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Incidence, Etiology and Clinical Profile of Newly Detected Chronic Kidney Disease (CKD) at Teaching Hospital.

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ABSTRACT

Chronic kidney disease (CKD) is an important noncommunicable disease epidemic that affects the world, including India. There is a rising incidence of chronic kidney disease that is likely to pose major problems for both healthcare and the economy. To study demographic, etiological and clinical profile of newly detected CKD. This was an observational, non interventional retrospective study conducted over period of one year from Jan 2014 to Dec 2014 at tertiary care teaching hospital. The study included patients of both genders fulfilling criteria of newly detected CKD with age ≥18 years. Inclusion criteria: The study included patients of both genders fulfilling criteria of newly detected CKD from CKD stage 2 to 5. Chronic Kidney disease (CKD) is defined as kidney damage or glomerular filtration rate (GFR) <60.0ml/min/ 1.73m2 for three months or more irrespective of the cause. Exclusion criteria: The patients with stage 1 CKD and the patients those who were stable CKD not requiring renal replacement therapy (hemodialysis). Complete clinical history, thorough clinical examination including blood pressure and laboratory investigations were done (from medical records). Statistical analysis was done by computer software SSPE‑11 trial version. Categorical data were analyzed by mean, SD, percentage and Chi-square test. The level of significance was set at 'p' < 0.05. Of total 51 (mean age 41.96±11.66 years) patients with CKD 33 (64.70%) were males and 18 (35.29%) were female with mean age of 47.18(13.55) and 36.74 (9.78) respectively. Total 23 (69.69%) males and 13 (72.22%) females were presented with nausea and vomiting. Of total 51 patients with newly detected CKD 19(57.57%) males and 11 (61.11%) females presented with breathlessness. Total 12(36.36%) male and 8 (44.44%) females were presented with tingling numbness in lower limbs. Total 21 (41.17%) patients had hypertension, of them 15 (45.45%) were males and 6 (33.33%) were females. Total 14 (27.47%) patients had diabetes mellitus, of them 10 (30.30%) were males and 4 (22.22%) were females. Total 5 (9.80%) patients had history of chronic NSAIDs consumption, of them 2(6.06%) were males and 3 (16.66%) were females. Total 2 (3.92%) patients were had SLE with lupus nephritis, of them and both (11.11%) were females. Total one (3.03%) patient had obstructive uropathy secondary to Ca. prostate and one (5.55 %) female had Ca. Cervix stage III-b. Total 25 (75.75%) male and 14 (77.77%) female patients were presented with significant metabolic acidosis on ABGA. Total 8(24.24%) males and 5 (27.77%) female patients had Hyperkalemia. Total 17 (51.51%) male and 9 (50%) female patients presented with pulmonary edema. Total 16 (48.48%) males and 9 (50%) female patients presented with accelerated hypertension. Total 25(75.75%) males and 15 (83.33%) female patients had anemia. Total 12(36.36%) male and 8 (44.44%) female patients had peripheral neuropathy. Total 8(24.24%) males and 5 (27.77%) female patients had retinopathy. Total 8 (15.68%) patients were with stage 2, 15 (29.41%) patients were with stage 3, 18 (35.29%) patients were with stage 4 and 10 (19.60%) patients were with stage 5 CKD. Present study highlighted burden of hypertension and diabetes mellitus as an important etiological factor for development of CKD. The majority of patient at the time of diagnosis were at stage three and four of CKD. There is intense need of community based program to detect early hypertension and DM and to control them with appropriate medications and strategy to prevent end organ damage including CKD. A comprehensive health education campaign and screening of the general populace are needed in order to detect chronic kidney disease early. There is pressing need of renal replacement therapy facilities at periphery and remote areas to reduce mortality and morbidity related with CKD in our country.

Keywords: Chronic kidney disease, diabetes mellitus, hypertension, renal replacement therapy, NSAIDs

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INTRODUCTION

Chronic kidney disease (CKD) is emerging to be an important chronic disease globally. One reason is the rapidly increasing worldwide incidence of diabetes and hypertension. [1] Chronic diseases have become a major cause of global morbidity and mortality even in developing countries including CKD. Diabetic kidney disease is the commonest cause of ESRD in India. [2] Chronic kidney disease (CKD) encompasses a spectrum of different pathophysiologic processes associated with abnormal kidney function and a progressive decline in glomerular filtration rate (GFR). The term chronic renal failure applies to the process of continuing significant irreversible reduction in nephron number and typically corresponds to CKD stages 3–5. Symptoms and overt signs of kidney disease are often subtle or absent until renal failure supervenes. It is important to identify factors that increase the risk for CKD, even in individuals with normal GFR. Risk factors include hypertension, diabetes mellitus, autoimmune disease, glomerulonephritis, older age, family history of renal disease, a previous episode of acute kidney injury, and the presence of proteinuria, abnormal urinary sediment, or structural abnormalities of the urinary tract. [3] Chronic kidney disease (CKD) is increasing worldwide at an annual growth rate of 8%. The prevalence of CKD is higher in developing countries than in the developed world. The natural decline and successful eradication of many devastating infectious diseases, there is rapid growth in the prevalence of metabolic and vascular disease in developing countries. [4] Diabetes mellitus is becoming increasingly prevalent in these countries. Therefore, it follows that there will be a proportionate increase in vascular and renal disease. Healthcare agencies must plan for improved screening for early detection, prevention, and treatment plans in these nations and must start considering options for improved availability of renal replacement therapies. The burden of chronic kidney disease (CKD) in India cannot be assessed accurately because of the absence of a renal registry in India. This study was conducted as there is scare data available in our country regarding demographic, etiological and clinical profile of CKD.

