



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.4452062>Available online at: <http://www.iajps.com>

Research Article

**A DESCRIPTIVE OBSERVATIONAL RESEARCH ON  
DEVELOPMENT OF CHRONIC KIDNEY FAILURE IN  
PATIENTS WITH DIABETES MELLITUS**<sup>1</sup>Dr. Ghanwa Pervaiz, <sup>2</sup>Dr. Anam Obaid, <sup>3</sup>Dr. Muhammad Asad Zia<sup>1</sup>Shaikh Zayed Hospital, Lahore<sup>2</sup>DHQ Hospital Sheikhpura<sup>3</sup>Jinnah Hospital Lahore**Abstract:**

**Objective:** The aim of this research work was to highlight how Diabetes Mellitus leads towards Chronic Kidney Failure and what are the major factors responsible for this complication

**Methodology:** Study design was descriptive observational research. The study was conducted from September 2017 to March 2018 at Nephrology Ward of two hospitals namely Mayo hospital, Lahore and Shaikh Zayed hospital, Lahore, where the patients suffering from kidney problems and Diabetes were counseled. The data of 30 patients was collected. These patients were asked about their past medical and medication history. Moreover, the prescription of each patient was thoroughly observed.

**Result:** After analyzing the data it was found that among 30 patients, 13 were males and 17 were females. This showed that females are at greater risk of developing Chronic Kidney Failure. Their ages ranged from 35 years to 70 years. It was found that patients with hypertension and other cardiovascular problems are more likely to develop kidney diseases in Diabetes Mellitus.

**Conclusion:** Chronic kidney failure progresses in most people regardless of treatment. The rate of decline in kidney function is dependent on the underlying disorder causing kidney failure and on how well it is controlled. For example, diabetes and high blood pressure, if poorly controlled, cause kidney failure to progress more rapidly. Kidney failure is fatal if not treated.

**Keyword:** Diabetes mellitus, chronic kidney failure.

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Please cite this article in press Ghanwa Pervaiz et al., A Descriptive Observational Reserch on Development of Chronic Kidney Failure in Patients with Diabetes Mellitus., Indo Am. J. P. Sci, 2018; 05(11).

## INTRODUCTION:

People with diabetes are at higher risk of developing kidney diseases [1]. This happens most often when people have diabetes for longer than 10 years.

The main function of kidneys is to remove waste from the blood and return the cleaned blood back to the body. Chronic kidney failure is a slowly progressive (months to years) decline in the kidneys ability to filter metabolic wastes from the blood.

One cause of kidney failure is diabetes melitus [2]; a condition characterized by dysfunction in the following:

- Metabolism of fats, carbohydrate and insulin
- Function and structure of blood vessels and nerves

Over time, high levels of sugar in the blood damage millions of tiny filtering units (nephron) within each kidney. This eventually leads to kidney failure. Around 30 to 40 percent of the people with diabetes develop kidney disease (**diabetic nephropathy**) [3], although not all of these progress to kidney failure. A person with diabetes is susceptible to nephropathy whether he/she uses insulin or not. The risk is related to the length of time the person has diabetes. There is no cure of diabetic nephropathy and treatment is life long.

People with diabetes are also at risk of other kidney problems including narrowing of arteries [4], called renal artery stenosis or renovascular disease.

It's clear that diabetes can lead to kidney disease. The fact that high blood sugar levels damage the glomeruli is unclear [5]. High blood pressure is a known risk factor for kidney disease and people with diabetes are prone to hypertension. The rennin-angiotensin aldosterone system (RAAS) which helps regulate blood pressure is also thought to be involved in diabetic nephropathy. Other risk factors include cigarette smoking and family history [6].

Diabetic nephropathy progresses steadily despite medical intervention. However, treatment can significantly slow the rate of damage. Following are some factors that contribute towards renal injury;

Systemic hypertension, proteinuria, hyperlipidemia, increased renal ammonia genesis with interstitial injury, hyperphosphatemia with calcium phosphate deposition, smoking and decreased level of nitrous oxide.

