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Research Article

Etiology and clinico-social profile of chronic kidney disease cases admitted to a dialysis unit in a rural tertiary care hospital

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Abstract: Chronic kidney disease is an emerging public health global problem, and the incidence as well as prevalence of the disease is on the rise. Clinico-social profile, etiology, associated risk factors and financial burden due to the disease were studied among 50 patients reporting to dialysis unit of a tertiary hospital in rural settings. The study revealed that diabetes, hypertension and analgesic nephropathy are responsible for 92% of the cases. In addition, considerable financial burden on the patients and families due to medical and non-medical costs of the disease management was brought out by the study. The authors recommend that CKD should be included in national programme for prevention and control of non-communicable diseases so that the disease is detected early and comprehensive management to the patients is ensured to prevent progression of disease, disability, handicap and premature death.
Keywords: CKD, disability, handicap.

INTRODUCTION

Chronic Kidney Disease (CKD) is emerging as an important public health problem, not only in developed countries, but also in developing countries including India [1]. Reasons for rising incidence of CKD are increasing incidence of diabetes and hypertension, although improving life-expectancy, better diagnostic facilities and treatment modalities are also playing their role by increasing the prevalence [2, 3]. WHO has identified kidney diseases as 12th and 17th major cause of death and disability worldwide, respectively [4]. It is estimated that approximately one million lives are lost every year globally due to CKD, up from 4 lakhs in 1990 [5]. US Centers for Disease Control and Prevention estimates that 16.8% of US adults aged 20 or more are suffering from CKD [6]. A recent study estimated that age-adjusted incidence rate of CKD in India is 229 per million populations, and more than 100,000 new patients enter renal replacement programme every year in India [7, 8]. The importance and impact of CKD should not be measured only in numbers, as its huge social and economic impact on the individuals, families and society cannot be ignored.

The studies on the prevalence of CKD among rural populations of India are scanty. The Indian CKD registry is purely voluntary and thus, only a small proportion of the population suffering from CKD is being captured. Moreover, there are minimal studies which have been conducted regarding the financial burden of CKD in rural India.

This study, conducted in a tertiary hospital established in rural settings attempts to study the socio-demographical profile of the CKD patients, causal and risk factors associated with the disease, and economic burden of the disease on the family and the society.

MATERIALS AND METHODS

Study Setting: Hospital based study conducted in a rural tertiary care hospital (Kamineni Institute of Medical Sciences (KIMS), Narketpally, Telangana).

Study Period: June to August 2014.

Study Design: Case series study.

Sample Frame and Sampling Technique: Patients reporting to dialysis unit of KIMS, Narketpally during the study period. Out of these, all patients who met the inclusion and exclusion criteria were included in the study.

Inclusion Criteria: CKD patients above 18 years of age on renal dialysis, and willing to participate in the study.

Exclusion Criteria: Those below 18 years of age; those who did not give informed consent, or had severe cognitive, speech or hearing defect.

Study Instrument, Data Collection, and Analysis

Personal particulars, socio-demographic and clinical data that included present, past, family, drug and treatment history, general and systemic examination and laboratory investigations were obtained by history taking, clinical examination and case records. Glomerular Filtration Rate (GFR) was calculated utilizing Cockcroft-Gault formula to stage CKD. Modified BG Prasad's classification was used to classify socio-economic status. The expenditure on management of CKD was divided into medical costs (costs of medication, surgeries, lab investigations, average cost of hospital stay and treatment costs of associated co-morbidities), and non-medical costs (cost of transportation, food and any extra care). Cost of dialysis has not been included in the direct medical cost calculation, as 49 out of 50 patients were being reimbursed through social security schemes. The data was collected on a pilot-tested structured questionnaire. Data was compiled on WINDOWS Excel spreadsheet, and analyzed using SPSS ver 19.

Ethical Clearance

Approval of Institutional Ethics Committee was obtained prior to start of the study. Informed consents were obtained from the patients.

RESULTS

A total of 50 patients of CKD admitted in a tertiary care hemo dialysis unit were studied. The socio-demographic profile of the study subjects is tabulated in Table 1.

Table-1: Socio-demographic Profile of CKD Patients

Socio-demographic Characteristics	Groups	Number of CKD patients (n=50)	Percentage
Age	21-40	7	14
	41-60	31	62
	61-80	12	24
Sex	Males	36	72
	Females	14	28
Education Status	No formal education	34	68
	Primary	10	20
	Secondary	6	12
Social Class Modified BG Prasad's Classification	Upper middle	43	86
	Lower middle	**7**	14
Employment Status	Unemployed	44	88.0
	Employed	6	12.0

Clinical and Laboratory Aspects:

The clinical staging of CKD patients is shown in Table 2, while Table 3 depicts the clinical f**ea**tures and laboratory findings of the patients.

