Innovations

Epidemiological profile of Chronic Kidney Disease (CKD) in patients attending a tertiary care hospital

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Received: 14 June 2022 Accepted: 05 July 2022 Published: 15 July 2022

Abstract

Problem: *The global prevalence of Chronic Kidney Disease (CKD) is steadily increasing due to the rise in lifestyle related diseases like diabetes and hypertension. Overall the current prevalence of CKD worldwide is estimated to be 229 per million populations with more than 100,000 people entering renal replacement therapy every year.* ***Methodology:*** *The objective of this study is to understand the clinico-epidemiological profile of patients who are presenting with CKD for analysing the risk factors which will help to improve the quality of their life.* ***Findings:*** *In this study, 85 CKD patients attending a tertiary care hospital were included and a detailed history was obtained in order to study their clinico-epidemiological profile. On assessment, it was found that CKD was more prevalent in males (65.8%) and people of low socio-economic background (87%), more common in agriculture workers (70.5%), and majority were of the age group of 40-49 years (24.7%) Diabetes and hypertension were also found to be major risk factors with 44.8% having diabetes and 61.1% having hypertension.* ***Conclusion:*** *It is strongly recommended to implement more schemes to provide affordable treatment to people of low socio-economic background and agriculture workers as they form a major population of people affected with CKD.*

Keywords: 1.*CKD, 2.clinical, 3.epidemiological*

Introduction

Chronic Kidney Disease (CKD) refers to a gradual and progressive loss of kidney function which leads to End Stage Renal Disease (ESRD) (Sathyan *et al.,* 2016; Haileamlak, 2018; Hallan *et al.,* 2006). It can also be described as an anatomical or pathological lesion of the kidney lasting for duration of 3 months or more (Singh *et al.,* 2013). CKD is one of the major non communicable diseases on the rise among the present generation and is a global health problem in view of increasing number of patients, high mortality and morbidity in addition to the increased cost of treatment (Jha *et al.,* 2013; Jurkovitz *et al.,* 2008).

The occurrence of CKD in an individual is attributed to various factors such as Diabetes mellitus, hypertension, hyperlipidemia and the consumption of diet with a high salt intake (Sathyan *et al.,* 2016). The clinical course of CKD, if left untreated and undiagnosed at an early stage, leads to end stage renal disease which can be treated only by dialysis or by transplantation both of which are high cost options of therapy and therefore not feasible for countries with a lower socio-economic status and it also poses a major burden on the physical, psychological and economic conditions of the patient (Santosh and Georgi, 2013; Agarwal *et al.,* 2005).

CKD can be classified into 5 stages based on renal function which is assessed with the help of GFR (Sathyan *et al.,* 2016). Glomerular Filtration Rate (GFR) which is the rate of blood flow through the kidney is generally accepted as the best overall index of kidney function (Singh *et al.,* 2013; Levey *et al.,* 2000). Stage 1 CKD is defined as a normal GFR above 90ml/ min/ 1.73m^2. Stage 2 CKD is defined as GFR in the range of 60-89ml/ min/ 1.73m^2. Stage 3 CKD is defined as GFR in the range between 30-59ml/ min/ 1.73m^2. Stage 4 CKD is defined as GFR in the range of 15-29ml/ min/ 1.73m^2. Stage 5 CKD is defined as a GFR below 15ml/ min/ 1.73m^2 which is consistent with ESRD (Sathyan *et al.,* 2016).

Etiological diagnosis of CKD includes chronic glomerulonephritis, diabetic nephropathy, ADPKD, obstructive uropathy etc (Santosh and Georgi, 2013). CKD is referred to as a silent killer as most individuals don't recognize the symptoms of CKD until the damage has been done (Veerappan and Abraham, 2013). Early management of CKD by early screening for CKD in addition to spreading awareness about the risk factors of CKD and their prevention along with the advantages of early detection of minor presenting symptoms like oliguria, microalbuminuria can go a long way in helping curb the steady rise of CKD in present days (Haileamlak, 2018).

Low socio-economic status is associated with a higher prevalence and risk of CKD because of the metabolic risk factor, lack of awareness about the disease and its presenting symptoms, lack of a balanced and healthy diet and the high cost of treatment which deter them from seeking treatment for their condition (Sathyan *et al.,* 2016; Selvavinayagam, 2018). Also, since the treatment for ESRD is mainly provided via higher healthcare centres, there is reduced access to these facilities for the people of a low socio-economic background by the financial burden and the transport facilities (Selvavinayagam, 2018; Volkova *et al.,* 2008).

This study is aimed at understanding the clinico-epidemiological profile of patients presenting with CKD such as the demographic details along with a detailed history in order to provide a better understanding of the disease and its risk factors and to facilitate early detection and treatment of the disease which will help to improve the quality of life.

