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PREVALENCE AND DETERMINANTS OF HYPERTENSION AMONG OUTPATIENT ADULTS IN NGARAMA DISTRICT HOSPITAL, RWANDA

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ABSTRACT

Background-Hypertension is a leading cause of cardiovascular diseases and a growing public health problem in many developed and developing countries. Epidemiological data in Rwanda, based on WHO estimates, suggest markedly high prevalence of hypertension as one of the main causes of deaths caused by non-communicable diseases. This study seeks to determine the prevalence and determinants of hypertension among outpatient adults in Rwanda

Methods- The study was cross-sectional study. Systematic sampling technique was used to get a representative sample. The sample size of this study was 286 outpatient adults in OPD at Ngarama District Hospital located in Gatsibo District. A structured questionnaire was used to collect data. Data was analysed by using SPSS. Descriptive analysis using frequencies and percentages was used to describe the basics characteristics of the respondents. The determinants of hypertension were determined using Chi-square test and multiple logistic regression. The findings of this study provided determinants of hypertension so as to prevent and control the disease. The researcher considered things with confidentiality of the respondents by assigning consent form and coding the questionnaires. Research permit and letter from the University was used so as to obtain permission to carry out the research study in Ngarama District.

Results- findings revealed that the majority of participants (92.3%) were coming from rural areas, 57.3% were females, 71.3% and were aged between 46 and 60 years. The prevalence of hypertension was found to be 16.1%. Among those with hypertension, 12.6% had stage 1 hypertension whereas 3.5% were at stage 2 of hypertension. After running multivariate analysis, respondents aged 40-60 years and more than 60years were more likely to be hypertensive (AOR=6.7; 95%CI: [1.34–13.10]; p=0.005), and (AOR=7.9; 95%CI: [2.78-20.97], p=0.018), respectively. The risk of having hypertension was 2.5 times (AOR=2.5; 95%CI: [1.14–5.80]; p=0.013) higher among respondents with secondary education than those with primary education. Respondents who were consuming too little salt were less likely to be hypertensive (AOR=0.4; 95%CI: [0.15–1.80)]; p=0.005) than those who were consuming an average quantity of salt. The prevalence of hypertension was found to be high among the adult outpatients at Ngarama district hospital in Rwanda. Interventions programs working at multiple levels are urgently needed that can increase awareness of hypertension, access to high blood pressure screening and treatment, and community wide health behavior interventions like decrease the salt in your diet, increase physical activity and limitation of alcohol are identified and

known to be effective in reducing high risk of hypertension

Conclusion- Interventions programmes working at multiple levels are urgently needed that can increase awareness of hypertension, access to high blood pressure screening and treatment, and community wide health behaviour interventions identified and known to be effective in reducing high risk of hypertension.

INTRODUCTION

Hypertension is a leading cause of cardiovascular diseases and a growing public health problem in many developed and developing countries. Hypertension is one of the five leading causes of mortality in the world and a major risk factor associated with more than 40% of deaths related to cardiovascular and renal diseases [2]. According to World Health Organization (WHO) estimates, hypertension or elevated blood pressure is a serious medical condition that significantly increases the risks of heart, brain, kidney and other diseases. An estimated of 1.13 billion people worldwide have hypertension, most (two-thirds) living in low- and middle-income countries. In 2015, 1 in 4 men and 1 in 5 women had hypertension. Fewer than 1 in 5 people with hypertension have the problem under control. Hypertension is a major cause of premature death worldwide. One of the global targets for non-communicable diseases is to reduce the prevalence of hypertension by 25% by 2025 [4]. Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure. It has been reported that one in four men and one in five women have raised blood pressure as a major modifiable risk factor for cardiovascular disease (CVD), it accounts for approximately 45%of global CVD morbidity and mortality. [37].

A systematic review and meta-analysis conducted to assess the recent burden of hypertension in Sub-Saharan Africa, based on studies published between 2000 and 2013 pooled data from 33 surveys involving over 110,414 participants of mean age 40 years. Hypertension prevalence varied widely across the studies (range 15%–70%) [3].

