

Research Paper

Prevalence and Risk Factors of Chronic Kidney Disease in Hypertensive Patients attended at Victoria Chitepo Provincial Hospital Mutare Zimbabwe, 2022

M.T. Mahamane Salissou^{1*}, T. Shumba², A.R. Mahaman Yacoubou³, S. Makengo Olivier⁴

^{1,2,4}Department of Biomedical and Medical Laboratory Sciences, College of Health Agricultural and Natural Sciences Africa University Mutare Zimbabwe

³Department of Pathophysiology, School of Basic Medicine, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

*Corresponding Author: salissoum@africau.edu

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Abstract— Hypertension and chronic kidney disorders (CKD) are key public health burdens in Zimbabwe. In this study we evaluate the prevalence and risk factors of CKD in hypertensive patients attended at Victoria Chitepo Provincial Hospital in Mutare from July to October 2022. This was an analytical cross-sectional study which investigated in a retrospective manner the medical records of patients with hypertension to determine those who developed CKD. The clinical characteristics and GFR were used to determine the stage of CKD. Random sampling method was used to choose 220 participants from the biochemistry results book to get Urea and electrolytes test results, age, race, gender, location of residence, whether patient had diabetes mellitus and on any antihypertensive medication. Out of 220 cases 71 (32.3%) had developed CKD at different stages as follows: 16.9% in stage 1, 22.5% in stage 2, 49.3% in stage 3, 7.1% in stage 4 and 4.2% were in stage 5. Furthermore 39 (55%) were female and 32 (45%) male. 11 (15.5%) participants were below 30 years old, 23 (32.4%) were between the ages of 30 and 50 and 37 (52.1%) participants were over 50 years old. Of the 71 participants, 100% were all black. About 28 cases (39.4%) of the participants also had Diabetes Mellitus. 23 (32.4%) participants were not on any antihypertensive drugs. 22.5% were from the rural areas, 32.4% were from semi-urban areas and 45.1% were from urban areas. Risk factors analysis indicated statistical significance between Hypertension induced CKD with regards to gender OR 1.96 CI (1.09- 3.51), $P=0.023$, History of diabetes mellitus OR 2.58 CI (1.38-4.81), $P=0.0024$, History of antihypertensive medication OR 0.46, CI (0.24-0.88), $P=0.018$. There is high burden of CKD among patients with hypertension in this study. Gender, Increasing age, Race, diabetes mellitus and use of antihypertensive drugs and location of residence are significantly associated with CKD in hypertensive patients.

Keywords— Hypertension, Prevalence, chronic, kidney disease, risk factors, Hospital.

1. Introduction

Approximately 1.28 billion adults in the age range of 30 to 79 were reported to have hypertension with almost two-thirds reside in low- and middle- income countries [1]. The prevalence of hypertension has greatly increased in low and middle income countries [2]. Approximately 46% of hypertensive cases are incidental findings which if uncontrolled leads to serious complications such as heart and kidney failure. In Africa, the prevalence of hypertension in men was 36.9% and 36.3% in women that is 64.8 million men and 63.8 million women respectively [3]. Chronic kidney disease due to hypertension is more common in Africa particularly for those in urban than rural areas [4]. Around 30% of the population in Zimbabwe have hypertension with a

further 8% of undiagnosed cases [5]. Chronic kidney disease is more common in women, older people, racial minorities, people with diabetes mellitus and people with hypertension [6]. Chronically raised blood pressure affects the renal perfusion therefore leading to chronic kidney disease with proteinuria or albuminuria. This is due to renal arteries narrowing and weakening leading to hypo perfusion of kidney thus resulting in chronic kidney disease [7]. Chronic kidney disease is determined by the glomerular filtration rate. The normal glomerular rate range from 90 to 120 mL/min/1.73 m². A GFR with levels below 60 mL/min/1.73 m² for more than 3 months is a sign of chronic kidney disease and a GFR lower than 15 mL/min/1.73 m² is a sign of kidney failure. Majority of the population rarely have access to healthcare, in Zimbabwe where approximately 53.5% of

