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Prevalence of Hypertension and Associated Factors among Patients Attending Hoima Regional Referral Hospital, Hoima District Western Uganda

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ABSTRACT

Hypertension is an important contributor to the global burden of disease and mortality, and is a growing public concern in the developing world but data on hypertension and its associated factors among populations in the developing nations is minimal. However, in Uganda as the rest of Sub-Saharan Africa (SSA), emphasis has been placed on communicable diseases which are also highly prevalent in the region. This study assessed the prevalence of hypertension and its associated factors among adults twenty years and above attending Hoima Regional Referral Hospital. A cross-sectional study design was used. The study employed qualitative and quantitative research approaches to collect data. This study found a relatively high prevalence of hypertension (17.1%) among patients attending Hoima Regional Referral Hospital. The prevalence of hypertension in this peri-urban study area confirms the growing public health challenge of non-communicable diseases in Uganda. However, community-based studies are required to determine the extent of this problem and the associated factors of hypertension in Ugandan communities, owing to the increasing burden of NCDs in developing countries. We need interventions that aim to reduce the associated factors identified in this study, targeting the entire population to lower the risk and prevalence of hypertension.

Keywords: Hypertension, Sub-Saharan Africa, Communicable diseases, cardiovascular diseases

INTRODUCTION

Hypertension is defined as persistent high blood pressure within the arteries [1]. According to the Uganda Clinical Guidelines 2016, the upper limit of normal blood pressure 130/80mmHg whereas the ACC/AHA guidelines of 2017 lowered the upper limit to 130/80 mmHg and as a result nearly half of the adult United States of America's population (46%) was estimated to be having hypertension with the greatest impact among young population [2].

The global briefing on hypertension published on the occasion of the World Health Day 2013 stated that hypertension became a global public issue in the early 21st century. The document explained that hypertension is preventable and treatable. Governments, health workers, civil societies, the public, families and individuals can join forces to reduce its impact [3]. Hypertension doubles the risk of cardiovascular diseases (CVD) including coronary heart disease, congestive heart failure ischemic and hemorrhagic stroke, renal failure and peripheral arterial disease [4, 5]. Systemic blood pressure rises with age and the prevalence of CVD (particularly stroke and coronary artery disease) is closely related to average blood pressure at all ages, even when blood pressure readings is in the so called normal ranges, thus a practical definition of hypertension is

the level of blood pressure at which the benefits of treating outweigh the costs and hazards [6]. In adults diastolic blood pressure also increases progressively with age until 55 years after which it tends to decrease. The consequence is the widening of the pulse pressure (the difference between systolic and diastolic blood pressure) beyond 60 years of age [7]. Obesity and weight gain are strong independent risk factors for hypertension [8, 9]. It has been estimated that 60% of hypertensive patients are more than 20% overweight. Hypertension is strongly linked with individual and societal lifestyle such as tobacco smoking, excessive alcohol consumption, physical activity and unhealthy diets (excessive salt intake refined sugars, fats and oils) [10]. Over 1.1 billion people in the world are living with hypertension and the number has increased over the last 40 years with the increase mainly occurring in the middle and low income countries in Sub Saharan Africa, South Asia and some pacific island countries [11]. The WHO refers to hypertension as a silent killer as it is usually asymptomatic and most people live with it without knowing that they have the condition. Hypertension kills more than 7.5 million people worldwide per year and its prevalence has been significantly

increased due to rapid economic development, population aging, urbanization and change in dietary habits and lifestyle [12].

Hypertension and other non-communicable diseases are now overtaking communicable diseases, maternal, perinatal and nutritional causes of morbidity and mortality in Africa. This proves to be a double burden of diseases to many African countries owing to scarcity of resources and hence national budgets need to be adjusted to cope up with the impact [13]. Furthermore, evidence that indicates that related complications of hypertension in particular stroke and heart failure are being increasingly common in the region. This can be attributed to increasing rural-urban migration coupled with acculturation and modernization as observed in epidemiological studies in Ghanaians [14].

A study by Gomez-Olive et al. [15] in 2017 discovered that the prevalence of hypertension in East Africa was at around 25%, South Africa between 42% and 54% and in West Africa at 15%.

