



## CHRONIC KIDNEY DISEASE; SCREENING OF RELATIVES OF PATIENTS WITH CHRONIC KIDNEY DISEASE

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**ABSTRACT... Introduction:** Chronic kidney disease (CKD) is a progressive health care issue that is increasing cost burden on patients and health care system. In different researches it was concluded that relatives of patients suffering from CKD are at more risk of development of kidney problems and diagnosed with CKD. **Objectives:** To evaluate the early diagnosis of CKD in at risk population by screening the close family relatives of CKD patients. **Study Design:** Cross-sectional screening study. **Setting:** Nephrology Department of Jinnah Postgraduate Medical Centre (JPMC), Karachi. **Period:** September 2015 to January 2017. **Methods:** Total 200 relatives (58% male and 42% female) of CKD patients close relatives were enrolled and screened for medical history, physical examination (weight, height and BMI) and clinical investigations such as urine analysis, serum Creatinine and Glomerular filtration rate (GFR) calculated by Cock Graft Gault equation for assessment of renal functions. **Results:** we observed 53 abnormalities in relatives of CKD patients. Family history for Diabetes was present in 58(29%) relatives, Hypertension in 42(21%) relatives, 26 (13%) relatives with Glomerulonephritis (GN), and 74 patients (37%) with Tuberculosis (TB), Kidney damage and Stone diseases. Albuminuria was high in 33% relatives of CKD patients, mostly affecting first degree relatives 20.5% as compared to second degree relatives 2.5%. Relatives of CKD patients were diagnosed with high albuminuria in DM (36.2%) as compare to HTN (35.8%) and GN (27.0%). For final diagnosis, albuminuria and CrCl were monitored, that were found abnormal in 26.5% relatives of CKD patients. **Conclusion:** The screened relatives of CKD patients are at higher risk of kidney problems in the future, especially patients suffering from DM, HTN and GN.

**Key words:** Chronic Kidney Disease (CKD), Creatinine Clearance (CrCl), Glomerular Filtration Rate (GFR), Nephrology.

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### INTRODUCTION

Chronic kidney disease (CKD) is an increasing major health problem throughout the world.<sup>1,2</sup> It is affecting 10-16% of the world population. Mostly adult population of Asia, Australia, European countries and United States of America (USA) are at high risk of CKD.<sup>3,4</sup> It is associated with much higher morbidity and mortality.<sup>5</sup> The World kidney day first time was celebrated jointly by the International Society of Nephrology (ISN) and the International Federation of Kidney Foundations (IFKF) in second Thursday of March 2006. Now the world kidney day is regularly celebrated throughout the world in the 2<sup>nd</sup> Thursday of March every year with different themes focusing on the preventable causes of renal diseases. The purpose of WKD was to promote the fact that CKD

is most common, rapidly raising but treatable disease.<sup>6</sup>

CKD is continuous sustained loss of renal function, that occurs over prolong time from months to years. The sign and symptoms of CKD are not clear and specific, vary from patient to patient. Most common symptoms of CKD include feeling of un-wellness and loss of appetite. Patients suffering from diabetes mellitus (DM), hypertension (HTN) and chronic heart diseases (CHD) are at high risk of CKD.<sup>7,8</sup> It is a most complex type of diseases, that may be ascend from non-communicable diseases such as DM, HTN, metabolic syndrome, Glomerulonephritis (GN) and Urological disease, or from infection diseases including Human immunodeficiency

virus (HIV), Malaria, Tuberculosis, Schistosomiasis and Hepatitis B and C.<sup>9-11</sup>

Different studies in past suggest the screening of relatives of patients suffering from CKD that will help in early detection, decreases the progression, helpful in prevention, enhances the quality of life, lower down the morbidity and mortality, and most importantly control the cost burden on treatment. Relatives of CKD patients are at higher risk of deranged kidney function. These relative are diagnosed by monitoring the albuminuria, serum creatinine, glomerular filtration rate (GFR), ultrasound and X-Ray KUB in some cases. In some studies, CKD patient's relatives were observed with reduced GFR and increasing proteinuria.<sup>12-15</sup>

