vascular disease histologically characterized by glomerulosclerosis,[1] hyalinosis of afferent and efferent glomerular arterioles and pyelonephritis, which occurs commonly in diabetes and may sometimes be in very severe form.[2] Diabetic Nephropathy with renal failure is considered to the be cause of death in 42% of patients below 20 years of age, 9% of the patients between 20-39 years of age but only 2.5 or 0.8 % between ages 40-59 years or beyond 60 years respectively.[3] Thus renal failure is considered to be the common cause of death in NIDDM. It can complicate NIDDM. However, since NIDDM is the most prevalent form of syndrome,[4] the number of patients of this type complicated by renal failure is considerable.

Anyone or any combination of following major lesions may be found.[5]

(1) Diffuse glomerulosclerosis, nodular glomerulosclerosis and exudative lesions, which result in proteinuria.

(2) Arteriosclerosis including the so-called benign nephrosclerosis and frequently associated with hypertension.

Bacterial urinary tract infections with pyelonephritis and sometimes necrotizing papillitis.

The aim of this study is to find the extent to which

duration of NIDDM determines the severity of Diabetic Nephropathy. Investigators may disagree to the extent to which the duration of NIDDM

determines the severity of Diabetic Nephropathy, however, they concur with the view that dipstick positive proteinuria, hypertension and raised serum urea and creatinine levels are the signs of far-advanced renal lesions.6 This forms the basis of our experimental study. The Diabetes Control and Complications Trial (DCCT)7 has shown that intensive diabetes treatment delays the onset and slows the progression of Retinopathy, Neuropathy and specially Nephropathy in patients of IDDM and NIDDM.

## Patients and Methods

All patients enrolled in this cross-sectional study, were diagnosed with Diabetes Mellitus according to the criteria based upon the WHO report of December 98. A total of 100 patients were thus included in the study who had their fasting blood glucose level > 126 mg %. The group comprised of 74 females and 26 males aged between 30 and 70 years. Subjects with a history of heavy alcoholism, vascular complications and drugs abuse within five years prior to entry or use of analgesics were excluded. Informed consent was obtained from all patients. This group of 100 diabetic subjects had their serum urea, serum creatinine and albuminuria levels determined in the clinical laboratory of East Medical Ward, Mayo Hospital Lahore. Early morning blood samples were taken from all the subjects.

The subjects under study showed Diabetic from 1st to

Nephropathy from 1st to 5th stage **(Table 1).** While some showed no nephropathic changes and were thus taken as a Control Group. Blood urea and creatinine levels were estimated using standard methods8 with the help of commercially prepared kits. Albuminureia was determined by chipstick method[9,10] usingalbastix.

These were coated with a buffered coat of Tetrabromophenol blue. This gives a colour change of yellow to various shades of green, depending on the amount of Albumin. The colour change was compared with the colour code given on maker's chart. The results were then grouped as +, ++ and +++ according to severity of Albuminuria.

**Table 1:** Urea creatinine and albumenuria levels in study subjects in relation to severity of nephropathty.

| Stage | | No. of Patients | Blood Urea mg % | Serum Creatinine mg % | Albuminuria | Duration of Diabetes |
|---|---|---|---|---|---|---|
| Control | M = 5 | F = 29 | < 30 | <1 | Nil | 3 yrs |
| Stage I | M = 7 | F = 14 | 30-32 | 1-1.1 | + | 4 yrs |
| Stage II | M = 6 | F = 10 | 32-35 | 1.1-1.2 | + | 7 yrs |
| Stage III | M = 4 | F = 8 | 35-38 | 1.2-1.4 | + + | 11 yrs |
| Stage IV | M = 3 | F = 10 | 38-40 | 1.4-1.8 | + + | 12 yrs |
| Stage V | M = 1 | F = 4 | >40 | >1.8 | + + + | 15 yrs |

**Table 2:** P-comparison of serum creatinine urea and albuminuria between patient central groups.

| Characteristies | Control | Patient group | P value |
|---|---|---|---|
| Serum Creatinine | 26 ± 2.1mg % | 34.6 ± 2.1 | < 0.05* |
| Blood Urea | 0.9±0.1mg % | 1.38 ± .09 | < 0.05* |
| Albuminuria | Nil | + + | < 0.05* |

*= Statistically Significant

## Results

Renal functional and biochemical studies:11

The results deducted from the cohort of 100 subjects with female pre-dominance revealed marked progress in Diabetic Nephropathy in accordance with advancement in the duration of Diabetes Mellitus. In addition to symptoms of Diabetes Mellitus, the subjects showed a high percentage of symptoms associated with End Stage Renal Disease (ESRD). These include energy loss in 95, bone pain in 82, edema in 41 and dry skin in 37 of subjects.

**Renal parameters:** Urinary Albumin excretion increased progressively
over a period of 5-10 years in patients of Diabetes Mellitus. 35 of them had Albuminuria in its early stages, 25 with moderate stages (double positive) and 4 with severe stages (triple positive).

