Chronic Kidney Disease (Stage 5) on Maintenance Hemodialysis at Pokhara Academy of Health Sciences

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ABSTRACT

Introduction: Chronic Kidney Disease stage 5 is diagnosed when glomerular filtration rate is <15.0ml/min/1.73m^2. Chronic kidney disease is an increasingly recognized major public health problem. The aim of our study was to estimate the socio-demographic profiles, etiologies and complications of chronic kidney disease stage 5 and associated co-morbidities in patients attending a referral hospital of Gandaki Province.

Materials and Methods: An observational cross sectional study was carried out in the Department of Medicine, Pokhara Academy of Health Sciences, during the period from August 2020 to February 2021. Chronic kidney disease patients undergoing maintenance hemodialysis in dialysis unit willing to participate were included. The data were collected and were analyzed using SPSS version 25.0 software.

Results: Hundred patients were taken into study. Most common causes of chronic kidney disease were chronic glomerulonephritis followed by diabetes mellitus and hypertension. Most common complications during dialysis were chills and rigor followed by muscle cramps, hypotension, backache, hypertension and hypoglycemia. Most common complications of chronic kidney disease were anemia (91%) followed by cardiovascular diseases and hypertension. It was observed that a proportion (5%) of patients developed stroke.

Conclusion: Chronic glomerulonephritis was found to be the most frequent cause of CKD, followed by diabetes and hypertension. Anemia was found to be most common feature among CKD patients.

Keywords: Chronic Kidney Disease, Hemodialysis, Glomerulonephritis

INTRODUCTION

Chronic kidney disease (CKD) is defined as abnormalities of kidney structure or function, present for more than 3 months, with implications for health (either markers of kidney damage or decreased glomeruler filtration rate (GFR) < 60 ml/min/1.73 m^2). CKD stage 5 is defined when GFR is <15.0ml/min/1.73m^2.[1] CKD is a major public health problem worldwide and is associated with considerable morbidity and mortality. In 2013, around a million people died because of CKD related cause.[2] CKD is associated with a wide range of life threatening diseases including cardiovascular disease. In Canada, the number of people living with end stage renal diseases (ESRD) tripled from

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1991 to 2010.[3] In one observational cross-sectional study conducted in a tertiary care hospital, it was discovered that the most common etiology of CKD was chronic glomerulonephritis (CGN) (36.2%) and major complications were related to cardiovascular disease, anemia, infections, neuropathy and abnormalities of mineral and bone metabolism.[4]
Along with the impact on an individual's health, CKD also affects the social life and is responsible for loss of productivity. The most common form of social impact due to CKD is financial burden.[2] CKD patients are at higher risk to develop end-stage renal disease (ESRD) which requires costly management like dialysis and kidney transplantation. In the present study, we aimed to study the epidemiology, sociodemographic profiles, etiology, and complications of CKD patients at a tertiary care hospital in Nepal.

MATERIALS AND METHODS

It was an observational prospective cross-sectional study, conducted in the Department of Medicine, Pokhara Academy of Health Sciences, Pokhara, Nepal from August 2020 to February 2021 for a period of six months. One hundred CKD patients undergoing maintenance hemodialysis in dialysis unit of PoAHS were included after proper informed written consent. Approval for the study was taken from the Institutional Review Committee, PoAHS prior to collecting data. Informed consent was taken from each patient. Statistical analysis was performed using SPSS version 25 (SPSS Inc., Chicago, IL). P value <0.05 was considered statistically significant.

RESULTS

Total number of patients included in the study was 100. There were 65 (65%) male and 35 (35%) female patients. (Figure 1)The mean age of the patients in the study was found to be 48.71 years (SD=15.089)

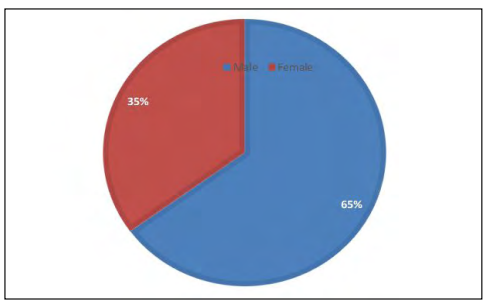

Figure 1: Gender distribution of study patients

The median duration of hemodialysis was 26 months with maximum of 158 months and minimum of 4 months.