Like other developing countries, Pakistan is also suffering from different sort of issues causing increased health related problems such as increased illiteracy, poverty, lack of medical related education in patients and lack of facilities in hospitals for final treatment of CKD including dialysis and kidney transplant. A large population of Pakistan suffering from hypertension and diabetes mellitus that is main risk factor for CKD. Approximately 15-20% of population having age 40 years or greater observed with lower GFR, so increased no of patients are diagnosed with CKD in Pakistan.<sup>16,17</sup> In order to control the increasing burden of CKD early detection is very necessary so initial preventive steps should be taken and patients treated in order to lower the ratio of CKD and cost burden.

This study is designed for the screening of relatives (close family members) of CKD patients for early diagnosis of CKD in order to treat the patients before it is too late.

## MATERIAL AND METHOD

The research method was as follows:

### SETTING

This study was performed in Department of Nephrology Jinnah Postgraduate Medical Centre (JPMC), Karachi.

### Patient

In JMPC Karachi, a cross sectional screening study on relatives of patients suffering from CKD was conducted. Total 200 relatives were completely screened including medical history, physical examination (weight, height and BMI of patients) and clinical investigations.

### Duration of Study

The study was completed in 2 years from January 2011 to December 2012.

### Case Definition of CKD

CKD is defined as either kidney damaged or  $GFR < 60 \text{ mL/min/1.73m}^2$  for 3 or > 3 months with or without kidney damaged.

### Clinical Investigation

Clinical investigation of patients includes serum creatinine, hemoglobin, urine analysis and ultrasound KUB. GRF rate was determined by using Cock Craft Gault Formula.

### Inclusion Criteria

Relatives of patients admitted in Nephrology ward and accompanied with those patients with maintenance dialysis suffering from CKD.

### Exclusion Criteria

Patients with known renal diseases.

### Statistical Analysis

Data of patients was collected, summarized and analyzed by using SPSS software version 22.

## RESULTS

In this study, 200 asymptomatic relatives of CKD patients were screened and 53 abnormalities were diagnosed in relatives of CKD patients. In 200 screened relatives 116 patients (58%) were male and 84 patients (42%) were female having mean age of  $35.22 \pm 8.21$  years. Relation of relatives with patients were sons 74 (37%), daughters 36 (18%), brothers 24 (12%), sisters 18 (9%), mothers 22 (11%), fathers 10 (5%) and first cousin 16 (8%). Among these 200 screened patients 15 patients (7.5%) were smokers, 18 (9%) were Gutka or Pan Addict and 1 (0.5%) was alcohol addict. The family history of patients

shows clear signs of patients towards CKD. Family history was positive for DM in 58(29%) relatives, 42 (21%) relatives with HTN, 26(13%) relatives with GN, and 74(37%) with TB, polycystic kidney disease (PKD) and Stone disease (SD) as shown in demographic Table-I.

Characteristics	Frequency	Percentage
<b>Gender</b>		
Male	116	58
Female	84	42
<b>Relation with CKD Patients</b>		
Sons	74	37
Daughters	36	18
Brothers	24	12
Sisters	18	9
Mothers	22	11
Fathers	10	5
First Cousin	16	8
<b>Habits</b>		
Smokers	15	7.5
Gatka-Pan	18	9
Alcohol	01	0.5
<b>Family History</b>		
DM	58	29
HTN	42	21
GN	26	13
Ohers (TB, PKD, Stone DS)	74	37

**Table-I. Demographic and health characteristics of CKD patients relatives**

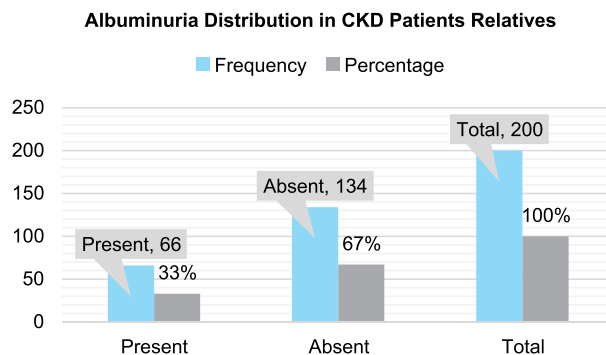
The occurrence of albuminuria was increased in 66 patients (33%) and normal in 134 patients (67%). Whereas relatives of CKD patients show increases in albuminuria with DM in 21 patients, with HTN in 15 patients, with GN in 7 patients and in Ohers (TB, KD, Stone DS) in 23 patients, as shown in Table-II, Figure-1 and Table-III, Figure-2.