**Blood urea assay:** Twenty subjects, with history of Diabetes Mellitus for more than 10 years, presented with elevated blood urea levels >35 mg/dl. While 62 subjects with 5-10 years of Diabetes Mellitus had urea levels between 30-35 mg/dl, showing tendency a marked tendency towards elevated blood urea index.

**Serum creatinine assay:** A total of 22 subjects had serum creatinine levels abnormally elevated >1.2 mg/dl with a history of
10-15 years of diabetes mellitus. While 42 had serum creatinine levels >0.9 mg/dl who presented with 5-10 years of diabetes mellitus history.

## Discussion

Diabetic Nephropathy is a common complication often associated with renal failure. The study of Nephropathic complications associated with duration of diabetes, led to specific results.

Our study agrees with a study, which showed diabetes mellitus as the primary cause of end stage renal disease (ESRD) in US13.

Our study also agrees with a research done on the topic of 'Long term glycemic control and rate of progression of early Diabetic Kidney disease.9 It concluded that in predisposed Diabetic subjects, long-term glycemic control is correlated with the rate of development of renal abnormalities.14

Another study on diabetic nephropathy done by American Diabetes Association presented Diabetic Nephropathy to account for 1/3 of all cases of ESRD.15

The subjects in our study presenting with more than 20 years of Diabetes, amounting to 3 out of 100, had their blood urea and creatinine levels as well as albuminuria in extremely elevated range. This showed marked progress in diabetic nephropathy with prolonged duration of Diabetes Mellitus showing end stages of diabetic nephropathy. In 42 patients with 10-20 years of Diabetic history, all above tests resulted in significantly elevated levels yet lesser than those of the previous group. This showed moderate stages of diabetic nephropathy. While in 46 patients with 5-10 years of diabetic history were in their upper most physiological ranges, closer to being pathologically elevated, marking the early stages of diabetic nephropathy.

All this is comparable with various previous studies mentioned above indicating the progressive complications of Diabetic Nephropathy with advancement in Diabetic history.7,12

With regards to the above discussion, following suggestions are worth noting.

1. A nationwide health education plan amongst Diabetics is needed to prevent complications of Diabetes Mellitus.
2. Diabetic clinics establishment amongst Government and private health sector is needed for control of both disease and complications.

## Conclusion

1. Diabetic nephropathy was prevalent in 66 % of NIDDM cross-sectional population.
2. The study data indicated the progressive complications of diabetic nephropathy with advancement in duration of diabetes (>4yrs.)
3. Female pre-dominance in Nephropathic complications was striking.

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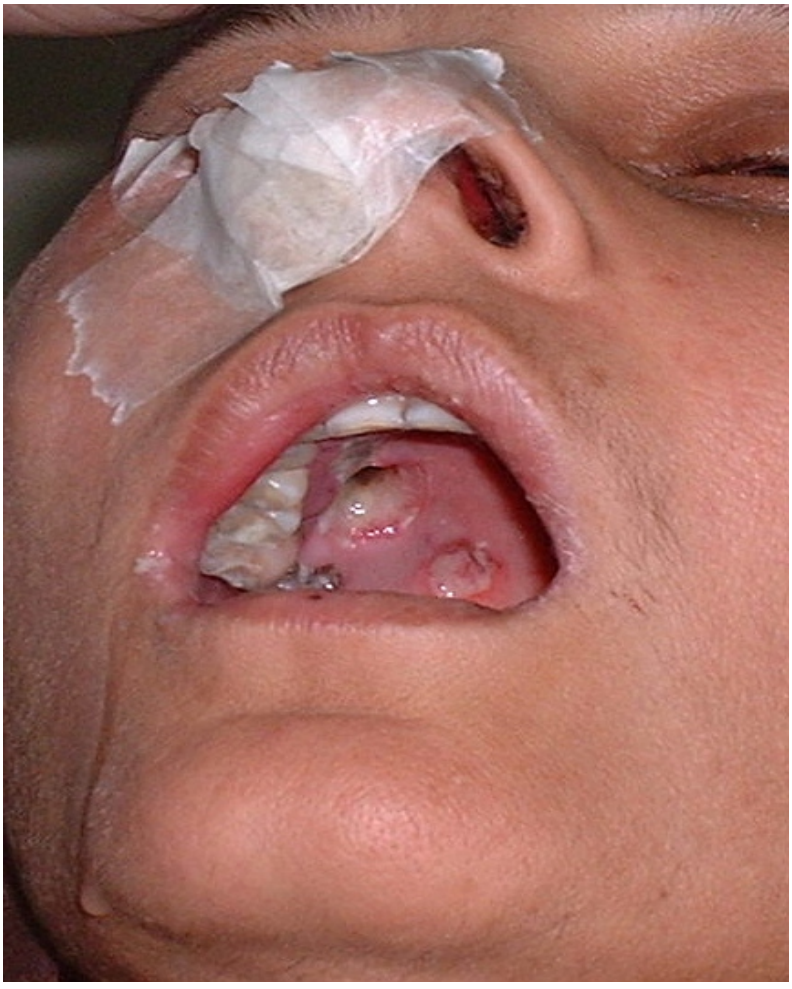
## Picture Quiz

What is the Diagnosis ?



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