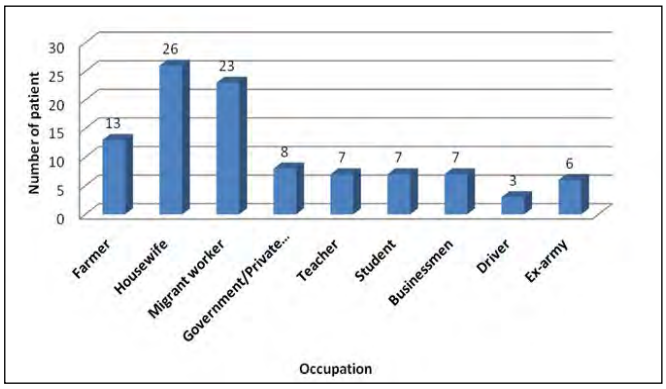

Figure 2: Occupational distribution of patients

House wives, migrant workers and farmer were the most common occupation observed where as few of them were active in other professions. (Figure 2)

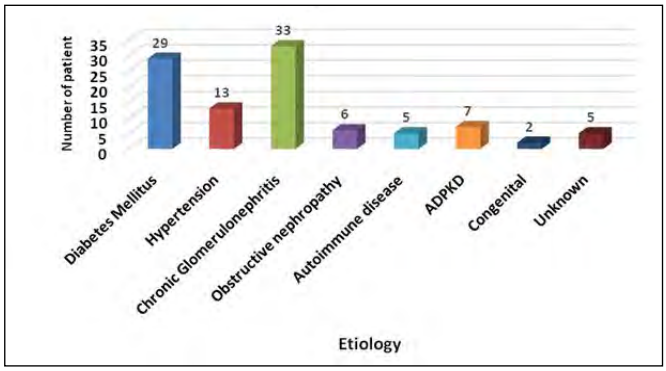

Figure 3: Etiology of End Stage Renal Disease

Most common causes of CKD in our institution was chronic glomerulonephritis (33%) followed by Diabetes Mellitus (29%) and Hypertension (13%). (Figure 3)

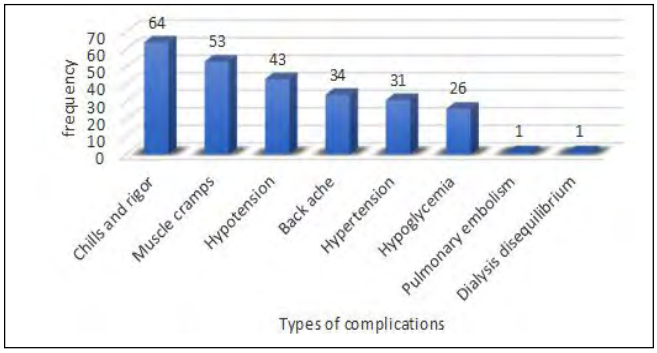

Figure 4: Complications during hemodialysis

Most common complications were chills and

rigor (64%) followed by muscle cramps (53%), hypotension (43%), backache (34%), hypertension (31%) and hypoglycemia (26). Rare cases(one each) of pulmonary embolism and dialysis disequilibrium syndrome were also observed. (Figure 4)

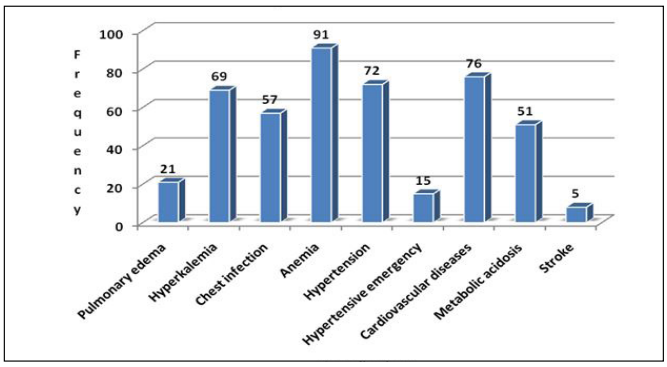

Figure 5: Complications of CKD

Common complications identified were anemia (91%) followed by cardiovascular diseases and hypertension. A proportion of patients (5%) were found to have suffered from stroke. (Figure 5)

Most of the patients in our study were anemic in which mean hemoglobin was 8.9 ± 1.51 gm/dl. Similarly, higher mean urea, creatinine, uric acid and potassium were observed. High Serum phosphorus level and low average calcium levels were observed. Median Serum Vitamin D level of most of the patients was within normal range. (Table 1)

