

## CHRONIC RENAL FAILURE; ASSOCIATION OF DIABETES MELLITUS

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**ABSTRACT...Objective:** To find the effect of diabetes mellitus on the development of Chronic renal failure (CRF). **Study Design:** Descriptive Cross-sectional study **Setting:** Allied Hospital, Faisalabad. **Period:** From May 2008 to June 2008. **Materials & Methods:** Forty-Five patients of CRF were selected for study by convenient method technique from admitted patients in dialysis unit of Allied Hospital Faisalabad. **Results:** In our study, out of 45 patients of CRF, 25 (55.6%) were found to be diabetic. The effect of diabetes on the development CRF was highest in age group of 71-85 years that was 100%. In this study diabetes mellitus was found to be more prevalent among married CRF patients (62%) as compared to unmarried patients among whom it was (17%). Among the male CRF patients 54% were diabetic, while among the female CRF patients 57% were diabetic. **Conclusion:** Percentage of CRF patients having diabetes mellitus was 55.6%. From the above results it is concluded that effect of diabetes mellitus on the development of CRF increases with age. Diabetes mellitus was found to be more prevalent among female CRF patients and also among the married CRF patients. The development of Chronic renal failure can be prevented by early diagnosis and treatment of diabetes mellitus.

**Key words:** Chronic renal failure, Diabetes mellitus, prevalence.

### INTRODUCTION

With increasing incidence of Diabetes Mellitus & Hypertension throughout the world, the number of patients with Chronic Kidney disease is increasing tremendously<sup>1</sup>. It is the progressive loss of kidney function. The kidneys attempt to compensate for renal damage by hyperfiltration (excessive straining of the blood within the remaining functional nephrons). Over time, hyperfiltration causes further loss of function<sup>2</sup>.

The social and economic consequences of CRF are considerable. In the UK, over 37000 patients are kept alive by renal replacement therapy and approximately 110 new patients per million of the adult population are accepted for long-term dialysis treatment each year. Of these, 50% are aged over 65 years<sup>3</sup>. The incidence of CRF is much higher in some countries due to differences in regional and racial incidences of disease as well as

differences in medical practice for example, in the USA, incident rates are over 300 per million population with nearly half of these patients having a primary diagnosis of diabetes mellitus<sup>3</sup>.

Diabetic nephropathy is a progressive kidney disease caused by angiopathy of capillaries in the kidney glomeruli. It is characterized by nephrotic syndrome and nodular glomerulosclerosis.

It is due to longstanding diabetes mellitus, and is a prime cause for dialysis in many Western countries<sup>4</sup>. Diabetes

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can be considered a vascular disease because it causes both Micro vascular complications (e.g., Nephropathy, retinopathy) and macro vascular complications<sup>5</sup>. Chronic loss of function causes generalized wasting (shrinking in size and progressive scarring within all parts of the kidneys). In time, overall scarring obscures the site of the initial damage. Yet, it is not until over 70% of the normal combined function of both kidneys is lost that most patients begin to experience symptoms of kidney failure<sup>2</sup>.

In a developing country, the exact prevalence of CRF is difficult to determine since medical facilities are limited and unevenly distributed between urban and rural areas. In the absence of a central registry, the only data available is center based with increasing awareness more patients are diagnosed with CRF; however, the majority are those requiring immediate dialysis and in whom etiology remains largely speculative. Chronic renal failure is a common and serious medical problem in Pakistan where its major cause is uncontrolled diabetes mellitus, followed by hypertension, polycystic kidney disease, obstructive uropathy and nephrotoxic drugs<sup>6,7</sup>.

