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Clinical Profile of Chronic Kidney Disease Patients in Rural Population of Haryana: A Single-center Experience.

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ABSTRACT

Background: CKD is a major health problem associated with high morbidity and mortality. Chronic kidney disease is end result of long standing cases of diabetes mellitus and hypertension. There is paucity of data, regarding spectrum of CKD. CKD is generally asymptomatic in early stages. Early interventions delay the progression to ESRD, thus reducing morbidity and mortality. **Objectives:** To study the Clinical profile, Biochemical profile and determine the Aetiology of chronic kidney disease among Rural population. **Methods:** In this study, we retrospectively analysed data of 161 patients admitted in hospital over a period of six months. Data was collected based on clinical assessment, laboratory analysis and Radiological investigations to determine aetiology of chronic kidney disease. **Results:** 161 patients of chronic kidney disease were included in the study. The mean age of all patients studied was 47.20±16.16 years. The most common aetiology was hypertensive nephropathy. Most of the patients presented with, pedal oedema (59.6%) followed by Oliguria (52.2%), facial edema (46.9%). **Conclusion:** The major causes of CKD in descending order were hypertension, Type 2 diabetes mellitus, chronic glomerulonephritis and obstructive uropathy. So if we are able to detect and treat these conditions in early phase, we can prevent further progression and damage to the kidney.

Keywords: Kidney, ESRD.

INTRODUCTION

Chronic kidney disease (CKD) ranges from mild kidney damage to end-stage renal disease (ESRD) and is major health problem worldwide associated with increased morbidity and mortality. Chronic kidney disease is characterized by a decrease in glomerular filtration rate. The clinical course is progressive with loss of nephron function, leading to end stage renal disease. There are multiple causes leading to End stage renal disease (ESRD) and is characterized by hypertension, anemia, nutritional impairment, neuropathy, skin changes and reduced life expectancy. Early stages of CKD can be detected through routine laboratory and radiological investigations. It is associated with other features which include anaemia, hypoalbuminemia, Electrolyte imbalance etc. So if we are able to detect these features at early stage we can increase life expectancy of CKD patients by timely interventions like Dialysis and renal transplantation.[1-3] Chronic kidney disease (CKD) is a worldwide health problem, both for the number of patients and cost of treatment involved. Globally, CKD is the 12th cause of death and the 17th cause of disability.[4]

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The definition of chronic kidney disease as per National Kidney Foundation (NKF) Kidney Disease Outcome Quality Initiative (K/DOQI) is [5]

1. Kidney damage for > 3 months, as defined by structural or functional abnormalities of the kidney, with or without decreased GFR, manifested by either Pathologic abnormalities; or markers of kidney damage, including abnormalities in the composition of the blood or urine, or abnormalities in imaging tests.
2. GFR <60 ml/min/1.73m2 for >3 months, with or without kidney damage.

With the help of dialysis and renal transplantation, there is improved survival for patients of ESRD. The 5 year survival rate for patients on hemodialysis is 30-50 % in nondiabetics, whereas for living donor transplantation it is 81%.[6] CKD patients presents with Clinical manifestations of CKD from stage 3 onwards. It is necessary to detect CKD as early as possible so that timely treatment can be initiated, thereby reducing morbidity and mortality.[7] The present study was undertaken to study the clinical, biochemical profile and determine aetiology of CKD patients at a tertiary care centre.

MATERIALS AND METHODS

It is a retrospective study, we analysed data of 161 patients who visited Medicine OPD, admitted in indoor and patients undergoing haemodialysis at Maharaja Agarsen Medical college Agroha from 01/01/2019 to 30/06/2019. Prior permission from ethical committe was taken.

Inclusion criteria:

1. GFR <60 ml/min/1.73 m2 on the basis of estimated GFR using the Modification of Diet in Renal Disease (MDRD) formula (CKD stages 3 to 5)
2. Serum creatinine>2.0 mg/dl
3. Age above15 years.

Exclusion criteria:

Patients with heart failure, malignancy, liver disorders, hyperuricemia, on drugs like antimetabolites and who undergone Renal Transplant were not included in this study.

Data was collected from Indoor Bed files and Dialysis files which included detailed history and physical examination. Data on age, sex, smoking, drug abuse, alcohol consumption along with past history of diabetes, hypertension, Tuberculosis and other co-morbid conditions were collected.