Table 3 illustrates that decreased urine output was the commonest complaint, present in 54% of cases, followed by shortness of breath (48%), and swelling of feet (30%). Anuria and fever were complained by 8% and 4% patients, respectively. Clinical examination revealed that pallor was the commonest clinical sign, present in 92% of the cases, while 52% presented with pedal edema. Anaemia (based on WHO definition) was present in all patients. The mean hemoglobin level was 7.52 +1.20 mg/dl, a finding corroborating the clinical presentation of pallor as the most common sign. Normocytic normochromic anemia (68%) was more common than microcytic hypochromic type which was detected in 16 patients (32%). Mean creatinine values was 7.48 + 2.26 mg/dL.

Table-2: Distribution of CKD patients according to Stage of kidney Failure

Stage	**Number of patients (n=50)**	**Percentage (%)**
III	3	6
IV	36	72
V	11	22

Table 3: Distribution of patients according to Clinical and Laboratory Findings

Clinical and Laboratory findings	**Symptom/sign/laboratory test**		**Number of patients with the symptom (N= 50)**	**Percentage**
Symptomology	Decreased urine output		27	54
	Shortness of breath		24	48
	Swelling of feet		15	30
	Puffiness face		5	10
	Anuria		4	8
	Fever		2	4
Clinical Sign	Pallor		46	92
	Pedal edema		26	52
Laboratory findings	Haemoglobin gms/dL	5-6.9	16	32
		7-9	30	60
		9-11	4	8
	Type of anaemia	Normocytic Normochromic	34	68
		Microcytic hypochromic	16	32
	Creatinine Levels mg/dL (prior to dialysis)	4-7	25	50
		7.1-10	17	34
		10.1-13	8	16

Note- The total number of patients and percentage exceed n and 100%, respectively due to multiple symptoms and signs in some patients.

Table 4: Distribution of CKD patients as per Causal and Risk Factors

Etiological & Behavioural Factors associated with CKD	**Number of patients (n=50)**	**Percent (%)**
Etiological Factors		
Diabetes Mellitus	20	40
Hypertension	16	32
Analgesic Nephropathy	10	20
Familial	1	2
Nephrolithiasis	1	2
Polycystic Kidney Disease	1	2
Unknown	1	2
Behavioural Risk Factors		
Alcohol	13	26
Smoking	11	22
Obesity	3	6

The study revealed that diabetes was the most common (40%) etiological agent for CKD, followed by hypertension (32%). Analgesics accounted for 20% of total cases while other causes e.g. familial, PCKD and nephrolithiasis were responsible for 6% of cases. In one case, the causative factor could not be identified. Chronic and excessive alcohol consumption, smoking and obesity were identified as additional risk factors, and were present in 26%, 22% and 6% of patients, respectively.

Financial Aspects associated with Management of CKD

CKD is a chronic disease that requires lifelong management. The authors attempted to study the medical and non-medical expenses related with management of CKD among rural patients reporting for dialysis itute. The economic aspects of CKD are summarized in Table 5.

Table 5: Economic Implications Associated with CKD

Economic Aspects		Frequency n=50	Percentage
Source of payment for dialysis	Arogya Sri	48	96
	CGHS	1	2
	Out of Pocket	1	2
Average Monthly Expenditure (Medical) (Rs)	4,000-5,000	21	42
	5,001-6,000	20	40
	6,001-7,000	9	18
Average Monthly Non-Medical Cost (Rs)	500-1000	9	18
	1001-1500	40	80
	1501-2000	1	2

Arogya Sri is a social welfare program of Govt. of Telangana that reimburses cost of dialysis (and approximately 1,000 other medical procedures) to BPL families. As shown, 96% of patients were getting re-imbursement of their dialysis expenditure under this scheme, while one patient was receiving compensation through CGHS. In spite of above, 58% of patients were spending more than Rs 5,000/- per month (mean expenditure Rs 5280.9 + 650.1) towards direct medical cost. Similarly, 82% of the patients were incurring additional monthly expenditure of more than Rs 1,000 (mean 1170.8 Rs+ 211.1) towards travel and other incidental expenditure associated with management of disease. It is pertinent to add that loss of pay has not been was not included in the above figures, and 88% of study subjects were not gainfully employed.

Knowledge regarding the Disease Causation

Figure 1 shows that 62% of the patients were unaware of the causative factor for their disease. Drugs, hypertension, diabetes, kidney stones, alcohol, smoking and familial were mentioned as likely causes only by minority of patients.