people have uncontrolled hypertension[8]. Furthermore, there is a literature gap in Zimbabwe concerning studies to do with the association between chronic kidney disease and hypertension as well as the prevalence of chronic kidney diseases in hypertensive patients. There is no known research in Zimbabwe which links chronic kidney disease in hypertensive patients although it is known as the leading cause besides diabetes mellitus. It is important to understand factors associated with hypertension and chronic kidney disease to try to prevent. There is less awareness, poor management of hypertension in African countries such as Zimbabwe consequently cases of patients with organ damage such as kidneys is commonly reported [4]. Worldwide Hypertension was reported as the etiological factor leading to kidney disease and it has been ranked as the second most common cause of kidney failure, after diabetes. Currently studies in exploring risk factor leading to kidney failure in hypertensive clients have yet been explore in Zimbabwe leaving a gap to explore, hence the importance of the present study. The present report give insight and informed ministry of health and child care of Zimbabwe on the burden of hypertension and potential risk factors that could have resulted in renal failure .

2. Related Work

Around 30% of the population in Zimbabwe have hypertension with an additional 8% of undiagnosed cases of CKD which is more frequent in women, aging, racial minorities, diabetic and hypertensive clients[9] ;[10]. In a study carried out in USA the prevalence of CKD in hypertensive setting was 35, 8 % within the period of 2011 to 2014 as compared to the 10.2% found among non-hypertensive clients [10]. [5]. Chronic kidney disease is more common in women, older people, racial minorities, people with diabetes mellitus and people with hypertension [6].Chronically raised blood pressure affects the renal perfusion therefore leading to chronic kidney disease with proteinuria or albuminuria. This is due to renal arteries narrowing and weakening leading to hypo perfusion of kidney thus resulting in chronic kidney disease[7]To diagnose CKD in hypertensive client's biochemical parameters such as, serum creatinine, urea, electrolytes level and the GFR must be computed. There are five stages of CKD will all relay on GFR test which in turn depend on creatinine level. Existing research show that the high proportion of patients that usually develop CKD from hypertension are poor because the appropriate treatments that are available are costly and scarce [11].There is a need for awareness programs that train people on hypertension as debilitating disorder. Hypertension and diabetes were well known morbidities that favour settlement of CKD [12] . Usually in conditions where the prevalence of hypertension is increasing in the cases of African continent such as Zimbabwe accordingly it correspond with the increase number of patients with target organ damage such kidneys witch is the most common finding . [4] .Several studies indicated that hypertension if uncontrolled it can lead to CKD and among potential risk factors are sedentary life styles

which lack exercises and usually leads to obesity as supported by studies conducted in Ethiopia ,Cameroon, China and Ghana [13] ; [14];[15];[16]

3. Theory/Calculation

This research was intended to obtain data on the prevalence of CKD in hypertensive patients because if the numbers are known then it ensures that awareness programs are implemented to prevent and treat hypertension before it advances. Zimbabwe is a low income country therefore the treatments for chronic kidney disease such as kidney dialysis and kidney transplant are severely limited and expensive therefore it is important to understand how hypertension advances to chronic kidney disease in order to be able to form strategies to prevent hypertension awareness, treatment and control. Hypertension and chronic kidney disease are also major risk factors for cardiovascular disease and stroke and is the leading cause of premature deaths globally[17]. If the prevalence is found to be high then people should be taught to reduce all the high risk factors that cause hypertension. The prevalence of CKD in hypertensive patients is higher in Africa especially in urban than rural areas [4] therefore it is significant to do the study at Victoria Chitepo Provincial Hospital which is the largest hospital in Mutare Province and is located in an urban area as there is no research that targets it. Kidney dialysis is expensive and severely limited therefore most of the patients with chronic kidney disease cannot afford or access it in Zimbabwe[18]. Since there is a high number of people living with hypertension and it is known to have an adverse impact such as chronic kidney disease which is the leading cause of deaths globally, there should be known implementation awareness for prevention and treatment of hypertension but they are none in Zimbabwe.