Many people with diabetes mellitus eventually develop complications, especially if it is not controlled well. Even if the diabetes is controlled well, complications can still occur. The good news is that short term complications can be easy to fix and that proper treatment of diabetes mellitus usually delays complications. The bad news is that long term complications are difficult to control and can cause someone to die earlier than normal and chronic renal failure is one of its long-term complications<sup>8</sup>. Chronic renal failure results in the accumulation of fluid and waste products in the body, causing azotemia and uremia. Azotemia is the buildup of nitrogen waste products in the blood. It may occur without symptoms. Uremia is the state of ill health resulting from renal failure. Most body systems are affected by chronic renal failure. Fluid retention and uremia can cause many complications eg. Anemia,

Changes in blood sugar metabolism, Decreased functioning of white blood cells, Decreased immune response, Decreased libido, impotence, Dementia, Electrolyte abnormalities including hyperkalemia, Encephalopathy, End-stage renal disease, High blood pressure, Increased infections, Liver inflammation (hepatitis B or hepatitis C), Liver failure, Loss of blood from the gastrointestinal tract, Nerve damage, Pericarditis, Peripheral neuropathy, Platelet dysfunction, Ulcers, Seizures, Skin dryness, itching /scratching with resultant skin infection, white crystals in and on the skin (uremic frost), Weakening of the bones leading to fractures<sup>9,10</sup>.

## METHODOLOGY

A descriptive cross-sectional study was conducted on 45 patients of CRF at Allied Hospital, a tertiary care hospital of Faisalabad Division. A structured pre-tested questionnaire was developed in English language for interviewing the patients admitted in the above hospital. The questionnaire was translated into Urdu language to remove the language barrier. A total of 45 patients were selected of either sex and occupation irrespective of age group by non-probability convenience sampling technique. Patients were diagnosed as cases of chronic renal failure on the basis of history, clinical and laboratory findings and their association was observed with diabetes mellitus and other variables like hypertension and renal stones. All the above findings were confirmed from patient's medical records. Only those patients who fully understood the objectives of the study and gave their verbal or written consent to participate in the study were eventually included in the study.

## DATA ANALYSIS

The data collected was entered, cleaned and analyzed by using Statistical Analysis Software (SAS) Version-6. Fisher's exact test was used to check the association of Diabetes Mellitus with chronic renal failure. The

association of other variables of interest with CRF was also calculated. P -value less than or equal to 0.10 was considered as significant.

## RESULTS

In our study, out of 45 patients of CRF, 25 were found to be diabetic, percentage of patients having diabetes mellitus was 55.6%, patients of CRF having associated risk factor of hypertension before development of CRF was 35.6% and those who were patients of renal stones were 8.8%. Percentage of diabetes (+) in CRF patients was highest in age group of 71-85 years that was 100% and lowest in age group of 11-25 years that was 0%, the association of diabetes with age was statistically significant (p-value 0.018). Percentage of diabetes mellitus in CRF patients increases as the age advances according to our study. Maximum numbers of CRF patients were found in age group of 41-55 that was 19 out of 45 patients. Percentage of diabetes (+) in CRF patients was highest among income group of above 30,000 rupees per month that was 67%. The association of income with diabetes mellitus in CRF patients was not found to be statistically significant. In this study percentage of diabetics was more among female patients i.e. 57% as compared to male patients i.e. 54%. The proportions were not statistically significant as p-value was 0.841. Diabetes mellitus was found to be more prevalent among married CRF patients i.e. 24 (62%) as compared to unmarried patients among whom it was 1(17%).

The association of married status with diabetes mellitus in CRF patients was found to be statistically significant (p-value 0.074). More numbers of CRF patients were found to be married i.e. 39 out of 45 patients. No statistical significance was found for the association of occupation with diabetes mellitus in CRF patients. Maximum numbers of CRF patients were found to be jobless. (table-I).

**Table-I. Association of Diabetes Mellitus with chronic renal failure according to Age, Income monthly, Sex, Marital status & Occupation.**

Variables	Diabetes ±	Diabetes (-)	P-value
<b>Age of Patient</b>			
11-25	0(0%)	3(100%)	0.018
26-40	2(20%)	8(80%)	
41-55	11(58%)	8(42%)	
56-70	9(90%)	1(10%)	
71-85	3(100)	0(0%)	
<b>Income Per month (Rs.)</b>			
Up to 10,000	12(63%)	7(37%)	0.579
10,000-30,000	11(48%)	12(52%)	
Above 30,000	2(67%)	1(33%)	
<b>Sex</b>			
Male	13(54%)	11(46%)	0.841
Female	12(57%)	9(43%)	
<b>Marital Status</b>			
Married	24(62%)	15(38%)	0.074
Unmarried	1(17%)	5(83%)	
<b>Occupation</b>			
Students	0(0%)	2(100%)	0.525
Business	1(50%)	1(50%)	
Labourer	1(33%)	2(67%)	
Job in Govt.	3(60%)	2(40%)	
Housewives	4(50%)	4(50%)	
Jobless	16(64%)	9(36%)	

Out of 45 patients of CRF, 25 were found to be diabetic. Percentage of patients having diabetes mellitus was 55.6%. (table-II).

