

## The Pattern of Chronic Kidney Disease in Rural India.

Vijay Kumar Binwal<sup>1</sup>, Dilip Ahir<sup>2</sup>, Thabish Syed<sup>2</sup>, Vikaskumar Patel<sup>2</sup>, Meenakshi Rana<sup>2</sup>, Zara Wani<sup>3</sup>

<sup>1</sup>Assistant Professor, Dept of Nephrology, NIMS, Jaipur.

<sup>2</sup>Resident, Dept of medicine, NIMS, Jaipur.

<sup>3</sup>Resident, Dept of Anaesthesia, NIMS, Jaipur.

Received: July 2017

Accepted: July 2017

**Copyright:** © the author(s), publisher. It is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

**Background:** Aims: Future prediction of Chronic Kidney Disease (CKD) patients in rural India based on 2 year observation study of patients attending nephrology department in National Institute of Medical Sciences, Shobha Nagar, Jaipur, Rajasthan, India. **Methods:** This is a 2-year retrospective survey conducted at NIMS Medical College and Hospital- a tertiary hospital in rural area close to Jaipur. All End Stage Renal Disease (ESRD) patients attending nephrology department for dialysis were studied to know the pattern of CKD-ESRD in rural India. **Result:** A total of 100 CKD-ESRD patients attended to dialysis unit of nephrology department between Jan 2014-Jan 2016, out of which 32 died (P=0.0026;highly significant), 10 changed the dialysis centre, 7 underwent successful Renal transplantation, 8 were on continuous ambulatory peritoneal dialysis (CAPD) and remaining 43 were on regular maintenance hemodialysis. **Conclusion:** Increased mortality in CKD-ESRD patients is due to poor compliance related to financial limitations.

**Keywords:** Chronic Kidney Disease, End Stage Renal Disease, continuous ambulatory peritoneal dialysis, renal replacement therapy, renal transplantation.

### INTRODUCTION

Chronic Renal Failure is generally considered as the disease of old age, especially in patients with long standing diabetes mellitus and hypertension,<sup>[1]</sup> whereas in children and young adults it is due to Glomerulonephritis, interstitial nephritis, obstructive uropathy.<sup>[2]</sup> Complications like uremic pericarditis, cardiac tamponade, seizures, intracranial bleeding are considered as a dangerous in a patients with chronic renal failure.<sup>[3]</sup>

Numbers of prevalent CKD patients will continue to rise, reflecting the growing elderly population and increasing numbers of patients with diabetes and hypertension. This rise is a problem of concern in a developing country like India whose health care and public sector economy is limited.<sup>[9]</sup> The epidemiology of CKD in India is very different from the West. Patients are roughly two decades younger, and a substantial proportion present with small kidneys, so the etiology of CKD is unclear.<sup>4</sup> In addition to that, there is substantial rise in CKD cases from rural areas thus narrowing the gap

Between urban and rural area prevalence of CKD.<sup>[10,11]</sup> As numbers of CKD patients in rural areas increase, primary care practitioners will be confronted with management of the complex medical problems unique to patients with chronic renal impairment due to unavailability of super speciality services and infrastructure at ground level. The nephrologist rarely manages the medical needs of CKD patients in rural areas.

CKD is defined as the presence of kidney damage, 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.<sup>[5]</sup> Practical approach in the office is to estimate GFR (estimated GFR or eGFR) from the serum creatinine concentration, using Cockcroft-Gault method. Estimated GFR <15ml/min/1.73m<sup>2</sup> is considered as ESRD which needs renal replacement therapy for survival which may be either continuous ambulatory peritoneal dialysis (CAPD) or maintenance hemodialysis (MHD) or Renal Transplantation(RT). Chronic Renal Failure is a disease which needs proper understanding by the family members. Illiteracy, poor follow-up, non-compliance to dialysis, denial of transplantation are common annoy in rural areas thus leading to increased morbidity and mortality.<sup>[6]</sup>

#### Name & Address of Corresponding Author

Dr. Dilip Ahir  
Resident,  
Dept of medicine,  
NIMS,  
Jaipur.