MATERIAL AND METHODS

This was an observational, non interventional and retrospective study conducted over period of one year from Jan 2014 to Dec 2014 at tertiary care teaching hospital.

Aims & objectives

To study demographic, etiological and clinical profile of newly detected CKD. The study is approved by the ethical committee KIMSDU Karad.

Inclusion criteria

The study included patients of both genders fulfilling criteria of newly detected CKD from CKD stage 2 to 5, with age ≥18 years, from inpatient department of medicine. Chronic Kidney disease (CKD) is defined as kidney damage or glomerular filtration rate (GFR) <60.0ml/min/ 1.73m2 for three months or more irrespective of the cause. [eGFR (mL/min/1.73 m2) = 186 × (SCr)–1.154 × (Age)–0.203 × (0.742, if female)]. To facilitate assessment of CKD severity and, the National Kidney Foundation developed criteria, as part of its Kidney Disease Outcomes Quality Initiative (NKF KDOQI™), stratify CKD patients. [5]

Exclusion criteria

The patients with stage 1 CKD and the patients those who were stable CKD not requiring renal replacement therapy (hemodialysis) and patients with no cause for CKD (uncertain etiology) were excluded from current study. Complete clinical history, thorough clinical examination including blood pressure(from medical records), necessary investigations (Hematological profile, Renal parameters, random BSL, serum electrolytes, LFTs, ECG, Chest x-ray, urine albumin, CT/MRI scan brain HIV, HbSAg and relevant serology) were done. Consecutive patients attending HD unit who met the inclusion criteria were enrolled for the study. Cockcroft-Gault equation was used in most of the patients for estimation of creatinine clearance. The inclusion criteria was CKD patients with GFR <15.0 ml/min/1.73m2. Patients with acute renal failure and CKD 5 patients not on regular hemodialysis were excluded from the study.

Stages of CKD

Stage 1: normal eGFR ≥ 90 mL/min per 1.73 m^2 and persistent albuminuria. Stage 2: eGFR between 60 to 89 mL/min per 1.73 m^2. Stage 3: eGFR between 30 to 59 mL/min per 1.73 m^2. Stage 4: eGFR between 15 to 29 mL/min per 1.73 m^2. Stage 5: eGFR of < 15 mL/min per 1.73 m^2 or end-stage renal disease.

Definition of CKD

We used the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation to estimate glomerular filtration rate (eGFR), and the National Kidney Foundation Kidney Disease Outcomes Quality Initiative (NKF/ KDOQI) guidelines to define and stage CKD. We used a sex- specific cut off for albuminuria: ≥ 1.9 mg/ mmol (17 mg/g) creatinine for men, and ≥ 2.8 mg/mmol (25 mg/g) creatinine for women. Thus we defined a participant as having CKD if he or she had eGFR below 60 ml/min/1.73 m2 or had albuminuria. [2]

Statistical analysis

Was done by computer software SSPE‑11 trial version. Categorical data were analyzed by mean, SD, percentage and Chi-square test. The level of significance was set at 'p' < 0.05.