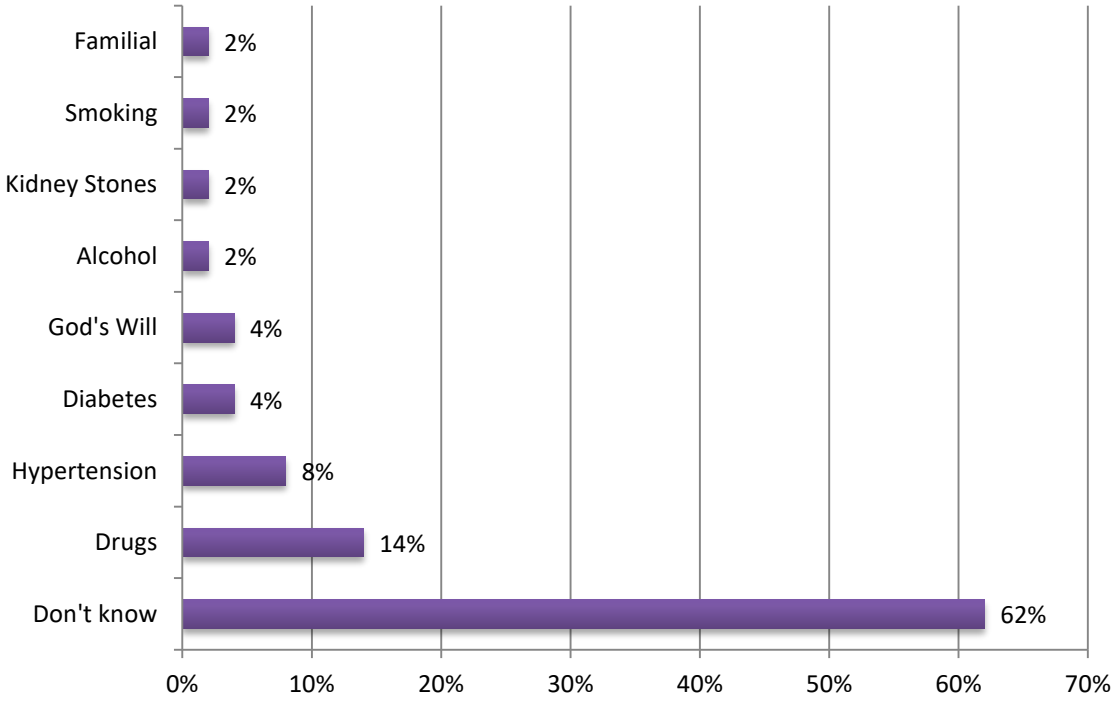

Fig-1: Knowledge regarding the cause/ risk factors of CKD

DISCUSSION

The majority of the patients (56%) in this study were more than 50 years of age (mean 53.4 + 11.5 years). This finding of the study is in agreement with results of studies conducted by Jungers *et al*. and Mittal *et al.* [9, 10]. However, Sardenberg *et al.;* indicated the mean age of renal failure to be 66 [11]. The higher mean age of patients in developed countries is most likely due to better medical management, increasing the life expectancy of CKD patients.

Sex

This study indicates that prevalence of renal failure is higher in males (72% vs. 28%). Jungers et al.; also reported that renal failure was twice as high in males than in females up to 75 years, and three times

higher in patients > 75 years [9]. The difference of prevalence between two genders may be due to higher prevalence of risk factors among males.

Socio Economic Status:

Forty three out of 50 patients (86%) in this study belonged to Social Class III, while the remaining (14%) were in Social Class IV (modified BG Prasad's classification). Low socio-economic status plays an independent risk factor for the progression of CKD. This was supported by Ejerbald *et al*.; study which illustrated that, in families with unskilled workers, the risk of chronic renal failure was increased by 110% comparative to subjects living in families in which at least one member was a professional [12].

Occupation

In present study, 88% of patients were unemployed, which is likely to be the consequence of the disease. This obviously led to additional financial burden on the family and society, considering that majority of the patients were males and in economically productive age-groups.

Education

Most of the patients in this study (68%) had received no formal education. These individuals are usually in the bottom tier of the society and unaware of the causative and risk factors of the disease. They also report late to health care system due to ignorance, poverty or both. These observations imply that CKD would affect more, the uneducated that usually do not have adequate information about disease and its risk factors. This brings up the issue of awareness among the population.

Knowledge

This study indicates that 62% of the patients have no idea as to what might have caused their renal failure. Studies, conducted by Waterman et al and White et al also showed low levels of awareness regarding hypertension and diabetes as risk factors for CKD among the study subjects [13, 14]. These values, were however higher than the levels detected in this study. This may be due to the higher education status in the West. Thus, it can be hypothesized that low awareness automatically leads to late reporting of cases to health care system, causing delays in diagnosis, increased morbidity and premature mortality.

