AN OBSERVATIONAL STUDY ON IMPACT OF COMORBID CONDITIONS IN CHRONIC KIDNEY DISEASE PATIENTS OF TELANGANA REGION

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ABSTRACT

Chronic kidney disease (CKD) is a most prevalent worldwide public health problem. There is raise in the incidence and prevalence of CKD since past decade. The purpose of this study is to find out the morbidity in CKD and End stage renal disease (ESRD) patients. This is a prospective observational study conducted in 480 patients in nephrology department. The results show that, 78.5 % of the study population were CKD patients. Diabetes mellitus (DM) with Hypertension (HTN) (29.3 %), followed by HTN (18.9 %) were the most commonly observed co-morbid conditions associated with CKD. Higher prevalence of CKD was observed in the age group interval of 51-60 years (22.7 %). Highest prevalence of CKD was observed in male (61.2 %) compared to female. CKD was observed more among rural population (59 %). This study concludes that increase in the dialysis centres & creating awareness in the public and health care workers may decrease the prevalence, economic burden, hospital stay and reduce the disease progression, therefore increase the quality of life of CKD patients.

KEYWORDS: Chronic kidney disease, diabetes mellitus, hypertension, end stage renal disease.

INTRODUCTION

Chronic kidney disease (CKD) is a condition characterized by gradual loss of kidney function over time, manifested by abnormal albumin excretion or decreased kidney function, quantified by measured or estimated glomerular filtration rate (GFR), that persists for more than three months.[1,2] Chronic kidney disease (CKD) is a worldwide public health problem. Overall CKD mortality has increased by 31.7 % over the last 10 years.[3] 10 % of the population worldwide is affected by chronic kidney disease.[4] The number of patients enrolled in the end-stage renal disease (ESRD) Medicare-funded program has increased from approximately 10,000 beneficiaries in 1973 to 661,648 as of 2013 [USRDS, 2013]. It is estimated that number of cases of kidney failure will increase disproportionately in developing countries, such as China and India, where the number of elderly people are increasing [USRDS, 2010]. The most important predictors of progressive CKD are the persistence of underlying initiation factors (e.g., Diabetes mellitus, hypertension, glomerulonephritis and polycystic kidney disease), and the progression factors of proteinuria, elevated blood pressure, smoking and obesity.[5] Individuals with type 1 diabetes mellitus have a 40 % lifetime risk of developing CKD of any stage whereas individuals with type 2 diabetes mellitus have a 50 % lifetime risk. [Joseph T. Dipiro, Chapter 46, 7th edition].

METHODOLOGY

This is a prospective observational study conducted at an In-patient nephrology department of a private hospital for six months to find out the morbidity in the patients. A total of 480 patients from surrounding regions of Warangal were considered and the patient's pertinent information was collected.

Inclusion criteria: Patient with renal disease, co-morbid conditions and past medical history with kidney disease.

Exclusion criteria: Patients visiting out-patient department, Pregnant women and Patients who are not diagnosed with kidney disease.

Procedure: Source of data and Parameters include collection of data such as demographics, laboratory data which includes renal function tests, complete blood picture, blood glucose

levels and all other pertinent clinical information was collected from past medical history, study patients and caretakers. Casesheets and datacollection form were used for the said purpose.

RESULTS

Table 1: Gender wise distribution of data.

Gender	No. of patients	Percentage
Male	294 (61.25 %)	61.25 %
Female	186 (38.75 %)	38.75 %
Total	**480**	**100**

Out of 480 patients, 61.25 % were male and 38.75 % were female. Highest prevalence was observed in male.

Table 2: Age wise distribution of data.

Age	Male	percentage	Female	Percentage	Total (%)
10-20	13	4.42	4	2.15	3.54
21-30	21	7.14	7	3.76	5.83
31-40	27	9.18	32	17.20	12.29
41-50	54	18.36	40	21.50	19.58
51-60	65	22.10	44	23.65	22.70
61-70	63	21.42	43	23.11	22.08
71-80	40	13.60	15	8.06	11.45
>80	11	3.74	3	1.16	2.91
TOTAL	**294**	**100**	**186**	**100**	**100**