Table 1: Laboratory parameters of the study population

Parameters	Mean	SD	Parameters	Median	IQR
Urea	200.51	54.91	Potassium	5.1	1.3
Creatinine	14.15	3.33	Calcium	8.4	1.3
Hemoglobin	8.99	1.51	Phosphorous	6.6	3.5
Uric acid	7.36	1.98	Vitamin D	35	17
Sodium	136.45	3.8	RBS	120	46

DISCUSSION

Around 850 million people are affected by chronic kidney disease (CKD), with over 2 million people worldwide receiving dialysis or living with a kidney transplant[5]. However, the demographic profile, causes and complications of CKD differ between different countries. The mean age of the patient in the study was 48.71 years. Male patients outnumbered female patients. This may be due to male dominance in treatment seeking behavior in our country like Nepal. Similar study was conducted by Shrestha TM et al in 2019.[6] Housewives (26%), migrant worker (23%) and farmer (13%) were the most common occupations observed in this study which might be due to poor access to health care of the female gender and less number of female populations undergoing kidney transplantation. Migrant workers have poor access to the health care services and lack of health related awareness. Environmental factors also lead to various health issues in gulf countries. Similar data was also observed by MR Sigdel et al in 2018[4].

Chronic glomerulonephritis was found to be the most common etiology of CKD in patients undergoing hemodialysis followed by diabetic kidney disease, hypertension, obstructive nephropathy, autosomal dominant polycystic kidney disease, autoimmune and congenital causes. In few cases, etiology was not clear. The most common cause of CKD worldwide is diabetic kidney disease. In the context of our study, CGN was found to be the commonest cause which may be due to the chronic infections, poor socioeconomic status, and poor health seeking behavior of the Nepalese populations, limited data and more number of younger age group patients in our study.

The common complications during dialysis were chills and rigor (64%), followed by muscle cramps (53%), hypotension (43%) and others. Rare conditions like pulmonary embolism and dialysis disequilibrium syndrome were also observed. B Bartaula et al in 2019 conducted a similar study in

which chills, hypotension and backache were the most common complications. [7] In contrast, the study by R K Aggrawal et al showed that hypotensive episodes were 66 (4.5%) and was the commonest complication, in 66 patients (4.5%) and followed by hypertensive episodes, seen in 58 patients (3.8%) amongst total 28 cases.[8]

Most common complications of CKD in the current study were anemia, cardiovascular diseases, hypertension and hyperkalemia. Similar study was observed by AK Bello et al in 2017 in which anemia, cardiovascular diseases, metabolic acidosis, volume overload and mineral bone disease were the most common complications.[9] According to K Ranabhat et al, hypertension was the most frequent co-morbidity among ESRD patients.[10] Metabolic acidosis and mineral bone diseases were not included in our study because of limited laboratory parameters that we could conduct in our institution. Most of the patients in our study were anemic in which mean hemoglobin was 8.9 ± 1.51 gm/dl. Anemia was observed in 85% of CKD patients in the study done by P K Chhetri et al.[11] Meanwhile, TM Shrestha et al found the mean hemoglobin to be 6.52 gm %, which is much lower level than that seen in our study.[12] In the study by HU Rashid et al hemoglobin level was found to be in the range of 8-10 gm%.[13] Anemia in CKD patients may be due to poor adherence to erythropoietin agents and various other factors like iron deficiency, poor nutrition and poor knowledge regarding sanitation and the disease. F Jahan et al concluded in their study in Bangladesh that most patients had inadequate knowledge regarding their disease, which might be due to lack of educational programs.[14]

High mean urea, creatinine, uric acid and potassium were observed, similar to other studies which may be due to inadequate hemodialysis and poor standardization of dialysis equipments and poor dietary adherence by the patients.[12] High serum phosphorus level and low average calcium were observed in this study which may be due to bone mineral disease which is the one of the common complications of CKD.

Cases of CKD are on the rise in our country and around the whole world which can impart a huge impact on socio-economic condition. MN Huda et al have highlighted the need for adopting intervention at early stages of CKD to slow its progression towards ESRD so that individual families and entire nation can be saved from high economic burden.[15]

Limitation of the Study

Limited laboratory investigations were included in the study. There were also no data regarding the management of complications. Comparison of data between patients with different etiologies could not be done. Limited number patients were included in the study and it was a single centered study.

Conclusion

The mean age of the Nepalese patients with CKD was found to be younger compared to their western counterparts. In our study, chronic glomerulonephritis was found to be the most common cause of CKD, followed by diabetes and hypertension. Anemia was found to be most common feature in CKD patients. Migrant workers were found to be more affected from the disease.

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