

ELEVATED BLOOD PRESSURE AMONG ADULTS AGED ABOVE 18 YEARS OBTAINING CARE AT A SELECTED TEACHING HOSPITAL IN KIGALI CITY

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Abstract

Background

Non-communicable diseases (NCDs) are an expanding global public health problem, especially in developed countries. Elevated blood pressure is a public health problem that is a major cause of morbidity. The study was aimed to determine prevalence and factor associate with elevated blood pressure among adults aged above 18 years obtaining care at Kibagabaga hospital in Kigali city.

Methods

The study was cross-sectional study. Consecutive sampling technique was used for selecting study participants. The sample size was 286 adults aged above 18 years obtaining care at Kibagabaga hospital in Kigali city. A structured questionnaire, blood pressure measurement and anthropometric measurement and were used to collect data. SPSS Version 21 was used for data analysis. Descriptive analysis, chi square, and multivariable logistic regression analysis were used. At 95% confidence level, $P < 0.05$ was considered statistically significant

Results

A total of 286 adults above 18 years obtaining care at Kibagabaga hospital in Kigali city have been interviewed. The age range is 21 years old and 92 years old, with an age mean of 55.43 and a standard deviation of 13.917. The prevalence of elevated blood pressure was 17.5%. Factors associated with elevated blood pressure among adults aged above 18 years were alcohol consumption that is correlated with a higher risk of developing elevated blood pressure. where Respondents who consume alcohol were found to have approximately 7.8 times higher odds of having elevated blood pressure and they were significantly associated (AOR=7.848; 95%CI: 1.164-52.919; $p=0.034$) compared to those who do not consume alcohol. There was a correlation found between diabetes and elevated blood pressure. Respondents with diabetes were more likely to experience elevated blood pressure (AOR=3.094, 95%CI: 1.134-8.437, $P=0.027$) compared to those who had not diabetes. Family history of hypertension was significantly associated with 2.7 times great chance to develop elevated blood pressure in individuals who had family history of hypertension (AOR = 2.751, 95% CI: 1.254-6.035, $p=0.012$) compared to those who had not.

Conclusion

This study showed that prevalence of elevated blood is high therefore there was a need to guide policymakers, health professionals, researchers, and stakeholders to prioritize areas and interventions. There should be routine examination of blood pressure among patients. This will enable early detection, control, and treatment after availing of protocol, policy, and guidelines.

Keywords: Elevated Blood Pressure, Prevalence, Teaching Hospital and Kigali City

Introduction

Non-communicable diseases (NCDs) are an expanding global public health problem, especially in developed countries. Hypertension is a global public health problem that is the third leading cause of death and a major source of morbidity (Solomon et al., 2023). Hypertension can raise your chance of developing heart, brain, kidney, and other illnesses. Over a billion people, or nearly 1 in 4 men and 1 in 5 women, are affected by it, making it a significant cause of premature death globally. Two-thirds of cases of hypertension are found in low- and middle-income nations, which bear a disproportionate burden of the disease in part because of recent increases in risk factors in those populations (WHO, 2023). Based on estimates, 1.39 billion adults globally (1 out of every 4 people) have hypertension, and it is projected that this prevalence will increase for a number of Epidemiological and demographic issues, such as urbanization, particularly in low- and middle-income nations (Omar et al., 2020).

The Americas have the lowest overall prevalence of hypertension (18%) in the WHO Region, whereas Africa has the highest prevalence (30%) (Nahimana et al., 2018). In the USA, the prevalence of hypertension was 49.64%. (Chobuo et al., 2020), in China hypertension prevalence was 29.6% (Wang et al., 2023) and also Hypertension prevalence in metropolitan France, a high-income nation, was estimated at 30.6% (Calas et al., 2022). In Africa, Hypertension affected 54.6 million people in 1990, 92.3 million in 2000 and 130.2 million in 2010. By 2030, this might increase to 216.8 million under current conditions (Adeloye & Basquill, 2014). It is estimated that 74.7 million people in Sub-Saharan Africa (SSA) suffer from hypertension, and by 2025, that number will rise to 125.5 million (Ogah & Rayner, 2013). Regarding a prevalence of 27% in Sub-Saharan Africa and 33.3% in Northern Africa, hypertension is more prevalent in the continent of Africa (Abdelbagi et al., 2021).