RESULTS

Out of total 122 patients with diagnosis of CKD, 51 (41.80%) were included in present retrospective study. The patients with stage 1 CKD and the patients those who were stable CKD not requiring renal replacement therapy (hemodialysis) and patients with no cause for CKD (uncertain etiology) were excluded from current study. Total 51 patients fulfilling criteria of newly diagnosed CKD were enrolled in this retrospective observational non-interventional study over period of one year. Of total 51 (mean age 41.96±11.66 years) patients with CKD 33 (64.70%) were males and 18 (35.29%) were female with mean age of 47.18(13.55) and 36.74 (9.78) respectively (Table no.1 & Graph no.1) Total 23 (69.69%) males and 13 (72.22%) females were presented with nausea and vomiting. Of total 51 patients with newly detected CKD 19(57.57%) males and 11 (61.11%) females presented with breathlessness. Total 12(36.36%) male and 8 (44.44%) females were presented with tingling numbness in lower limbs. Total 9(27.27%) male and 7 (38.88%) females were presented with facial puffiness Total 5 (15.15%) male and 3 (16.66%) females were presented with altered sensorium. Total 4(12.12%) male and 3 (16.66%) females were presented with hemiplegia. Total 7(21.21%) male and 5 (27.77%) females were presented with seizure. Total 7(21.21%) male and 3 (16.66%) females were presented with reduced urine output. Total 5(15.151%) male and 5 (27.77%) females were presented with fever. (Table no.2) Nausea and vomiting, breathlessness and tingling numbness in lower limbs (neuropathic complains) were the most common presenting complaints in present study with CKD with 'p' < 0.003 [Computing Chi-squared: Sum: 34.54090909; df: 7; P-value: 5.29E-06]. Total 21 (41.17%) patients had hypertension, of them 15 (45.45%) were males and 6 (33.33%) were females. The mean SBP and DBP were positively correlated with stage of CKD. Total 14 (27.47%) patients had Diabetes mellitus, of them 10 (30.30%) were males and 4 (22.22%) were females. The hypertension and the DM outnumbered as an etiology for CKD with 'p'< 0.001 [Computing Chi-squared: Sum: 51.79084967; df: 7; P-value: 2.05E-09]. The mean BSL and HbA1C in diabetic patients and blood pressure in hypertensive individuals was negatively correlated with eGFR. Total 4 (7.84%) patients had UTI / pyelonephritis, of them 3(9.09%) were males and 1 (5.55%) were females. Total 5 (9.80%) patients had history of chronic NSAIDs consumption, of them 2(6.06%) were males and 3 (16.66%) were females. Total 2 (3.92%) patients were had SLE with lupus nephritis, of them and both (11.11%) were females. Total 2 (3.92%) patients had calculopathy, of them 1(3.03%) was males and 1 (5.55%) was females. Total one (3.03%) patient had obstructive uropathy secondary to Ca. prostate and one (5.55%) female had Ca. Cervix stage III-B. One (3.03%) male patient had chronic glomerulonephritis (idiopathic). (Table no.3 & Graph no.2) The majority of patients presented with multiple clinical and laboratory abnormality at the time of presentation. Total 25 (75.75%) male and 14 (77.77%) female patients presented with significant metabolic acidosis on ABGA. The mean pH was negatively correlated with stage of CKD. Total 8(24.24%) males and 5 (27.77%) female patients had hyperkalemia. [Figure no.1 E] Total 7 (21.21%) males and 4 (22.22%) female patients had hyponateremia. Total 17 (51.51%) male and 9 (50%) female patients presented with pulmonary edema. [Figure no.1 A] Total 16 (48.48%) males and 9 (50%) female patients presented with accelerated hypertension. Total 25(75.75%) males and 15 (83.33%) female patients had anemia. The mean hemoglobin level was negatively correlated with stage of CKD. Total 12(36.36%) male and 8 (44.44%) female

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patients had Peripheral neuropathy. The neuropathic symptoms were significantly correlated with stage 4 and 5 of CKD. Total 9 (27.27%) male and 8 (44.44%) female patients presented with uremic encephalopathy. Total 9(27.27%) males and 7 (38.88%) female patients had pleural effusion. Total 4(12.12%) males and 2 (11.11%) female patients had pneumonia. Total 8(24.24%) males and 5 (27.77%) female patients had retinopathy. Total 2 (6.06%) males and 2 (11.11%) female patients had hemorrhagic stroke. [Figure no.1 B] Total 2 (6.06%) males and 1 (5.55%) female patients had ischemic stroke. [Figure no.1 C] Total 5 (15.15%) males and 3 (16.66%) female patients had pericardial effusion. [Figure no.1 D] Total 2 (6.06%) males and 1 (5.55%) female patients had pericarditis. (Table no.4) Anemia, metabolic acidosis, pulmonary edema, hypertension, uremic encephalopathy and peripheral neuropathy were the most common clinical and laboratory abnormality detected in patients with CKD with 'p' < 0.005. There were no patients were present in stage 1(normal eGFR ≥ 90 mL/min per 1.73 m^2 and persistent albuminuria). Total 8 (15.68%) patients were with Stage 2 CKD (eGFR between 60 to 89 mL/min per 1.73 m^2), of them 5 (15.15%) were males and 3 (16.66%) were females. Total 15 (29.41%) patients were with Stage 3 CKD (eGFR between 30 to 59 mL/min per 1.73 m^2), of them 11 (33.33%) were males and 4 (22.22%) were females. Total 18 (35.29%) patients were with Stage 4 CKD (eGFR between 15 to 29mL/min per 1.73 m^2), of them 10 (30.30%) were males and 8 (44.44%) were females. Total 10 (19.60%) patients were with Stage 5 CKD (eGFR < 15 mL/min per 1.73 m^2), of them 7 (21.21%) were males and 3 (16.66%) were females. (Table no. 5 & Graph no. 3). Total 28 (84.84%) male patients and 16 (88.88%) female patients were discharged after treatment including hemodialysis. Total 5 male patients and 2 female patients were succumbed with mean duration of stay 3days (±1) with overall case fatality rate of 13.72%. The cause of death in these patients was related to pulmonary edema, pneumonia, ARDS, severe metabolic acidosis, hyperkalemia with ventricular arrhythmias [i.e. cardiopulmonary and metabolic cause]. There was no statistically significant difference between the genders for mortality. Stage 4, 3, 5, and 2 were the stage of CKD at the time of presentation in newly detected CKD in decreasing trend in present study.