Of 480 study population, patients were divided into various groups according to their age and gender. Higher prevalence was observed in the age groups between 51-60 years (22.7 %) followed by 61-70 years (22.08 %), 41-50years (19.58 %), and the least was observed among age group of >80 years (2.91 %) followed by 10-20 years (3.54 %), 21-30 years(5.83 %). The mean age was found to be 54.03 ± 17.17 years.
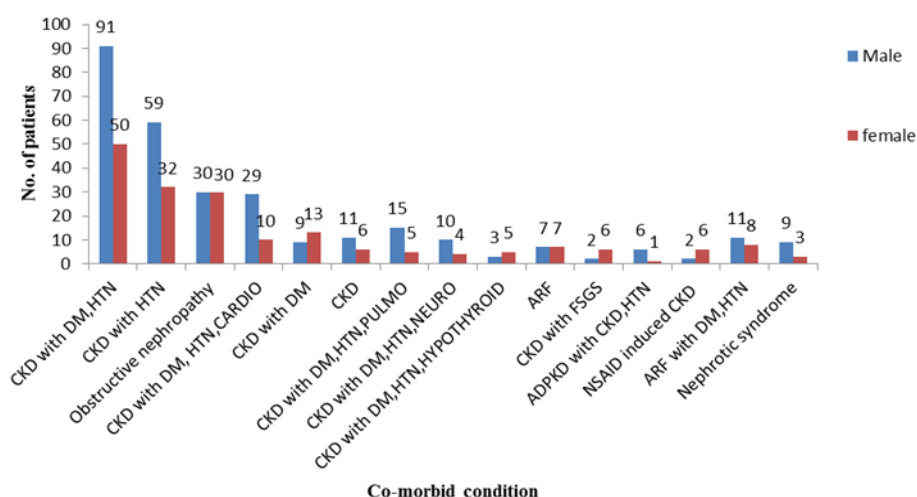
Fig 1: Gender wise distribution of co-morbid conditions.

Out of 480 patients, most frequently observed co-morbid condition was CKD with DM, HTN in 91 male and 50 female, followed by CKD with HTN in 59 male and 32 female. There were only 6 male and 1 female with co-morbid condition Autosomal dominant polycystic kidney disease (ADPKD), HTN with CKD.

Table 3: Age wise distribution of co-morbid conditions.

CKD with co-morbid condition	<20 yrs	21-30 yrs	31-40 yrs	41-50 yrs	51-60 yrs	61-70 yrs	71-80 yrs	>80 yrs	Total
DM, HTN	0	0	8	25	44	41	20	3	141(29.3%)
HTN	2	15	24	20	12	10	7	1	91(18.95%)
Obstructive nephropathy	1	5	9	18	12	12	3	0	60(12.5%)
DM, HTN, Cardiovascular disorders.	0	0	1	8	8	13	8	2	40(8.33%)
DM	0	0	1	4	7	6	4	0	22(4.58%)
CKD	1	2	7	0	3	2	0	3	18(3.75%)
DM, HTN, Pulmonary disorders.	0	0	0	2	2	10	4	2	20(4.16%)
DM, HTN, Neurological disorders	0	0	1	1	9	1	1	1	14(2.91%)
DM, HTN and Hypothyroidism.	0	1	2	2	2	0	1	0	8(1.66%)
Acute renal failure (ARF)	0	3	2	5	2	1	1	0	14(2.91%)
Focal segmental glomerulosclerosis	1	1	2	4	0	0	0	0	8(1.66%)
ADPKD with CKD,HTN	0	0	0	2	3	0	2	0	7(1.45%)
NSAID induced CKD	0	0	2	2	2	2	---	0	8(1.66%)
ARF with DM, HTN	0	2	0	1	3	8	4	1	19(3.95%)
Nephrotic syndrome	12	0	0	0	0	0	0	0	12(2.5%)
Total	17	29	59	94	109	106	55	13	480
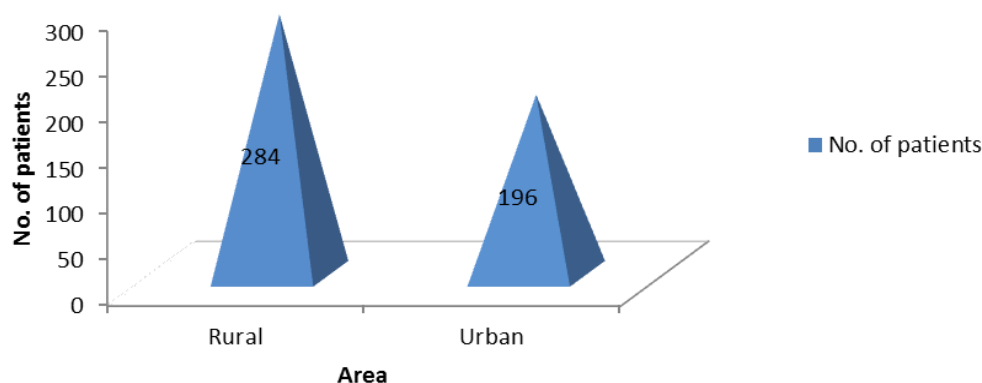
Fig 2: Area wise distribution of data.