In Rwanda, hypertension is a major contributor to cardiovascular disease and regarded as a public health problem, particularly in urban regions. The prevalence of hypertension projected to be 15.9%, and in 2025, it is predicted to reach 17.78 percent due to risk factors already in place, these include poor diets, physical inactivity, smoking, alcohol misuse, and other risk factors that cannot be changed, such as age and family history (Rwanda Biomedical Centre, 2022).

Elevated blood pressure is a significant issue in developing nations like Rwanda, leading to increased risk of heart disease, stroke, renal failure, early mortality, and disability. However, there has not been much work done recently, some research gaps are still there, and there is also a gap in knowledge on the prevalence and factors associated with elevated blood pressure among adults aged above 18 years, particularly in the teaching hospital in Kigali city. The Current study determines prevalence and factors associated with elevated blood pressure among adults aged above 18 years obtaining care at Kibagabaga hospital in Kigali city.

Methods

Study design and participants

The cross-sectional study was conducted from April to May 2024, involving adults aged above 18 years obtaining care at Kibagabaga hospital in Kigali city. Rwanda is among seven countries that make East Africa community countries. Its capital city is Kigali. It has a population of estimated 1,745,555, with 50.6% being male and 49.1% being female (RPHC, 2022). Kibagabaga hospital is located in Rugero Village; Kimironko Sector; its radiation area is Gasabo; and it receives patients from Gasabo district and those who come from other surrounding districts (Kicukiro, Nyarugenge) and elsewhere. An estimate with 95% confidence interval with a margin of error 5% was used. The Fisher's formula was utilized to determine the sample size. A sample size of 286 was used in the study. A consecutive sampling technique was used where every subject meeting the criteria of inclusion is selected. The inclusion criteria are: being an adult aged above 18 years obtaining care at Kibagabaga hospital in Kigali city and freely signing a consent form to participate in the study; Data from 286 participants were analyzed.

Study procedures

After receiving authorization from Mount Kenya University, the researcher approached Kibagabaga hospital to request permission to perform the study. The researcher and research assistant explained the significance of the research and how to proceed. The necessary approvals were obtained. The instrument for data collection was a structured interviewer-administered questionnaire adapted from the World Health Organization's STEPswise approach to surveillance (STEPS) instrument. The interview questionnaire was divided into three sections: measures, behavioral and medical-related aspects, and socio-demographic characteristics. Data was collected from April to May 2024. Data gathered by health professional in collaboration with the researcher by asking questions to respondents, A blood pressure measurement was taken; the respondent was sitting quietly for fifteen minutes with their arms at their sides, their backs supported, and their legs uncrossed. Three readings of their systolic and diastolic blood pressure were taken, with a three-minute gap in between each reading. The analysis was conducted using the average of the second and third readings. Height and weight were measured, and then Body mass index (BMI) was also calculated from the measurements made using the portable standard stature scales and digital weighing equipment, respectively.

Statistical Analysis

Data entry was done in Excel, and then data was imported to SPSS software version 21 for statistical analysis. Descriptive statistics for socio-demographic characteristics were performed and presented using tables with frequency and percent. At the bivariate analysis level, chi square, and P-value were used to determine the relationship between the identified factors and elevated blood pressure and all variables that are significantly associated with elevated blood pressure with $p\text{-value} < 0.05$ in bivariate model were selected for multivariate analysis. Multivariable logistic regression analysis was conducted to adjust and control confounding factors. 95% CIs, p-values and adjusted odd ratios were calculated to determine independent predictors for elevated blood pressure.

