

# A Study on The Risk Factors of Chronic Kidney Disease Amongst Patients of Jinnah Hospital Lahore

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## ABSTRACT

**Background:** Chronic Kidney disease(CKD) is an important cause of morbidity worldwide, and the prevalence is increasing. Hypertension, diabetes, obesity and age are amongst the most important risk factors.

**AIMS & OBJECTIVE:** To study the socio-demographic and clinical factors in the patients of CKD, and to find which is the most frequent factor associated with CKD.

**Study Design:** This is a cross sectional study.

**Setting:** The 4 medical units and the nephrology ward of Jinnah Hospital, Lahore along with the nephrology outpatient department.

**Duration of Study:** April to May 2016.

**Sample Size:**80 patients.

**Type of Sampling:** Non-random purposive sampling

**Results:** the frequency of hypertensives in the CKD patients was 68.3%,diabetes was present in 46%, 56% of the population was male, 53% had a history of using traditional alternative medicine (Specifically Hakeem Medications). The mean age of the population was 44.3+ 16.5.

**Conclusions:** Hypertension is the most frequent risk factor found in the CKD patients. However, its control is not upto the mark. Strategies should be employed to control hypertension and diabetes to prevent further progression of disease in this country where there are insufficient medical services.

**Keywords:** chronic kidney disease, risk factors, hypertension, diabetes

## INTRODUCTION

Chronic Kidney Disease (CKD) is defined as either kidney damage or glomerular filtration rate (GFR) <60mL/min/1.73m<sup>2</sup> for greater than or equal to 3 months. Kidney damage is defined as pathological abnormalities or markers of damage, including abnormalities in blood or urine tests or imaging studies<sup>[1]</sup>.This disease is staged as follow

**Stage 1:** Kidney damage with normal or increased GFR (>90 ml/min/1.73m<sup>2</sup>)

**Stage 2:** Mild reduction in GFR (60-89 ml/min/1.73m<sup>2</sup>)

**Stage 3a:** Moderate reduction in GFR (45-59 ml/min/1.73m<sup>2</sup>)

**Stage 3b:** Moderate reduction in GFR (30-44 ml/min/1.73m<sup>2</sup>)

**Stage 4:** Severe reduction in GFR (15-29 ml/min/1.73m<sup>2</sup>)

**Stage 5:** Kidney failure. GFR <15ml/min/1.73m<sup>2</sup> or dialysis.

In Stage 1 and Stage 2, CKD reduced GFR alone does not clinch the diagnosis because the

GFR may be normal or borderline normal. In such cases presence of one or more of the following markers of kidney damage can establish the diagnosis.

1. Albuminuria (Albumin excretion >30mg/24hours or Albumin: Creatinin ratio >30mg/g [>3mg/mmol])
2. Urine sedimentation abnormalities
3. Electrolyte abnormalities
4. Histopathological abnormalities
5. Anatomical problems seen by radiology.
6. History of any kidney transplant.

**Etiology:** Causes of CKD includes following; Diabetic Kidney disease, Hypertension, Vascular diseases, Glomerular disease (Primary & Secondary), Recurrent kidney stone disease, Urinary Tract Obstruction, Congenital defects of kidney or bladder, Tubulointerstitial diseases, Vascular diseases (Renal artery stenosis, Atheroemboli, Hypertensive nephrosclerosis, Renal vein thrombosis), Primary glomerular diseases (Minimal change disease, Alport syndrome, IgA

nephropathy, FSGS, Membranous nephropathy. MPGN, Crescentic glomerulonephritis, Complement related diseases), Cigarette smoking, Male gender, Age, Hyperlipidaemia, HIV, Obesity, Metabolic syndrome, Hepatitis C, History of kidney disease, Potentially nephrotoxic drugs, Low vitamin D levels<sup>[4],[5]</sup>.

Prevalence of CKD is increasing worldwide. In the United States the number of patients has risen to 571,414<sup>[2]</sup>. In Pakistan the figure is 12.5%<sup>[3]</sup>.

