

# Self-Reported Hypertension and Associated Factors Among Adults in Butambala District, Central Uganda: A Community-Based Prevalence Study

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**Background:** The prevalence of hypertension (HTN) differs among regions and income groups, showing a substantial increase in low- and middle-income countries. The development of hypertension is modulated by modifiable lifestyle factors, and uncontrolled hypertension poses a risk for the onset of cardiovascular diseases.

**Objective:** To determine the community-level point-prevalence and factors associated with self-reported HTN among adults in Butambala district, central Uganda.

**Methods:** A community-based cross-sectional study was conducted among adults aged  $\geq 18$  years in Budde subcounty, central Uganda. Data on sociodemographic characteristics and behavior were collected using a semistructured questionnaire. Self-reported HTN was assessed using a single question: "Do you have high blood pressure?" Bivariate and multivariate logistic regression analyses were performed to identify predictors of self-reported HTN.

**Results:** A total of 565 participants (53.5% female) with a median age of 38 years (IQR: 26–52) were included in the study. The prevalence of self-reported hypertension was 18.9%. Factors independently associated with HTN were age 60 years or older (aOR: 2.9, 95% CI: 1.64–5.23,  $p < 0.001$ ), female sex (aOR: 3.3, 95% CI: 2.3–6.3,  $p < 0.001$ ), being widowed (aOR: 10.4, 95% CI: 1.25–87.14,  $p = 0.03$ ), secondary (aOR: 0.4, 95% CI: 0.20–0.85,  $p = 0.016$ ) and tertiary (aOR: 0.2, 95% CI: 0.09–0.64,  $p = 0.005$ ) education, unemployment (aOR: 3.0, 95% CI: 1.11–7.96,  $p = 0.03$ ), tobacco use (aOR: 2.9, 95% CI: 1.83–4.53,  $p < 0.001$ ), having had at least one blood pressure measurement during antenatal visit (aOR: 4.7, 95% CI: 1.97–11.33,  $p < 0.001$ ) or medical checkup (aOR: 10.7, 95% CI: 6.06–18).

**Conclusion:** We observed a high prevalence of self-reported HTN affecting approximately one in five participants. More efforts are required to enhance routine screening, health education, and accessibility to HTN services in rural areas, with a particular emphasis on implementing HTN prevention and control strategies to effectively reduce the prevalence of HTN.

**Keywords:** self-reported hypertension, high blood pressure, blood pressure, Uganda

## Introduction

Hypertension (HTN) is a critical global public health issue that significantly contributes to morbidity and mortality worldwide. HTN is a major risk factor for cardiovascular diseases such as heart disease and stroke, which are the leading causes of death worldwide.<sup>1</sup> Moreover, the prevalence of HTN differs among regions and income groups, showing a substantial rise in low- and middle-income countries.<sup>2</sup>

According to the World Health Organization (WHO), approximately 1.28 billion adults aged 30–79 years are estimated to have hypertension, with approximately two-thirds living in low- and middle-income countries.<sup>3</sup> The

WHO African Region bears a significant burden of HTN, with an estimated prevalence of 27%, which is significantly lower than the WHO Region of the Americas, whose prevalence is estimated at approximately 18%.<sup>3</sup> The number of adults with hypertension is expected to be over 1.5 billion by 2025, with the increase largely seen in low- and middle-income countries, including Uganda, and as observed, there is still a lack of awareness about the growing problem of noncommunicable diseases concurrently with the absence of a clear policy framework for prevention and control.<sup>4</sup> The prevalence of HTN varies across different regions of Uganda, with the central region experiencing the highest prevalence, estimated at approximately 34.3%, as reported in a national epidemiological study published in 2019.<sup>5</sup>