According to the ministry of health of Uganda, over 10 million people have high blood pressure. A study by Guwatudde *et al.*[16] in 2015 showed that the prevalence of hypertension was at 28.5% in Central Uganda, 26.4 Eastern Uganda, 26.3% in Western Uganda and 23.3% in Northern Uganda. Urban prevalence was at 28.9% and rural at 25.8%.

Study Design

A hospital-based cross-sectional study design was used to determine the prevalence of hypertension and its associated factors among the adult population. The design allows one-time data collection on prevalence, and qualitative and quantitative techniques will be applied in data collection, analysis, and presentation.

Study Area

This study was carried out at Hoima Regional Referral Hospital in Western Uganda.

It serves the rural communities of Hoima, Masindi, Bulisa, Kikuube, Kyakwanzi, Kibale, Kiryandongo, and Kiboga districts, including parts of the Eastern DR Congo, with an overall growth of about 3 million people. Hoima Regional Referral Hospital is at the level of a regional referral hospital, ranking number 2 out of the 16 regional referrals in Uganda. The hospital is found in Hoima district, in the centre of the Bunyoro region, which is now upgraded to Hoima City, and it is about 200km west of Kampala. The hospital is one of the oldest in Uganda, dating back as far as 1935. The hospital offers both general and specialised health services, including internal medicine, surgery, gynaecology, obstetrics, paediatrics, ophthalmology, nutrition, TB, dental health, ear, nose, and throat (ENT), and mental health, among others. The hospital has both

The data on hypertension and its related risk factors in Uganda is minimal at best. The WHO data base does not contain updated figures on hypertension in Uganda. A study done by Wamala *et al.*[17] in Rukungiri Western Uganda showed that 252 out of 842 adults (30.5%) had blood pressure equal or higher than 140/90 mmHg.

Globally the burden of hypertension is rapidly increasing and Africa continent seems to be most affected region in the world with WHO estimates showing 40% of the adult population in most African countries including Uganda [18]. Therefore, achieving the WHO goal of reducing hypertension to 25% by the 2025 is unlikely unless effective policies are put into consideration including extensive research studies about the condition so as to guide in policy making.

No published study has been done at Hoima Regional Referral Hospital to give a clear picture of hypertension and its associated risk factors among patients attending to this health facility. Therefore, this study seeks to assess the prevalence of hypertension and its related risk factors in this population, which will be helpful for policy makers, for interventional programs and come up with the strategies of how to reduce the prevalence which in turn may reduce the morbidity and mortality rates among the respective population.

METHODOLOGY

outpatient and inpatient capacity, with an average bed capacity of 400 beds, about 300 outpatients attending every day, and 350 inpatients. The outpatient department (OPD) consists of a maternal child health clinic, an ART clinic, special clinics, a minor theatre, a minor laboratory, radiological services, a pharmacy, a records office, an accident, and an emergency.

Patients with more complicated diseases are referred to a higher level of health care, like Mulago National Referral Hospital. The facility also receives referrals from lower health facilities around, such as Masindi District Hospital, Kikuube Health Centre IV, and Bulisa Health Centre IV, among others. The care is provided by specialists, medical officers, lab technicians, and nurses. The UCG 2016, which includes guidelines for care in the diagnosis and treatment of common diseases, is used especially in the outpatient department of the hospital.

Study Population

The target population were all adults aged 20 to 100 who are attending outpatient health care, since the researcher's interest is in the prevalence of hypertension and its associated risk factors among the adult population, which will be obtained using selective criteria, that is, inclusion and exclusion criteria.

Sample Size estimation

The Krejcie and Morgan tables was used to determine the sample size. This was in accordance with the population profile of the patients attending the outpatient department, with an age range of 20–100 years. N represents the population, and n denotes the sample size.

Inclusion Criteria

All adults aged 20–100 are attending Hope Regional Referral Hospital as outpatients.

Exclusion criteria

All patients below 20 years, those were admitted and severely ill, and those who never consent.