## Diabetic Ketoacidosis:

- Insulin deficiency results in hyperglycemia
- As blood glucose concentrations increases, the glucose reabsorptive capacity of the kidney is exceeded. This occurs at a concentration of about 180mg/dl, referred to as the threshold for glucose [7]. Glucose is then excreted into the urine, resulting in an **osmotic diuresis** with subsequent dehydration and electrolyte abnormalities. Breakdown of protein yields carbohydrate/glucose moieties, but with insufficient insulin. The additional glucose worsens hyperglycemia rather than serving as an energy source.
- Breakdown of triglycerides yield free fatty acids and glycerol through the process of lipolysis. Without the administration of insulin, Type 1 Diabetes Mellitus will progress to **ketoacidosis**.

## Hyperosmolar Hyperglycemic State:

- Insulin deficiency, often with concomitant insulin resistance in hyperglycemia.
- In Type 2 Diabetes Mellitus, the presence of even minimal blood levels of endogenous insulin usually prevents the breakdown of fats and subsequent **ketonemia and ketoacidosis**. Thus patients with Type 2 Diabetes /mellitus are described as ketosis **resistant** [8].
- Although sufficient to suppress ketosis, endogenous insulin secretion in Type 2 Diabetes Mellitus is insufficient for glycemic control. If insulin is not administered, profound dehydration with very high blood glucose levels may occur.

## Diabetic Complication Leading Towards Renal Disease:

Coexistence of hypertension and Diabetes Mellitus strikingly increase the risk of **cardiovascular diseases** and increase the risk of **stroke and transient ischemic events** in diabetic individuals [9].

Severity or liability of hypertension is determined by factors such as age, race, gender, greater body mass, duration of Diabetes Mellitus and persistence of proteinuria [10].

Hypertension in diabetes is associated with acceleration of nephropathy, retinopathy and atherosclerosis. Hyperinsulinemia and/or insulin resistance may be significant factor in the development of Diabetes Mellitus and hypertension. In **chronic kidney failure**, blood levels of urea and creatinine, metabolic waste product that is normally filtered out by the kidneys, are increased. Typically blood becomes more acidic. The level of K in the blood is often normal or only slightly increased but

can become dangerously high when kidney failure reaches an advanced stage or if people ingest large amounts of potassium (K) or take a drug that prevents the kidneys from excreting the potassium. Usually people have some degree of anemia. The levels of calcium and calcitriol in the blood decreases and the phosphate and parathyroid hormone levels increase. Analysis of the urine may detect many abnormalities including protein and abnormal cells.

## II.MATERIALS AND METHODS:

The study was conducted at Nephrology Ward of two hospitals namely **MAYO HOSPITAL, Lahore** and **SHAIKH ZAYED HOSPITAL, Lahore**, from 2017 to 2018, where the patients suffering from kidney problems and Diabetes were counseled. Study design was descriptive observational research .The data of 30 patients was collected. These patients were asked about their past medical and medication history. Moreover, the prescription of each patient was thoroughly observed. During the survey it was observed that the drugs that were given to manage diabetic as well as renally compromised patients were;

**Ampicillin** and **Salbactam** were given to 5 patients to treat infections. 3 patients were prescribed with **Ciprofloxacin** and **Coamoxiclav**. Only 1 patient was prescribed with **Ofloxacin** and one with **Clarithrimycin**. To maintain glycemic control **Humulin R<sup>®</sup>** was given to 9 patients and 2 patients were on oral hypo glycemic agents i.e. **Metformin** and others with **Glycid<sup>®</sup>**. **Furosemide** was given to 15 patients who complaint edema. Calcium Channel Blockers, **Amlodipine Besylate** was prescribed to 5 patients with cardiovascular problems and two patients were prescribed with **Nifedipine**. Nitrates that are **isosorbide Nitrate**, **Isosorbide Dinitrate** and **Isosorbide Mononitrate** were included in the prescription of 3 patients.