4. Experimental Method/Procedure/Design

Study design: The analytical cross sectional study design, was applied in this report in order to assess the prevalence and causal effects of independent variables upon a dependent variable namely hypertension induced CKD at a specific point in time. In this setting we assessed the relation between chronic kidney disease and hypertension as well as we evaluated various risk factors that lead to chronic kidney diseases in a hypertensive setting. Additional an analytical method was used to test the association with various risk factors.

Study Area

This study was conducted at Victoria Chitepo Provincial Hospital Mutare which is located in Manicaland province which have a population of 2.037 million. The hospital is in an urban provincial hospital therefore it was easier to get adequate records from this setting since majority of patients in the province are referred to that hospital. The study used both laboratory and clinical data from records of hypertensive patients who developed chronic kidney disease after

laboratory confirmation in the hospital from July to October 2022.

Study population

All patients who are adults with diagnosed hypertension being on follow-up care by routinely at Victoria Chitepo Provincial hospital, and in addition have satisfied the inclusion criteria were enrolled in the study.

Inclusion criteria

The inclusion criteria's are adults 18 years and above with diagnosed hypertension, patients should have a regular follow-up in the cardiology unit for chronic kidney disease, from July 2022 to October 2022.

Exclusion criteria

The study excluded the records of patients who developed chronic kidney disease from hypertension before and after July to October 2022. Patients that developed chronic kidney disease from other factors such as diabetes mellitus only or as a result of their own genetics were also excluded. Patients with gestational hypertension were excluded because it usually does not cause organ damage and goes away after birth. All patients who are below 18 were be excluded.

Operational definitions

Severe Chronic kidney disease: we used in this study a documented evidence of CKD in the client s medical chart including parameter of having an e-GFR < 60 mL/ min/1.73 m using Cockcroft Gault equations as indicator of CKD.

Hypertension: case definition in this study was if patients had documented diagnosis of hypertension (BP \geq 140/90 mmHg) or patients on antihypertensive drugs therapy while for diabetic patient it was set at >130/80 mmHg.

Variables of study

Independent variables: The demographical, clinical, and social characteristics included age, hypertension, diabetic mellitus, gender, race and hypertensive drugs therapy were all considered as independent variables

Dependent variable: Absence or presence of CKD was considered as the dependent variable

Sampling design

Sample size

To calculate the sample size the following formula was used as recommended when the population is unknown: $SS = \frac{Z^2 \cdot P(1-P)}{d^2}$

Where: Z= Statistic corresponding to confidence level which is 95% in this case 1.96

P= Expected prevalence. The prevalence of CKD in hypertensive clients was 17.6% using a study that was carried at Northwest Amhara Referral Hospitals, Northwest

Ethiopia in 2020 [19]. d= margin of error. It is recommended to use a margin of error of 5% and below if the prevalence used is between 10 and 90%. $SS = \frac{(1.96)^2 \cdot 0.176(0.824)}{(0.05)^2} = 223$

Sampling procedure

A random sampling method was employed, to give every patient who had hypertension from July to October 2022 an equal chance of being selected. The biochemistry results of hypertensive patients that attended Victoria Chitepo Provincial Hospital from July to October 2022 in the Urea and Electrolytes test results were randomly chosen and the records were checked to investigate whether they had developed chronic kidney disease. The patients' results for Urea and Electrolytes test and the GFR calculation in the record book was compared to the reference ranges of the laboratory to determine chronic kidney disease.

Data collection methods and instruments

The study used the archival data collection method. The data was retrieved and collected from patient records at Victoria Chitepo Provincial Hospital in Mutare .The study participants were first identified by generating a list of all the hypertensive patients who came for regular checkups to investigate whether they had developed CKDs for the period of interest by checking the recorded results for Urea and Electrolyte test and the glomerular filtration rate. The ages of each of the patients on the list were checked and recorded to determine whether or not all the patients were over 18. The data was retrieved with no names of patients but only the patient's age, gender, race, location of residence, recent measurements of the patients' blood pressure, whether the patient had Diabetes mellitus, serum level for the following were measured : creatinine , urea , sodium , potassium , chloride and information on antihypertensive drugs and the glomerular filtration rate. For this study, a data extraction template was used to collect data from July to October 2022 at Victoria Chitepo Provincial Hospital. The data collected included age, gender, race, location of residence, recent measurements of the patients' blood pressure, whether the patient also had Diabetes mellitus, serums levels for the following biochemical including : creatinine , urea , serum sodium , serum potassium , chloride were assessed , including patient history of antihypertensive drugs therapy and the calculated glomerular filtration rate was in addition collected .