Dependent variable

Hypertension (Prevalence)

Independent variables

Risk factors of hypertension, as well as awareness of hypertension and its risk factors, level of education, age, occupation, and gender.

Data Collection Procedure

We collected all data on socio-demographic factors, awareness about hypertension and risk factors, level of physical activity, smoking and alcohol consumption habits, diet, and family history of hypertension using a questionnaire with both closed and open-ended questions. The risk factors for hypertension are intended to be adapted from the 2002 WHO Stepwise Approach to non-communicable disease surveillance guidelines.

We followed a standardized technique for all anthropometric measurements. Weight was measured by a digital weighing machine, and height was measured using anthropometric tape. BMI will be calculated using the formula $BMI = \text{weight in kg} / \text{height in square meters}$. Based on the BMI obtained, the subject will be categorised according to the WHO global classification. Participants with a BMI less than 18, a BMI from 18 to less than 25, a BMI from 25 to less than 30, and a BMI of 30 and above were classified as underweight, normal weight, overweight, and obese, respectively.

Blood pressure was measured with the aid of a sphygmomanometer and a stethoscope. Systolic BP below 120mmHg and diastolic BP below 80mmHg will be classified as normal; either systolic BP from 120mmHg to 139mmHg or diastolic BP from 80mmHg to 89mmHg will be classified as pre-

hypertensive; and either systolic BP of 140mmHg and above or diastolic BP of 90mmHg and above were classified as hypertensive according to the UCG 2016.

Ethical consideration

In the study, the following ethical measures were considered during the process of data collection, analysis, and dissemination:

1. The research study proposal and details was submitted to Kampala International University (IREC) for approval.
2. An introduction letter was acquired from the dean of clinical medicine and dentistry, and permission was sought from the administration of HRRH.
3. Full and complete information were provided to the respondents about the aim, purpose, and course of the study before they decide to sign or not to sign a consent form to participate in the
4. Respondents were made aware that the signed consent form is non-binding and they can withdraw from the research at any time should they choose to do so.
5. The principle of equity was strongly adhered to. No favouritism of any kind was exercised, as all participants were treated the same way regardless of age, sex, religious affiliation, or any other
6. All data generated were handled carefully and kept in as at place by designated

Data Analysis

Statistical package for social sciences (SPSS) version 16.0 was used for data entry and analysis. Descriptive analysis was done and presented in terms of frequency which were reported in terms of number of percentages using tables. Regression using binary logistics was used to find out factors associated with hypertension.

Quality Control

In order to ensure quality control, the questionnaires including other data collection tools were pre-tested by the research supervisor and adjustments made accordingly.

RESULTS

Socio-Demographic Data

Despite the researcher's efforts to adjust the time frame to achieve a relevant sample size, only 158 patients, out of the anticipated 300, met the inclusion criteria for the study.

Patient's gender

The study involved both male and female participants. The findings tallied show more female participants (62%), compared to males (38%). The results are summarized in table 1 below.

Table 1: showing number of participants by gender

Gender	Number	Percentage
Male	60	38
Female	98	62
Total	158	100

Patients' age

The study involved patients from 20 to 99 years. The majority of the participants were between age group 20-29 years (38.6%) while age group 90-99

years had the least number of participants with (0.6%). The results according to various age groups are summarized in table 2 below.

Table 2: showing number of participants according to their age groups

Age group	Number of participants	Percentage
20-29	61	38.6
30-39	26	16.5
40-49	28	17.7
50-59	18	11.4
60-69	9	5.7
70-79	10	6.3
80-89	5	3.2
90-99	1	0.6
Total	158	100

Patients' level of education

The majority of participants reported having attended primary education 36.7% (58/158), followed by secondary education 25.9% (41/158),

followed by those who had never attended any level of education 23.4% (37/158), and only 13.9% (22/158) had attained tertiary education. Table 3 below summarizes the results.

Table 3: showing number of participants according to level of education

Level of education	Number of participants	Percentage
Primary	58	36.7
Secondary	41	25.9
Tertiary	22	13.9
None	37	23.4
Total	158	100

Patients' employment status

86/158 of the participants (54.4%) were self-employed, who had economic activities like farming, boda-boda riding, tailors, shop attendants among others, 52/158 were unemployed (32.9%) who

included mostly housewives, students and elderly individuals and 20/158 were employed who included mostly civil servants and a few who were working with private sector. The results are summarized in the table 4 below.

