

## Original Research Article

# A cross-sectional study on socio-demographic profile and associated risk factors of chronic kidney disease patients in a tertiary care hospital of Andhra Pradesh

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**Received:** 22 August 2020

**Accepted:** 07 October 2020

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## ABSTRACT

**Background:** Chronic kidney disease (CKD) is a global problem, and its prevalence is increasing dramatically. In chronic kidney disease (CKD) there is progressive loss in kidney function over a period of time. The objectives of this study were to study the socio-demographic characteristics and associated risk factors in CKD patients so as to suggest preventive measures for CKD and its long term health consequences.

**Methods:** A cross-sectional study was conducted at MIMS Medical College, Vizianagaram, Andhra Pradesh among 194 confirmed CKD patients. A pre-tested, pre-designed questionnaire was used for collecting data on socio-demographic characteristics like age, education, occupation, residence, income etc. After completion of the questionnaire, the patients were subjected to anthropometric measurements, abdominal ultrasonography and their laboratory reports were assessed.

**Results:** Out of 194 CKD patients, 148 were males and 46 were females. Hypertension and diabetes were present in 74.2% and 41.2% cases respectively and both of these risk factors were found to be significantly associated with CKD. Family history of diabetes/hypertension/CKD were present in 40.2% of cases and the association was found to be significant.

**Conclusions:** Early screening and intervention is necessary for prevention of risk factors of CKD. All patients with hypertension, diabetes, family history of CKD/hypertension/diabetes, history of chronic NSAID use should be periodically screened for CKD for its early detection and effective management.

**Keywords:** Chronic kidney disease, Diabetes, Hypertension, Risk factors

## INTRODUCTION

Chronic kidney disease (CKD) is a modern day global epidemic and it is now recognized as a public health issue.<sup>1</sup> In chronic kidney disease (CKD) there is progressive loss in kidney function over a period of months or years which leads to severe metabolic and nutritional derangements in body.

According to National Kidney Foundation (NKF) guidelines, CKD is defined as either kidney damage or

Glomerular filtration rate (GFR) below 60 ml/min/1.73 m<sup>2</sup> for three or more months.<sup>2</sup> CKD can be caused by a variety of conditions and evidence suggests that hypertension and diabetes are the two major causes of it worldwide.<sup>3,4</sup> Its prevalence appears to be increasing in India. Given its population of more than one billion, the rising incidence of CKD in India is likely to pose major problems for both healthcare and the economy in future years. Indeed, it has been recently estimated that the age adjusted incidence rate of end stage renal disease (ESRD) in India to be 229 per million population, and >100,000

new patients enter renal replacement programs annually in India.<sup>5,6</sup> On the other hand, because of scarce resources, only 10% of the Indian ESRD patients receive any renal replacement therapy (RRT).<sup>6-8</sup> This is mainly due to the low socioeconomic status and lack of awareness among patients, which increases the risk for mortality and morbidity.

Hypertension, diabetes, family history of kidney disease, long term NSAID use, renal stones, acute kidney injury etc. are some of the known risk factors for chronic kidney disease. Besides these, the socio-demographic factors such as age, gender, education, residence and socio-economic factors also appear to have significant role in the development of CKD.<sup>9,10</sup> In India the major causes of CKD were diabetic nephropathy (31.2%) and hypertensive nephrosclerosis (12.8%).<sup>11</sup> The burden of cost of treatment of CKD highlights the role of socioeconomic status and its direct relation to the progression of the disease condition.

Patients with CKD are very prone to develop complications like anemia, pericarditis, cardiovascular diseases or renal osteodystrophy and also at high risk for progression to end stage renal disease (ESRD) or renal failure. These can be prevented or delayed by early detection and treatment with population based screening.<sup>12,13</sup>

In a country with limited resources, it is only appropriate that efforts are directed towards prevention of CKD rather than the treatment. This study was done for focusing attention to the socio-demographical profile of patients, causal risk factors associated with CKD and the economic burden of the disease on the family and the society so that the high risk characteristics that are associated with such prevalence can be modified.

This study was carried out at MIMS Medical College, Vizianagaram, Andhra Pradesh as prevalence studies were hitherto not conducted in this region of Andhra Pradesh and most of the patients coming to this hospital with clinical features of renal disease are eventually diagnosed to be suffering from CKD and also the prevalence of CKD is increasing in the nearby coastal districts like Srikakulam (Uddanum area) and Prakasham of Andhra Pradesh.<sup>14</sup> The objectives of this study were to study the socio-demographic characteristics and associated risk factors in CKD patients so as to suggest preventive measures for CKD and its long term health consequences.