Data Analysis

The data were presented in graphs, tables and charts.The numerical data were represented in percentages and the mean and standard deviation were calculated to present socio-demography and clinical characteristics of the participants. Chi square test was used to evaluate the association of hypertension induced CKD with various risk factors. In addition Confidence interval (CI), Odd Ratio were assessed, and P value was set at P< 0.05 as statistically significant

Ethical considerations

This study was guaranteed by Africa University Research Ethical Committee (AUREC) .Permission to carry out the

research was given by the laboratory superintendent at Victoria Chitepo Provincial Hospital and patient details were used in code to protect patient's confidentiality.

5. Results and Discussion

Results

Socio-demographic characteristics of the participants

A total of 220 patients were enrolled in this investigation with a rate of response of about 100% in addition their full biochemistry reports was taken in account in this present report. About 76 cases (34.5%) were male and 144 (65.5%) were female. About 44 (20%) of participants were below 30 years of age, 64 (29%) were between 30 and 50 years old and 112 (51%) were over 50 years of age. 215 (97.7%) patients were black and 5 patients (0.3%) were white. The frequency and percentage of patients who lived in urban, semi-urban and rural areas was 113(51.4%), 60(27.3) and 47(21.3%) respectively. The mean average age was 48 and the standard deviation was 11.3.

Table 1 Socio-demographic characteristics of participants (N=220)

| Variable | Category | Frequency | Percentage |
|-----------|------------|-----------|------------|
| Gender | Male | 76 | 34.5 |
| | Female | 144 | 65.5 |
| Age | <30 | 44 | 20.0 |
| | 30-50 | 64 | 29.0 |
| | >50 | 112 | 51.0 |
| Race | Black | 215 | 99.7 |
| | White | 5 | 0.3 |
| Residence | Urban | 113 | 51.4 |
| | Semi-Urban | 60 | 27.3 |
| | Rural | 47 | 21.3 |

Source: Filed data

Clinical characteristics of the participants

The clinical characteristics of 220 hypertensive participant is presented in table 2 below in the form of mean, minimum, maximum and standard deviation which revealed a mean average hypertensive score of SBP/DBP 142/88 for all study participants, indication majority of study participants have low GRF = 67, which almost approaching the severe CKD from. Furthermore alteration in Urea, Creatinine, Sodium Chloride and Potassium were documented as follow Urea mmol/L=21, Creatinine μ mol/L=115, Sodium mmol/L=148, Potassium mmol/L =5.3, Chloride mmol/L=105, Furthermore about 170 (77.3%) patients were on antihypertensive medication and 50 (22.7%) had not yet started any medication. 58 (26.4%) patients also had preexisting diabetes mellitus (table2).

Table 2 Clinical and biochemical characteristics of participants (N=220)

| Variable | Mean | Minimum | Maximum | SD |
|------------------------|------|---------|---------|------|
| SBP(mm/Hg) | 142 | 118 | 180 | 18.3 |
| DBP(mm/Hg) | 88 | 72 | 110 | 11.7 |
| Urea mmol/L | 21 | 2.3 | 52 | 43.3 |
| Creatinine μ mol/L | 115 | 58 | 279 | 36.6 |
| Sodium mmol/L | 148 | 137 | 151 | 4.3 |
| Potassium mmol/L | 5,3 | 4.1 | 5.8 | 2.1 |
| Chloride mmol/L | 105 | 97 | 115 | 3.7 |
| GFR | 67 | 13 | 102 | 23.7 |