Table 1: Demographic profile of newly diagnosed CKD

Variables	Total	%	Mean Age (years)	(±SD)
Males (n=33)	33	64.70	47.18	13.55
Female (n=18)	18	35.29	36.74	9.78
Total	51	100	41.96	11.66

Graph 1: Demographic profile of newly diagnosed CKD

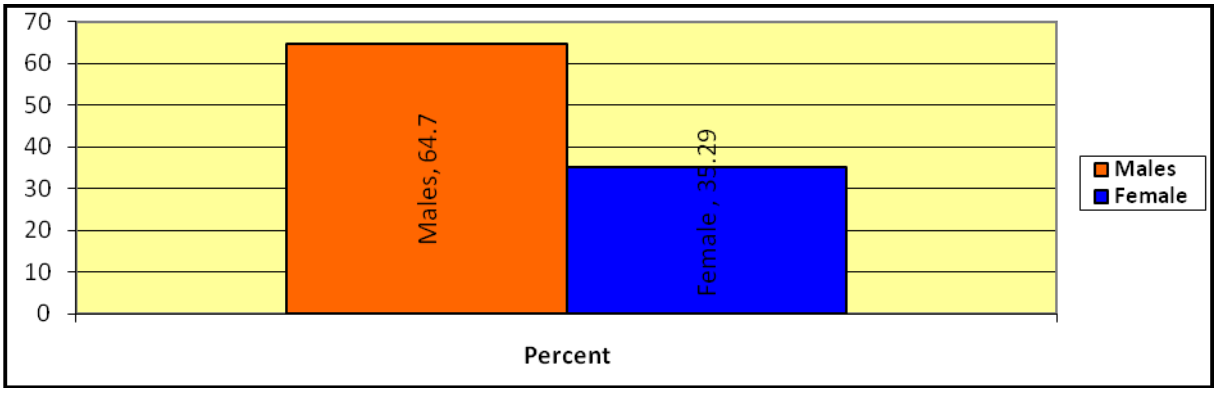

Table 2: Symptomatology of newly diagnosed CKD

Variables	Males	%	Females	%
Breathlessness	19	57.57	11	61.11
Nausea vomiting	23	69.69	13	72.22
Altered sensorium	5	15.15	3	16.66
Tingling numbness in lower limbs	12	36.36	8	44.44
Hemiplegia	4	12.12	3	16.66
Seizure	7	21.21	5	27.77
Reduced urine output	7	21.21	3	16.66
Fever	5	15.15	5	27.77
Facial puffiness	9	27.27	7	38.88

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Table 3: Etiological profile of newly diagnosed CKD

Variables	Males	%	Females	%	Total	%
Hypertension	15	45.45	6	33.33	21	41.17
Diabetes mellitus	10	30.30	4	22.22	14	27.45
Glimerulonephritis	1	3.03	0	0	1	1.96
SLE	0	0	2	11.11	2	3.92
NSAIDs	2	6.06	3	16.66	5	9.80
UTI/pyelonephritis	3	9.09	1	5.55	4	7.84
Calculopathy	1	3.03	1	5.55	2	3.92
Prostate /Ca Cx	1	3.03	1	1	2	3.92
Total	33	100	18	100	51	100