According to Okaka et al, prevalence of hypertension and obesity in Benin City was 33.5% and 18.2% respectively<sup>[4]</sup>. A 1 year increment in life increases by 4% the chance of getting CKD; males are at a 1.69 times greater risk to get CKD than females and hypertensives have a likelihood to develop CKD 1.69 times more than the normotensive<sup>[6]</sup>.

According to Pierre et al, the mortality risk and chances of developing end stage renal disease (ESRD) is trivial in older patients with estimated glomerular filtration rate (eGFR) just below 60ml/min/1.73m<sup>2</sup> and the risk is higher in young patients with eGFR levels even slightly above 60ml/min/1.73m<sup>2</sup> advocating the need of an age calibrated definition of CKD, i.e. for patients <40 years, the lower limit of eGFR should be 75ml/min/1.73m<sup>2</sup> and in older patients i.e. greater than >60 years, it should be less than 45ml/min/1.73m<sup>2</sup><sup>[7]</sup>.

The increasing prevalence of the CKD demands for screening and prevention of the risk factors that lead to CKD<sup>[5],[6],[8]</sup>. The most effective attributes to screen out patients with CKD are Hypertension, Diabetes and Age >55 years<sup>[9]</sup>. Though tight glycaemic control is advised, a study shows that there was no correlation between tight glycaemic control and longevity in ESRD patients<sup>[10]</sup>. We hope to have convinced the nephrologic community that motivation of patients to quit smoking should be immediately implemented, because it is certainly the most cost-effective and beneficial strategy against the whole spectrum of CKD, ESRD, and CVD morbidity and mortality in renal patients<sup>[13]</sup>. Cigarette smoking also contributes to the development and/or progression of CKD and thus adds another important reason to quit and patients should be advised of this<sup>[14]</sup>.

## OBJECTIVE

To study the socio-demographic and clinical factors in the patients of CKD, and to find which is the most frequent factor associated with CKD.

## METHODOLOGY

### Inclusion Criteria

Persons admitted in the medical and nephrology wards who are diagnosed with chronic kidney disease, and those chronic kidney disease patients who are visiting the nephrology outdoor.

### Exclusion Criteria

Patients younger than 15 Years.

### Operational Definitions

Chronic Kidney Disease (CKD): is defined as either kidney damage or glomerular filtration rate (GFR) <60ml/min/1.73m<sup>2</sup> for greater than or equal to 3 months. Kidney damage is defined as pathological abnormalities or markers of damage, including abnormalities in blood or urine tests or imaging studies.

**Hypertension:** is defined as physician office systolic blood pressure level of  $\geq 140$ mmHg and diastolic blood pressure  $\geq 90$ mmHg. JNC defines normal blood pressure <120 and diastolic <80. The gray area between systolic BP of 120-139 and diastolic BP of 80-89mmHg is defined as prehypertension. Diabetes: was defined as fasting blood sugar greater than or equal to 126mg/dl or taking diabetes medication.

### Collection of Data

The wards of medicine and nephrology and outdoor of nephrology were visited, the patients were found by using the medical files of the patients or asking the concerned doctor. Questions regarding the patients' biodata and clinical factors like hypertension, diabetes, heart disease, history of paralysis, smoking, alternative medicine usage, medication adherence, history of autoimmune disease and childhood kidney disease were asked. In cases where the patient had difficulty remembering or in communicating, the attendants were involved in the interview. 3 visits were conducted to the wards and the nephrology outdoor. The visits were separated by a week or more, thus making it possible for us to interview newer patients.

### ANALYSIS

The data was analysed by IBM SPSS v17. Tables were made in SPSS, Microsoft word

## RESULTS

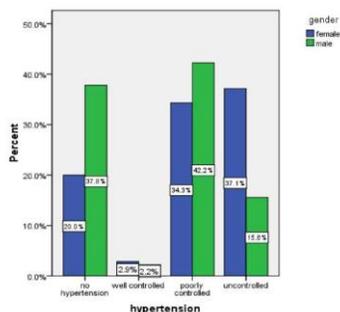
A total of 81 patients of CKD were found. 1 patient refused to participate due to ill health.