Albuminuria	Frequency	Percentage
Present	66	33
Absent	134	67
Total	200	100

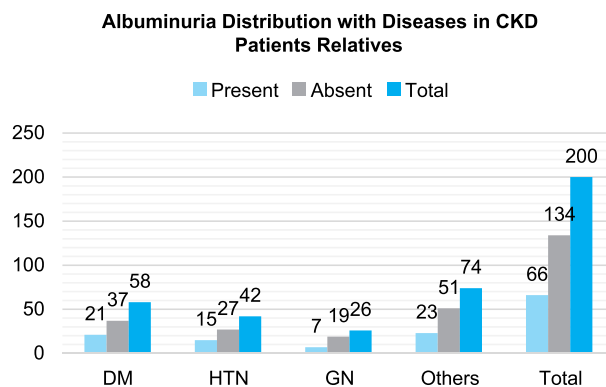
**Table-II. Albuminuria distribution in CKD patients relatives**

BMI of patients were clearly reflecting that mostly relatives of CKD patients has normal weight but a significant no of patients showing obesity as shown in Table-IV. CrCl of relatives reflects increased albuminuria in first degree relatives as compared to second degree relatives as shown in Table-V.

The presence of abnormal kidney function was observed in 53 relatives of CKD patients that is showing increases no of kidney problems in relatives of CKD as compare to other patients. Small size kidney problem was observed in 5 patients, Severe anemia in 3 patients, HTN in 12 patients, deranged renal function in 7 patients, abnormal urine analysis in 5 patients, stone on ultrasound in 6 patients, Hydro-nephrosis in 7 patients, and Polycystic kidney disease in 8 patients as shown in Table-VI and Figure-3.



**Figure-1. Albuminuria distribution in CKD patients relatives**



**Figure-2. Albuminuria distribution with diseases in CKD patients relatives**

Albuminuria	Frequency (%)				Total
	DM	HTN	GN	Others	
Present	21 (36.2)	15 (35.8)	7 (27.0)	23 (31.0)	66 (33%)
Absent	37 (63.8)	27 (64.2)	19 (73.0)	51 (69.0)	134 (67%)
Total	58	42	26	74	200

Table-III. Albuminuria distribution with diseases in CKD patients relatives

WHO Classification	Range	Frequency	Percentage
Under weight	< 18.5	58	29
Normal	18.5- 24. 99	98	49
Pre-obese	25- 29. 99	30	15
Obese	> 30	14	07

Table-IV. BMI in CKD patients relatives

CrCl (mL/min/1.73m <sup>2</sup> )	1 <sup>st</sup> Relatives	2 <sup>nd</sup> Relatives	Total
< 60 with albuminuria	4 (2%)	2 (1%)	6 (3%)
<60 without albuminuria	6 (3%)	1 (0.5%)	7 (3.5%)
> 60 with albuminuria	37 (18.5%)	3 (1.5%)	40 (20%)
Abnormal Kidney Function	47 (23.5%)	6 (3%)	53 (26.5%)

Table-V. CrCl in CKD patients relatives

Abnormality	Frequency	Percentage
Small size kidneys	5	2.5
Severe anemia	3	1.5
Hypertension	12	6
Deranged renal function	7	3.5
Abnormal urine analysis	5	2.5
Stone on ultrasound	6	3
Hydro-nephrosis	7	3.5
Polycystic kidney disease	8	4
Total	53	26.5