The development of HTN is influenced by a multitude of factors, including both nonmodifiable and modifiable risk factors. Nonmodifiable risk factors encompass increasing age, gender (twofold risk of HTN in males than females), and genetic predisposition, while modifiable risk factors include unhealthy dietary habits, including high salt consumption (>5 g per day), high saturated fat and trans-fat diets and low intake of fruits and vegetables, physical inactivity, tobacco use, excessive alcohol consumption, obesity, and socioeconomic factors.<sup>6,7</sup> HTN is largely asymptomatic in a majority of patients is thus referred to as a ‘silent killer’, however, uncontrolled hypertension is associated with a range of adverse health outcomes, including an increased risk of cardiovascular events such as heart attacks and strokes, as well as end-organ damage, including renal failure and retinopathy.<sup>8–10</sup> Moreover, approximately 54% of stroke and 47% of coronary heart disease are attributable to high blood pressure.<sup>11</sup> Furthermore, HTN imposes a substantial financial burden on individuals, families, healthcare systems, and societies as a whole.

Despite several limitations, such as low sensitivity, self-reporting is a commonly utilized method in research settings to assess the burden of conditions such as HTN.<sup>12</sup> Self-reporting is a cost-effective method that depends on individuals willingly revealing their behaviors, beliefs, attitudes, or intentions regarding the particular condition.<sup>13</sup> The comparability of self-reports with objective measurements of HTN has been well demonstrated by Najafi et al, where self-reported HTN had a prevalence of 16.8%, while medically confirmed HTN based on verified medical history and measurements had a prevalence of 15.7%.<sup>14</sup> Thus, self-reported HTN exhibited a sensitivity of 75.5% and specificity of 96.4%.<sup>14</sup> Despite several studies in Uganda investigating the prevalence of HTN, there are limited data on the prevalence of self-reported HTN in Uganda. Therefore, this study was conducted to determine the community-level prevalence and factors associated with self-reported HTN among adults in Butambala district, Uganda.

## Methods

### Study Design and Setting

We conducted a community-based cross-sectional study among adults from Budde Subcounty, Butambala district, central Uganda. Budde Subcounty, which is located in Butambala district in the central region of Uganda. Butambala district is approximately 68 kilometers, southwest of Kampala, Uganda’s capital and largest city. Budde Subcounty consists of four parishes and 21 villages, with a total population of approximately 13,800 people.

### Study Population and Eligibility Criteria

Participants were individuals aged 18 years and above who were residents of Budde Subcounty during the data collection period and willing to participate in the study. A resident was defined as someone who had stayed within the area for at least 3 months and expected to stay for another 3 months, based on the residency rules of Uganda. Individuals with critical illness or mental retardation were excluded from the study.

### Sample Size, Recruitment, and Sampling Approach

The sample size was determined using the equation obtained from the STEPS-WHO stepwise Approach to chronic disease and risk factor surveillance.<sup>15</sup> A prevalence of 6.3% for HTN, obtained from the rural Uganda noncommunicable disease (RUNCD) Survey (2021), was used in the calculation. With a permissible error of 5% and a 95% confidence interval, the sample size was calculated to be approximately 600, considering an expected response rate of 0.9 and accounting for age-sex estimates. The target sample size was obtained through simple random sampling from the four parishes.

## Data Collection

Data were collected during household visits within the community using an interviewer-administered questionnaire obtained from the WHO Stepwise Approach to Chronic Disease Risk Factors Surveillance (<https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/steps/instrument>). The questionnaire collected data on social demographic characteristics and behavior. Data on self-reported HTN were collected using a single question: “Do you have high blood pressure?” Participants who responded “YES” were considered to have self-reported hypertension, those who responded “NO” were considered to have normal blood pressure, and those who responded “I do not know” were categorized as unaware of their blood pressure status.

## Data Management and Analysis

Data were cleaned, coded and entered into Microsoft 2016 and exported for analysis using STATA version 16.0 analysis software. Numerical data were assessed for normality using the Shapiro–Wilk test. Continuous variables were expressed as the mean and standard deviation for parametric variables or median and interquartile range for nonparametric variables. Categorical data are presented as frequencies and percentages. Chi-square or Fischer’s exact tests were used to compare categorical variables as appropriate, and Student’s *t* tests or Mann–Whitney *U*-tests were used for numerical variables. Multivariable logistic regression analysis using the forward, stepwise logistic regression analysis model was used to determine factors associated with self-reported HTN, and the results are presented as adjusted odds ratios with corresponding 95% confidence intervals. A  $p < 0.05$  was considered statistically significant.