Results

Characteristics of Participants

Characteristic of participants by social characteristics

Table 1 study findings reveal that about 15 % of 286 research participants were between the ages of 19 and 39, 43.4 % between the ages of 40 and 59, and 41.6% between the ages of 60 and beyond (mean age:55.43 , standard deviation:13.917 ,minimum:21 and maximum:92). The majority of participants, 68.2%, were female. In terms of level of education, the majority of respondents(43.7) went to primary school, followed by secondary school with 33.9%, and 57.3 were married, 65.0% were unemployed, and 47.6% of respondents said they were in social category 2.

Table 1. Characteristic of participants by sociodemographic characteristics

Variables	Frequency (n=286)	Percentage (%)
Gender		
Male	91	31.8
Female	195	68.2
Age Category		
19-39 years	43	15
40-59 years	124	43.4
≥60 years	119	41.6
Marital status		
Single	18	6.3
Married	164	57.3
Others(divorced, widowed)	104	36.4
Residence		
Rural	103	36
Urban	183	64
Level of education		
No formal education	62	21.7
Primary	125	43.7
Secondary	97	33.9

Tertiary	2	0.7
occupation		
Employed	100	35
Unemployed	186	65
Ubudehe categories		
Category1	33	11.5
Category2	136	47.6
Category3	117	40.9

Source: Primary data (2024)

Characteristic of participants according to their behavioral factors

Findings presented in Table 2 indicated that among 286 participants, 94.8% were not smoking, while among 5.2% who were smoking, 4.2% were daily smoking versus 95.8% not daily smoking. Among 75.9 % consuming alcohol, 65.7 % were consuming it occasionally. More than a half of participants (72.7) said they were occasionally eating fruits, 56.6 % were sometimes eating vegetables, and 75.5% were not eating added salt, the estimation of intake salt is too little by 52.1%. Most of the respondents (88.1%) reported they were consuming vegetable oil, and 78.3% claimed they involved physical activity. 58% had no family history with hypertension while 42% had family history with hypertension. The majority of respondents (72.7%) had not diabetes versus 27.3% had diabetes, 16.1% taking any diabetes medication. 40.9% were between BMI 18.5-24.9 Normal, followed by 25-29.9 Overweight(33.6%).

Table 2 Characteristic of participants according to their behavioral factors

Variables	Frequency (n=286)	Percent (%)
Smoking		
No	271	94.8
Yes	15	5.2
Daily smoker		
No	274	95.8
Yes	12	4.2
Alcohol consumption		
No	69	24.1

