ORIGINAL RESEARCH PAPER

Medicine

DEMOGRAPHIC AND CLINICAL SPECTRUM OF CHRONIC KIDNEY DISEASE IN PATIENTS WITH HYPERTENSION, PREHYPERTENSION AND THOSE WITH UNDIAGNOSED HYPERTENSION IN A TERTIARY CARE HOSPITAL.

KEY WORDS:

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ABSTRACT

BACKGROUND. Chronic kidney disease (CKD), emerging to be an important chronic disease globally, encompasses a spectrum of different pathological processes. Hypertension is the one of leading risk factors for developing CKD. **Objective:** To assess the prevalence of CKD in people with undiagnosed hypertension, hypertension and those with prehypertension. **Material and Methods** This cross-sectional observational hospital based study was conducted in the tertiary care hospital of Kashmir over a period of two years. Ethical clearance was obtained from the Institutional Ethical Committee. A total of 600 outdoor patients were included in the study. Data based on relevant history, socio - demographics, risk factor profile, general physical examination and various lab investigations was collected and included. Statistical analysis was performed.. **Results:** Most of the patients were >40 years of age, with highest number of patients in age group 60-69 years (38.2%).A large group of patients was formed by isolated hypertension and pre hypertension (38.5 & 22.5%, respectively). Patients with hypertension and diabetes mellitus formed 15.3% of the patient population. Overall prevalence of CKD was found out to be 25.2 percent. Prevalence of CKD in hypertension and pre-hypertension was 29.2 percent and 16.2 percent respectively. **Conclusion:**CKD is an emerging chronic disease globally with hypertension being one of the important risk factors .our study is indicative of the fact patients with hypertension are twice as prone to develop CKD as compared to those with prehypertension , hence should be screened early .

INTRODUCTION

Chronic kidney disease (CKD) encompasses a spectrum of different pathological processes associated with abnormal kidney function and a progressive decline in glomerular filtration rate (GFR) . It is classified into 6 stages (stage 0 to stage 5) based on risk factors, and demonstrated kidney damage[1]. CKD is emerging to be an important chronic disease globally. In India, it has been estimated that the overall prevalence of CKD is 17.2% with 11.3% stage 1 and 2[2]. National Chronic Kidney Disease Fact Sheet (2014) estimates that more than 10% of adults may have CKD of varying severity[3] .The risk factors of CKD include hypertension, diabetes mellitus, autoimmune disease, old age, African ancestry, a family history of renal disease, a previous episode of acute kidney injury and the presence of proteinuria, abnormal urinary sediment and structural abnormalities of the kidney.

Hypertension is the second leading cause of end stage renal disease in United States. It is estimated that every 5th patient with high blood pressure and every 7th patient with diabetes mellitus will develop CKD[4]. In view of risk of hypertension and the impressive increase in the risk of cardiovascular complications associated with levels of BP previously considered to be normal, the JNC 7 report has introduced a new classification that includes the term "prehypertension" for those with BP ranging from 120–139 mmHg systolic and/or 80–89 mmHg diastolic[5].People with prehypertension need to be identified so that necessary interventions can be done early to prevent the development of hypertension. High blood pressure can be either a cause or a consequence of CKD. High BP may develop early in the course of CKD and can be associated with adverse outcomes such as worsening renal function and development of cardiovascular disease. Hypertension is a major promoter of the decline in GFR in both diabetic and non-diabetic kidney disease[6].

Hypertension-related mechanisms that are involved in the progression of renal damage include the systemic BP load, the degree to which it is transmitted to the renal microvasculature (i.e., renal auto regulation), and local susceptibility factors to barotrauma, which is the degree of damage for any degree of BP load[6]. Although hypertension in advanced stages of CKD has been studied, and a stepwise increase in the prevalence and control for hypertension with increase of stage of CKD was reported for stages 3–5; prevalence and control rates of hypertension in earlier stages of CKD are not very well known for the development of national and international health policies for prevention and control of hypertension, reliable information about the epidemiology of hypertension in CKD from different world regions is essential.[7]

Aims and objectives:

To calculate the prevalence of CKD in persons with hypertension, undiagnosed hypertension and pre-hypertension in Kashmiri population and the proportion of patients with Known hypertension with CKD.