SBP: Systolic Blood Pressure, DBP: Diastolic Blood Pressure

GFR: Glomerular Filtration rate, SD: Standard Deviation

Source: Filed data

Table 3 : Comorbidities and history of Antihypertensive medication of participants (n=220)

| Variable | Category | Frequency | Percentage |
|------------|----------|-----------|------------|
| Medication | Yes | 170 | 77.3 |
| | No | 50 | 22.7 |
| DM | Yes | 58 | 26.4 |
| | No | 162 | 73.6 |

Source: Filed data

Prevalence of hypertension stratified by age and gender

For the ages that are below 40 years, males have a higher prevalence of hypertension than female (59% versus 41%). The ages range from 40 – 60 show that the prevalence of the males is slightly higher than that of the females (53% for male versus 47% for female). For the ages that are above 60 years women have a higher prevalence (68%).

Prevalence of CKD in hypertensive patients

Of the 220 biochemistry reports seen, 71 (32.3%) participants had developed chronic kidney disease and it was at different stages. The clinical characteristics and GFR were used to determine the stage of the chronic kidney disease a participant was at. Of the 71 participants with chronic kidney disease, 16.9% were in stage 1, 22.5% were in stage 2, 49.3% were in stage 3, 7.1% were in stage 4 and 4.2% were in stage 5 (Figure 1). Of the 71 participants, 39 (55%) were female and 32 (45%) were male. 11(15.5%) participants were below 30 years old, 23 (32.4%) participants were between the ages of 30 and 50 and 37 (52.1%) participants were over 50 years old. Of the 71 participants, 100% were all black. 28 (39.4%)

of the participants also had Diabetes Mellitus. 23 (32.4%) participants were not on any antihypertensive drugs. 22.5% were from the rural areas, 32.4% were from semi-urban areas and 45.1% were from urban areas (Table 4).

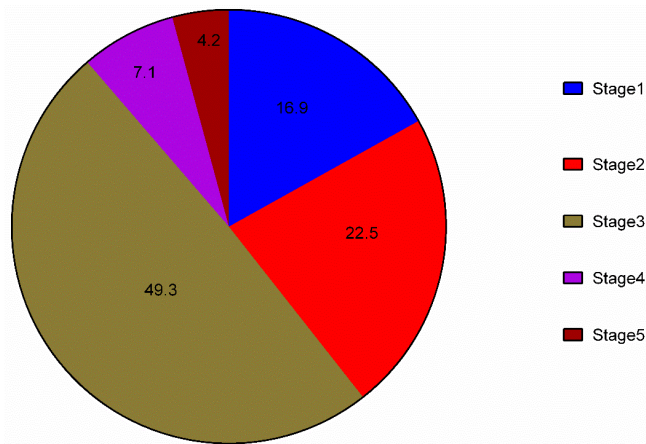


Figure 1: Stratified Prevalence of different stages of CKD in hypertensive patients (n=71). Majority of CKD patient with regards to severity of renal failure are in stage3 (49.3%), followed by stage 2(22.5%), stage1 (16.9%), stage4 (7.1%), stage 5

Prevalence of CKD by Stages and Risk factors of CKD in Hypertensive setting

Out of 220 hypertensive participant involved in this study about 71 participants developed CKD given a prevalence of 32.3% among them 39 (55%) were female and 32 (45%) were male. 11(15.5%) participants were below 30 years old, 23 (32.4%) participants were between the ages of 30 and 50 and 37 (52.1%) participants were over 50 years old. Of the 71 participants, 100% were all black. 28 (39.4%) of the participants also had Diabetes Mellitus. 23 (32.4%) participants were not on any antihypertensive drugs. 22.5% were from the rural areas, 32.4% were from semi-urban areas and 45.1% were from urban areas(table4) . Furthermore risk factors analysis indicated the was statistical significance in term of association between Hypertension induced CKD and risk factors such as gender OR 1.96 CI (1.09- 3.51) ,P=0.023, History of diabetes mellitus OR 2.58 CI(1.38-4.81) ,P= 0.0024, History of antihypertensive medication OR 0.46,CI(0.24-0.88) , P= 0.018 (table5), while location of residence whether urban or rural was not associated with CKD CI (0.37-1.18) , OR = 0.66, P=0.16 and race CI (0.29-99.8) ,OR= 5.44, P=0.177 were not as well associated with CKD