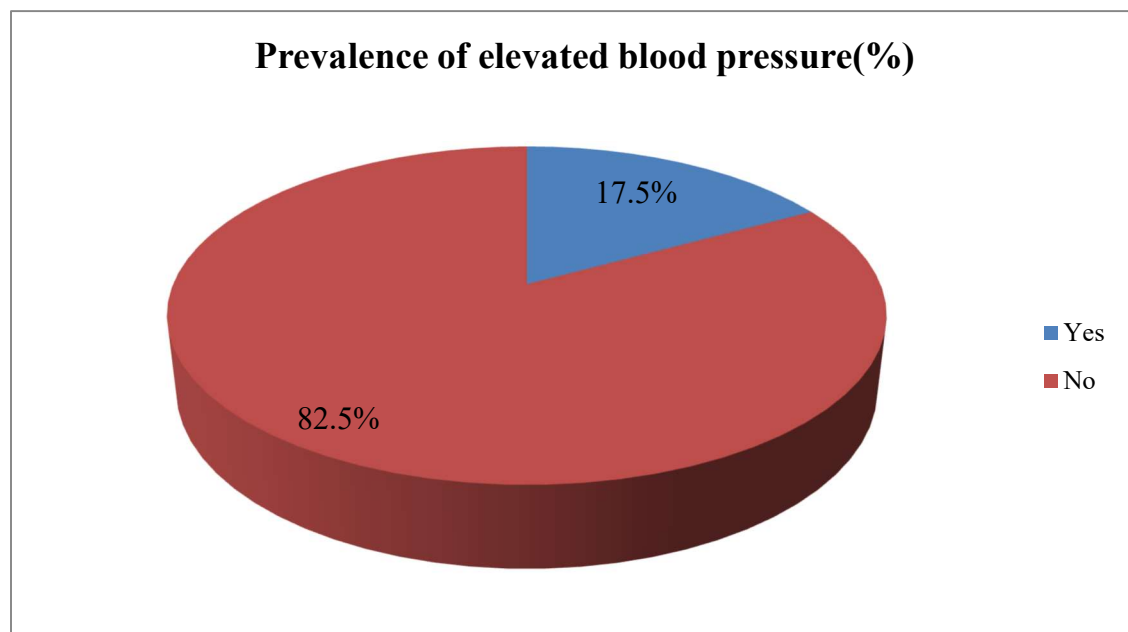
Yes	217	75.9
Frequency of Alcohol consumption		
Daily	7	2.4
Weekly	12	4.2
Occasionally	188	65.7
None of above	79	27.6
Frequency of eating fruit		
Never	16	5.6
Occasionally	208	72.7
Sometimes	62	21.7
Frequency of eating vegetable		
Never	6	2.1
Occasionally	116	40.6
Sometimes	162	56.6
Always	2	0.7
Frequency of eating added salt		
Never	216	75.5
Occasionally	45	15.7
Sometimes	19	6.6
Always	6	2.1
Estimation of intake salt		
Far too little	57	19.9
Too little	149	52.1
Average	52	18.2
Too much	28	9.8
Type of oil consumed		
Vegetable oil	252	88.1

Butter oil	7	2.4
Other	27	9.4
Physical activity		
No	62	21.7
Yes	224	78.3
Family history with hypertension		
No	166	58
Yes	120	42
Diabetes		
No	208	72.7
Yes	78	27.3
Taking any diabetes medication		
No	240	83.9
Yes	46	16.1
BMI		
Below 18.5 Underweight	12	4.2
18.5-24.9 Normal	117	40.9
25-29.9 Overweight	96	33.6
Above 30.0 Obesity	61	21.3

Source: Primary source (2024)

The prevalence of elevated blood pressure among adults aged above 18 years

The total sample size was 286 adults obtaining care at Kibagabaga hospital in Kigali city during the period of this study. All of them took part in the study and findings in graph below indicate that the prevalence of elevated blood pressure among them was 17.5%.



Factors associated with elevated blood pressure among adults aged above 18 years

Table 3 presents the result from bivariate analysis. The findings indicate that 21.9% lived in urban and Residence was significantly associated with elevated blood pressure with a p-value < 0.009. People consume alcohol made up 21.2%, and Alcohol consumption was statistically linked with elevated blood pressure with a p-value of 0.001. Frequency alcohol consumption was statistically connected with elevated blood pressure with a p-value <0.019 and 42.9% consume alcohol daily. A p-value of less than 0.001 showed that Physical activity was linked to elevated blood pressure and 37.1% of those were not involved in physical activities. Family history with hypertension was related to elevated blood pressure with a p-value <0.011 and 24.2% had family history with hypertension. Diabetes had a statistically significant association with elevated blood pressure with p-value of <0.001 and 37.2% indicated they had diabetes. Taking any diabetes medication had a statistically significant association with elevated blood pressure with a p-value of <0.001 and 45.7% were Taking any diabetes medication.