Although socio-economic status is not regarded as a “treatable” risk factor, its impact on blood pressure may be modified by better understanding of, and intervening on its mediating mechanisms [15].

The Rwanda NCD survey has shown that 21.3% of the survey participants have had their blood pressure ever taken by a health care professional. This includes 29.9% of females and 11.8% of males. Survey participants living in semi- urban and urban areas are more likely to have their blood pressure taken respectively 25.9% and 26.4% compared to 19.8% for rural residents (Rwanda, 2015). In a study conducted in Ruhengeri District Hospital found that the prevalence of hypertension in hospitalized patients in the department of internal medicine was 2.53% [12]. A population-based national estimate of the prevalence and risk factors associated with hypertension conducted in Rwanda showed that the overall prevalence of hypertension in Rwanda was 15.4% [14].

In their cross-sectional survey among 100 adults aged 27 to 67 years at an urban tertiary education institution in Rwanda showed that 36 participants were classified as being hypertensive, giving a crude prevalence of 36%. Of these only 3% were aware of their hypertensive status, 33% were not aware. The main finding of this survey has not found to be only the high prevalence (36%) of hypertension among employees in Rwanda but also the high prevalence of individuals not aware of their hypertension (33%). The low levels of

awareness is a concern but some researchers are of the opinion that this could be a reflection of the combined effects of competing priorities in health care, scarce re-sources, and the low levels of public education on non-communicable diseases [7]. Some studies stated vigorously, that one or more of these factors may permanently change physiological factors, predisposing the individual to an increased risk of cardiovascular disease later. Four main risk factors for major NCDs are tobacco use; physical inactivity; harmful use of alcohol and unhealthy diet. These risk factors, acting singly or in combination, significantly contribute to common NCDs and related conditions [20]. The risk factors for NCDs that influence individuals, households and communities are driven by social and economic determinants that exist outside the domain of the health sector.

These include poverty, globalization, trade, education, urbanization, climate change, employment conditions and gender disparities among others [21]. Progress in implementing comprehensive NCDs strategies and policies has been hampered by fragmented, scarce and lack of resources. Scarce resources and lack of policies and strategies for controlling NCDs are key challenges in the region [22].

METHODS

STUDY DESIGN, SITE AND POPULATION

This research was a hospital-based cross-sectional study to determine the prevalence of hypertension and its associated risk factors among adult outpatients in OPD at Ngarama District Hospital. A cross-sectional study was selected by the researcher because it helps to determine the prevalence and determinants of hypertension as both were measured at the same time. The researcher used a structured questionnaire in collecting data from the respondents. Ngarama Hospital is located about 23kms from the tarmac road leading to Nyagatare District in the Northern-Eastern of Rwanda. Ngarama is Gatsibo's referral hospital. It serves about 150,000 residents and by estimation, it welcomes at least 2700 outpatients per month. Ngarama District Hospital contains: Internal medicine, Emergency, Paediatrics, Surgery, Ophthalmology and mental health. systematic sampling technique to select respondents to be part of the study. Respondents were selected each third from the target population at regular intervals from the sampling frame. The first person within the interval was selected randomly using lottery. The target population was adults ranging from 35 years and above who were coming for medical check-up at the Ngarama District Hospital. The inclusion criteria were: being an adult with 35 years and aboveand freely sign a consent form to participate in the study.The exclusion criteria were being aged less than 35 years, not having signed a consent form to take part in the study, and if the respondent cannot respond/speak.

Study procedures

After authorization from Mount Kenya University, the researcher contacted Ngarama hospitals to request permission to conduct the study on their patients, the researcher and research assistant explained the importance of research and how to proceed. Approval from the appropriate authorities was received. The data were collected from April- May 2021. The researcher was filled himself the questionnaire by asking questions to the respondents: this method is called "survey questionnaire or structured interview".Statistical Analysis.