**Table-II. Associated risk factors in chronic renal failure patients**

Associated risk factor	Diabetes (+)	Hypertension (+)	Renal Stones (+)
No.Of patients	25	16	4
Percentage	55.56%	35.56%	8.88%

## DISCUSSION

The objective of this study was to find the prevalence of diabetes in CRF patients. In this study the overall 25 (55.6%) of CRF patients were found to be diabetic and 16(35.6%) had hypertension, this shows that diabetes is the most common cause of CRF and hypertension is the second leading cause of CRF. According to the United States Renal Data System (USRDS), diabetes is the leading cause of End Stage Renal Disease (ESRD) 42.9% followed by hypertension 26.4% and glomerulonephritis 9.9% in the US population<sup>8</sup>. The results of our study are nearly consistent with this US study. In another international study on Africans in America, Diabetic nephropathy, Kidney disease associated with diabetes; was the most common cause of CRF and hypertension was the second leading cause of CRF<sup>11</sup>. The results of our study are also consistent with this study.

In a study "Causes of Chronic Renal Failure in Pakistan: A Single Large Center Experience" done by Rizvi H, Manzoor K, in Karachi, Pakistan, the largest group comprised of patients in whom the exact cause was unknown. Diabetes mellitus and hypertension were the next two commonest causes. Obstruction (including both due to stone disease and due to lower urinary tract pathology) was the fourth commonest cause. The two most common known causes of CRF in males were diabetes mellitus in 113 (22.3%) and hypertension in 92 (18.1%) patients respectively. Among females CRF was related to hypertension in 79 (21.8%) patients and to diabetes mellitus in 59 (16.3%) patients<sup>12</sup>. A study described by Prof. S.A. Jaffar Naqvi showed that almost 70% of chronic kidney disease is due to the two conditions diabetes mellitus and hypertension and is the

result of neglect, if these patients are picked up and treated early, can be cured<sup>13</sup>. In our study, out of 45 patients of CRF 25(55.6%) were found to be diabetic and 16(35.6%) had hypertension, being almost 91.2% due to these two conditions. The results are alarming and need early diagnosis and treatment of these two conditions for the prevention of CRF. In this study, association of diabetes with CRF was highest in age group of 71-85 years that was 100% and lowest in age group of 11-25 years that was 0%. Association of diabetes mellitus with CRF increases as the age advances according to our study. Diabetes mellitus was found to be more prevalent among married CRF patients i.e. 62% as compared to unmarried patients among whom it was 17%. Percentage of diabetics was more among female patients i.e. 57% as compared to male patients among whom it was 54%. According to occupation out of 25 jobless CRF patients 16(64%) were diabetic. Among house wives out of 8 CRF patients 4(50%), in Government servants out of 5 CRF patients 3(60%), among laborers out of 3 CRF patient 1(33%) and businessmen out of 2 CRF patient 1(50%) were diabetic. (P-value was 0.525) The effect of Sex, income and occupation in diabetic CRF patients was not found to be statistically significant.

## CONCLUSION

After comparison and discussion of results it is concluded that effect of diabetes mellitus on the development of CRF increases with age. Diabetes mellitus was found to be more prevalent among married CRF patients and is a major risk factor in CRF patients. Overall Diabetes mellitus was a major cause of chronic renal failure and need early diagnosis and treatment for its prevention.

## RECOMMENDATIONS

Non-communicable diseases now have created greater realization and emphasis by the community all over the world. Knowledge and awareness of the community at large by the media and health authorities about diabetes and CRF needs appreciation and must be enhanced. The treatment of CRF is very costly and expensive. Late referral of patients leads to poor results, hence prevention is emphasized.



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