## METHODS

**Study design:** Cross-sectional, descriptive, hospital based study.

**Study setting:** Department of Medicine and Department of Radio-diagnosis, MIMS Medical College, Vizianagaram, Andhra Pradesh.

**Study period:** 6 months (1<sup>st</sup> May 2018 to 31<sup>st</sup> October 2018).

### Inclusion criteria

Patients with confirmed diagnosis of CKD and patients willing to participate in the study by giving informed written consent.

### Exclusion criteria

Patients not willing to participate in the study and CKD patients having other chronic diseases like COPD, CVD, cancer etc.

### Sample size

All the patients coming to the Department of Medicine, MIMS Medical College with clinical features of renal disease and subsequently found to have features of CKD on blood examinations and Ultrasonography examination during the study period and also meeting the inclusion criteria were considered as study subjects. A total of 194 patients were included in this study.

### Data collection tools

A pretested, predesigned questionnaire for obtaining socio-demographic data; Weighing scale and stadiometer for measurement of BMI; a stretch resistant measuring tape for measuring waist to hip (W/H) ratio; mercury column sphygmomanometer for BP measurement; patient's laboratory reports for biochemical assessment; ultrasonography machine.

### Methodology

The study was conducted in the Departments of Medicine and Radio-diagnosis of MIMS Medical College during the above mentioned study period. After thoroughly explaining the research and its purpose, a written consent was obtained from every participant. A pre-tested, pre-designed questionnaire was used for collecting data on socio-demographic characteristics like age, education, occupation, residence, income etc. The questionnaire was designed in English and then translated into local language Telugu for better understanding of the patients. After completion of the questionnaire, the patients were subjected to anthropometric measurements and their laboratory reports were assessed.

### Operational definitions

**BMI:** Height was measured by a stadiometer to the nearest 0.1 cm and weight by a weighing scale to the nearest 0.1 kg, when the patient was asked to stand in a relaxing position without footwear. BMI was calculated by dividing weight in kg by height in square meter.

The BMI cut offs as per WHO was used. BMI less than 18.5, 18.5 to 24.99, 25 to 29.99 and more than and/or equal to 30 are considered to be underweight, normal, overweight and obese respectively.

**Waist to hip ratio:** It is the ratio of circumference of waist to that of hips. The waist circumference was measured at the midpoint between the lower margin of the last palpable rib and the top of the iliac crest, at the end of normal expiration to the nearest 0.5 cm. The hip circumference was measured around the widest portion of the buttocks to the nearest 0.5 cm.

The WHO cut-off points for men and women and the risk of metabolic complications was used. Waist to hip ratio  $\geq 0.90$  cm in males and  $\geq 0.85$  cm in females was considered to be having substantially increased risk of metabolic complications.

**Blood pressure:** The BP was measured in sitting position of the patient. Three readings of both systolic and diastolic BP were taken and the lowest reading was recorded.

The American Heart Association guideline was followed to categorise the patients as having normal BP, pre-hypertension and hypertension. Systolic BP  $\geq 140$  mmHg and diastolic BP  $\geq 90$  mmHg was considered to be hypertension.

**Confidentiality:** Confidentiality of all the patients was strictly maintained.

#### Statistical tools

Data were collected and analysed by using both descriptive and inferential statistics as appropriate with the help of SPSS version 21.

#### Ethical clearance

Ethical approval has been obtained from the Institutional Ethical Committee, MIMS Medical College, Vizianagaram before the start of the study.

## RESULTS

A total of 194 CKD cases who met the inclusion criteria were considered for this study. They were interviewed for their socio-demographic and other health profile data. The age of respondents ranged from 21-76 years with a mean age of  $50.93 \pm 12.72$  years. Majority of the CKD cases were in the age group of 41-60 years (57.7%) followed by age group of 61-80 years (22.7%) and 21-40 years (19.6%). Out of 194 cases, 148 (76.3%) were males and rest 46 (23.7%) were females. There were 168 Hindus (86.6%) and 26 Christians (13.4%) with no Muslims in this study. Out of 194, 126 (64.9%) cases were living in urban area and rest 68 (35.1%) cases in rural area. 184

(94.8%) cases were married as compared to 10 (5.2%) cases those were unmarried as shown in Table 1.