Table 3 Bivariate analysis of factors associated with elevated blood pressure among adults aged above 18 years

Variables	Elevated blood pressure		X ² /FET	P-value
	1 Yes	2 No		
	n (%)	n (%)		
Gender				
Male	19(20.9%)	72(79.1%)	1.067	0.302
Female	31(15.9%)	164(84.1%)		

Age Category				
19-39 years	6(14%)	37(86%)	0.471	0.790
40-59 years	23(18.5)	101(81.5%)		
≥60 years	21(17.6%)	98(82.40%)		
Marital Status				
Single	2(11.1%)	16(88.9%)	1.709	0.438
Married	33(20.1%)	131(79.9%)		
Others(divorced, widowed)	15(14.4%)	89(85.6%)		
Residence				
Rural	10(9.7%)	93(90.3%)	6.743	<0.009
Urban	40(21.9%)	143(78.1%)		
Level of education				
No formal education	8(12.9%)	54(87.1%)	2.945	0.371
Primary	20(16%)	105(84%)		
Secondary	22(22.7%)	75(77.3%)		
Tertiary	0(0%)	2(100%)		
Occupation				
Employed	22(22%)	78(78%)	2.175	0.140
Unemployed	28(15.1%)	158(84.9%)		
Ubudehe categories				
Category1	7(21.2%)	26(78%)	3.243	0.198
Category2	18(13.2%)	118(86.8%)		
Category3	25(21.4%)	92(78.6%)		
Smoking				

No	45(16.6%)	226(83.4%)	2.757	0.097
Yes	5(33.3%)	10(66.7%)		
Daily smoker				
No	47(17.2%)	227(82.8%)	0.447	0.504
Yes	3(25%)	9(75%)		
Alcohol consumption				
No	4(5.8%)	65(94.2%)	10.305	<0.001
Yes	46(21.2%)	171(78.8%)		
Frequency alcohol consumption				
Daily	3(42.9%)	4(57.1%)	9.099	<0.019
Weekly	1(8.3%)	11(91.7%)		
Occasionally	39(20.7%)	149(79.3%)		
None of above	7(8.9%)	72(91.1%)		
Frequency of eating fruit				
Never	4(25%)	12(75%)	1.169	0.593
Occasionally	37(17.8%)	171(82.2%)		
Sometimes	9(14.5%)	53(85.5%)		
Frequency of eating vegetable				
Never	1(16.7%)	5(83.3%)	1.503	0.698
Occasionally	17(14.7%)	99(85.3%)		
Sometimes	32(19.8%)	130(80.2%)		
Always	0(0%)	2(100%)		

Frequency of eating added salt				
Never	33(15.3)	183(84.7%)	5.564	0.115
Occasionally	11(24.4%)	34(75.6%)		
Sometimes	6(31.6%)	13(68.4%)		
Always	0(0%)	6(100%)		
Estimation of intake salt				
Far too little	6(10.5%)	51(89.5%)	5.622	0.132
Too little	24(16.1%)	125(83.9%)		
Average	14(26.9%)	38(73.1%)		
Too much	6(21.4%)	22(78.6%)		
Type of oil consumed				
Vegetable oil	45(17.9%)	207(82.1%)	0.216	0.898
Butter oil	1(14.3%)	6(85.7%)		
Other	4(14.8%)	23(85.2%)		
Physical activity				
No	23(37.1%)	39(62.9%)	21.111	<0.001
Yes	27(12.1%)	197(87.9%)		
Family history with hypertension				
No	21(12.7%)	145(87.3%)	6.403	<0.011
Yes	29(24.2%)	91(75.8%)		
Diabetes				
No	21(10.1%)	187(89.9%)	28.843	<0.001
Yes	29(37.2%)	49(62.8%)		

Taking diabetes medication	any				
No		29(12.1%)	211(87.9%)	30.153	<0.001
Yes		21(45.7%)	25(54.3%)		
BMI					
Below Underweight	18.5	0(0%)	12(100%)	6.951	0.066
18.5-24.9 Normal		15(12.8)	102(87.2%)		
25-29.9 Overweight		20(20.8%)	76(79.2%)		
Above Obesity	30.0	15(24.6%)	46(75.4%)		

Source: Primary data (2024)

Predictors of elevated blood pressure among adults aged above 18 years at Kibagabaga hospital

Table 4 shows respondents who consume alcohol were found to be 7.8 times more likely to have elevated blood pressure and they were significantly associated (AOR=7.848; 95%CI: 1.164-52.919; p=0.034) compared to those who do not consume alcohol. Family history of hypertension was also found to be an important factor, those who were found to have family history of hypertension were found to be 2.7 times more likely to have elevated blood pressure (AOR = 2.751, 95% CI: 1.254-6.035, p=0.012) compared to those who had not.