Table 4: showing number of participants according to their employment status

Employment status	Number of participants	Percentage
Employed	20	12.7
Self employed	86	54.4
Unemployed	52	32.9s
Total	158	100

Patients' religion

Majority of the participants up to 148/158(93.7%) were Christians who included Catholics, Protestants,

Seventh day Adventists and born again Christians, 9/158 (5.7%) were Muslims and only 1/158 (0.6%)

had no religion. The results are shown in the table 5 below.

Table 5: showing number of participants according to their religion

Religion	Number of participants	Percentage
Christian	148	93.7
Moslem	9	5.7
None	1	0.6
Total	158	100

Patients' Marital status

Majority of the participants 92/158 (58.2%) were married, 42/158 (26.6%) were single, 15/158 (9.5%)

were widows or widowers and 9/158 (5.7%) were divorced. The results are summarized in table 6 below.

Table 6: Showing number of participants according to their marital status

Marital status	Number of participants	Percentage
Single	42	26.6
Married	92	58.2
Divorced	9	5.7
Widow(er)	15	9.5
Total	158	100

Patients' tribe

Most of the study participants 133/158 (84.2%) were Banyankole by tribe, followed by Bakiga 12/158 (7.6%), followed by Batoro 5(3.2%), then Banyoro

and the other tribes which included Baganda, Bakonjo among others both comprised 4/158 (2.5%). The results are summarized in table 7 below.

Table 7: Showing number of participants according to their tribe

Tribe	Number of participants	Percentage
Munyoro	133	84.2
Mugungu	12	7.6
Munyankele	4	2.5
Alur	5	3.2
Others	4	2.5
Total	158	100

Prevalence Of Hypertension

The patients' hypertension status was categorized into hypertensive, pre-hypertensive, and normal. Of the 158 participants 27 (17.1%) were categorized as hypertensive with 11/27(40.7%) males and 16/27 (59.3%) females. Of the 60 males who participated in the study 11 (18.3%) were classified as hypertensive

while among the 98 females, 26(26.5%) were hypertensive. This indicated a slightly higher prevalence among females. The results about prevalence of hypertension and pre-hypertension in the general study are summarized in the table 8 below.

Table 8: Showing the prevalence of hypertension and pre-hypertension among the study population

Hypertension status	Frequency	Percentage
Hypertensive (Elevated BP)	27	17.1
Pre-hypertensive	63	39.9
Normal	68	43.0
Total	158	100

Prevalence of hypertension according to age groups

The prevalence of hypertension was found to generally increase with age. The study findings are summarized in table 9 below.

Table 9: Showing the prevalence of hypertension according to each age group

Age group	Number of participants	Number of hypertensives participants	Percentage
20-29	61	1	1.6
30-39	26	4	15.4
40-49	28	3	10.7
50-59	18	3	16.6
60-69	9	4	44.4
70-79	10	7	70.0
80-89	5	4	80.0
90-99	1	1	100.0
Total	158	27	17.1

Awareness about hypertension

Of the 158 study participants, 76(48.1%) reported to be aware of hypertension while 82 (51.9%) were unaware of hypertension. This indicates a low rate of

hypertension awareness among the study participants. The study results are summarized in table 10 below.

Table 10: Showing awareness about hypertension among study participants

AWARENESS RESPONSE	FREQUENCY	PERCENTAGE
YES	76	48.1
NO	82	51.9
Total	158	100

Awareness about associated factors of hypertension

Among the 158 study participants, only 36(22.8%) were aware about some of the factors associated with hypertension while 122(77.2%) reported to be

unaware about any factor about hypertension. This indicated a low rate of awareness about factors associated with hypertension. The findings are summarized in table 11 below.