Materials and Methods

Type of study: Prospective and Observational study

Study settings: Department of General Medicine in a tertiary care hospital

Study population: Patients with CKD who attended Medicine Outpatients and Inpatients Department

Period of study: The study was conducted for a period of 2 months (June to July 2019)

Sample size: Initially 80 cases were proposed based on the overall prevalence rate. But as there was a high prevalence rate in the particular locality, the number of cases evaluated and studied was increased to 85.

Ethical Consideration

The study was started after getting approval from the institutional ethical committee (Ref: 636/TSRMMCH&RC/ME-1/2019-IEC No: 004 dated 17.07.2019) and the details of the patient were collected only after obtaining informed consent.

Newly diagnosed cases of CKD attending a tertiary care hospital were included in the study. Patients who did not give consent, patients below 18 years of age and patients already undergoing dialysis and treated for CKD were excluded.

Procedure

A comprehensive effort was made to assess and understand the epidemiology of CKD. A detailed case study proforma was prepared in order to collect and evaluate the personal details of the patient including details such as age, economic background, occupation, social habits, source of water for daily use and food habits along with an elaborate history of the patient's past and present illness and also mentioned about the family history of CKD. Only after informing the patients about the objectives of the study, assuring confidentiality of the data and obtaining their consent the proforma details were collected. Questions were asked in patient's native language to facilitate better understanding and in order to obtain a clear history. Assessment of the individual was also supplemented with the help of clinical examination and lab investigations. Final statistics was done by means of a descriptive analysis of the data collected.

Variable Terms

Diabetes: Self-reported history of diabetes in patients was confirmed by checking the blood glucose values and a random blood sugar >200mg/dl and fasting blood sugar >126mg/dl was confirmed to be a diabetic. History of medication was also verified with the help of medical records.

Blood Pressure: The blood pressure of patients was measured with the help of a mercury sphygmomanometer. It was also confirmed by asking a history of medication and verifying medical records. Systolic BP >140mmHg and Diastolic BP >90mmHg was considered to be hypertensive.

Body Mass Index (BMI): The BMI of the patient was assessed using the standard BMI formula: Weight (kg) / Height x Height (m^2). The parameters followed were: underweight (<18.5); Normal (18.5 to 24.9); Overweight (25 to 29.9) and Obese (>30.0).

Results

Among the 85 cases studied, 65.8% were found to be males and 34.2% were found to be females and the details were interpreted in figure 1. On analysing the data collected, it was found that CKD was highly prevalent among people belonging to the age group of 40 – 49 years with 24.7% followed by people who belong to the age group of 60 – 69 years with 21.1% .CKD was least prevalent among the age group of 20 – 29 years with no case being recorded.

Around 7% of the population hail from an urban area, 5.9**%** hail from a semi– urban area and the remaining 87.05% which form the majority, hail from a rural area (Figure 2).The occupational distributions of the study population are divided into two categories including Agriculture and Non-Agriculture workers. Out of the two categories CKD was more prevalent among agriculture workers (70.5%) compared to non-agriculture workers (29.5%) (Figure 3).

The study population was questioned about their food habits, in which the majority (90.5%) said they consumed a mixed diet of both vegetarian and non-vegetarian food while 9.5% consumed a vegetarian diet (Figure 4).The social habits of the study population namely alcohol consumption, smoking and tobacco chewing were studied and the result was depicted in table 2.

The BMI of the study population was assessed with the help of the standard BMI formula and integrated data was impregnated in table 3. In this population study, 44.8% presented with Diabetes and 55.2% did not have a history of Diabetes; meanwhile, while analysing the hypertension, 61.1% presented with hypertension (Figure 5).

While analysing other co-morbid status, only 6 had a history of bronchial asthma; only 4 cases had undergone treatment for pulmonary tuberculosis; 6 had thyroid disorder; 10 had coronary artery disease (CAD); 7 patients had history of renal stones and 10 patients have the family history of chronic kidney disease (CKD) (Table 4).

Discussion

On completion of the study, it was found that out of 85 cases 65.8 and 34.2% were males and females respectively which are in accordance with a previous study showed out of 333 patients 65 and 35% were males and females respectively. In concordance with the India CKD registry study, it was noted that 68 and 32% were males and females respectively which implies that hormonal influence could play a role in the development of CKD (Volkova *et al.,* 2008; Satyan *et al.,* 2016).

Majority of the study population were in the age group of 40-49years which corresponds to the reference study in which majority of the people were in the age group of 41-60 years and the India CKD registry study which had a mean age of 48.3±16.6 years which indicates that the decline in GFR progresses with age (Rajapurkar *et al.,* 2012; Satyan *et al.,* 2016).