Descriptive statistics for sociodemographic characteristics were performed. Means and standard deviations were calculated for continuous variables, while frequencies and percentages were calculated for categorical variables. To assess whether sociodemographic, prevalence and determinant factors, lifestyle and dietary factors differ between hypertensive groups, the Pearson Chi-square test was used to test the independence between variables.

The association between sociodemographic characteristics, behavioral factors and hypertension were determined using bivariate and multivariable analyses methods. Furthermore, multivariate logistic regression was conducted for all variables of interest with p-value <0.05 in the bivariate model. These variables are sociodemographic including age, marital status, education; behavioral variables such as tobacco use, alcohol consumption, and physical activities. Adjusted odds ratios (AOR), 95% confidence intervals (CI), and p-values were generated to determine independent predictors for hypertension.

Results

Table 4. 1 Distribution of respondents by sociodemographic characteristics

Variables	Items	Frequency (n=286)	Percent (%)
Residence	Rural	264	92.3
	Semi-urban	22	7.7
Gender	Male	122	42.7
	Female	164	57.3
Age category	35-45 years	60	21.0
	46-60 years	204	71.3
	> 60 years	22	7.7
Marital status	Single	109	38.1
	Married	177	61.9
Education level	Primary	246	86.0
	Secondary	35	12.3
	University	5	1.7
Employment status	Employed	2	7.0
	Self-employed	57	19.9
	Unemployed	227	79.4
Social category	Category A	38	13.3
	Category B	133	46.5
	Category C	115	40.2

As presented in Table 4.1, study findings revealed that 92.3% of respondents were coming from rural areas, 57.3% were females, 71.3% were aged between 46-60 years (mean age: 47.04, Stand. Dev.: 9.5, minimum: 35.0 and maximum: 69.0), 61.9% were married, 86% had primary education, 79.4% were unemployed, and 46.5% were in the third social category.

Table 4. 2 Distribution of participants according to their behavioral factors

Variables	Items	Frequency (n)	Percent (%)
Currently smoking	Yes	128	44.8
	No	158	55.2
Frequency of smoking (n=128)	Yes	57	44.5
	No	71	55.5
Duration of smoking(n=128)	0-5 years	87	68.0
	6-10 years	4	3.1
	>10 years	37	28.9

Attempted to stop smoking (n=128)	Yes	28	21.9
	No	100	78.1
Alcohol consumption	Yes	193	67.5
	No	93	32.5
Frequency of alcohol consumption (n=193)	Occasionally	95	49.2
	Daily	28	14.5
	Weekly	70	36.3
Number of bottles drunk (n=193)	1-3 bottles	49	25.4
	4-6 bottles	101	52.3
	>6 bottles	43	22.3
Frequency of eating fruits	Occasionally	127	44.4
	Sometimes	159	55.6
Frequency of eating vegetables	Occasionally	79	27.6
	Sometimes	207	72.4
Frequency of eating added salt	Occasionally	73	25.5
	Sometimes	211	73.8
	Always	2	0.7
Quantity of salt consumed	1-3spoon salt	18	6.3
	4-6 spoon salt	137	47.9
	>6 spoon salt	131	45.8
Type of oil consumed	Vegetable oil	252	88.1
	Butter oil	24	8.4
	Other	10	3.5
Work involving vigorous intensity activity	Yes	181	63.3
	No	105	36.7
Sports, fitness and recreational activities	Yes	237	82.9
	No	49	17.1
Frequency of doing physical activity (n=237)	Every day	132	55.7
	Every week-end	44	18.6
	2 days/week	16	6.8
	3 days/week	28	11.8
	>3 days/week	17	7.2
Walking or cycling (n=237)	Yes	183	77.2
	No	54	22.8
Hours spent per day in walking or cycling (n=183)	0-3 hours/day	157	85.8
	>3 hours/day	26	14.2

Source: Primary data (2021)