Table 4: Social history among CKD patients.

Social history	No. of patients
Occasional alcoholic	132
Regular alcoholic	53
Smoking	77

Among 237 CKD male patients, 132 were occasional alcoholic, 53 were regular alcoholic and 77 are smokers.

Table 5: Severity wise distribution of anaemia in CKD patients.

Severity of anemia	Gender		Total
	Male	Female	
Mild anemia (9-11 gm %)	92	63	155 (43.79 %)
Moderate anemia (7-9 gm %)	80	60	140 (39.55 %)
Severe anemia (<6 gm %)	31	28	59 (16.67 %)
Total	203	151	354

Out of 377 CKD patients, 354 patients were with anaemia. Highest prevalence of anaemia was observed in male (58.84%) than in female (42.65%).

Table 6: Distribution of data based on initiation of dialysis.

Age	No haemodialysis	<3 months	3-6 months	7 months – 1year	>1 year	Total
10-20	9	3	3	0	0	15(3.12 %)
21 - 30	11	6	7	3	2	29(6 %)
3 - 40	16	10	18	7	5	56(11.6 %)
41- 50	33	27	15	22	5	102(21.25 %)
51-60	41	20	19	21	14	115(23.95 %)
61-70	35	11	11	26	13	96(20 %)
71-80	24	1	8	11	7	51(10.6 %)
>80	12	0	1	3	0	16(3.33 %)
Total	181(37.5 %)	78(16.25 %)	82(17 %)	93(19.37 %)	46(9.5 %)	480

Out of 480 patients, 62.29 % were on haemodialysis and 37.5 % were not on haemodialysis. Highest prevalence was observed in the age group between 51-60 years (23.95 %), followed by 41-50 years (21.25 %).

DISCUSSION

A study conducted by Percy Herrera-Anazco *et al* 2014, stated that the mean age was 56.4 ± 15.8 years. Mohamed Elhafiz Elsharif *et al* 2011, stated that the mean age was 44.08 years. In another study conducted by Stavroula Gerogianni *et al* 2014, found that the majority of the participants (69 %) were between 50 and 59 years. In contrast, in our study we observed that out of 480 patients, majority (22.7 %) of them were in the age group between 51 to 60 years, followed by 61 to 70 years (22.08 %) and the mean age was found to be 54.03 ± 17.17 years. We observed that kidney function starts declining at elderly ages. The aging process is accompanied by increased risk factors like HTN, DM and compromised kidney function.

A study conducted by Stavroula Gerogianni *et al* 2014, stated that male were 69 % and female were 31 %. Percy Herrera-Anazco *et al* 2014, stated that nearly 60 % were male. In another study conducted by Maria do Sameiro Faria *et al* 2013, stated that 55.02 % were male, 44.97 % female. Similarly, in the present study, we observed that 61.25 % were male, 38.75 % were female. This disparity may be due to variation in the dietary habits; usually men tend to have a greater protein, salt intake and unhealthy lifestyle which could have a significant influence on renal physiology.

A study conducted by Al Wakeel JS *et al* 2002, stated that Diabetes mellitus was the most prevalent co-morbidity (59 %) followed by heart disease (32.7 %), liver disease (27.3 %), cerebrovascular accidents (11.8 %) and neoplasm (10 %). Shang-jyh hwang *et al* 2010, stated that DM (43.2 %), Chronic glomerulonephritis (25.1 %), HTN (8.3 %) and chronic interstitial nephritis (2.8 %) are four major underlying renal diseases of ESRD. DM has become the first leading cause of ESRD outnumbering Chronic glomerulonephritis (CGN) since 2000. In another study conducted by Maria do Sameiro Faria *et al* 2013, stated that the main cause of renal failure in the patients was diabetes mellitus (35.9 %), followed by arterial hypertension (13.2 %), glomerulonephritis (8.4 %), polycystic renal disease (6.3 %), reflux nephropathy (4.23 %), obstructive uropathy (2.11 %), hereditary nephropathy, chronic interstitial nephritis, nephrolithiasis and uncertain aetiology. Pranavi dasari *et al* 2014, stated that highest percentage of co-morbidity was HTN and DM (26 %), only HTN (23.3 %) and (15.3 %) of HTN, DM, CAD. Similarly, in the present study, highest percentage of co-morbidity was

observed with DM with HTN (29.3 %) followed by Hypertension (18.9 %), Obstructive nephropathy (12.5 %) and cardiovascular disease (8.1 %). It is previously evident that uncontrolled diabetes causes mesangial expansion, podocyte effacement and intimal hyaline thickening in the blood vessels that progress to arterial hyalinosis of the afferent and efferent arterioles resulting in glomerular hyperfiltration as stated by Stephanie TM *et al* 2015. Uncontrolled Hypertension leads to increased blood pressure on kidney vasculature and impairing glomerular filtration. Damage to the glomeruli leading to an increase in protein filtration, resulting in abnormally increased amounts of protein in the urine as stated by Leticia Buffet *et al* 2012.