Staging of CKD Cases

The present study illustrates that 72% of the individuals were suffering from stage IV kidney failure. The fact that 72% of the individuals in this study are in stage IV and only 6% in stage III and none in stage I and II may be due to the fact that this is a hospital based study and the individuals undergoing dialysis are usually in the end stages of renal failure.

Clinical and Laboratory Aspects

Decreased urine output or oliguria, shortness of breath and pedal edema and pallor were the most common presentations seen in CKD patients. A study by Talwar et al.; also found that pallor (present in 94%) and pedal edema (96%) were the commonest signs seen in CKD cases. The laboratory findings of present study have been compared with other studies in Table 6 below.

Table 6: Comparison of Laboratory Parameters

		Present study	Talwar et al.; [15]	Afshar et al.; [16]
Type of Anemia	Normocytic normochromic	68%	30%	-
	Microcytic hypochromic	32%	60%	-
Hemoglobin Levels (mean in g/dl)		7.52	7.1	<10
Creatinine Levels (mean in mg/dl)		7.48	-	>10

The mean Haemoglobin level in this study was 7.52 g/dl, which corroborates well with the study by Talwar et al.; The mean creatinine value in this study was 7.48 mg/dl.

Etiology

In this study, diabetes mellitus was the commonest cause (40%) of renal failure followed by hypertension (32%) and analgesic nephropathy (20%). Other causes were nephrolithiasis (2%), familial (2%), polycystic kidney disease (2%), and unknown (2%). The studies by Modi *et al.* Mittal *et al.* Talwar *et al.* and Afshar et al all supported the findings of this study as diabetes mellitus being the most common cause of renal failure [7,10,15,16]. However Elsharif *et al.* reported hypertension as the major cause [17]. Analgesic nephropathy accounted for 20% of the patients in this study. Segal et al. and Gooch et al, both illustrated decline in the renal function in populations with high NSAID usage [18, 19].

Smoking Alcohol and Obesity

22% of the individuals in this study were smokers. This finding of the study is collaborated by studies by Sawicki *et al*. also reported association of smoking with renal failure [20], In this study, it was found that 26% of the individuals were regular alcoholics. Menon *et al.* also illustrated that 52% of CKD patients had history of excessive alcohol consumption [21]. Six percent of the patients in this study were obese with BMI > 30. In studies conducted by Nomura et al, prevalence of obesity with CKD was found to be higher than in those without CKD in both genders [22].

Financial Aspects

The study revealed that, although the cost of dialysis was being reimbursed to 98% of patients through social security schemes, the out of pocket burden due to medical and non-medical costs, and inability of the patients to get an economically gainful employment cause tremendous financial hardship to the family. Seventy five percent of the patients receiving reimbursement through Aarogya Sri stated that without this aid, they would not have been able to afford dialysis, and most probably would have discontinued the treatment. A study by Kher found that 60% of hemodialysis patients were being lost to follow up within 3 months unaffordable costs [23]. Abraham *et al.;* also illustrated that hemodialysis cost in developing countries is about five times more than in developed countries [24]. This may be the reason for frequent dropout and poor prognosis of CKD patients in developing countries, and highlights the need for provision of dialysis units in all district hospitals.

Limitations of study

This was a hospital-based study and the findings cannot be generalized to the population. Secondly, etiology of renal failure was based on clinical-laboratory findings. Renal biopsy would provide more accurate indication of etiology, but was not done in any of the case. A multicentre study with larger sample size is recommended to validate the results.

CONCLUSION

The study reveals that CKD is an important public health problem in rural India mainly affecting adult males. The chief etiological factors of the disease are diabetes mellitus, hypertension and analgesic nephropathy. Insidious onset and asymptomatic progression dictate that renal complication of these diseases is detected late in the natural history of the diseases, thus increasing disability premature mortality, and considerable financial burden on families and society. The authors recommend that the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular disease and Stroke should consider including CKD in its domain. Screening programs for early detection of risk factors of CKD (primordial prevention), health education (primary prevention), early detection of disease (secondary prevention) and establishment of dialysis units in all district hospitals (tertiary prevention) will go a long way in ensuring that the incidence of the disease decreases, and patients of CKD are treated timely and as close to community as feasible to ensure longevity and social, medical and vocational rehabilitation of CKD cases. As the medical management of CKD is costly and prolonged, social security schemes are essential if the nation wants to ensure an affordable, acceptable and effective health care for all citizens.

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