Analysis of spectrum of chronic kidney disease in IPD and OPD

TANU JAIN AND SEEMA JAISWAL

The health care burden due to chronic kidney disease has increased worldwide in past decade. Elucidating the spectrum of chronic kidney disease may help in identifying strategies for prevention of chronic kidney disease. So the present study was conducted in 2 tertiary care centers of Lucknow to analyze the spectrum of chronic kidney disease in IPD and OPD renal patients. 100 chronic kidney disease patients (50 from indoor patient department and 50 from outdoor patient department) of more than 15 years of age, belonging to different socio-economic status were selected and surveyed. A questionnaire-cum-interview schedule method was used which included demographic profile of patients, risk factors, severity of disease etc. The findings concluded diabetes as a most prevalent risk factor among patients of both groups, followed by hypertension and other glomerular diseases. Other diseases like urinary tract infections, chronic tubulointerstitial nephritis and CVD cause greater levels of morbidity and mortality among the population as a whole and kidney disease is important in large part because of its relationship with more common diseases. Early treatment can reduce the risk of developing more serious disease or can at least slow the rate at which the disease progresses.

Key Words : Chronic kidney disease, Risk factors, Spectrum of CKD, Symptoms of CKD, Complications of CKD

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INTRODUCTION

Kidneys play an essential role in the maintenance of normal homeostasis. A variety of diseases may affect the kidneys and lead to progressive nephron loss. Chronic kidney disease is defined as a progressive loss of renal function over a period of months or years through five stages. Each stage is a progression through an abnormally low and deteriorating glomerular filtration rate (National Kidney Foundation, 2002).

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The term "spectrum" is the graphic representation of variations in the manifestations of chronic kidney disease (Park, 2007). It contains illnesses ranging in severity from mild to severe and risk factors which gradually lead further diseases. The sequence of events in the spectrum of disease can be interrupted by early diagnosis and treatment or by preventive measure which if introduced at a particular point will prevent or retard the further development of the disease. The spectrum shows variations in IPD and OPD. So the present study was conducted to analyze the spectrum of chronic kidney disease and associated risk factors in IPD and OPD renal patients.

METHODOLOGY

The study was conducted at in and out patient wards

of two tertiary care centers of Lucknow. A sample of 100 chronic kidney disease patients (50 from IPD and 50 from OPD) undergoing treatment, were randomly selected. A detailed questionnaire was developed to elicit data on demographic profile, previous health and medical history, morbidity pattern and severity of disease. Clinical and biochemical information was used to determine the risk factors of CKD. Severity of disease was observed with the help of stages of CKD provided by National kidney Foundation (2002) (Table A).

Table A : Stages of chronic kidney disease		
Stage	Description	Glomerular filtration rate (GFR) (ml/min/1.73m^2)
1.	Kidney damage with normal or increased GFR	$\geq$90
2.	Kidney damage with mild decreased GFR	60-89
3.	Moderate decreased GFR	30-59
4.	Severe decreased GFR	15-29
5.	Kidney failure	<15 or Dialysis

National Kidney foundation (2002)

Serum creatinine level (S_{Cr}) (mg./dL.) of CKD subjects was obtained from medical reports and kidney function (eGFR) was estimated by using Cockcroft-Gault Equation (Cockcroft and Gault, 1976), mentioned below:

$$Ccr = \frac{[140 - age\,(yr)\,x\,total\,body\,weight\,(kg)\,x\,\dagger}{72\,x\,Scr}$$

$\dagger$F = factor (F=1 for male, 0.85 for female)

OBSERVATIONS AND ASSESSMENT

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Demographic profile :

The demographic profile of chronic kidney disease patients has been presented in Table 1. Among 100 patients interviewed, 50 were from IPD and 50 were from OPD. Among IPD patients, majority of patients (54%) were males, while only 46 per cent were females. Same results were found in OPD where 64 per cent were males and the rest were females (36%). The study of Singh *et al.* (2013) supported these results. Among both categories, maximum patients belonged to the age group of 45-60 years. A study conducted by Minutolo *et al.* (2007) also proved that CKD prevalence is greater among older persons and among persons with diabetes, hypertension and CVD. The table portrays that more than half of the IPD as well as OPD subjects had qualification of graduation and above graduation (56% vs. 60%). Only 4 per cent patients were illiterate in IPD and no illiterate was found in OPD. Majority of patients were non-vegetarian (46% in IPD and 42% in OPD). 34 per cent of subjects of IPD as well as OPD were vegetarian. Only a few (20% vs. 24%) were taking lacto-ovo vegetarian diet. Mean protein intake of non-vegetarians goes quite high and kidney has to perform extra work. This result is consistent to the report of Viswanathan *et al.* (2002). Majority of patients belonged to low income group (36%) followed by middle and high income group (32% and 32%, respectively) in IPD while in OPD 38 per cent subjects belonged to high income group. Most of the patients had medium sized family in both groups (70% in IPD and 62% in OPD).