Table 4: Stratified prevalence of CKD by stages with various Risk factors (N=220)

| Variable | Category | CKD Stage1 - 5 (S1-S5) | | | | | Total |
|----------|----------|------------------------|----|----|----|----|--------|
| | | S1 | S2 | S3 | S4 | S5 | |
| Gender | Male | 5 | 7 | 13 | 4 | 3 | 32(45) |
| | Female | 7 | 9 | 22 | 1 | 0 | |

| | | | | | | | |
|------------|------------|----|----|----|---|---|----------|
| Age | <30 | 5 | 4 | 2 | 0 | 0 | 39(55) |
| | 30-50 | 2 | 7 | 13 | 1 | 0 | |
| | >50 | 5 | 5 | 20 | 4 | 3 | |
| Race | Black | 12 | 16 | 35 | 5 | 3 | 11(15.5) |
| | White | 0 | 0 | 0 | 0 | 0 | |
| DM | Yes | 3 | 7 | 13 | 3 | 2 | 23(32.4) |
| | No | 9 | 9 | 22 | 2 | 1 | |
| Residence | Urban | 6 | 8 | 13 | 3 | 2 | 37(52.1) |
| | Semi-urban | 2 | 8 | 11 | 1 | 1 | |
| | Rural | 4 | 0 | 11 | 1 | 0 | |
| Medication | Yes | 6 | 12 | 27 | 2 | 1 | 71(100) |
| | No | 6 | 4 | 8 | 3 | 2 | |

DM: Diabetes Mellitus
Source: Filed data

Table 5: Chi-square test on risk factors of CKD in Hypertensive patients (N=220)

| Variable | Category | CKD | No CKD | CI | OR | P-Value |
|------------|----------|-----|--------|-------|------|---------|
| Gender | Male | 32 | 44 | 1.09- | 1.95 | 0.02 |
| | Female | 39 | 105 | 3.51 | | |
| Age | <30 | 11 | 33 | 0.25- | 0.59 | 0.22 |
| | >30 | 60 | 116 | 1.39 | | |
| Race | Black | 71 | 144 | 0.29- | 5.44 | 0.17 |
| | White | 0 | 5 | 99.8 | | |
| DM | Yes | 28 | 30 | 1.38- | 2.58 | 0.002 |
| | No | 43 | 119 | 4.81 | | |
| Residency | Urban | 32 | 81 | 0.37- | 0.66 | 0.16 |
| | Rural | 39 | 68 | 1.18 | | |
| Medication | Yes | 48 | 122 | 0.24- | 0.46 | 0.01 |
| | No | 23 | 27 | 0.88 | | |

DM: Diabetes Mellitus
Source: Filed data

Discussion

Socio demographic and clinical characteristics

The demographic characteristics of study participants revealed that about 22.5% were from the rural areas, 32.4% were from semi-urban areas and 45.1% were from urban areas. This result shows that people from urban and semi urban areas were at a greater risk of developing chronic kidney disease from hypertension because of sedentary life styles which lack exercises and usually leads to obesity This study findings are in agreement with a study conducted by Kumela and colleagues in Ethiopia and another study in Ghana which revealed similar findings which all stipulated placed of residence was significantly associated with CKD due to hypertension [14] ;[13]. With respect to gender about 39 cases (55%) were female and 32 cases (45%) were male. There was a statistical significance in term of gender as potential risk factor likely because women are at a greater risk of getting hypertension after 60. Similarity in finding was observed in Ethiopia study where female account for 55.1% of CKD cases [20]. However in term of age no significant