In a study conducted by Melissa E. Stauffer *et al* 2014, it was found that anaemia was present in 15.4 % of people with any stage of CKD. In a study conducted by Bruce robinson *et al* 2007, they found that 60 % of patients had anaemia. In another study conducted by Muhammad salman *et al* 2016, they stated that anaemia was prevalent in 75.8% of the study population, of which 47.7 %, 32.2 %, 20 % were mild, moderate and severe respectively. Similarly, we observed that 73.7 % patients had anaemia, of which 43.79 %, 39.55 %, and 16.67 % were mild, moderate and severe respectively and the mean Haemoglobin % was found to be 9.05 ± 1.84. It is evident that erythropoietin is a glycoprotein secreted by the kidney interstitial fibroblasts which are essential for the growth and differentiation of red blood cells in the bone marrow. In CKD, tubular atrophy generates tubulointerstitial fibrosis, which compromises renal erythropoietin synthetic capacity and results in anaemia as stated by Robert Thomas *et al* 2008.

Ayodele *et al* 2010, stated that there was an increase in the prevalence of chronic kidney disease in Europe by 10.2 % and the United States by 11.7 %. In contrast to our study, the prevalence of CKD was found to be 78.54 %. This increase in the prevalence of CKD is due to uncontrolled diabetes and high blood pressure that accounts for the majority of cases. CKD has no symptoms in early stages and cannot be detected until it is in an advanced stage.

In a study conducted by Anoop Shankar *et al* 2006, stated that 45.06 % of the CKD patients were smokers. Elisabeth *et al* 2004, stated that 59.34 % were smokers. In another study conducted by Rabi Yacoub *et al* 2010, they stated that 43.4 % of CKD patients were smokers. In contrast, we observed that 16.04% of our patients were smokers. Smoking causes intraglomerular hypertension, vascular damage, extracellular matrix deposition and fibrosis through intra-renal vasoconstriction, prothrombotic factors, oxidative stress and

proinflammatory cytokines leading to tubular dysfunction, atrophy and glomerulosclerosis as stated by Stephan R O *et al* 2008.

Anoop Shankar *et al* 2006, stated that 84.8 % of the CKD patients were alcoholic. Yueh-Han Hsu *et al* 2013, stated that 20.5 % of Stage 3 CKD patients were alcoholic. Whereas 38.5 % of the patients were alcoholic in our study. Alcohol causes changes in the kidney function by altering the filtration capacity. Alcohol affects the ability to regulate fluid and electrolyte balance in the body when alcohol dehydrates the drying effect can deteriorate the normal function of cells and organs including kidneys as stated in National kidney foundation, 2017.

Mitesh Singh *et al* 2017, stated that 87% of the CKD patients were urban and 13% from the rural area. In contrast, we observed that 59.17 % of the CKD patients were rural and 40.8 % from the urban area. Majority of the cases were observed in rural areas due to lack of awareness regarding the disease.

In study population of 480 subjects 37.5% were not on haemodialysis, 19.3 % were on dialysis since 7months - 1year. 17% were on a dialysis for a duration of 3-6 months and 16.2% were on dialysis for a duration of <3 months. This evidence suggests that majority were on haemodialysis ever since they were diagnosed as CKD patients.

CONCLUSION

Of the total study population, CKD was most frequently observed in 78.54 % patients. Uncontrolled diabetes and blood pressure are the primary cause of CKD. We found that prevalence of CKD was most affected in the age group of 51 to 60 years. Male were predominantly affected with CKD compared to female. DM with HTN is the majorly seen co-morbid condition with CKD. We observed that 73.7 % of patients had anaemia. 16.04 % of the patients were smokers, 38.5 % of the patients were alcoholic in the present study. 59.17 % patients were from rural area and 40.8 % from the urban area. 62.5 % of patients were on haemodialysis. Clinical Pharmacist plays a major role in hospital by providing services such as patient education, Disease counselling, assessment of risk factors and detection of CKD in early stages. Increase in the dialysis centres & Creating the awareness in the public and health care workers may decrease the prevalence, economic burden, hospital stay and reduce the disease progression therefore improve quality of life among CKD patients.

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