**Table 1: Socio-demographic characteristics of study population.**

Socio-demographic factors	No. of cases (n=194)	Percentage (%)
<b>Age in years</b>		
21-40	38	19.6
41-60	112	57.7
61-80	44	22.7
<b>Gender</b>		
Male	148	76.3
Female	46	23.7
<b>Religion</b>		
Hindu	168	86.6
Muslim	0	0
Christian	26	13.4
<b>Place of residence</b>		
Urban	126	64.9
Rural	68	35.1
<b>Marital status</b>		
Unmarried	10	5.2
Married	184	94.8
<b>Socio-economic status</b>		
Upper	6	3.1
Upper middle	28	14.4
Lower middle	38	19.6
Upper lower	120	61.9
Lower	2	1.0

About half (50.5%) of the study subjects were illiterate. 14.4% were having high school certificate education and 12.4% were graduates. 7.2% were having intermediate education, 7.2% primary school certificate, 5.2% middle school certificate and the lowest 3.1% were having profession or honours. The present study revealed that 35.2% were in the clerical, shop owner and farmer category followed by 25.7% in unskilled worker group and 18.5% in skilled worker group.

**Table 2: Family history of CKD cases.**

Family history	No. of cases	Percentage
<b>Diabetes</b>	30	15.4
<b>Hypertension</b>	28	14.4
<b>CKD</b>	10	5.2
<b>Multiple</b>	10	5.2
<b>No family history</b>	116	59.8

The least 2.1% were noted in unemployed group. Majority of the cases (43.4%) belonged to Rs.2111-6268 income group followed by 19.6% in Rs.6269-10448 group and 11.3% each in Rs.20898-41785 and Rs.10449-15673 group. So as per Modified Kuppuswamy socio-economic status scale, maximum number of cases

(61.9%) were in upper lower class followed by 19.6% in lower middle class. The least number of cases 1% were noted in lower class as shown in Table 1.

Family history of diabetes was found in 15.4% cases, that of hypertension in 14.4% cases, that of CKD in 5.2% cases and multiple family histories were present in 5.2% cases. Family history was not suggestive in 59.8% cases as shown in Table 2. The association between family history of diabetes/hypertension/CKD with presence of CKD was found to be statistically significant as shown in Table 5.

**Table 3: Dietary habit of CKD cases.**

Dietary habit	No. of cases	Percentage
<b>Vegetarian</b>	24	12.4
<b>Mixed</b>	170	87.6
<b>Junk food consumption</b>		
<b>Present (&gt;3 times/week)</b>	110	56.7
<b>Absent</b>	84	43.3
<b>Chronic NSAID use</b>		
<b>Present</b>	70	36.1
<b>Absent</b>	124	63.9

Table 3 shows 87.6% cases were having mixed dietary habit whereas rest 12.4% cases were strict vegetarians. Junk food consumption on a regular basis i.e. more than 3 times per week was present in 56.7% cases and in rest 43.3% cases it was absent or present in lesser value. Chronic use of NSAIDs was noted in 36.1% of CKD

cases and its association was found to be not significant with CKD as shown in Table 5.

**Table 4: Distribution of CKD cases according to BMI and waist hip ratio.**

BMI	No. of cases	Percentage
<b>Underweight (&lt;18.5)</b>	34	17.5
<b>Normal (18.5-24.99)</b>	118	60.8
<b>Overweight (25-29.99)</b>	36	18.6
<b>Obese (≥30)</b>	6	3.1
<b>WHR</b>		
<b>High risk</b>	142	73.2
<b>No risk</b>	52	26.8

In this study maximum number of CKD cases were found to be having normal BMI (60.8%). 17.5% were underweight, 18.6% were overweight and 3.1% were obese as shown in Table 4.

Overall 42 patients were having generalized obesity and the association between obesity and CKD was not significant as shown in Table 5. According to waist hip ratio, 73.2% belonged to high risk group for metabolic complications and the association between central obesity and CKD was also not significant as shown in Table 5.

History of renal stones was noted in 13.4% CKD patients and the association was found to be not significant as shown in Table 5.