## MATERIALS AND METHODS

This is a 2 year retrospective survey conducted at NIMS Medical College and Hospital- a tertiary hospital in rural area which is close to Jaipur. All End Stage Renal disease (ESRD) patients attending nephrology department were studied. A total of 100 CKD-ESRD patients attended to nephrology department between January 2014-January 2016, the youngest being 10 year old and the oldest being 75 year old. Investigations like complete hemogram, blood urea, serum creatinine, serum electrolytes, serum calcium, serum phosphorus, parathyroid hormone levels and abdominal sonogram for kidney size/echotexture were done in this study. Staging of CKD is done through Cockcroft-Gault method.

## RESULTS

In our study of 100 patients, 61(61%) were males and 39(39%) were females. The mean  $\pm$  SD age of all participants was  $42.5601 \pm 14.97298$  years (range 10–75 years). Etiology of 100 CKD patients in our region is given in [Table 1], with diabetes being most common (40%).

Out of these 100 patients, 32 died, 10 changed the dialysis centre, 7 underwent successful renal transplantation, 8 were on continuous ambulatory peritoneal dialysis (CAPD) and remaining 43 were on regular maintenance hemodialysis- three sessions per week, each session lasting for 4-6 hours. ( $P < 0.0001$ ; very highly significant).

[Table 2]

[Figure 1]

Among 32 patients died, 8 patients were those who stopped access to dialysis facility completely and 16 were those who use to undergo haphazard dialysis (less than two sessions per week, under dialysed-presenting with fluid overload, acidosis etc..) due to poverty, influence of quacks, relying on non-evidence based medicine (homeopathy, ayurvedic, herbal- [Figure 1] where as 7 died due to other diseases like cardiac illness, refractory hypertension, sepsis, fistula failures etc., and only 1 died during dialysis due to sudden hypotension. ( $P$  value=0.0026; highly significant). [Table 3]

Among cause of death, pulmonary edema due to fluid overload is commonest (43.75%) followed by acute myocardial infarction (25%) and hemorrhagic shock due to uremic gastritis(3.12%) is least. [Table 4] 10 patients changed dialysis centre due to long distance of travel, however they were doing good with regular hemodialysis with monthly nephrology consultation in our hospital.

8 patients were on CAPD at home, 7 underwent successful renal transplantation (4 in our hospital, 3 outside). The remaining 43 were on regular MHD in our hospital without any problematic events. Patients who were in regular consultation with nephrology

department lived better quality of life. Results were calculated by manually applied chi-square test.

**Table 1: Etiology of Chronic kidney disease.**

Etiology	Number of patients
Diabetes mellitus	40
Not otherwise specified	17
Hypertension	12
Obstructive uropathy	10
Chronic glomerulonephritis	9
Chronic interstitial nephritis	8
Adult polycystic kidney diseases	4

**Table 2:**

Observations	No. of patients	% of patients	X2 value
No. of death	32	32%	7.2
Changed dialysis centre	10	10%	5
Renal transplantation	7	7%	8.45
Continuous Ambulatory Peritoneal Dialysis (CAPD)	8	8%	7.2
On maintenance hemodialysis	43	43%	26.45

Total no. of patients n=100

Total chi-square X2 value is 54.3

Two tailed P value  $< 0.0001$ ; which is very highly significant.

**Table 3:**

Reason of death	No. of patients	% of patients	X2 value
Completely stopped dialysis	8	32%	0
Irregular maintenance hemodialysis	16	50%	8
Other diseases	7	21.875%	0.125
During dialysis	1	3.125%	6.125

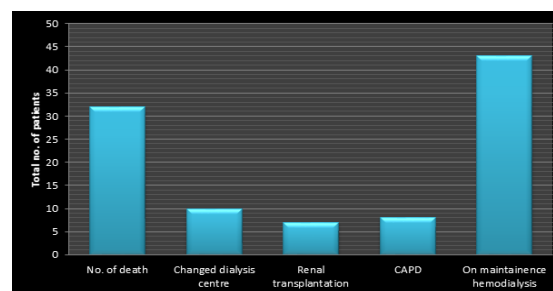
Total no. of death (n=32)

Total chisquare X2 value is 14.25

Two tailed P value is 0.0026; which is highly significant.