**Demographic characteristics:**

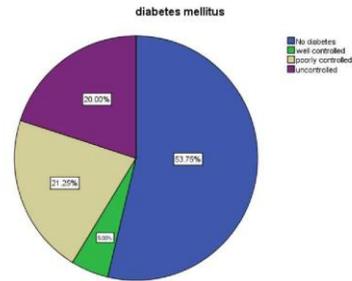
The mean age of the population came out to be 44.3 years (SD 16.5) with 15 being the minimum age and 80 being the maximum age. 73.9% of the population was in the age group 30-69. There was a male predominance, i.e.56.3%. 31.3% of the population had primary education, and 30% had no education. Only 2.5% had a graduation or higher education. 47.5% of the population was from Lahore, while 15% was from Okara. others were from Sialkot, Kasur, Pakpattan. Majority of the female population was housewives, Labour was the major occupation amongst males, i.e. 22.5%, only 2.5% were professionals, i.e. teacher [Table 1].

**Clinical characteristics:**

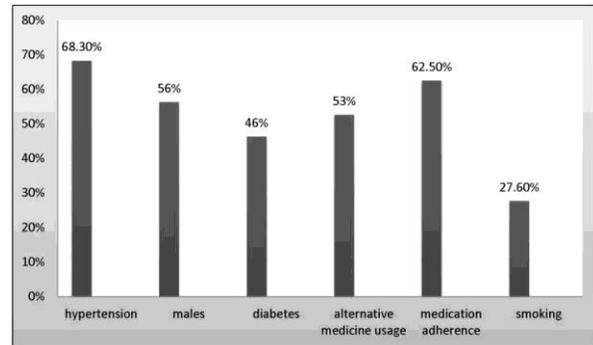
51 (63.75%) had poorly controlled or uncontrolled hypertension, 2 (2.5%) had control over their blood pressure and 24(30%) didn't have hypertension [Figure 1]. Diabetes mellitus was present in 39(48.7%) , while the rest were non diabetic. 33 members(41.3%) of the population were having no or poor control over blood sugar [Figure 2] 31(38.8%) had used alternative medicine occasionally, 11 (13.8%) had often used such medications. High cholesterol was present in 29(36.3%), while half of the population, i.e. 50% was unaware of their status. 23(28.8%) had a positive history of heart disease, while 15(18.8%) also had a history of paralysis or weakness of body. 57(71.3%) had no history of smoking , 11(13.8%) were chain smokers smoking consecutive cigarettes, lighting one off the previous smoked, at least 1 pack per day), 7 (8.8%) were moderate smokers (who smoke 6-10 Cigarettes Per Day and 4( 5%) were occasional smokers (who smoke 1-2 times per month 1 Cigarette Per Day). 50( 62.5%) were compliant with the medications. A history of frequent urinary tract infections was present in 20 (25%), autoimmune disease in 3(3.85), and kidney disease since childhood in only 2( 2.5%) [Table.2].



**Figure 1:** Hypertensive status in patients



**Figure 2:** Diabetes in CKD patients



**Figure 3:** Important characteristics in the CKD patients

**Table1:** Demographic Characteristic Of The Studied Population (N=80)

| Characteristics       | Frequency | Percentage |
|-----------------------|-----------|------------|
| <b>Age Group</b>      |           |            |
| 15-19                 | 4         | 5          |
| 20-29                 | 10        | 12.5       |
| 30-39                 | 18        | 22.5       |
| 40-49                 | 13        | 16.3       |
| 50-59                 | 15        | 18.8       |
| 60-69                 | 13        | 16.3       |
| 70-79                 | 4         | 5          |
| 80-89                 | 1         | 1.3        |
| <b>Gender</b>         |           |            |
| Males                 | 45        | 56.3       |
| Females               | 35        | 43.8       |
| <b>Education</b>      |           |            |
| None                  | 24        | 30         |
| Primary               | 25        | 31.3       |
| Middle                | 12        | 15         |
| Matric                | 9         | 11.3       |
| Intermediate          | 3         | 3.8        |
| Bachelor & Above      | 2         | 2.5        |
| Islamic Education     | 3         | 3.8        |
| <b>Marital Status</b> |           |            |
| Unmarried             | 11        | 13.8       |
| Married               | 69        | 86.3       |