Findings presented in Table 4.2 indicated that among 286 participants, 55.2% were not smoking while among 44.8% who were smoking, 44.5% were daily smoking versus 55.5% not daily smoking, 68% had 0-5 years of smoking, and 78.1% did not try to stop smoking. Among 67.5% consuming alcohol, 49.2% were consuming it occasionally and 52.3% were drinking between 4-6 bottles. More than a half of participants (55.6%) said they were sometimes eating fruits, 72.4% were sometimes eating vegetables, and 73.8% were sometimes eating added salt at a too little quantity (47.9%). The majority of the respondents (88.1%) reported they were consuming vegetable oil, and 63.3% said their work involved vigorous intensity activity. The majority of participants (82.9%)

accepted they were involved in sports, fitness and recreational activities while among them, 55.7% were doing physical activity every day, 77.2% were walking or cycling and 85.8% were spent 0-3 hours per day in walking or cycling.

4.2.1 Prevalence of hypertension among adult outpatients at Ngarama DH

Variables	Items	Frequency (n)	Percent (%)
Hypertension	Yes	46	16.1
	No	240	83.9
Stage of hypertension	Stage 1	36	12.6
	Stage 2	10	3.5
	Normal	240	83.9

Source: Primary data (2021)

The total sample size was 286 adult outpatients. All of them took part in the study and findings in Table 4.3 indicate that the prevalence of hypertension among them was 16.1% while 83.9% of respondents have been found without hypertension based on the blood pressure measurements (systolic and diastolic blood pressure in mmHg). Among those with hypertension, 12.6% had hypertension at stage 1 whereas 3.5% were at stage 2 of hypertension.

Behavioural factors associated with hypertension at Ngarama DH

Variables	Item	Hypertension		Pearson square (X^2)	P-Value
		Yes n(%)	No n(%)		
Currently smoking	Yes	21(16.4)	107(83.6)	0.018	0.894
	No	25(15.8)	133(84.2)		
Alcohol consumption	Yes	26(13.5)	167(86.5)	3.001	0.083
	No	20(21.5)	73(78.5)		
Frequency of eating fruits	Occasionally	18(14.2)	109(85.8)	0.618	0.432
	Sometimes	28(17.6)	131(82.4)		
Frequency of eating vegetables	Occasionally	16(20.3)	63(79.7)	1.406	0.236
	Sometimes	30(14.5)	177(85.5)		
Frequency of eating added salt	Occasionally	14(19.2)	59(80.8)	1.033	0.597
	Sometimes	31(15.2)	179(84.8)		
	Always	1(50.0)	1(50.0)		
Quantity of salt consumed	Too much	6(33.3)	12(66.7)	12.13	0.002
	Too little	12(8.8)	125(91.2)		
	Average	28(21.4)	103(78.6)		
Type of oil consumed	Vegetable oil	42(16.7)	210(88.3)	1.986	0.370
	Butter oil	4(16.7)	20(83.3)		
	Other	0(0.0)	10(100.0)		
Work involving vigorous intensity activity	Yes	26(14.4)	155(85.6)	1.080	0.299
	No	20(19.0)	85(81.0)		
Sports, fitness and recreational activities	Yes	42(17.7)	195(82.3)	2.749	0.097
	No	4(8.2)	45(91.8)		

Source: Primary data (2021)

As presented in Table 4.5, results from a bivariate analysis indicate that the quantity of salt consumed (p=0.002) was found to be associated with hypertension as the p-value<0.05.

Predictors of hypertension among adult patients at Ngarama DH

Variables	Items	Crude OR (95%CI)	Adjusted OR (95%CI)
Age category	35-45 years	Ref.	
	46-60 years	7.9(1.87-33.94)	6.7(1.34–13.10)
	> 60 years	8.2(2.63–21.42)	7.9(2.78-20.97)
Marital status	Single	Ref.	