**Table 4: Probable etiology of death in a CKD patients.**

Cause of death	n(%)
Pulmonary Edema	14(43.75%)
Acute myocardial infarction-cardiogenic shock	8(25%)
Arrhythmias( VF,VT,PEA)	3(9.3%)
Septic shock	6(18.75%)
Hemorrhagic Shock	1(3.12%)
Total	32(100%)



**Figure 1:**

## DISCUSSION

National Health and Nutrition Examination Survey (NHANES) data showed that over the last decade (from 1994 to 2004) prevalence of CKD increased from 14.5 % to 16.8% (15% rise). Stage wise prevalence is stage 1- 5.7%, stage 2- 5.4%, stage 3- 5.4%, stage 4/5- 0.4%.<sup>[7]</sup> Mani, working in Chennai, South India, estimated a prevalence of chronic renal failure of 0.16 per cent in the community in 2003; applying the Modification in Diet in Renal Disease (MDRD) equation for GFR estimation in 2005, 0.86 per cent were found to have a GFR <80ml/min/1.73m<sup>2</sup>.<sup>[8]</sup>

In our study of 100 patients, 61% were males and 39% were females. This prevalence almost matches with previous studies by Singh et al (55.1% males and 44.9% females).<sup>[9]</sup> The mean  $\pm$  SD age of all participants was 42.5601  $\pm$  14.97298 years. This is in line with Singh et al (45.22  $\pm$  15.2 years) and Anupama et al (39.88  $\pm$  15.87 years).<sup>[9,11]</sup>

Diabetic nephropathy (40%) is the most common etiology in our patients which is also the most common cause of CKD all over the world and India.<sup>[14]</sup> The second most common cause is idiopathic/not otherwise specified/unknown (17%), this could probably be due to relying on non-evidence based medicine, indigenous drug abuse whose usage is more rural areas. This is well supported by Almaguer M et al who did his work on unknown cause of CKD in rural areas of Andhra Pradesh state in India.<sup>[15]</sup>

In our study, among 32 patients died, 8 patients (25%) were those who stopped access to dialysis facility completely and 16 (50%) were those who use to undergo haphazard dialysis (less than two sessions per week, under dialysed- presenting with fluid overload, acidosis etc.) due to poverty, influence of quacks, relying on non-evidence based medicine (homeopathy, ayurvedic, herbal- Image-1). So, 75% of deaths in rural areas were related to illiteracy, lack of awareness, affordability. These reasons were highlighted previously by Mani M K in 1992<sup>[12]</sup> and Sharma et al in 2000.<sup>[13]</sup>

The only way of prolonging life in Stage 5- ESRD is renal replacement therapy. But the monthly cost of hemodialysis/ peritoneal dialysis is around 20,000 INR (Indian National Rupee). Renal transplantation costs around 1-2 lakhs in government facility and 5-8 lakhs in a private facility, besides this cost of immunosuppression is around 10,000 INR/month. An average Indian, even an upper middle class can't afford this. The worst part is there is maldistribution of these facilities with most of the facilities/nephrology consultation exists in bigger cities. Thus CKD-ESRD had become sorrow for rural population in India.

Generally in India, CAPD is advised in old age (>60-65yrs),<sup>[16]</sup> people living in remote areas limited to primary health centre services who can't attend to

dialysis centers regularly. Hemodialysis(HD) is mode of renal replacement in majority of patients. Renal transplantation which is the best renal replacement is still limited in only major cities. However with increasing awareness, the direction of CKD in rural India is holding promise but still needs lot of improvement.

## CONCLUSION

75% of CKD-ESRD deaths in rural areas were due to poor compliance of renal replacement therapy because of financial limitations, illiteracy, false counselling by quacks. Among these the most common cause of death is pulmonary edema(43.75%) which was seen in patients who wished to continue medical management instead of hemodialysis. Patients on proper renal replacement therapy showed good quality of life during their illness, however best among them were patients who underwent renal transplant. Hence, failing to take proper treatment in proper time increases mortality in CKD patients.

