Research Article

PREVALENCE, RISK FACTORS, ADHERENCE AND NON ADHERENCE IN PATIENT WITH CHRONIC KIDNEY DISEASE: A PROSPECTIVE STUDY

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ABSTRACT

This prospective observational study was attempted to investigate the prevalence, risk factors, adherence and non adherence in patients with chronic kidney diseases among the people in a private hospital, Thrissur. The study was carried out in a Nephrology department over a period of 5 months from October 2012 to March 2013. During the study period, a total of 79 participants ranging from 20 to 85 years were studied. The analysis discovered that 34.18 % of the patients were hypertensive, 22.78% were diabetic and 56.96% had proteinuria. Based on Cockcroft-Gault and MDRD equations 75.23% of the participants were detected as having chronic kidney disease(CKD) and prevalence of CKD is found to be significant by these two methods (P = 0.009). Adherence to drug therapy was evaluated by the self-report method and pills count method. Medication non-adherence was lower than 5.06% and adherence was about 70.88%. The association between CKD and its risk factors like proteinuria, diabetes mellitus, hypertension, obese and overweight, was highly significant. In CKD, patient's non-adherence to medication was found to be increasing with the increase of total number of pills taken per day and drug administration by third parties. Adherence is more frequent than non-adherence over the study period.

Keywords: Chronic kidney disease, Drug adherence, prevalence, risk factors.

INTRODUCTION

Chronic kidney disease (CKD) is a life-threatening condition characterized by progressive and irreversible loss of renal function. CKD is a precursor to end-stage renal disease, is associated with increased risk of morbidity and mortality.10% of the Indian population suffers from chronic kidney diseases and this figure is expected to increase[7]. Indians are clearly at a higher risk of developing kidney diseases because of the surge in the number of patients suffering from diabetes and high blood pressure. 60% of the patients suffering from chronic kidney diseases in India are either diabetic or suffer from high blood pressure. With constant lifestyle changes amongst teens and youngsters is leading to an early onset of kidney related ailments. Consumption of fast food, sedentary way of living with little or no exercise is an important cause for the rise in cases of diabetes, hypertension, gastrointestinal and obesity in our country and this in turn has led to increasing incidence of kidney disease[7]. Minimal physical activity, unhealthy diet, smoking and drinking are some of the reasons that are resulting in an increased number of chronic kidney diseases especially among women in both rural and urban India[8].

The 'National service framework for renal services' adopted the US 'National Kidney Foundation kidney disease outcomes quality initiative' (NKF-KDOQI) classification of CKD. This classification divides CKD into five stages. Stages 3–5 may be defined by glomerular filtration rate (GFR) alone, whereas stages 1 and 2 also require the presence of persistent proteinuria, albuminuria or haematuria, or structural abnormalities [10]. GFR is calculated from serum creatinine by Cockcroft-Gault and MDRD equations. Staging of CKD is based on glomerular filtration rate.

The participants at the WHO Adherence meeting in June 2001 concluded that defining adherence as "the extent to which the patient follows medical instructions". A merged version of the definitions of Haynes and Rand, "adherence is a person's behavior concerning taking medication, following a diet, and making changes in lifestyle in accordance with medical or non-medical health professional recommendations"[11].

Non-adherence is considered to be a multidimensional phenomenon related to multiple factors, and its occurrence can adversely impact the course of the disease, particularly in cases of chronic disease. These factors are determined by the characteristics of each disease, patient's healthcare system, socioeconomic factors, treatment characteristics, and the health team who assists the patient; thus, considering patients as solely responsible for following treatment is misleading, mainly because some factors are independent of their will, particularly the occurrence of different levels of cognitive decline, treatment of asymptomatic diseases, medication side effects, no clarification about the disease, and medication cost. The methods used to assess adherence to drug therapy can be classified into direct and indirect[2].