More and near 87% people were from a rural background in the present study while other studies reflected nearly 84% people were from a rural background which implicates that low socio-economic status is one of the major factors of CKD due to the lesser awareness about CKD leading to people presenting at a later stage and consequently leading to unaffordable cost of treatment (Rajapurkar *et al.,* 2012; Satyan *et al.,* 2016).

Around 90% consumed a mixed diet of both vegetarian and non-vegetarian food and 78% people consumed water from the municipal street taps which implicates that dietary factors could play a role in the progression of CKD (Khalil, 2005; Veerappan and Abraham, 2013). Nearly 70% of the study population were agriculture workers which once again indicate that low socio-economic status is one of the major demographic factors for the prevalence of CKD. It could also implicate the constant exposure to pesticides as one of the factors which play a role in the progression of CKD.

In the present study, 36.5% were found to be alcoholics whereas in the study conducted by the India CKD registry, out of 333 cases 7% were found to be alcoholics (Rajapurkar *et al.,* 2012). This can be attributed to the increase in the trend of consumption of alcohol which has largely negative effects on the body overall (Levey *et al.,* 2000). Nearly 22% had a history of smoking in the present study compared to 33% and 32% in the India CKD registry study (Rajapurkar *et al.,* 2012; Satyan *et al.,* 2016). This implicates that even though awareness has been spread regarding the ill effects of smoking it still remains a trend and contributes to the progression of diseases. Also depicted with 15.3% were found to have a history of tobacco chewing.

While analysing the diabetic status, more than 44% were found in the present study which is in accordance with the India CKD registry study which showed that 40.7% were found to have Diabetes making DM one of the major factors of CKD. This shows that early screening for microalbuminuria and proteinuria can help in the earlier detection of CKD (Prasad *et al.,* 2012). Nearly 61% were found to have hypertension in the current study compared to 84.6% in the Sathyan et al study and 71.1% in the India CKD registry study (Rajapurkar *et al.,* 2012; Satyan *et al.,* 2016). This showed that hypertension is also one of the major risk factors of CKD. It could also be due to hypertensive nephrosclerosis.

The history of bronchial asthma and tuberculosis were found to be 5.9 and 4.8% respectively and had undergone treatment for it. In the SEEK (Screening and Early Evaluation of Kidney Diseases) study conducted in 2013, 3.1% were found to have Tuberculosis (Santosh and Georgi, 2013).

Around 7% were found to have thyroid disease. 11.8% had CAD (Coronary Artery Disease) in the present study compared to the study in which 50.15% had CAD (Satyan *et al.,* 2016). Nearly 8% had a history of renal stones in the current study compared to 5.3% in the SEEK study (Santosh and Georgi, 2013). Nearly 12% had a family history of CKD. Thus when compared to other similar studies it was found that Diabetes and hypertension are the major risk factors of CKD. Other factors include hailing from a rural background and the occupation at risk was found to be agriculture workers. Therefore targeted screening can lead to the prevention of the rising incidence of CKD.

Only 85 cases were studied so it was not possible to gain more data for a more precise and accurate analysis of the risk factors. Also the study was limited only to patients attending a particular tertiary care hospital therefore the geographical variations of the risk factors could not be analysed.

Therefore it is recommended that future studies include a wider range of study population so that an in-depth analysis can be made.

On studying the clinico-epidemiological profile of patients presenting with CKD, it reveals that Diabetes and hypertension continue to be major risk factors for CKD. Detection of urine microalbuminuria and proteinuria, especially in patients with DM, helps to identify patients at risk of kidney disease at an early stage.

It is strongly recommended to implement more schemes to provide affordable treatment to people of low socio-economic background and agriculture workers as they form a major population of people affected with CKD. Also initiation of nation-wide programs to spread awareness among the public and the healthcare professionals regarding the prevalence, symptoms, risk factors and the advantage of early detection and treatment of CKD could help in reducing the incidence of CKD and its progression to end stage renal disease.

Screening of high risk individuals those with hypertension, diabetes mellitus, cardiovascular diseases and other risk factors and educating them about the benefits of lifestyle modification, physical exercise and abstinence from social habits like alcohol consumption and smoking will retard the progression to ESRD (Anupama and Uma, 2014). Upgrading facilities to provide better treatment will also retard the progression of CKD into end stage renal disease.

This study has the wide recommendations of screening of the high risk group facilitates prevention of CKD and its progression to ESRD; spreading awareness of CKD and its risk factors among the public and the medical community via implementation of nation-wide programs; upgrading facilities for treatment and initiation of schemes to provide more affordable treatment for people of low socio-economic background and agriculture workers is advised and further performing an extensive study in the field of the co-factors bringing about an outcome of CKD needs further progressive introspection over prolonged periods of time taking into account various other intricate factors accounted for in the disease process.