### Limitations

Chronic illness like CKD should involve large number of patients and prolong follow up right from the beginning of CRF till death of patients to extract proper information which is lagging in our study.

## REFERENCES

1. Quiroga B, Arroyo D, de Arriba G. Present and future in treatment of diabetic kidney disease. *J Diabetes Res*. 2015;2015:801348. Epub 2015
2. Roth KS, Koo Hp, Spottswood SE, Chan JC. Obstructive uropathy: an important cause of chronic renal failure in children. *Clin Pediatr (Phila)*. 2002 ;41(5):309-14.
3. Alpert MA, Ravenscraft MD. Pericardial involvement in end stage renal disease. *American Journal of the medical sciences*. 2003;325(4):228-35.
4. Rao M, Juneja R, Shirley RB, Jacob CK. Haemodialysis for end-stage renal disease in southern India - a perspective from a tertiary referral care centre. *Nephrol Dial Transplant*. 1998; 13 :2494-500.
5. Levey AS, Eckardt KU, Tsukamoto Y, et al. Definition and classification of chronic kidney disease: a position statement from Kidney Disease: Improving Global Outcomes (KDIGO) *Kidney Int*. 2005;67:2089-2100.
6. Garcia GG, Jha V. World Kidney Day 2015: CKD in disadvantaged populations. *Am J Kidney Dis*. 2015;65(3):349-353.
7. Coresh L, Byrd-Holt D, Astor BC, et al. Chronic Kidney Disease awareness, prevalence and trends among US adults, 1999-2000. *J Am Soc Nephrol*. 2005;16:180-8.
8. Mani MK. Experience with a program for prevention of chronic renal failure in India. *Kidney Int*. 2003; 94 (Suppl) : S75-8.
9. Singh AK, Youssef MK et al. Epidemiology and risk factors of chronic kidney disease in India -results from the SEEK (Screening and Early Evaluation of Kidney Disease) study. *BMC Nephrology*. 2013-14:114, DOI: 10.1186/1471-2369-14-114.
10. Varma PP. Prevalence of chronic kidney disease in India - Where are we heading? *Indian Journal of Nephrology*, 2015 May-June; 25(3):133-135.

11. Anupama YJ, Uma GJ. Prevalence of chronic kidney disease among adults in a rural community in South India: Results from the kidney disease screening (KIDS) project. *Indian J Nephrol.* 2014 Jul-Aug; 24(4): 214-221. doi: 10.4103/0971-4065.132990, PMID: PMC4119333.
12. Mani MK. Chronic renal failure in India. *Nephrol Dial Transplant.* 1993; 8: 684-689.
13. Sharma AK, Gupta R, Tolani SL, Rathi GL, Gupta HP. Evaluation of socio-economic factors in non-compliance in renal transplantation. *Transplant Proc.* 2000; 32: 1864.
14. Alam BNV, Prasad R, Vidyasagar, Gupta U. Study of etiology of chronic kidney disease in a tertiary care hospital in Kolar. *Ejpmr,* 2016;3(5):351-354.
15. Almaguer M, Herrera R, Orantes CM. Chronic kidney disease of unknown etiology in agricultural communities. *MEDICC Rev.* 2014;16:9-15.
16. Castrale C, Evans D, Verger C, Fabre E, Aguilera D, Ryckelynck JP, Lobbedez T. Peritoneal dialysis in elderly patients: report from the French Peritoneal Dialysis Registry (RDPLF). *Nephrol Dial Transplant.* 2010; 25:255-262.

**How to cite this article:** Binwal VK, Ahir D, Syed T, Patel VK, Rana M, Wani Z. The Pattern of Chronic Kidney Disease in Rural India. *Ann. Int. Med. Den. Res.* 2017; 3(5):ME54-ME57.

**Source of Support:** Nil, **Conflict of Interest:** Nil.