Table 1 : Demographic profile of chronic kidney disease patients
n=100 (50+50)

Characteristics	IPD		OPD	
	F	%	F	%
Gender				
Male	27	54	32	64
Female	23	46	18	36
Age (years)				
15-30	6	12	2	4
30-45	12	24	10	20
45-60	24	48	22	44
>60	8	16	16	32
Education				
Illiterate	2	4	0	0
Primary	5	10	5	10
High school	9	18	7	14
Pre-university	6	12	8	16
College and above	28	56	30	60
Food habit				
Vegetarian	17	34	17	34
Non-vegetarian	23	46	21	42
Ovo-lacto vegetarian	10	20	12	24
Socio-economic status				
LIG	18	36	17	34
MIG	16	32	14	28
HIG	16	32	19	38
Family size				
Small (<4)	14	28	14	28
Medium (4-8)	35	70	31	62
Large (>8)	1	2	5	10

Spectrum of disease :

A perusal of Table 2 and Fig. 1 revealed that diabetes mellitus was the most prevalent risk factor among both groups (28% in IPD and 32% in OPD). Hypertension was more pre-existing in IPD (28%) as compared to OPD (16%). Majority of patients (28%) in IPD and only 10 per cent patients in OPD were suffering from glomerulonephritis. It was observed that polycystic kidney disease was prevalent in only 8 per cent of IPD subjects, followed by chronic tubulointerstitial nephritis (6%), cardiovascular disease (6%) and urinary tract infection (4%). Only 2 per cent of subjects were suffering from chronic obstructive nephropathy, while in OPD subjects, urinary tract infection was found in 12 per cent of subjects, followed by renal stone (6%) and polycystic kidney disease (6%). No one was found with chronic obstructive nephropathy in OPD. The most common risk factor for CKD is diabetes mellitus, followed by hypertension and glomerulonephritis. The pathogenesis of diabetes mellitus may be genetic or due to some metabolic error. Hypertension causes destruction of glomeruli and glomerular diseases are the results of infections. The pathogenesis of diabetic nephropathy is undoubtedly multifactorial and includes level of glycemic control, genetic predisposition and race. Hypertension causes intraglomerular destruction. Another cause of CKD in subjects is glomerular disease which may present clinically as acute glomerulonephritis, nephritic syndrome, or hematuria, which in long run can cause chronic glomerulonephritis. Chronic tubulointerstitial nephritis is another major cause and refers to a group of disorders characterized by inflammation, cellular infiltration and fibrosis of the renal tubules and interstitium. Urinary tract infection and polycystic kidney

Table 2 : Risk factors of chronic kidney disease in the patients   n=100 (50+50)

Risk factors	IPD		OPD	
	F	%	F	%
Diabetes mellitus	14	28	16	32
Hypertension	8	16	14	28
Glomerulonephritis	14	28	5	10
Polycystic kidney disease	4	8	3	6
Renal stone	1	2	3	6
Urinary tract infection	2	4	6	12
Chronic tubulointerstitial nephritis	3	6	2	4
Chronic obstructive nephropathy	1	2	0	0
Cardiovascular disease	3	6	1	2