Directly observed therapy, measurement of concentrations of a drug or its metabolite in blood or urine, and detection or measurement in blood of a biologic marker added to the drug formulation are examples of direct methods of measures of adherence[9]. Indirect methods of measurement of adherence include asking the patient about how easy it is for him or her to take prescribed medication, assessing clinical response, performing pill counts, ascertaining rates of refilling prescriptions and collecting patient questionnaires[9].

Most of the studies on kidney disease are carried out only on the prevalence and risk factors or adherence to drug therapy. The aim of the present study was to evaluate the prevalence, risk factors, adherence and non adherence in patient with chronic kidney disease.

MATERIALS AND METHODS
The study was carried out in a Nephrology department over a period of 5 months from October 2012 to March 2013. A total of 79 participants ranging from 20 to 85 years had been studied. A total of 105 patients 79 patients are chosen from that 30 were females and 49 were males.

Inclusion criteria
Patients age between 20 and 85 years irrespective of sex.
Patient diagnosed with chronic kidney diseases.

Exclusion criteria
Patients who have acute kidney disease.
Patients who did not cooperate with study.
Various variable such as age, sex, marital status, occupation, family income, literary status, body weight (in kilogram), height (in centimeter), and body mass index (BMI) = weight in kg/height in m^2 Risk factors studied were diabetes mellitus, hypertension, overweight and obesity, and proteinuria detected by multistick.

According to WHO criteria of Body mass index (BMI) patient were categorized into normal (BMI 18.5–24.9), underweight (<18.5), overweight (25.0–29.9), obese (30.0–39.9), and morbid obese (≥40.00).

We identified various coexisting illness using patient medication chart, laboratory results, self report method and patient direct interview. Patients have diabetes mellitus if previously they had been recognized by the doctor as having DM or any documents in favors of DM or they reported taking insulin or oral antidiabetic drug or random plasma glucose ≥150 mg/dl with symptom. Hypertension was defined as systolic BP ≥ 140mmHg or diastolic BP ≥ 90mmHg or use of medication for hypertension irrespective of the blood pressure.

Serum creatinine level is used to estimate the GFR (glomerular filtration rate) by using Cockcroft-Gault and MDRD (modification of diet in renal disease) equations.

1. Cockcroft-Gault equation (1976)

$$Ccr\ (mL/min) = \frac{(140 - age) \times Weight\ (Kg)}{72 \times S.\ creatinine\ (mg/dL)} \times 0.85\ if\ female$$

2. Original MDRD equations (2000)

$$GFR = 186.3 \times (S.\ creatinine)^{-1.154} \times (age)^{-0.203} \times 0.742\ (if\ female).$$

CKD staging was done according to K/DOQI guideline 2002. Stage 1 includes GFR ≥ 90 mL/min, Stage 2 includes GFR 60–89 mL/min, Stage 3 includes GFR 30–59 mL/min, Stage 4 includes GFR 15– 29 mL/min and Stage 5 includes GFR < 15 mL/min.

Adherence to drug therapy was assessed by the self-report method which consisted of the patient's information about which drugs he had taken since the last follow-up visit. Patients older than 60 years underwent the Minimental State Examination (MMSE) and, when they were found to have impaired the caregiver was invited to answer the questionnaire in the place of the patient.

Data were collected using structured questionnaire and patient case record was finalized after field testing. Software "GraphPad Instat" had been used for data processing and analysis. Test statistics used to analyze the data were "Chi-square test". P values less than 0.05 were considered significant.

RESULTS

Analysis showed that the 62.03% patients were male and 37.97% patients were females. 51.89% of the patients were middle aged (from 40-59 years of age) while the mean age was 50.11(±15.45) years. The majority of the patients were married 83.54%. Most of the patient's 86.07% were non vegetarian, 13.92% were vegetarian 16.46% were alcoholic and 22.78% were smoker (Figure 1). BMI study categorized 30.37%of the patients as normal, 31.64% as underweight, 18.98% as overweight, 17.72% as obese and 1.26% as morbidly obese. Out of 79 patients 34.18% were hypertensive, 22.78% were diabetics, 5.06% were dyslipidemia and 21.52 % of patients had combination of hypertension and diabetes (Figure 2).