All patients underwent the following investigations – Haemogram, Blood urea, Blood Sugar, Serum creatinine, Serum electrolytes, Serum proteins, Serum albumin, Serum calcium and other relevant investigations

GFR was calculated by using MDRD equation: 186.3 × (serum creatinine) -1.154 × age -0.203 × (0.742 for women) × (1.212 if black). All Patients were categorized in stage 3 to stage 5 based on GFR, according to criteria laid by National Kidney Foundation.[5]

Stage 1: eGFR> 90 mL/min per 1.73 m2 and persistent albuminuria

Stage 2: eGFR between 60 to 89 mL/min per 1.73 m2

Stage 3: eGFR between 30 to 59 mL/min per 1.73 m2

Stage4: eGFR between 15 to 29 mL/min per 1.73 m2

Stage 5: eGFR< 15 mL/min per 1.73 m2 or end-stage renal diseases

An aetiological diagnosis was made but not confirmed by histopathology. The data was analyzed using statistical methods in which quantitative variables were summarized using mean and standard deviation while categorical variables were tabulated using frequencies and percentages. Analysis of variance (ANOVA), was applied and p value of less than 0.05 was considered significant. Results 161 consecutive patients of chronic kidney disease were taken up for the study.

RESULTS

161 patients of chronic kidney disease were included in the study. The mean age of all patients studied was 47.20±16.16 years. The maximum patients belonged to 51-60 years age group (21.7%). Age wise distribution of cases in study group is shown in [Table 1, Figure 1]. In this study, 75.8% of the patients were male and 24.2% were females [Table 2, Figure 2].

Table 1: Age wise distribution of CKD Patients

AGE	NO	Percent
<=20	8	5.0
21-30	24	14.9
31-40	29	18.0
41-50	28	17.4
51-60	35	21.7
61-70	29	18.0
>70	8	5.0
Total	161	100.0

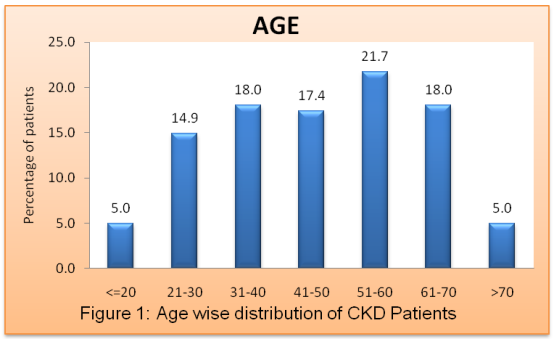
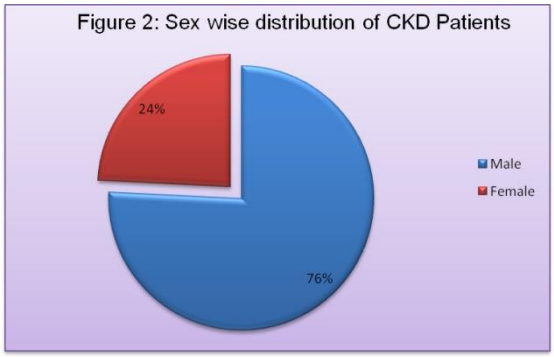


Figure 1: Age wise distribution of CKD Patients

Table 2: Sex wise distribution of CKD Patients

SEX	No	Percent
Male	122	75.8
Female	39	24.2
Total	161	100.0



All the patients of CKD were categorised in 3 stages. Stage 3, stage 4 and stage 5 patients constituted 6.8%, 46.0% and47.2% of the total cases.[Table 3, Figure 3].