Materials and methods:

This cross-sectional observational hospital based study was conducted in the tertiary care hospital of Kashmir over a period of two years. The study was conducted in accordance with the guidelines approved by the Ethics Committee of our institute. A total of 600 outdoor patients were included in our study. A thorough history and clinical examination was performed in each patient. Relevant clinical history which included past history of hypertension, diabetes mellitus, and drug history was recorded. Each participant was allowed a rest of at-least 5 minutes before the first measurement. Up to 3 sequential brachial systolic and diastolic blood pressure recordings were taken by using appropriate cuff sizes and a mercury sphygmomanometer. The averages of all the available measurements for systolic and diastolic blood pressure were used. Undiagnosed hypertension was defined

by a measured average systolic blood pressure of ≥140 mm Hg or by diastolic blood pressure of ≥90 mm Hg. Pre hypertension was defined by an average systolic blood pressure of ≥120-139 mmHg (with diastolic <90mmHg) or diastolic blood pressure of 80-89 mmHg (with systolic <140 mmHg) according to JNC-7. Normal blood pressure was defined by an average systolic blood pressure of <120 mmHg and a diastolic blood pressure of <80 mmHg, according to JNC-7.Serum Creatinine was measured by using the modified Jaffe Kinetic Method. eGFR was calculated according to the Modification of Diet in Renal Disease:

$eGFR = 175 \times [(\text{calibrated serum creatinine in mg/dl})^{-1.154}] \times Age^{-0.203} \times (0.742, \text{if female})$.

Random spot urine samples were obtained and urine albumin and creatinine measured. Urine albumin was measured by Turbidimetric method and urine creatinine by Modified Jaffe Kinetic Method. Significant albuminuria was defined at urinary albumin: creatinine ratio of ≥30 mg/g creatinine. Microalbuminuria was defined as 30-300 mg/g creatinine and macroalbuminuria as >300 mg/g creatinine. Chronic kidney disease (CKD) was defined by using eGFR and the presence of albuminuria according to the Kidney Disease Outcomes Quality Initiative staging guidelines. Due to cross-sectional nature of urinary albumin measurements the stages of CKD were a modification of the modified National Kidney foundation classification, as follows:

- Stage 1 eGFR >90ml/min/1.73m^2 BSA and the presence of albuminuria at a single measurement.
- Stage 2 eGFR 60-89ml/min/1.73m^2 and presence of albuminuria at a single measurement.
- Stage 3 eGFR 30-59ml/min/1.73m^2
- Stage4 eGFR 15-29ml/min/1.73m^2.

Statistical analysis:

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as Mean±SD and categorical variables were summarized as percentages. Chi-square test or Fisher's exact test, whichever appropriate, was used for comparison of categorical variables.. A P-value of less than 0.05 was considered statistically significant.

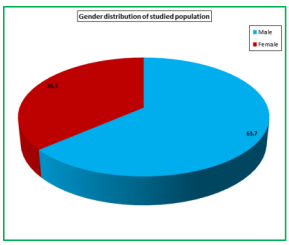
Results:

A total of 600 patients were studied. Most of the patients were >40 years of age, with highest number of patients in age group 60-69 years (38.2%).

Table 1: Age distribution of studied population

Age (years)	No. of patients	Percentage
20-29	20	3.3
30-39	40	6.7
40-49	100	16.7
50-59	143	23.8
60-69	229	38.2
≥ 70	68	11.3
Total	600	100

Males outnumbered females, with 382(63.7%) males and 218(36.3) females. 2/3 rd of the patients (63.7%).