Urine albumin analysis using multisticks demonstrated that 56.96 % of patients had proteinuria, of them 16.46% had"+" proteinuria, 17.6 % had "++", 20.25 % had "+++"proteinuria and 2.53% had "++++" proteinuria.

The mean eGFR by Cockcroft-Gault equation was 26.63mL/minute in males and 35.42 mL/minute in females, while the mean eGFR by MDRD equation was 24.84 mL/ minute in males and 32.09 mL/minute in females.

Stage 5 chronic kidney disease was most dominant 45.57% in Cockcroft-Gault equation and 46.83% in MDRD equation (Table 2) and the prevalence of CKD is found to be significant by these two methods (P = 0.009).

Most patients self – administered their own medication 83.54% and the average daily number of tablet 7.7± 1 were 15.15% were non adherent and 84.85% were adherent.

Middle –aged and elderly (from age 40 to 59 years) patients tends to develop CKD more than the young and early middle aged patients. The risk factors are significantly associated with hypertension, diabetes, proteinuria, food habit and smoking.

DISCUSSION

The present study conducted for "detection of chronic kidney disease and its associated risk factors and patient medication adherence to the treatment. The prevalence study was done to examine the prevalence of diabetes mellitus, hypertension, and chronic kidney disease (based on proteinuria and low GFR) and to find the association of CKD with sociodemographic and other alleged risk factors. Non-adherence to medication in chronic illness significantly increases morbidity and mortality, especially in developing countries. The measurement of non-adherence and the risk factors associated with it aim to develop interventions to improve adherence. Non-adherence to drug therapy has multifactorial origins[2].

Most studies on adherence to drug therapy in renal diseases are conducted on post-transplant patients and evaluate the percentage of non-adherence to immunosuppressants and outcomes such as death and graft loss. So far, only few studies have been published on the evaluation of adherence by patients with kidney disease not yet on dialysis, a fact that justifies the relevance of the present study[2]. Our study mainly focused for the prevalence and risk factors for chronic kidney disease and also these patients have long term medication to control the risk factors such as diabetes and hypertension so the adherence to the medication was very poor in these patients.

In the case of adherence there is no satisfactory gold standard method for assessing adherence to drug therapy, since all methods have limitations related to low sensitivity and specificity[2]. We used the self-reported method to test patients' adherence, which was applied during the patient admitted in the hospital. Since this method is easy to use and interpret, it can be incorporated into the management of patients with kidney disease.

Comparisons of results from this study with previously published reports are difficult due to the great diversity of methods used in assessing

adherence and the scarcity of publications on patients with clinical conditions similar to those of our patients.

In the present study we found that 62.03% were male and 37.97 % were female patients. Prevalence of CKD more in middle –aged and elderly (from age 40 to 59 years) patients of about 51.89%. Prevalence of CKD in the mean age was 50.11(±15.45). The previous studies such as Prevalence of CKD in the slum areas of Mirpur in Dhaka city of Bangaldesh showed that the 55% of the participants were young and early middle aged (from 15-40 years of age) while the mean age was 34.39 (±12.70) years[1]. Prevalence of CKD in Kinshasa showed that 58.1% of the participants were in the age range between 20 and 39 while the mean age was 38.6 ± 14.4[3].

We found 22.78% of the patients were diabetes, 34.18% were hypertensive, 5.06% had dyslipidimia, 21.52% had combination of DM and HTN, 1.26% had combination DM, HTN and dyslipidimia, 2.53% had combination of HTN and dyslipidimia and 6.33% had renal disease in our study. The previous population based studies had examined the prevalence of hypertension was 38.8% and diabetes 2.9% respectively[12].