Percentage in IPD   n=50

Legend:
- Diabetes mellitus
- Hypertension
- Glomerulonephritis
- Polycystic kidney disease
- Renal stone
- Urinary tract infection
- Chronic tubulointerstitial nephritis
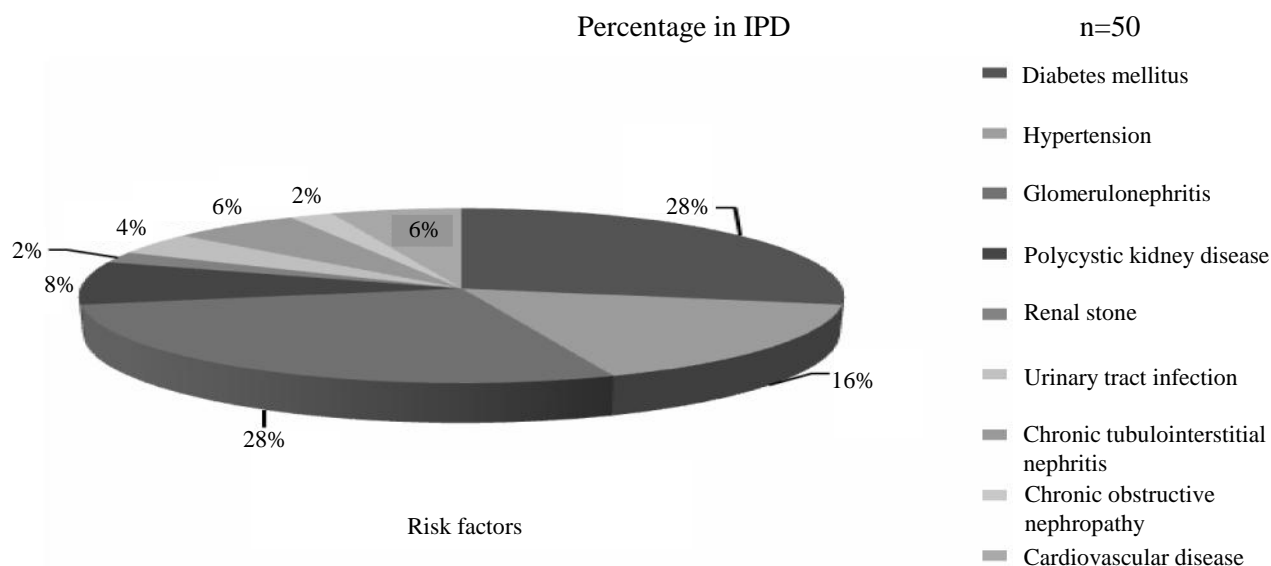- Chronic obstructive nephropathy
- Cardiovascular disease

Risk factors

Fig. 1(a) : Risk factors of CKD in IPD subjects

Percentage in OPD   n=50

- Diabetes mellitus
- Hypertension
- Glomerulonephritis
- Polycystic kidney disease
- Renal stone
- Urinary tract infection
- Chronic tubulointerstitial nephritis
- Chronic obstructive nephropathy
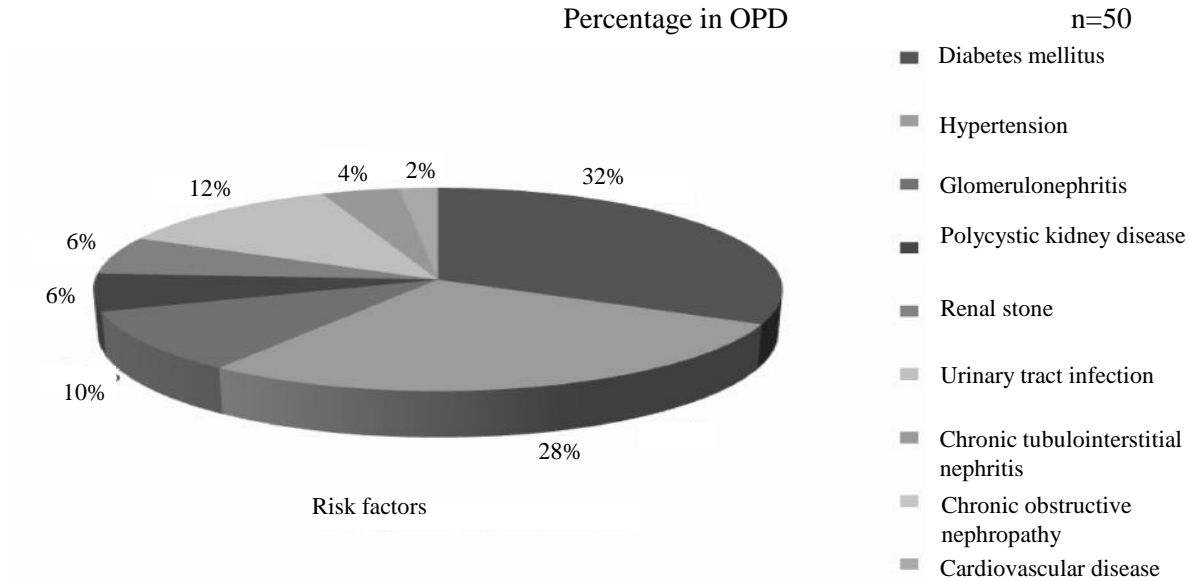- Cardiovascular disease

Fig. 1(b) : Risk factors of CKD in OPD subjects

disease that occurs due to genetic disorder have also been seen as regions of CKD. Modi and Jha (2006) stated that diabetic nephropathy is the leading cause of chronic kidney disease and end stage renal disease in India. According to Atkins (2005) diabetes followed by cardiovascular disease were the most common causes of renal failure.