Table 3: Stage wise distribution of CKD Patients

Stage Of CKD	No Of Patients(161)	% age
3	11	6.8
4	73	46.0
5	77	47.2
	161	100

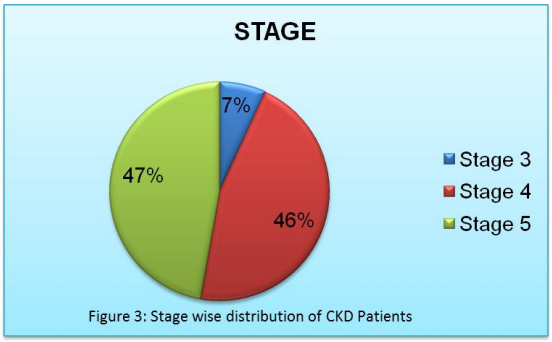


Figure 3: Stage wise distribution of CKD Patients

In this study, the most common aetiology was hypertensive nephropathy (n=60, 37.27%) followed by Diabetic nephropathy (n=52,32.3%), Chronic glomerulonephritis (n=36,22.58%), Obstructive uropathy (n=8,4.98%), PCKD (n=5,3.24%) Chronic pyelonephritis (n=2,1.26%), Alport syndrome (n=1,0.63%). Aetiology wise distribution of cases of chronic kidney disease is shown in [Table 4 Figure 4].

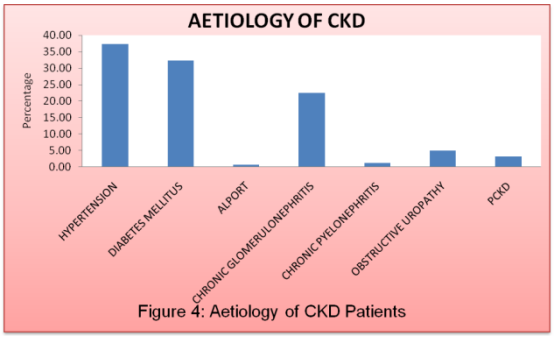


Figure 4: Aetiology of CKD Patients

Table 4: Aetiology of CKD Patients

AETIOLOGY	NO	Percent
HYPERTENSION	60	37.27
DIABETES MELLITUS	52	32.30
ALPORT	1	0.63
CHRONIC GLOMERULONEPHRITIS	36	22.58
CHRONIC PYELONEPHRITIS	2	1.26
OBSTRUCTIVE UROPATHY	8	4.98
PCKD	5	3.24
Total	161	100.00

Table 5: Symptoms of CKD Patients

Symptom	NO	Percent
ALTERED SENSORIUM	24	15.02
ABDOMINAL DISTENSION	10	6.24
ANOREXIA	13	8.21
DYSPNOEA	43	26.99
CONVULSION	4	2.54
FACIAL EDEMA	76	46.94
HEMATURIA	16	10.08
OLIGURIA	84	52.17
PEDAL EDEMA	96	59.63
VOMITING	34	21.29
WEAKNESS	30	18.63
FLANK PAIN	2	1.31
Total	161	100.00

In this study most of the patients presented with, pedal oedema (59.6%) followed by Oliguria (52.2%), facial edema (46.9%). [Table 5, Figure 5] shows the symptoms of chronic kidney disease in study population. The clinical examination reflects that almost 56.5% had pedal edema,46.6% of the patients had pallor, 37.8% had hypertension [Table 6, Figure 6].

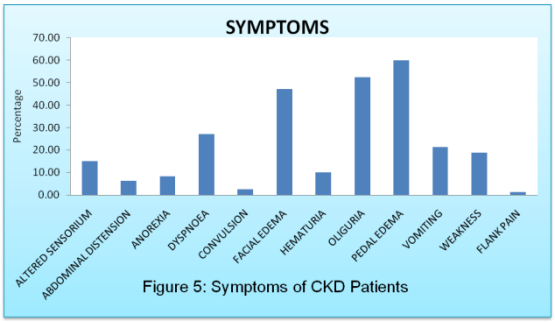


Figure 5: Symptoms of CKD Patients

Table 6: Signs of CKD Patients

SIGN	Frequency	Percent
ASCITIS	49	30.69
HTN	61	37.89
PALLOR	75	46.58
PEDAL EDEMA	91	56.45
PLEURAL EFFUSION	2	1.26
PERIPHERAL NEUROPATHY	20	12.52
PULMONARY EDEMA	5	3.14
SKIN CHANGES	23	14.37
Total	161	100.00