Acknowledgement

The Authors wish to acknowledge Indian Council of Medical Research (ICMR) for approving and funding this project under the scheme of Short Term Studentship (STS). Also thanking the Institutional Ethics Committee (IEC), Trichy SRM Medical College Hospital and Research Centre, Tiruchirapalli for permitting to proceed this research work and issuance of institutional ethical clearance.

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Table 1: Age distribution of study population

Age (in years)	Number of cases (%)
30 – 39	11 (12.9)
40 – 49	21 (24.7)
50 – 59	17 (20)
60 – 69	18 (21.1)
70 - 79	11 (12.9)
>80	7 (8.4)

Table 2: Social Habits of the study population

Social habits	Yes		No	
	No. of cases	Percentage	No. of cases	Percentage
Alcohol consumption	31	36.5	54	63.5
Smoking	19	22.4	66	77.6
Tobacco Chewing	13	15.3	72	84.7

Table 3: BMI distribution of the study population

BMI variables	Number of cases (%)
Underweight	7 (8.2)
Normal	63 (74.1)
Overweight	13 (15.2)
Obese	2 (2.5)

Table 4: Co-morbid status of the CKD patients (n=85)

Comorbid status	Number of cases	Percentage
Bronchial asthma	6	7.1
Pulmonary tuberculosis	4	4.7
Thyroid disorders	6	7.1
Coronary artery disease	10	11.8
Renal stones	7	8.2
Family history of CKD	10	11.8

Figure 1: Gender distribution of study population

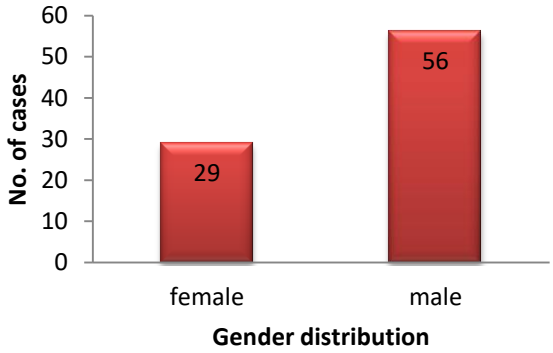

Figure 2: Distribution of Locality of study population

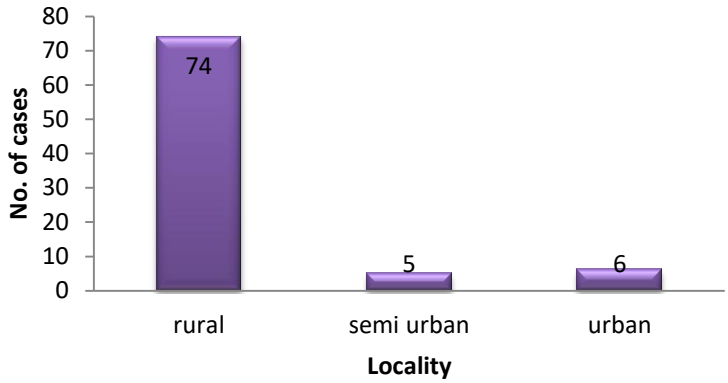

Figure 3: Occupational distribution of study population

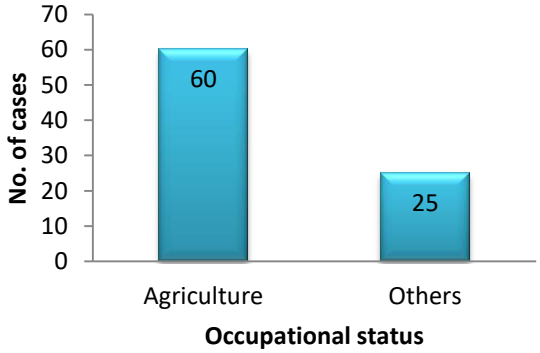

Figure 4: Food Habit of study population

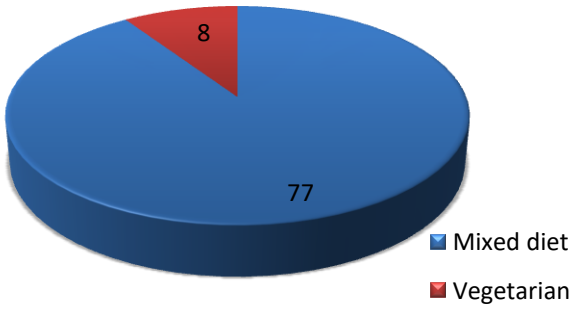

Figure 5: Prevalence of Diabetes and hypertension among cases included