**Table 5: Distribution of risk factors among CKD cases.**

Risk factor	All (n=194)	Males (n=148)	Females (n=46)	$\chi^2$ value	p value
<b>Hypertension</b>	144	120	24	15.32	<0.001
<b>Diabetes</b>	80	70	10	9.46	0.002
<b>Family H/O CKD</b>	78	50	28	10.70	0.001
<b>Renal stones</b>	26	18	8	0.82	0.36
<b>Generalised obesity</b>	42	26	16	6.13	0.01
<b>Central obesity</b>	142	114	28	4.67	0.03
<b>Chronic use of NSAID</b>	70	58	12	2.61	0.10

## DISCUSSION

In this study majority of the CKD cases were in the age group of 41-60 years (57.7%) and 61-80 years (22.7%) than in 21-40 years (19.6%). This finding is similar to the findings of the study done by Kala et al on various risk factors among chronic kidney disease patients admitted in the nephrology department of GGH, Kurnool from June to November, 2012, which states that majority (83%) of the CKD cases were above 40 years.<sup>9</sup> Their results showed that hypertension was present among 82.35% of the study subjects, diabetes among 32%, and renal stones in 3.9%. In our study the prevalence of hypertension,

diabetes and renal stones were 74.2%, 41.2% and 13.4% respectively.

In our study with respect to CKD risk factors, we found that 40 (41.2%) individuals had DM. In the study by Venkatachalam et al in an area of rural Tamil Nadu, only 18% were diabetics. Likewise the prevalence of hypertension in their study was 24.3% while it was more in our study i.e. 74.2%. In Venkatachalam et al study, majority of the respondents were females (67.8%) with maximum belonging to the age group of 20-29 years (23.8%), followed by 30-39 years (22.8%) in contrast to our study where maximum were males (76.3%) and



maximum belonging to the 41-60 years age group (57.7%). Most of them belonged to upper lower class (31.8%), followed by lower middle class (25.8%). This finding is consistent with our study with most cases belonging to upper lower class (61.9%) followed by lower middle class (19.6%).<sup>15</sup>

In this study, the overall prevalence of hypertension among CKD cases was found to be 74.2%. Gaurav et al in a community based study in urban area in India found that the prevalence of hypertension was 23.9% which is much lower than our study.<sup>16</sup>

Kala et al in a study on various risk factors among chronic kidney disease patients admitted in the nephrology department of GGH, Kurnool from June to November, 2012 interviewed a total of 153 CKD patients for their socio-demographic details like age, gender, education level and socio-economic status, and for history of various known risk factors like hypertension, diabetes, use of analgesics, and family history of CKD etc. Their result showed that hypertension was present among 82.35% of the study subjects, diabetes among 32%, and renal stones in 3.9%. Slightly less than half of the participants (46.41%) reported chronic use of non-steroidal analgesic drugs.<sup>9</sup> In our study the prevalence of hypertension, diabetes, renal stones and chronic use of NSAID were 74.2%, 41.2%, 13.4% and 36.1% respectively.

Anupama et al found a statistically significant relationship of CKD with presence of diabetes and hypertension in their study conducted between 2011 and 2012, the findings of which are consistent with our study with respect to association of diabetes and hypertension with CKD.<sup>17</sup> Similar finding was also noted by Haroun et al on a prospective study on risk factors for chronic kidney disease.<sup>3</sup>

## CONCLUSION

On the basis of the results obtained, it can be concluded that, CKD is more common in males of 41-60 years age group. It is mostly prevalent in urban dwellers, illiterates, unskilled workers and upper lower socio economic class. Individuals with hypertension and diabetes are more prone for chronic kidney diseases as compared to general population. The results also support the evidence that CKD patients have an increased risk of developing metabolic complications and therefore form a population in whom early screening and intervention is necessary. All patients with hypertension, diabetes, family history of CKD/hypertension/diabetes, history of chronic NSAID use should be periodically screened for chronic kidney disease for its early detection and effective management. A more in depth and community based study involving a larger study group is required to understand the contribution of each socio-demographic variable in the pathogenesis of the disease.

## ACKNOWLEDGEMENTS

The authors thank and express their gratitude to all the patients for their time and cooperation for the study.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Kanyari SS, Panda S, Shruthi P. A cross-sectional study on socio-demographic profile and associated risk factors of chronic kidney disease patients in a tertiary care hospital of Andhra Pradesh. *Int J Community Med Public Health* 2020;7:4512-7.