| Residence                          |    |      |
|------------------------------------|----|------|
| Lahore                             | 38 | 47.5 |
| Okara                              | 12 | 15   |
| Pakpattan                          | 4  | 5    |
| Qasur                              | 4  | 5    |
| Others (Sialkot, Gujranwala, Etc.) | 22 | 32.5 |

**Table 2:** Occupation Of Ckd Patients According To Gender.

| Occupation                     | Male N(%) | Female N(%) |
|--------------------------------|-----------|-------------|
| Labour                         | 18 (22.5) |             |
| Shopkeeping                    | 6 (7.5)   |             |
| Others(Hawker, Welder, Driver) | 6 (7.5)   |             |
| Student                        | 2 (2.5)   | 1 (1.25)    |
| Farmer                         | 4 (5)     |             |
| Landlord                       | 1 (1.25)  |             |
| Retired And Unemployed         | 7 (8.75)  |             |
| Teacher                        | 1 (1.25)  | 1 (1.25)    |
| Housekeeping                   |           | 31 (38.75)  |

**Table 3:** Clinical Characteristics Of The Studied Population ( N=80)

|   |    |      |
|---|----|------|
| <b>Medications</b>                        |    |      |
| Sometimes                                 | 31 | 38.8 |
| Often                                     | 11 | 13.8 |
| <b>Smoking</b>                            |    |      |
| Sometimes                                 | 4  | 5    |
| Moderate                                  | 7  | 8.8  |
| Heavy                                     | 11 | 13.8 |
| <b>Medication Adherence</b>               |    |      |
| Yes                                       | 50 | 62.5 |
| No  | 30 | 37.5 |
| <b>Recurrent Urinary Tract Infections</b> | 20 | 25   |
| <b>Autoimmune Disease</b>                 | 3  | 3.8  |
| <b>Kidney Disease Since Childhood</b>     | 2  | 2.5  |

**Table 4:** Clinical Characteristics Of The Studied Population ( N=80)

| Characteristic      | Frequency | Percentage |
|---------------------|-----------|------------|
| <b>Hypertension</b> |           |            |
| No                  | 24        | 30         |
| Well Controlled*    | 2         | 2.5        |
| Poorly Controlled** | 31        | 38.8       |
| Uncontrolled***     | 20        | 25         |

|   |    |      |
|---|----|------|
| <b>Diabetes Mellitus</b>                              |    |      |
| No  | 41 | 51.3 |
| Well Controlled                                       | 4  | 5    |
| Poorly Controlled                                     | 17 | 21.3 |
| Uncontrolled  | 16 | 20   |
| <b>Heart Disease</b>                                  | 23 | 28.8 |
| <b>History Of Paralysis</b>                           | 15 | 18.8 |
| <b>High Cholesterol</b>                               | 29 | 36.3 |
| <b>Unknown Cholesterol</b>                            | 40 | 50   |
| <b>Alternative Medicine (Esp. Hakeem Medications)</b> |    |      |
| Sometimes   | 31 | 38.8 |
| Often   | 11 | 13.8 |
| <b>Smoking</b>  |    |      |
| Occasional <sup>+</sup>                               | 4  | 5    |
| Moderate <sup>++</sup>                                | 7  | 8.8  |
| Chain <sup>+++</sup>                                  | 11 | 13.8 |
| <b>Medication Adherence</b>                           |    |      |
| Yes   | 50 | 62.5 |
| No  | 30 | 37.5 |
| <b>Autoimmune Disease (SLE)</b>                       | 3  | 3.8  |
| <b>Kidney Disease Since Childhood</b>                 | 2  | 2.5  |

\*Well Controlled: Blood Pressure that remains below 140/90 with first-line medication.