Table 11: Showing rate of awareness about hypertension associated factors among the study participants

AWARENESSRESPONSE	FREQUENCY	PERCENTAGE
YES	36	22.8
NO	122	77.2
Total	158	100

Awareness about hypertension and its associated factors among Hypertensive Participants

Among the 27 participants classified as hypertensive 13(48.1%) reported being aware about hypertension whereas 14(51.9%) were not aware about hypertension. Only 9 out of the 27 (33.3%) hypertensive participants were aware about their current blood pressure readings. A higher number

18(76.7 %) were not aware of their current blood readings. Out of the 27 hypertensive participants only 4 (14.8%) reported to be aware of associated factors of hypertension while 23(85.2%) of them reported not being aware about associated factors of hypertension. The study results are summarized in table 12 below.

Table 12: Showing the rate of awareness about hypertension and factors associated with hypertension among hypertensive participants.

Awareness About Hypertension	Frequency	Percentage
Yes	13	48.1
No	14	51.9
Awareness About Associated Factors of Hypertension		
Yes	4	14.8
No	23	85.2
Total	27	100

Factors associated with hypertension

Among the various factors associated with hypertension that were included in our study, three of them were found to be associated with hypertension in our analysis. Compared to participants Who had never smoked, patients who had ever smoked were five times more likely to be hypertensive with an adjusted OR of 5.01 (P value 0.049). Compared to individuals who had attended

tertiary level of education, participants who had attained no education were almost thirteen times more likely to be hypertensive with an adjusted OR of 12.6 (P value 0.031). Obese participants were almost fifteen times more likely to be hypertensive compared to those who are underweight with adjusted OR of 14.72 (P value 0.031). Table13 shows the crude OR and Table14 shows the adjusted OR.

Table 13: Showing crude OR and P value of the factors associated with hypertension

Variable	Status of hypertension frequency n (%)		Crude OR	P-value
	Hypertensive	Non hypertensive		
Gender*				
Male	11(18.3)	49(81.7)	1.66	0.234
Female	16(16.3)	82(83.7)	1	–
Level of education				
**	12(32.4)	25(67.6)	10.08	0.033
None	10(17.2)	48(82.8)	4.92	0.139
Primary	2(0.05)	29(99.95)	1.66	0.670
Secondary	3(0.14)	19(86.36)	1	–
Tertiary				
Ever smoked**				
Yes	3(30)	7(70)	5.72	0.010
No	24(16.2)	124(83.8)	1	–
Alcohol use*				
Yes	7(16.7)	35(83.3)	1.20	0.694
No	20(17.2)	96(82.8)	1	–
BMI status*				
Normal	16(16.8)	79(83.2)	0.84	0.838
Overweight	5(11.6)	38(88.4)	0.73	0.725
Obese	4(44.4)	5(55.6)	3.60	0.214
Underweight	2(18.2)	9(81.8)	1	–
Level of physical Activity while going to work *				
Using motorized transport through				
	6(22.2)	21(77.8)	4.00	0.109
Out				
Walking or cycling	19(18.8)	82(81.2)	3.22	0.129
1-29minutes				
Walking or cycling	2(6.7)	28(93.3)	1	–
>30 minutes				

**indicates variable with significance while *indicates variable that was used in finding out the adjusted OR though it had no statistical significance as it is a factor associated to hypertension from literature.

Table 14: Showing the adjusted OR and P value of the factor associated with hypertension

Variable	Adjusted Odds Ratio	P-value
Gender Male		
Female	2.02	0.227
	1	—
Level of education* None		
Primary Secondary Tertiary	12.60	0.031
	4.48	0.200
	1.38	0.798
	1	—
Ever smoked* Yes		
No	5.01	0.049
	1	—
Level of physical activity while going to work Using motorized transport through out	4.79	0.102
Walking or cycling 1-29 minutes		
Walking or cycling >30 minutes	2.93	0.204
	1	—
BMI status* Normal Overweight		
Obese	3.06	0.279
Underweight	2.92	0.325
	14.72	0.031
	1	—

*indicates the statistically significant variable OR above 1 indicates that there is a correlation between hypertension and associated factors in the present study.

P-Value below 0.05 indicates the test is significant in relation to hypertension and associated factors.