Fig. 2 depicted the severity of disease, based on estimated glomerular filtration rate (eGFR). As the disease progresses, declination in GFR takes place. Maximum patients (42%) fell in stage 4 in IPD followed by stage 5 (40%). No patient was seen in stage 1, while in OPD, majority of patients belonged to stage 2 (48%) followed by stage 3 (32 %). No patient was found in stage 5. In IPD group, most of the patients required dialysis because of renal failure, while in OPD, only a few subjects needed dialysis. Kidney disease gradually progresses and through proper treatment, it can be
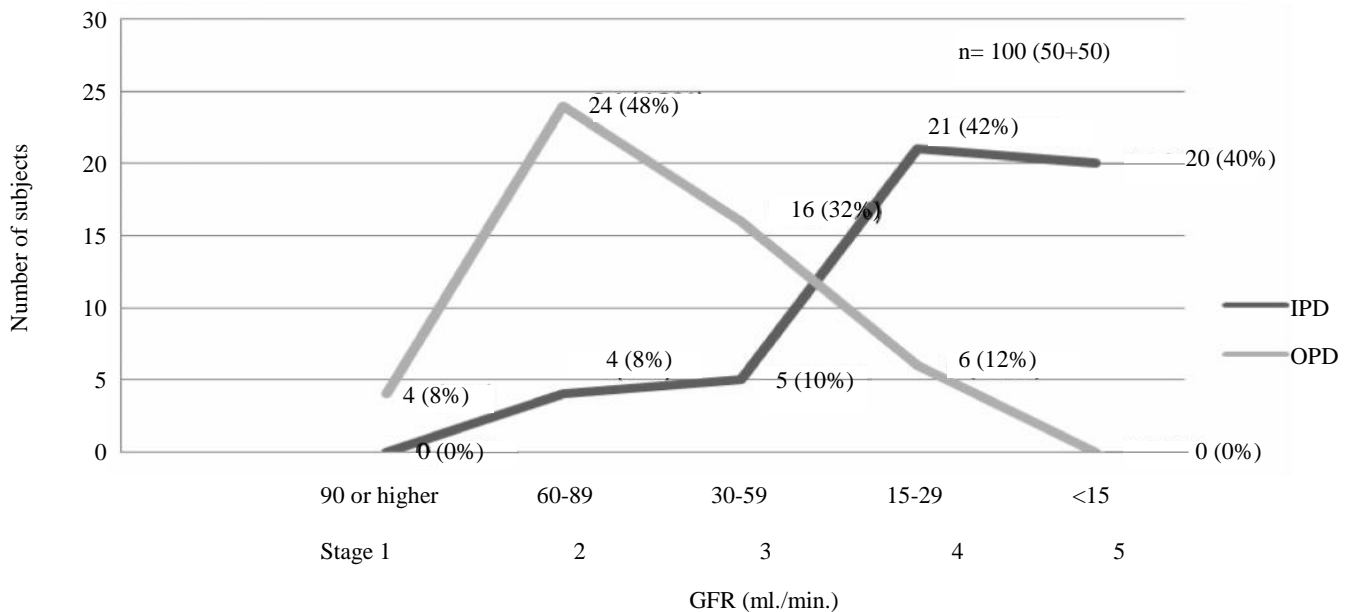

Fig. 2 : Severity of disease based on glomerular filteration rate

prevented. So only a few subjects needed dialysis in OPD. OPD patients were in better condition than IPD patients. Similarly Kent (2005); Schelling and Sedor (2004); Shah (2007) and Zalba *et al.* (2006) also worked on the related topic.

Summary and Conclusion:

A study was conducted to analyze the spectrum of chronic kidney disease in IPD and OPD. There was a trend towards more frequent pre-existing diabetes mellitus in both groups, followed by glomerular disease in IPD and hypertension in OPD. The disease spectrum ascends from OPD to IPD as majority of IPD patients fell in stage 4 and stage 5, while in OPD, majority of patients belonged to stage 2 and stage 3. The condition of IPD patients was more severe than OPD patients.

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