Urine albumin analysis using multisticks found that 56.96% of the patient had proteinuria. The previous study had examined the prevalence of proteinuria detected by dipstick result of 7.7% of the participants had proteinuria[1].

Prevalence of CKD categorized based on MDRD equation was 46.83% of patients had stage 5 CKD. The mean eGFR in male was found to be 24.84 mL/ minute and 32.09 mL/ minute in female. Prevalence of CKD categorized based on Cockcroft-Gault equation was 45.57% of patients had stage 5CKD. The mean eGFR in male was found to be 26.63 mL/ minute and 35.42 mL/ minute. The previous study found that the mean eGFR by Cockcroft-Gault equation was 85.1 mL/minute in males and 99.2 mL/minute in females, while the mean eGFR by MDRD equation was 100.8 mL/minute in males and 133 mL/minute in females[1].

Based on Cockcroft-Gault and MDRD equations 75.23% of the participants were detected as having chronic kidney disease(CKD) and prevalence of CKD is found to be significant by these two methods (P = 0.009). Md Nurul Huda et.al studies 13.1% were identified as CKD by MDRD equation and 16% by Cockcroft- Gault equation. The prevalence of CKD did not differ significantly between the two methods[1].

Association of demographic factor with CKD showed that age >40 years was significantly prone to developing CKD compared to age <40 years. The earlier study show that the middle-aged and elderly (from 41 to 65 years) population tend to develop CKD more than the young and early middle-aged population (from 15 to 40 years of age)[1].

In this study, diabetes mellitus and hypertension were present in significant proportions in CKD group compared to combined prevalence of DM, HTN, and proteinuria.

Comparisons of results from this study with previously published reports are difficult due to the great diversity of methods used in assessing adherence and the scarcity of publications on patients with clinical conditions similar to those of our patients. The present study most patients self – administered their own medication 83.54% and the average daily number of tablet 7.7± 1 were 15.15% were non adherent and 84.85% were adherent. The previous study observed that the number of non-adherent patients increased throughout the study (up to 26.8%), but it is worth noting that the percentage of adherent patients who became non-adherent (22%) was lower than the percentage of non-adherent patients who became adherent (50%), possibly demonstrating the educational role of the interdisciplinary team in monitoring patients with CKD[2].

This study had limitations at baseline the interview to evaluate adherence to drug therapy was assessed by the self-report method. To improve the adherence to drug therapy another method such as interventional method is used which is more useful to compare the adherence drug therapy.

Table 1: Characteristics of study population

Clinical features	No of patients = 79	%
Gender		
Male	49	62.03
Female	30	37.97
Age (mean ± SD) (years)	50.11±15.45	
Age range (years)	20- 85	
20-39 (years)	18	22.78
40-59 (years)	41	51.89
60-79(years)	17	21.52
≥ 80 (years)	3	3.79
History of hypertension	18	22.78
History of diabetes	27	34.18
History of proteinuria	45	56.96
History of renal disease	5	6.33
History of over wt and obese	29	36.70
History of smoking	18	22.78
History of alcohol use	13	16.46