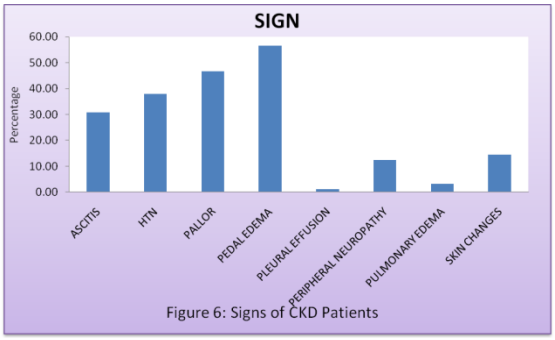


Figure 6: Signs of CKD Patients

Mean Hb was 9.18±1.85. The average level of hemoglobin showed a falling trend with stages of CKD. The standard deviation showed falling trend from stage 3 to stage 4, indicating more variation in the level of hemoglobin in stage 5 patients. [Table 7] Blood urea and Serum Creatinine showed a falling trend with stages of CKD with more variation in stage 5 patients. Comparison among the stages of average level of Blood urea and Serum Creatinine was found to be statistically significant (p=0.0001, p=0.0001). [Table 7]

The average level of Sodium showed a decreasing trend with the CKD stages and the standard deviation value has gone up (6.53) which indicates more variation in the level of Sodium in stage 4 patients and was found to be statistically significant (p=0.0001) [Table 7].

Other biochemical parameters in chronic kidney disease are depicted in [Table 7].

Table 7: One way ANOVA

	STAGE									p-value
	Stage 3			Stage 4			Stage 5			
	n	Mean	SD	n	Mean	SD	N	Mean	SD	
HB	11	9.95	1.23	74	9.40	1.86	76	8.84	1.87	.063
UREA	11	99.27	17.76	74	125.41	33.98	76	225.97	95.94	.0001**
CREATININE	11	2.25	.21	74	3.40	.55	76	7.03	2.81	.0001**
GFR	11	33.45	3.17	74	19.72	3.99	76	8.86	3.11	.0001**
SODIUM	11	141.82	4.21	74	138.68	6.53	76	136.04	5.96	.003**
POTASSIUM	11	4.61	1.36	74	4.82	1.38	76	4.43	1.39	.144
CALCIUM	11	9.31	.84	74	8.96	.88	76	9.24	1.00	.156
ALBUMIN	11	3.64	.62	74	3.57	.61	76	3.80	.82	.137

** Significant p value

DISCUSSION

We included 161 patients in this study, which were distributed as per the GFR calculated with the MDRD equation. The mean age of all patients studied was 47.20±16.16 years. The maximum patients belonged to 51-60 years age group (21.7%). In this study, 75.8% of the patients were males. Various studies analysed by the NKF K/DOQI1, majority reported that the male sex was more at risk for CKD with progression to end stage renal disease. Nand et al,[8] reported in there study males accounting for 64.25% and females 35.75% of CKD patients respectively with mean age at presentation being 46.66 ± 16.60.

In this study most common cause of Nephropathy was Hypertension (37.27%) followed by Diabetes. This trend is similar to that reported by Jha et al.[7]
The haemoglobin levels were below 10 gm/dl in 90% of the patients with falling trend from stage 3 to stage 4. Renuka Prasad. Y. Set al also reported similar trend.[9] Lower hemoglobin results from reduced erythropoietin synthesis in the kidneys and inhibitors of erythropoiesis.[10] The severity of anaemia in chronic kidney disease is related to the duration and extent of kidney failure. Onset and severity of anaemia are related to the levels of GFR.

In stage 3 patients, the average level of potassium was 4.6 with a standard deviation of 1.36 which kept on increasing with the CKD stage. Hyperkalemia may occur in association with dietary indiscretion, increased catabolism or metabolic acidosis.[7]

Hyponatremia was observed in 22.3% of the total patients with increasing standard deviation from stage 3 to stage 5. This trend was statistically significant with p value 0.003. Chronic kidney disease (CKD) is frequently complicated with hyponatremia, due to fluid overload or diuretic usage. Hyponatremia in CKD population is associated with increased mortality.[11]

CONCLUSION

The major symptoms were pedal edema, Oliguria and Facial edema, the major signs were pallor and high blood pressure. So patients presenting with these features must be evaluated to detect CKD at early stage to reduce morbidity and mortality.
The major causes of CKD in descending order were hypertension, type 2 diabetes mellitus, chronic glomerulonephritis and obstructive uropathy. So by detecting these causes, we can prevent further progression of chronic kidney disease.
Other complications like Electrolyte Imbalance and hypoalbuminemia were seen in majority number of cases, thus it becomes important to detect and correct these complications early to prevent mortality.

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