Graph 2: Etiological profile of newly diagnosed CKD

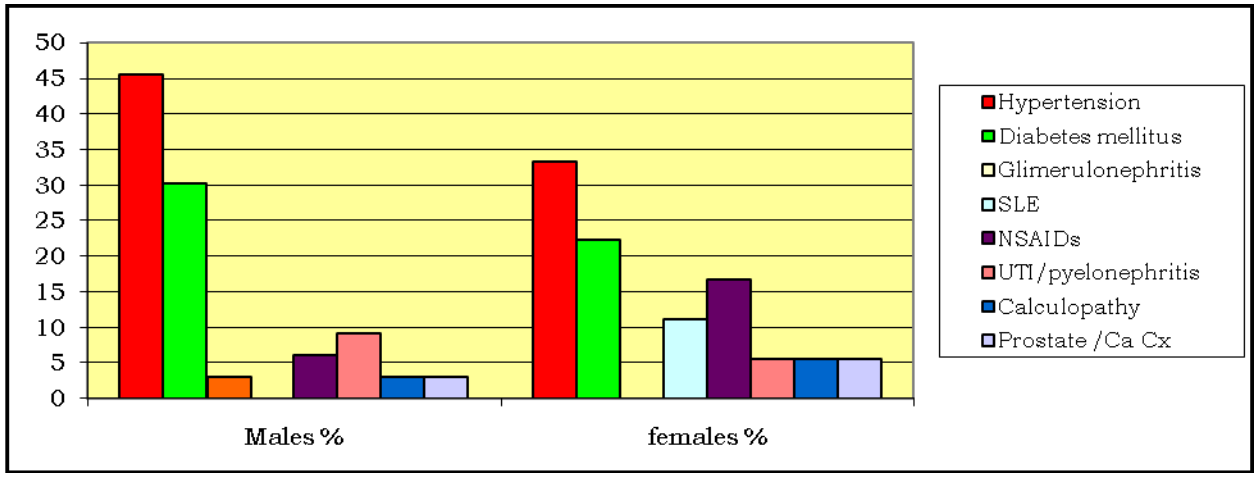

Table 4: Clinical profile of newly diagnosed CKD

Variables	Males	%	Females	%
Pulmonary edema	17	51.51	9	50
Hyperkalemia	8	24.24	5	27.77
Hyponateremia	7	21.21	4	22.22
Metabolic acidosis	25	75.75	14	77.77
Pericardial effusion	5	15.15	3	16.66
Pericarditis	2	6.06	1	5.55
Uremic encephalopathy	9	27.27	8	44.44
Accelerated hypertension	16	48.48	9	50
Ischemic stroke	2	6.06	1	5.55
Hemorrhagic stroke	2	6.06	2	11.11
Retinopathy	8	24.24	5	27.77
Anemia	25	75.75	15	83.33
Pleural effusion	9	27.27	7	38.88
Pneumonia	4	12.12	2	11.11
Peripheral neuropathy	12	36.36	8	44.44

Table 5: Demographic distribution of stages of CKD

Variables of CKD	M	%	F	%	Total	%
Stage 1: normal eGFR ≥ 90 mL/min per 1.73 m^2 and persistent albuminuria	0	0	0	0	0	0
Stage 2: eGFR between 60 to 89 mL/min per 1.73 m^2	5	15.15	3	16.66	8	15.68
Stage 3: eGFR between 30 to 59 mL/min per 1.73 m^2	11	33.33	4	22.22	15	29.41
Stage 4: eGFR between 15 to 29 mL/min per 1.73 m^2	10	30.30	8	44.44	18	35.29
Stage 5: eGFR of < 15 mL/min per 1.73 m^2 or ESRD	7	21.21	3	16.66	10	19.60
Total	33	100	18	100	51	100

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Graph 3: Demographic distribution of stages of CKD

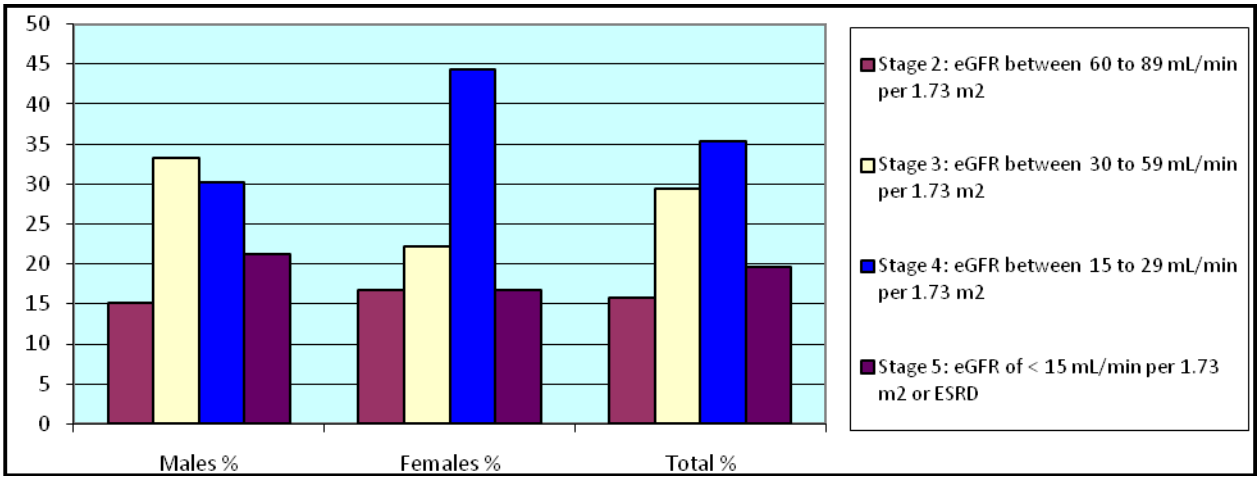
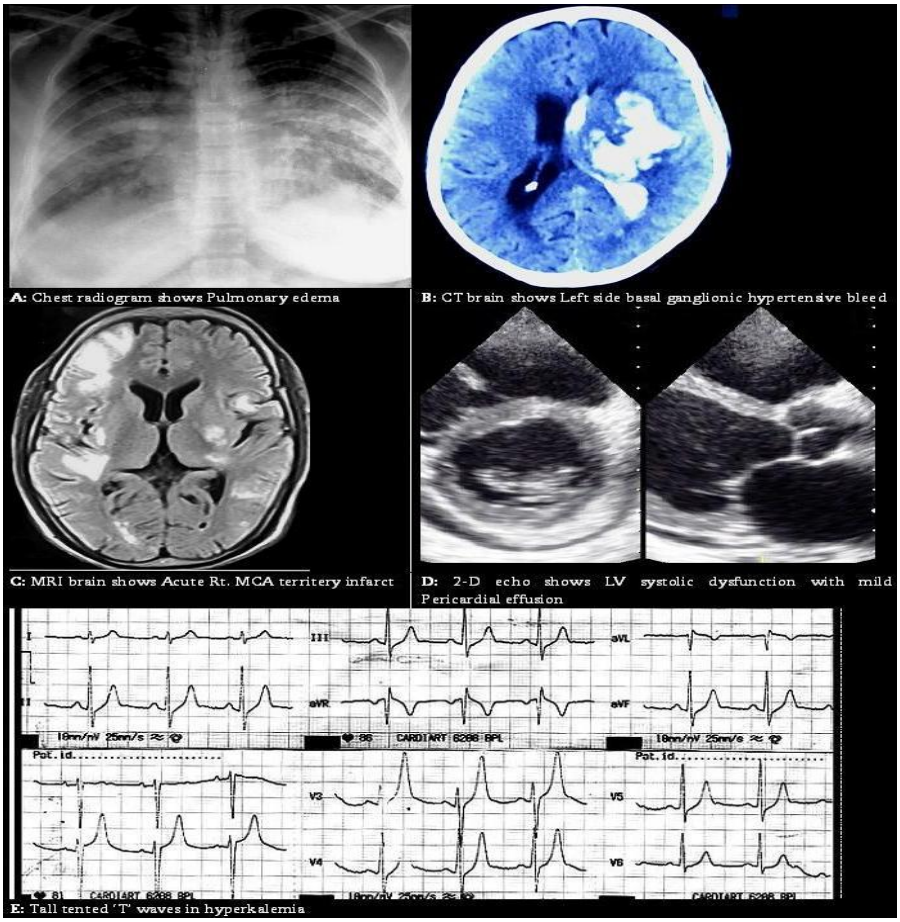