To treat hypertension, **Prazosin**, a selective alpha 1 blocker was administered to 1 patient and one patient

was prescribed with **Bisoprolol**. **Clopidogrel** and **Aspirin** was also included in the prescription of 2 patients. To relieve pain **Diclofenac Sodium** and **Nalbuphine** were given. To give relief from nausea and vomiting **Metoclopramide** and **Domperidone** were prescribed to 4 and 1 patients respectively. Calcium supplement and antidote to hyper phosphatemia i.e. **Calcium Acetate** was prescribed to 4 patients and **Calcium Gluconate** was administered to 1 patient.

To treat anemia, 3 patients were given **recombinant human erythropoietin**. 2 patients were prescribed with vitamin D analogue i.e. **Caltriol<sup>®</sup>**. **Neurobion<sup>®</sup>**, a multivitamin, was prescribed to 5 patients to relieve muscle weakness and 1 patient was prescribed with **Sangobion<sup>®</sup>**. To treat neuropathic pain, **Gabapentin** was given to 1 patient. Patients who had gastro intestinal problems were prescribed with **Omeprazole** and **Ranitidine**. **Dopamine** and **Dobutamine** were administered in patients with sever condition.

It was observed that long term dialysis was done when the treatment for chronic kidney failure was no longer effective.

## Aims and Objectives:

The basic aim was to highlight how Diabetes Mellitus leads towards Chronic Kidney Failure and what are the major factors responsible for this complication.

## III.RESULTS:

After analyzing the data it was found that among 30 patients, 13 were males and 17 were females. This showed that females are at greater risk of developing Chronic Kidney Failure. Their ages ranged from 35years to 70years. It was found that patients with hypertension and other cardiovascular problems are more likely to develop kidney diseases in Diabetes Mellitus. The results of lab findings are shown in the table:

LAB TESTS	AVERAGE VALUES OF FINDINGS IN	
	MALES	FEMALES
Serum Creatinine*	4.72mg/dl	7.32mg/dl
Serum Urea	172.3mg/dl	156.6mg/dl
Heamoglobin	10.4mg/dl	11.2mg/dl
Blood Glucose	213mg/dl	256mg/dl
Na <sup>+</sup>	174.8mmol/L	121mmol/L
K <sup>+</sup>	3.8mmol/L	4.6mmol/L
pH	6	7.409

\*Rising serum creatinine causes progressive decrease in glomerular filtration rate until end stage renal disease

occurs

#### IV.DISCUSSION:

The distribution of estimated serum creatinine (2-10mg/dl) for end stage renal disease was similar in both genders. Data revealed that the incidence rate of end stage renal disease cases is higher for females compared to males. The highest incidence rate of end stage renal disease occurs in patients older than 50 years. Patients with hypertension and other cardiovascular problems are more likely to develop kidney diseases in Diabetes Mellitus. 6% people were found deprived of the basic knowledge about their medication. Multiple drug therapy and irrational use of drugs often lead to chronic kidney diseases. 3% were not compliant to their anti-diabetic therapy so left the treatment and later paid the consequences. Patients with chronic kidney disease have random glucose level reached up to 300mg/dl.

#### Prevention and Treatment Strategies:

Measures must be taken to prevent worsening of kidney disease.

- Aggressive measurement of hypertension and blood pressure
- Controlling cholesterol and triglyceride level
- Smoke cessation
- Limit daily protein intake to 0.8g/kg of body weight. Note that lower protein meal plans should be used with caution to avoid malnutrition and associated muscle weakness.
- Early identification and treatment of urinary tract infection.
- Yearly assessment of kidney functions.
- For end stage renal failure, fluid and electrolyte restriction as well as intermittent or chronic dialysis treatment as indicated by severity of pathology, laboratory findings and patient's symptomology.
- For end stage renal disease, patients and caregiver's counseling to prepare them for the psychosocial, financial, physical, medical, and quality of life changes that accompany dialysis and possible kidney transplantation.

#### V.CONCLUSION:

Chronic kidney failure progresses in most people regardless of treatment. The rate of decline in kidney function is dependant on the underlying disorder causing kidney failure and on how well it is controlled. For example, diabetes and high blood pressure, if poorly controlled, cause kidney failure to progress more rapidly. Kidney failure is fatal if not treated.

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