difference was observed among age groups. In reference to clinical characteristics the physiological range for serum creatinine is 0.7 to 1.3 mg/dL (61.9 to 114.9 $\mu\text{mol/L}$) in men while it is 0.6 to 1.1 mg/dL (53 to 97.2 $\mu\text{mol/L}$) in women however in this present study mean creatinine level was 115 $\mu\text{mol/L}$ for both sex and it was greater than 1 mg/dl as reported by many studies that postulated that its high level correlates with chronic kidney disease among hypertensive patients and this could increase about 9 times a more likely event in developing chronic kidney disease in hypertensive clients when compared with their counterparts and this present study finds similar results with India study [21]. This present study also found high systolic and diastolic blood pressure as a significant risk factor for CKD in hypertensive setting, the increased diastolic blood pressure can lead to renal arteries narrowing and damage [22]. Furthermore in this present study alteration in sodium potassium and chloride were documented due to comorbid interaction between hypertension Diabetes and CKD

Prevalence of chronic kidney disease in hypertensive patients

It was reported that age, sex, level of education and religion significantly influence the prevalence trend of hypertension in elderly persons not only in Kampala but all over Africa as well [23]. There were no previous studies found in Zimbabwe pertaining to this research study. The present report evaluated the prevalence of CKD in adult hypertensive clients on follow-up clinic at Victoria provincial hospital and assessed risk factors of CKD in hypertensive setting. The prevalence of CKD in hypertensive clients was found to 32.3 % which is high when compare to Ethiopian study which found prevalence of 17.6% (95% CI: 14.7–20.8%) [20] as well with Jimma et al study (26%) [22]. Of the 220 records analyzed of hypertensive patients attended at Victoria Chitepo Provincial Hospital from July 2022 to October 2022 by making use of a GFR cut-off reference of 90 ml/min/1.73 m², 71 (32.3%) were found to have developed chronic kidney disease in different stages. 28 (39.4%) records of the participants were found to have Stage 1 and Stage 2 chronic kidney disease which is mild damage to the kidneys. 35 (49.3%) had Stage 3, 5 (7.1%) had Stage 4 and 3 (4.2%) had Stage 5 chronic kidney disease which ranges from mild to mostly severe kidney damage The find from this current study with regards to prevalence and its stratification of stage of CKD were low when compare to a prevalence study conducted in South Africa (45.5%) [24]. Among the main reasons that could explained variation in stages in CKD and the prevalence obtained in this study could mainly because Zimbabwe is an developing African country, with decreased awareness, as well as poor management and control of hypertensive disorders therefore stage 1 and stage 2 of the chronic kidney disease can easily progress to stage 3, 4 and 5 which is more severe. From pathophysiological point of view persistent high of blood pressure lead to renal vascular nephropathy, ending with a fall in glomerular filtration rate leading to renal diseases[25]. Using a 90 ml/min/1.73 m² cut-off reference, the overall proportion of CKD in this

investigation was low when compared with findings of study carried out in Ghana [26] which was 46.9%. This could be attributed to variation in a study participants, setting, and the sample size variation. This study is higher than the study conducted in Ethiopia which was 17.6%. This variation could be attributed to variability in study participants, the size of sample size as well as the settings of the investigation and the geographical variation among the two nations [19]. The mean average age was calculated and was 48 and the standard deviation was 11.3.

Risk factors for chronic kidney disease in Hypertensive clients

Among the 71 (32.3%) participants diagnosed with chronic kidney disease about 39 cases (55%) were female and 32 cases (45%) were male. There was a statistical significance in term of gender as potential risk factor likely because women are at a greater risk of getting hypertension after 60. Similarity in finding was observed in Ethiopia study where female account for 55.1% of CKD cases[20]. With regard to CKD stages men in their majority are in stage 4 and stage 5 and this corroborate with a study in Southwest Nigeria that revealed similar findings [27]. Men have a higher chance of developing end stage renal failure faster than women 11(15.5%) participants were below 30 years old, 23 (32.4%) participants were between the ages of 30 and 50 and 37 (52.1%) participants were over 50 years old. This shows that chronic kidney disease in hypertensive patients is more prevalent in people of advanced ages. This result is similar to the research study in Ghana [26]. Zimbabwe is a predominantly black country which explains why only the records of the black participants were diagnosed with CKD. In the present study about 28 cases (39.4%) of the participants were found to have Diabetes Mellitus. Diabetes mellitus as comorbidity. The potential pathophysiological mechanism for developing renal failure in diabetic mellitus setting is well known. The present study found Diabetes mellitus as potential risk factor for CKD in hypertensive patients, this finding corroborate with a study conducted in Asia which found that diabetes is associated with CKD in hypertensive clients [28]. A study conducted by Wei Chen and colleagues stipulated that diabetes mellitus, hypertension, and nephrotoxic drugs were reported to be highly associated with settlement of CKD with regards to albuminuria; hyperuricaemia, and reduced eGFR [29]. Not only drugs also dangerous heavy metals such as Cadmium were reported to be nephrotoxic therefore worsen CKD [30].