Table 6: Demographic distribution outcome of patients with CKD

Variable of outcome	Males	%	Females	%	total	%
Deaths	5	15.15	2	11.11	7	13.72
Discharge	28	84.84	16	88.88	44	86.27
Total	33	100	18	100	51	100

Figure 1: Shows presentations and complications of CKD



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DISCUSSION

Present study revealed about two third of CKD patients had hypertension and or diabetes mellitus as a cause for CKD. We compared our results with various study conducted in India and overseas. Chronic kidney disease (CKD) is becoming a major global health problem. It increases patient mortality and morbidity and puts a major economic strain on the health care system. It is estimated that 1,00,000 new patients of end stage renal disease (ESRD) enter renal replacement programs annually in India.[6] In the absence of any registry in our country these figures were based on estimates from rest of the world, tertiary care centre data and collective experience of nephrologists. [7] There are only three population based studies in India commenting on the magnitude of chronic kidney disease. In a prevention program started at community level in Chennai, the reported prevalence is 0.86% in the project population and 1.39% in the control region. The second study is based on Delhi involving 4972 urban patients. The prevalence of chronic renal failure (defined as serum creatinine more than 1.8 mg/dL) to be 0.79 % or 7852 per million/population. The third study perhaps the only longitudinal study to identify the incidence of end stage renal disease is based on 572,029 subjects residing in city of Bhopal suggests that the average crude and age adjusted incidence rates of end stage renal disease were 151 and 232 per million population respectively. [8] Rajapurkar M et al (2010) Three studies which have been carried out in different parts of India have been reviewed to examine the prevalence of CKD, which ranges from 0.79% to 1.4%. [9] In an initial survey conducted by Mani et al, in the rural population of Chennai from South India, the evidence of CKD short of renal failure was 0.7%. In a population based study from Bhopal in Central India, Modi et al have reported the average crude and age adjusted incidence rates of stage 5 CKD (ESRD) as 151 and 232 per million population . In a community based study from Delhi in Northern India the prevalence of earlier stages of CKD was reported to be 7852 per million population. [10] Similar to our results, Alebiosu CO et al (2005) stated that, the most common causes of CKD in the developing countries are systemic hypertension and diabetic nephropathy. [4] Agarwal SK et al(2009) The most common cause of CKD in population-based studies is diabetic nephropathy. [11] Agarwal SK et al (2005) quoted that, in India, diabetes and hypertension are responsible for 40% to 50% of all cases of chronic renal failure. [12] Similarly in our study about two third of the patients with CKD had hypertension and diabetes as a etiological factors for development of CKD. Agarwal SK et al (2005) In India there is a rising burden of chronic diseases like hypertension and diabetes. India has the largest number of diabetics in the world, and the prevalence of hypertension has been reported to range between 20-40% in urban adults and 12-17% among rural adults. [13] Similarly Madhumathi Rao et al (2007) quoted that, the India has been described as the diabetes capital of the world, every fifth diabetic in the world being Indian. Hypertension is not far behind, that every fifth individual was hypertensive. [14] Similarly total 21 (41.17%) patients had hypertension and 14 (27.47%) patients had Diabetes mellitus both of them outnumbered as an etiology for CKD with 'p'< 0.001 in present study. Shuchi Anand et al (2014) studied total of 357 (89%) participants with mean age of 49.5 (± 12. 7) years. Chronic kidney disease was evident in 94 (26%). They found an alarmingly high prevalence of CKD—particularly CKD associated with insulin resistance in urban Bangladeshis. [2] These findings are comparable with our study in which, the mean age of CKD was 41.96±11.66 years and 14 (27.47%) patients had Diabetes mellitus. Modi GK et al (2006) Varughese and colleagues studied 561 patients presenting with CKD stage 5 for the first time to their institution, over an eight month period. Advanced CKD was the initial presentation in over half the patients, and CKD. [15] Similarly in our study 18 (35.29%) patients were in stage 4 and 10 (19.60%) patients were with stage 5 CKD. Varughese S et al (2007) quoted the mean age in the fourth decade and a similar degree of male preponderance. Diabetic nephropathy was cause for CKD in 14% of patients. [16] Similarly in our study the mean age of patients with CKD was 41.96±11.66 years with male to female ratio of 1.833:1 and 14 (27.47%) patients had Diabetes mellitus. Rao M, et al (1998) reported a tenth of the cohort were died and 60 per cent of deaths occurred in the first four weeks of dialysis, a large proportion from complications of severe uremia including pericarditis, pulmonary oedema and severe metabolic acidosis. [17] Similarly in our study 5 male patients and 2 female patients were succumbed with mean duration of stay 3days (±1) with overall case fatality rate of 13.72%. The cause of death in these patients was related to pulmonary edema, pneumonia, ARDS, severe metabolic acidosis, hyperkalemia with ventricular arrhythmias [i.e. cardiopulmonary and metabolic cause]. Ajay K Singh et al (2013) studied 5588 subjects with mean ± SD age of all participants was 45.22 ± 15.2 years with 55.1% of them were males and 44.9% were females. [1] These findings are slightly different compared to our results in which total 51 (mean age 41.96±11.66 years) patients with CKD, 33 (64.70%) were males and 18 (35.29%) were female with mean age of 47.18(±13.55) and 36.74 (±9.78) respectively. The male to female ratio of CKD was about 1.833:1. The differences in these findings could be due to different size of population and different study population. Ajay K Singh et al (2013) reported overall prevalence of CKD in the SEEK-India cohort was 17.2% with a mean eGFR of 84.27 ± 76.46 mL/min/1.73 m^2.