Table 2: Prevalence of CKD

Stages of CKD	MDRD (ml/min/1.73m^2)		Cockcroft- Gault (ml/min)	
	No of patients	%	No of patients	%
Stage 1 ≥ 90 ml/min	2	2.5	4	5.06
Stage 2 60-89 ml/min	9	11.39	7	8.86
Stage 3 30-59	15	18.98	13	16.46
Stage 4 15-29	16	20.25	19	24.05
Stage 4 < 15	37	46.83	36	45.57
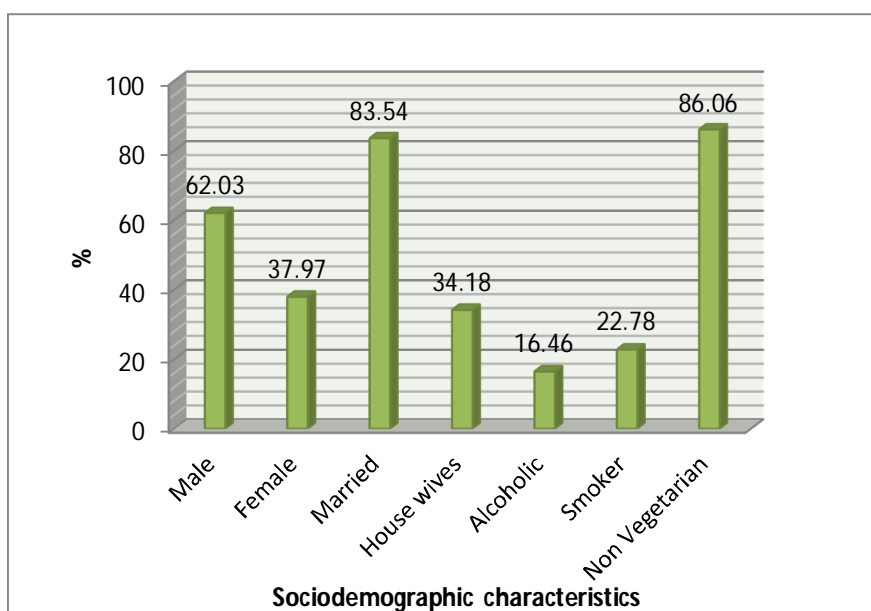
Fig. 1: Dominant sociodemographic characteristic of the patients
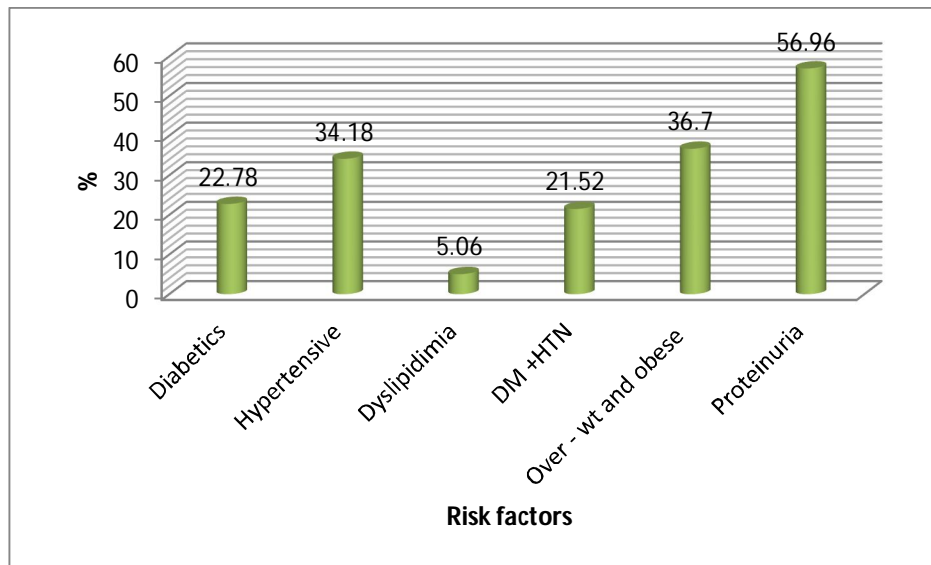
Fig. 2: Distribution of patients by risk factors: The commonest risk factors

CONCLUSION

The present study revealed that CKD is present more in the age group between 40 to 59 years of age. The commonest risk factors for CKD like DM and hypertension are also alarmingly high and obviously adding to the existing burden of CKD. The association between CKD and other risk factors like age, obese and overweight, use of tobacco, DM, and HTN was also highly significant. When more than one risk factor was present, the chance of developing CKD was extensively eminent. The adherence to drug medication was identified most patients self – administered their own medication 83.54% and the average daily number of tablet 7.7± 1 were 15.15% were non adherent and 84.85% were adherent.

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