DISCUSSION

This study provides information regarding the prevalence and associated factors of hypertension among adults attending Hoima Regional Referral Hospital, Hoima district, Western Uganda. It has demonstrated a 17.1% prevalence of hypertension. The study showed that having no education, a history of tobacco smoking, and being obese (BMI of 30 and above) were significantly associated with hypertension.

The overall prevalence of hypertension in my study was 17.1%, which was significantly lower than some published studies in Uganda. A study in Uganda found an overall prevalence of 26.4% [16], and a study in Rukungiri, Uganda, found an overall prevalence of 29.9% [17]. The prevalence in this study was consistent with a study in Ethiopia, which found a prevalence of 29.3% [19]. The high prevalence of pre-hypertension, at 39.9%, was another significant finding. This was consistent with a study by [16], which found a prevalence above 30% in Rukungiri, Western Uganda.

In this study, participants who had attained no level of education were more likely to be hypertensive as opposed to those who had attained a level of

education. This association is consistent with results from previous studies [8, 10] that reported a positive relationship between low education and hypertension. Such an association may be due to a lack of awareness of risk factors for hypertension [12] as a result of low education status [20].

Obese participants were more likely to have hypertension. This was in agreement with other previous studies, which reported an association between obesity and high blood pressure [21, 22]. Obesity is a well-established risk factor for hypertension. These findings imply that a reduced BMI or losing weight among those who are obese would reduce the chances of developing hypertension. Dietary practices such as a high intake of saturated fats, a low intake of fruits and vegetables, and low physical activity greatly influence BMI [23]. However, in this study, physical activity and a low intake of fruits and vegetables were not significantly associated with hypertension. Perhaps the individuals' BMI reflects the risk these factors impose.

Participants who reported having ever smoked were more likely to be hypertensive compared to those

who had never smoked. This finding is in agreement with previous studies which also reported an association between smoking and high blood pressure [24].

In this analysis, we discovered correlations between hypertension and factors previously identified as associated with it, such as physical activity [15], age [17], sex and fruit and vegetable consumption. This suggests the presence of additional factors of fundamental importance for hypertension in this study population. Therefore, we need to conduct larger investigative studies to identify other factors not found in this study.

In my study, 48.1% of the study participants were aware of hypertension, but alarmingly, only 22.8% were aware of the associated factors of hypertension, so a large proportion of the study population is likely to live unhealthy lifestyles that expose them to hypertension. Among the hypertensive participants, 33.3% were aware of hypertension, which is greater than the 7.7% reported by a study by [16], which indicates a high burden of undiagnosed and uncontrolled hypertension. Awareness about

CONCLUSION

Our study found a relatively high prevalence of hypertension (17.1%) among patients attending Hoima Regional Referral Hospital. The prevalence of hypertension in this peri-urban study area confirms the growing public health challenge of non-communicable diseases in Uganda.

However, community-based studies are required to determine the extent of this problem and the associated factors of hypertension in Ugandan communities, owing to the increasing burden of NCDs in developing countries. We need interventions that aim to reduce the associated factors identified in this study, targeting the entire

population to lower the risk and prevalence of hypertension.

hypertension is largely dependent on the capacity of the health care system to provide diagnostic services for hypertension to the general population. Unfortunately, communicable diseases constrain Uganda's healthcare system, and NCDs have not received the attention they deserve [25].

The slight difference in prevalence observed between my study and other studies with respect to hypertension could be due to social and cultural differences, dietary and lifestyle factors, and also the age span as well as the research methodology used. Women exhibit a higher prevalence of hypertension than their male counterparts (male: 40.7% and female: 59.3%), but other studies show a higher percentage of hypertension in men than women, possibly because of the gender disparity in hypertension prevalence, partially due to biological sex differences and behavioural risk factors like less physical activity. Neglected health care and a lack of awareness regarding hypertension could also contribute to the increased prevalence of hypertension among women.

Recommendations

- Efforts to educate the community about hypertension and associated factors of hypertension, including sensitization about NCDs.
- Comprehensive screening of hypertension is conducted through routine blood pressure measurements in healthcare settings while also considering community outreach initiatives.

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