Prevalence of CKD stages 1, 2, 3, 4 and 5 was 7%, 4.3%, 4.3%, 0.8% and 0.8%, respectively. The prevalence of CKD was observed to be 17.2% with ~6% have CKD stage 3 or worse. [1] Similarly the mean eGFR in our study was of 54.23 ± 19.57 mL/min/1.73 m^2 with total 8 (15.68%) patients were with stage 2 CKD, 15 (29.41%) patients were with stage 3 CKD, 18 (35.29%) patients were with stage 4 CKD and 10 (19.60%) patients were with Stage 5 CKD. Ajay K Singh et al (2013) Chronic kidney disease (CKD) is emerging to be an important chronic disease globally. One reason is the rapidly increasing worldwide incidence of diabetes and hypertension. [1] Similarly in our study total 21 (41.17%) patients had hypertension, of them 15 (45.45%) were males and 6 (33.33%) were females and total 14 (27.47%) patients had Diabetes mellitus, of them 10 (30.30%) were males and 4 (22.22%) were females. The hypertension and the DM outnumbered as an etiology for CKD with 'p'< 0.001in current study. Mohan M Rajapurkar et al (2012) quoted mean age of 50.1 ± 14.6 years, with M: F ratio of 70:30. Diabetic nephropathy was the commonest cause (31%) and hypertensive nephrosclerosis (13%). About 48% cases presented in Stage V. [18] These findings are comparable with our study in which, The mean age 41.96±11.66 years, 18 (35.29%) patients were with stage 4 CKD and 10 (19.60%) patients with stage 5 CKD,41.17% patients had hypertension, 27.47% patients had Diabetes mellitus with male to female ratio of CKD was about 1.833:1. PK Chhetri et al (2008) studied CKD stage 5 patients having GFR of <15ml/min/ 1.73m2 under HD. Among 100 patients included in the study 57 were male and mean age of the study population was 46.9 ±17.9 years. Most common cause of CKD 5 in the study was hypertension (54.0%); other causes included diabetic nephropathy (18.0%), idiopathic (13.0%) and glomerulonephritis (6.0%). Total 15.0% of the study population died. Majority of patients were anemic (85.0%). Hypertension was the leading cause of CKD 5. [19] Similarly in our study total 21 (41.17%) patients had hypertension, of them 15 (45.45%) were males and 6 (33.33%) were females. The mean SBP and DBP were positively correlated with stage of CKD. The hypertension outnumbered as an etiology for CKD with 'p'< 0.001. Total 10 (19.60%) patients were with Stage 5 CKD (eGFR < 15 mL/min per 1.73 m^2), of them 7 (21.21%) were males and 3 (16.66%) were females of them about two third had hypertension in present study. Stauffer ME, Fan T (2014) reported 14.0% of the US adult population had CKD in 2007–2010. Anemia was twice as prevalent in people with CKD (15.4%) as in the general population (7.6%). The prevalence of anemia increased with stage of CKD, from 8.4% at stage 1 to 53.4% at stage 5. [20] These findings are comparable with our results in which, 25(75.75%) males and 15 (83.33%) female patients had normochromic, normocytic anemia and mean hemoglobin level was negatively correlated with stage of CKD and overall mortality. Aggarwal HK et al (2013) stated that, the neurological complications secondary to the uremic state, contribute largely to the morbidity and mortality in patients with renal failure. The prevalence of peripheral neuropathy remains high in advanced renal dysfunction. It was observed that neurological symptoms increased steadily with raise in serum creatinine about 70% of the patients had uremic polyneuropathy; 6% had asymptomatic neuropathy, 51% had symptomatic non-disabling neuropathy, while disabling neuropathy was seen in 13% of the patients. [21] Similarly in our study 12(36.36%) male and 8 (44.44%) females presented with tingling numbness in lower limbs due to peripheral neuropathy and the neuropathic symptoms were significantly correlated with stage 4 and 5 of CKD. Robert Thomas et al reported prevalence of stages of CKD in the US population was 1.8% for stage 1, 3.2% for stage 2, 7.7% for stage 3 and 0.35 % for stages 4 and 5. [5] Similarly in our study 15 (29.41%) patients were in stage 3 CKD, 18 (35.29%) were in stage 4 CKD and 10 (19.60%) were in stage 5 CKD and stage of CKD was positively correlated with overall mortality. The NKF defines anemia as hemoglobin of less than 13.5 g/dL in men and less than 12.0 g/dL in women. A normochromic, normocytic anemia usually accompanies progressive CKD, and the overall prevalence of CKD-associated anemia is approximately 50%. Although anemia may be diagnosed in patients at any stage of CKD, there is a strong correlation between the prevalence of anemia and the severity of CKD. [5] These findings are comparable with our study in which, 25(75.75%) males and 15 (83.33%) female patients had normochromic, normocytic anemia and mean hemoglobin level was negatively correlated with stage of CKD. Hypertension is a traditional cardiovascular risk factor which contributes to the cardiovascular risk associated with CKD. They found that, the patients with hypertension are at increased risk for new or recurrent cardiovascular events in individuals with stage 2–3 CKD. [5] Similarly, in our study total 16 (48.48%) males and 9 (50%) female patients presented with accelerated hypertension. Diabetes is associated with adverse outcomes in all stages of CKD. The presence of left ventricular hypertrophy (LVH), a complication which increases in relation to progressively lower levels of eGFR, is also a cardiovascular risk determinant in CKD patients. [5] Similarly in our study mean BSL and HbA1C in diabetic patients and blood pressure was negatively correlated with eGFR. Anemia and hypertension, are two CKD associated complications hypothesized to play a role in the development of LVH. Progression of CKD is associated with a number of serious health complications, including increased incidence of cardiovascular disease. CKD patients are more likely to develop congestive heart failure (CHF). Investigators evaluated the association between CKD and new-onset CHF and found that risk for developing CHF correlated with the degree of renal impairment. [5] Similarly in our study