\*\*Poorly Controlled: Blood Pressure that remains above 140/90 but less than 159/99 with three antihypertensive agents. (One should be diuretic).

\*\*\*Uncontrolled Hypertension: Blood Pressure that remains above goal in spite of concurrent use of three antihypertensive agents of different classes. (One should be diuretic).

+Chain Smoker: who smokes consecutive cigarettes, lighting one off the previous smoked, at least 1 pack per day.

++Moderate Smoker: who smokes 6-10 Cigarettes per day.

+++Occasional smokes: who smokes 1-2 times per month. (1 cigarette per time)

## DISCUSSION

Our research is the only research done regarding risk factors of CKD in Lahore. In Karachi the prevalence of CKD was 12.5% (95% Confidence interval 11.4 to 13.8%), 74.4% of the CKD patients had concomitant hypertension, diabetes was present in 41.8% , heart disease in 12%<sup>3</sup>. A cohort study in Karachi found the overall prevalence of kidney disease (both mild and moderate grades as suggested by the authors) to be 16%, while hypertension was present in 69.4%, diabetes was present in 34.6% patients<sup>13</sup>. The percentage of hypertension in our study was 68.3%, which was

also comparable. Diabetes was present in 46% and heart disease was present in 28.8%.

The community based study in Karachi showed mean age of patients to be 58.8±12.3. In an Indian study, the mean age was 52.73±17.08. In our study, however, the mean age was 44.3±16.5, which was lower than other studies, and the fact that 22.5% of the patients were in 30-39 age group was worth mentioning. Majority of the male patients, i.e. 53.3% were involved in occupation like labour, welding, hawking, etc. and 15.5% were retired suggesting a higher disease burden in those who are less capable of affording the disease. This could be explained by the fact that this is a public sector institute and those who have the financial means opt for the better hospitals.

Medication adherence in a study on CKD in Nigeria revealed the adherence to be 67%. The medication adherence in our study came out to be 62.5%. There could be a possibility, that the medication adherence could actually be lower due to fear of admitting non-compliance in front of medical persons. Despite being the major risk factor in hypertension, the blood pressure control to the recommended level of less than 140/90mmHg was found in less than 20% of the population in Karachi<sup>3</sup>. Only 17 participants reported (21.5%) good control over their BP. The result was however not confirmed by BP measurement. Vitamin D deficiency was found to be associated with chronic kidney disease<sup>5</sup>. Unfortunately due to absence of vitamin D analysis in the regular kidney analysis, vitamin D couldn't be studied. In a Karachi based study, current smokers were 37%<sup>3</sup>. In India, percentage of smoking was 12.2%<sup>6</sup>, while in our study 22.6% of the participants were moderate to heavy smokers.

The limitations of our study were first the hospital based setting, second there was no specific catchment population attached to the hospital and third there was no investigation done by our part to confirm the disease. And despite the hospital setting, the frequency turned out to be like the one in Karachi, this could be justified as the patients admitted in the wards are worked up by nephrologists.

One of the important findings in our study was a lower mean age of the patients which is a point of concern.

## CONCLUSION

Chronic kidney disease is an important cause of hospital admissions and medical consultations all

over the world. Chronic kidney disease is a multifactorial disease. The study conducted in Jinnah hospital, Lahore shows that among all the risk factors, Hypertension and Diabetes mellitus were the most frequent comorbidities found in the patients. In 68.3% patients with chronic kidney disease, hypertension was the main cause and in 46% patients with chronic kidney disease, Diabetes Mellitus was found to be the cause. Other risk factors play a minor role. There is a need to educate the population about the risk factors (i.e. Hypertension & Diabetes mellitus) to control their blood sugar and blood pressure so that increasing frequency of renal failure could be limited. The lower age of patients needs attention of the health authorities.

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