	Married	1.4(0.75-2.95)	1.3(0.61–1.87)	0.244
Educational level	Primary	Ref.		
	Secondary	2.7(1.24-6.13)	2.5(1.14–5.80)	0.013
	University	1.1(0.58–1.78)	0.95(0.43–1.88)	0.99
Quantity of salt consumed	Too much	1.8(0.63-5.33)	1.4(0.15-4.39)	0.262
	Too little	0.3(0.17-0.72)	0.4(0.15–1.80)	0.005
	Average	Ref.		

The multivariate logistic regression revealed that an increase in age was associated with an increase in the risk of having hypertension, being 6.7 times (AOR=6.7; 95%CI: [1.34–13.10]; p=0.005).and 7.9 times (AOR=7.9; 95%CI: [2.78-20.97], p=0.018) more than respondents aged 35-45 years old. The risk of having hypertension was found to be 2.5 times (AOR=2.5; 95%CI: [1.14–5.80]; p=0.013) higher among respondents with secondary education than those with primary education. Respondents who were consuming too little salt were less likely to be hypertensive (AOR=0.4; 95%CI: [0.15–1.80)]; p=0.005) than those who were consuming an average quantity of salt.

Discussion

This study provided hospital-based estimates of hypertension at Ngarama District Hospital, which revealed an overall prevalence of 16.1%, among the population aged from 35 years and above. The respondents' mean age were 47.04, Stand. Dev. = 9.5, minimum age=35 and maximum=69.0. This prevalence was near one's found in a population-based national estimate conducted in Rwanda (15.3%) among the population aged between 15-64 years [14].

Also, this prevalence was about 1.25 times greater than what was reported through hospital-based data [33], but similar to the findings of a previous study in Bugesera district [34]. The prevalence of hypertension observed in this study is lower than what has been revealed by similar studies conducted in other low- and middle- income countries nonetheless we consider this prevalence as high.

In a nationally representative population-based survey on hypertension in Indonesia, the prevalence was 33.4% in 2014-2015 (35); the Myanmar in 2014 survey found 30.1% in 15-64-year-olds [36], and the China survey in 2015 of 29.6% in individuals aged 18 years and older [37], and similar to the global adult (≥20 years) prevalence in low- and middle- income countries (31.5%) [38], but higher in Iran [39], [40], Sri Lanka [41], and Vietnam [42].

The study finding indicated that the marital status was not statistically significant associated with having hypertension (p=0.244). This finding was inconsistent with findings from Kenya where in marital union was associated with higher risk (AOR=1.27, 95%CI: [1.02 1.57], p=0.013) of having of NCD risk factors [21].

In this study, respondents with secondary level of education were more likely to be hypertensive (AOR=2.5; 95%CI: [1.14–5.80]; p=0.013) than those with primary level of education. This finding was different with what found in a study conducted in Indonesia where there was a high prevalence of hypertension in people with low or no education [35].

So, this might be related to having a huge number of risk factors such as stress, poor dietary habits, poor working conditions, and lack of access to health services in Turkey [43].

The study finding was consistent with what found in a study conducted by Krauss et al. [44] where the elevated blood pressure among the study participants may not only be attributable to smoking and physical inactivity but also linked to other risk factors such as alcohol consumption and the quantity of salt consumed [36], [37], [45], [46] and [34]. In agreement with some preceding studies in Nigeria [47] and in Saudi Arabia [48], this study revealed that consuming too little salt was less likely to be associated with hypertension(AOR=0.4; 95%CI: [0.15–1.80)]; p=0.005).

Conclusion

The study found a high prevalence of hypertension in a representative sample size of the adult outpatients at Ngarama district hospital in Rwanda. The study identified age, marital status, education, smoking, alcohol consumption, quantity of salt consumed, and physical inactivity as the risk factors associated with hypertension. The psychosocial stress, loss of job and poverty were found as outcomes of hypertension. Interventions programs working at multiple levels are urgently needed that can increase awareness of hypertension, access to high blood pressure screening and treatment, and community wide health behavior interventions identified and known to be effective in reducing high risk of hypertension.

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