In this study about 23 (32.4%) participants were not on any antihypertensive drugs exposing them to high risk of uncontrolled hypertension therefore likely ending with CKD. Our study revealed that no compliance with anti-hypertensive therapy could be a significant risk factor for CKD

6. Conclusion and Future Scope

There is a significant rise in CKD among hypertensive patients attended at Victoria Chitepo Provincial Hospital in Mutare Zimbabwe. Gender, Increasing age, Race, diabetes mellitus and use of antihypertensive drugs and location of residence are significantly associated with CKD in those hypertensive patients. Optimizing and controlling hypertension may alleviate CKD in population exposed to high risk of cardiovascular disorders in developing nations. There should be known implementation awareness for prevention and treatment of hypertension. The present study has limitation due to its study design in addition it focus mainly to Manicaland province only therefore findings cannot be generalized. As recommendation there is also need to do this research on a larger scale for a longer period of time in order to be able to generalize it in Zimbabwe and for people.

Availability of data and materials

Data are available from the corresponding author upon demand

Competing interests

The authors declare they have no competing interests in this report

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Authors' Contributions

Author 1 T. S^{1,3}, and Author 4 : M. T. M. S^{1*} designed the works .analyzed data and write the first draft of manuscript , Author 2 : S.M. Or⁴ and author3 A. R. M. Y², revised the manuscript for its critical contents and assist in data analysis

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AUTHORS PROFILE.

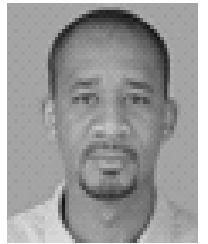
Maibouge Tanko Mahamane Salissou, Graduated from Ahmadu Bello University with a Bsc and MSc MED Physiology in 2012, He also Hold a Ph.D. in in Pathology and Pathophysiology from Huazhong University of Science and technology Wuhan China in 2019. He is currently working as Chair Pathologist in Department of Biomedical and Medical laboratory sciences at Africa University Mutare Zimbabwe. He published several SCI High Impact factor journal in Medicine. He has 8 years' experience in teaching and research, His main areas of research interest are: Neuropathology, Gynecological Pathology and oncology.



T. Shumba has just earned her Bachelor of Biomedical and medical laboratory sciences at Africa University Zimbabwe Her area of research interest is Histopathology, and chemical Pathology, She is currently undertaking internship in the advances techniques in diseases diagnosis



Abdoul Razak Mahamane Yacoubou Graduated from Ahmadu Bello University with a Bsc and MSc in Anatomy in 2012, He also Hold a Ph.D. in in Pathology and Pathophysiology from Huazhong University of Science and technology Wuhan China in 2019. He is currently working as Post-doctoral scholar in Department of pathophysiology. He published several SCI High Impact factor journal in Medicine. He has 10 years' experience in teaching and research, His main areas of research interest is in Neurological disorders



Sundika Makengo Olivier Graduated from University with a MBBS degree at University of Lubumbashi DRC Congo He also recently obtained a Master of Public Health obtained at Africa University Mutare Zimbabwe. As Physician he has 12 years' experience in both clinical and research setting, His area of research interest are Reproductive Health and Obstetrical complications in emergency setting



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