Development of elevated blood pressure was found to be associated with diabetes where Respondents with diabetes are 3 times more likely to develop elevated blood pressure (AOR=3.094, 95%CI: 1.134-8.437, P=0.027) compared to those who had not diabetes.

Table 4 Predictors of elevated blood pressure among adults aged above 18 years at Kibagabaga hospital

Variables	COR Value	95% CI for COR	P-value	AOR	95% C.I for AOR	P-value
		Lower Upper			Lower Upper	

Residence

Rural	0.384	0.183	0.806	0.011	0.373	0.160	0.870	0.023
Urban	Ref				Ref			

Alcohol consumption

No	Ref				Ref			
Yes	4.371	1.513	12.628	0.001	7.848	1.164	52.919	0.034

Frequency alcohol consumption

Daily	Ref				Ref			
Weekly	0.121	0.010	1.531	0.103	0.116	0.006	2.189	0.151
Occasionally	0.349	0.075	1.624	0.180	0.494	0.075	3.240	0.462
None of above	0.130	0.024	0.700	0.018	1.178	0.099	14.020	0.897

Physical activity

No	Ref				Ref			
Yes	0.232	0.121	0.447	0.001	0.179	0.078	0.412	0.001

Family history with hypertension

No	Ref				Ref			
Yes	2.200	1.184	4.089	0.012	2.751	1.254	6.035	0.012

Diabetes

No	Ref				Ref			
Yes	5.270	2.769	10.032	0.001	3.094	1.134	8.437	0.027
Taking any diabetes medication								
No	Ref				Ref			
Yes	6.112	3.041	12.283	0.001	2.559	0.849	7.716	0.095

Source: Primary data (2024)

Discussion

We aimed to determine prevalence and factors associated with elevated blood pressure among adults aged above 18 years obtaining care at a selected teaching hospital in Kigali city, the capital city of Rwanda. Rwanda is one of the seven countries that comprise the East African Community. Our findings indicate that prevalence was 17.5%. The reported rate of elevated BP in this study was also lower than 18.1% reported in a study conducted in Mwanza region, Tanzania (Sungwa et al., 2020). This reported prevalence, however, is approximately 1.5 times lower than the prevalence of 27% in Sub-Saharan Africa (Abdelbagi et al., 2021). The other key finding in this study is that Alcohol consumption was significantly associated with elevated blood pressure. The study finding was consistent with what was found in a study conducted by Ntaganda et al where BP was correlated with alcohol consumption and other factors like age, weight, waist circumference and smoking (Ntaganda et al., 2022)

The report in the current study showed that Family history of hypertension is an important factor in the development of elevated blood pressure, where those who were found to have family history of hypertension were found to be 2.7 times more likely to have elevated blood pressure (AOR = 2.751, 95% CI: 1.254-6.035, p=0.012) compared to those who had not. This finding reinforces consistently reported observation that having relatives with a history of hypertension demonstrates the strongest association (Tesfaye et al., 2019). In this study findings indicate diabetes was significantly associated with elevated blood pressure. This finding was consistent with findings from Nepal where diabetes was associated with higher risk of having elevated blood pressure (Dhungana et al., 2016)

Conclusions

The study revealed that 17.5 % of participants had elevated blood pressure and it was found that the important factors associated with elevated blood pressure were alcohol consumption, family history of hypertension and diabetes. These findings underscore the need for Protocols and guidelines regarding health promotion, preventing and education of elevated blood pressure must be developed and utilized by healthcare providers in health facilities in Rwanda. Routine examinations of blood pressure among patients were advised.

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Competing Interests

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Data availability

Authors declare that data are available from Jean De Dieu upon written request

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