Table-VI. Frequency of abnormalities identified in CKD Patients Relatives

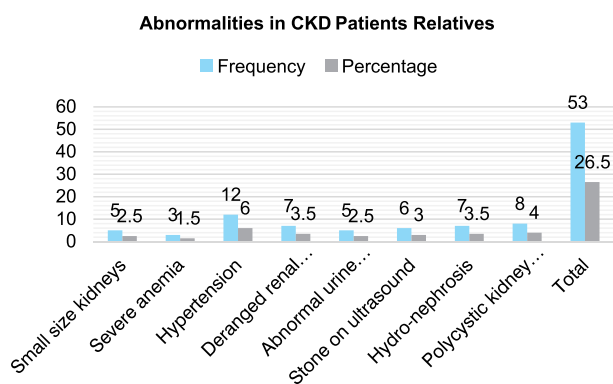


Figure-3. Abnormalities in CKD patients relatives

**DISCUSSION**

CKD, is an increasing non-communicable progressive disease, affecting the large population of worldwide per year. Our research focus was

on relatives of CKD patients because different previous research concludes that relatives of CKD patients are at high risk of abnormal kidney function as compare to other people's.<sup>12-15</sup>

In our research, it was concluded that occurrence of albuminuria was considerably high 33% in relatives of CKD patients, mostly affecting first degree relatives 20.5% as compared to second degree relatives 2.5%, similarly in Dutta, P. K. et al.<sup>18</sup> it was high 29% in relatives of CKD patients, whereas albuminuria low was observed in Gouda, Z. et al.<sup>13</sup> study 10.6%, in Wei, X. et al.<sup>19</sup> it was 12.9%, and in Jurkovitz, C. et al.<sup>12</sup> study shows 9.9% relatives of CKD patients with albuminuria. The albumin occurrence rate was high in our screening study as compare to others researches may be due to single collection of patients sample for clinical investigations.

In our research, relatives of CKD patients were observed with high albuminuria in DM (36.2%) as compare to HTN (35.8%) and GN (27.0%) relatives of CKD patients, whereas in Dutta, P. K. et al.<sup>18</sup> study it was high in relatives of CKD patients having GN (39.8%) as compare to DM (21.9%) and HTN (17.9%), in Wei, X. et al.<sup>19</sup> same results were obtained as in Dutta, P. K. et al. study but in O'Dea, D. F. et al.<sup>14</sup> study high albuminuria frequency were observed in CKD patients

relatives having HTN. In our study albuminuria was high in DM patients as compare to other studies, it might be due to increases frequency of DM patient in our research.

Abnormal kidney function was decided on albuminuria and CrCl basis that shows 26.5% abnormality in relatives of CKD patients, whereas in Dutta, P. K. et al.<sup>18</sup> study it was slightly high i.e. 30%, in Jurkovitz, C. et al.<sup>12</sup> abnormality was observed in 24% relatives and in Wei, X. et al.<sup>19</sup> study it was 29.7%. Our study results and previous study results shows almost same rate of abnormality in renal function in relatives of CKD patients.

In our study, different diseases were finally diagnosed in relatives of CKD patients as compare to previous research. Final results shows small size kidney problem in 2.5%, severe anemia in 1.5%, HTN in 6%, deranged renal function in 3.5%, abnormal urine analysis in 2.5%, stone on ultrasound in 3%, Hydro-nephrosis in 3.5% and Polycystic kidney disease in 4% relatives of CKD patients.

From our research, it is clear that CKD patients relatives are at high risk of kidney problems as compare to other persons, so continuous screening of CKD relatives is very necessary that will helpful in early diagnosis and treatment of diseases

## CONCLUSION

At the end of cross-section screening study, it was concluded that in relatives of CKD patients chances of development of kidney problems are more as compare to others because most of the relatives were unaware of their diseases such as DM, HTN that will leads towards kidney problems. Such screening programs should be carried out routinely that will help in lowering the development of kidney problems leading to CKD and put burden in terms of cost and quality of life.  
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
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*The greatest weapon against stress is our ability to choose one through over another.*

– William James –

**AUTHORSHIP AND CONTRIBUTION DECLARATION**

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
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2	M. Nadeem Ahsan	Data collection	
3	Mehwish Bukhari	Data analysis	
4	Abdul Manan Junejo	Review	