A large group of patients was formed by isolated hypertension and pre hypertension (38.5 & 22.5%, respectively). Patients with hypertension and diabetes mellitus formed 15.3% of the patient population. Chronic kidney disease was found in 25.2% of the patients table 3.

Table 3: Prevalence of CKD in studied population

CKD	No. of patients	Prevalence
Present	151	25.2
Absent	449	74.8
Total	600	100

*Statistically Significant Difference (P-value <0.05)

Chronic kidney disease prevalence increased in proportion to the advancement of age with highest prevalence (35.2%) in age group ≥70 years. Age group of 20-29 years had prevalence of 10%.No gender predisposition of CKD patients was found in our study (24.6% Vs 26.1%, in males and females, respectively). Chronic kidney disease prevalence was comparable in hypertension (29.2%) and undiagnosed hypertension (25.4%). Prevalence of CKD in prehypertension was 16.3% tab 4.

Table 4: Prevalence of CKD among hypertensive and pre-hypertensive patients in studied population

	CKD	No CKD	Prevalence	P-value
Hypertension	83	201	29.2	0.017*
Pre-Hypertension	22	113	16.3	
Undiagnosed Hypertension	46	135	25.4	
Total	151	449	25.2	

*Statistically Significant Difference (P-value <0.05)

Discussion:

Non-communicable diseases are the leading cause of premature and preventable mortality worldwide[8]. Hypertension forms the major bulk of non communicable diseases, with 29% prevalence in adult population in USA as per the CDC data[9]. Prevalence of CKD in our study was 25.2% with an increase across the spectrum of blood pressure, prevalence being almost twice in hypertensive group as compared to those in the pre-hypertensive group (29.2% vs 16.3%), the results in pre-hypertensive group were similar to the data shown by Min-Ju Kim et al, in his study[10]. A number of factors like hypertension, increase in age, BMI and history of diabetes mellitus had significant impact on prevalence of CKD. The prevalence of CKD in patients with undiagnosed hypertension was almost comparable to those with diagnosed hypertension, similar observations were made by Deidra C. Crews et al[11], which clearly demonstrated the marked influence of the stage of hypertension over the progression of CKD.In our study, men constituted 63.7% of studied population, however there was no significant gender predisposition with regard to CKD prevalence (p value 0.676), as has been reported previously as well[12].Age is one of the important non-modifiable risk factors for estimating the prevalence of CKD as is evident from the eGFR calculation formulae . Our results also reflected parallel increase in CKD prevalence with advancing age. However, CKD prevalence was found higher in age group 20-29. In this age group high prevalence of CKD may be attributed to significantly higher number of patients with proteinuria. We assume that younger patients with glomerulonephritis may have contributed to increased prevalence of CKD in age group of 20-30, but further studies need to be carried out to validate our assumption. Another reason may have been a small sample size in this age group thus confounding the results. Proteinuria as a risk factor for progression of CKD has been validated in many studies including a study conducted by J Reed N et al[13].in our study people with diabetes had higher prevalence

of proteinuria , which has a significant had significant impact over the prevalence of CKD (52.2% Vs 20.3%), as has been validated previously in many large studies[14]. JNC-8 and ADA (2016) guidelines impress upon maintaining optimal blood pressure and blood sugar levels in patients of diabetes mellitus with proteinuria such that their renal progression of disease can be halted or modified[15, 16]. Thus, population screening for identification of early stages of hypertension and strict follow up of patients with diabetes mellitus to gauge their complications including proteinuria may form a tool to prevent the renal involvement and further progression.

Conclusion:

CKD is an emerging chronic disease globally with hypertension being one of the important risk factors. The beneficial effect of mass screening for early stages of hypertension and further education about risk factor modification is quite evident from our study as the patients in hypertensive stage were twice more prone for development of CKD as compared to patients in pre hypertensive group

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Conflict of interest: Nil

Ethical clearance: Obtained from institutional ethical committee.

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