stage 4 and 5 CKD had complications and death related to LV systolic dysfunction, pulmonary edema and LV hypertrophy with diastolic dysfunction resulting to mortality of 13.72%.

CONCLUSIONS

Present study highlighted burden of hypertension and diabetes mellitus as an important etiological factor for development of CKD. The majority of patient at the time of diagnosis were at stage four to six of CKD. There is intense need of community based program to detect early hypertension and DM and to control them with appropriate medications and strategy to prevent end organ damage including CKD. Screening for these 2 diseases and CKD is simple and easy to perform. A comprehensive health education campaign and screening of the general populace are needed in order to detect chronic kidney disease early. These measures will ensure appropriate and timely institution of proven measures to halt or reduce progression of CKD. The best approach will be to start screening for CKD in a high-risk group, like first-degree relatives of patients with diabetes, hypertension, and CKD, and simultaneously making a platform to run the program through the existing health care system of the country. There is pressing need of renal replacement therapy at periphery and remote areas to reduce mortality and morbidity related with CKD in developing world including our country. Many more such efforts are needed across our country in order to determine the exact burden of CKD. The screening of high-risk individuals for CKD and the risk factors is the best bet for country like India. Thus, in India there is a long way to go with respect to CKD. We suggest stressed to all primary care physicians taking care of hypertensive and diabetic patients to screen for early kidney damage and to manage appropriately to a maximum extent.

Limitations of the study: This study was retrospective, hospital based and the study population in present study is small and was conducted at tertiary care teaching hospital.

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