## Ethics Approval and Consent to Participate

Ethical approval was obtained from the Gulu University Research Ethics Committee before data collection (Approval number GUREC-2022-233). Written informed consent was obtained from every participant. The study was conducted in accordance with the Declaration of Helsinki-2013.

## Results

A total of 567 participants (response rate, were approached for the study, out of which 2 declined to provide written informed consent and were excluded. The final analysis included 565 participants, resulting in a response rate of 94.2% (565/600).

## Sociodemographic Characteristics of Participants

Of the 565 participants, 302 (53.5%) were female, and the median age was 38 years, with an interquartile range (IQR) of 26–52 years. The majority (28.1%,  $n=159$ ) were from Budde parish. Nearly half of the participants (48.9%,  $n=254$ ) were aged 40–59 years, most (79.1%,  $n=446$ ) were married and living together, and 276 (46.7%) had completed primary education. Most participants (33.5%,  $n=188$ ) were employed in the private sector. [Table 1](#)

## Frequency of Risk Factors for Hypertension

One hundred ninety-nine participants (35.2%) reported alcohol use, with the majority (89.5%,  $n=178$ ) reporting current use. One hundred twenty-six participants (22.3%) reported tobacco use, with most (73%,  $n=94$ ) reporting daily use. The majority of the participants (89%,  $n=508$ ) reported high salt intake (added salt to already salted food). The most common comorbidities reported were diabetes mellitus (8.9%,  $n=50$ ). Furthermore, 71.9% ( $n=406$ ) of participants reported having a family history of high blood pressure.

## Blood Pressure Status and Prevalence of Self-Reported Hypertension

Most of the participants (60.5%,  $n=342$ ) had undergone at least one blood pressure measurement, with the majority reporting having it done during antenatal care services (55.9%,  $n=191$ ), followed by hospital visits for ill health (36%,  $n=123$ ) and medical check-ups (8.1%,  $n=28$ ). The overall prevalence of self-reported HTN was 18.9% ( $n=107$ ). However, 48.5% ( $n=274$ ) were unaware of their blood pressure status.

**Table 1** Demographic Characteristics of the Study Participants (N=565)

Variable	Frequency	Percentage
<b>Age (years), median, IQR, years</b>	38	26–52
<40	189	36.4
40–59	254	48.9
≥60	76	14.6
<b>Parish</b>		
Budde	159	28.1
Gwatiro	145	25.7
Kibugga	126	22.3
Lugala	135	23.9
<b>Biological sex</b>		
Female	302	53.5
Male	263	46.5
<b>Marital status</b>		
Divorced	17	3
Married and together	447	79.1
Single	63	11.2
Widowed	38	6.7
<b>Education level</b>		
No formal education	115	20.4
Post graduate	4	0.7
Primary	264	46.7
Secondary	111	19.7
Tertiary	71	12.6
<b>Occupation</b>		
Government	48	8.5
Private	189	33.5
Self employed	149	26.4
Unemployed	179	31.7
<b>Comorbidities, self-reported</b>		
Diabetes mellitus	50	8.9
Asthma	49	8.7
Chronic kidney disease	12	2.1
Chronic obstructive pulmonary disease	9	1.6

## Factors Associated with Self-Reported HTN

Participants with self-reported HTN were significantly older ( $p<0.001$ ), predominantly female ( $p<0.001$ ), widowed ( $p<0.001$ ), had no formal education ( $p=0.002$ ), were unemployed ( $p=0.006$ ), smoked tobacco ( $p<0.001$ ), and had a family history of HTN ( $p<0.001$ ) compared to those without self-reported HTN (Table 2).

Factors independently associated with self-reported HTN were age 60 years or older (aOR: 2.9, 95% CI: 1.64–5.23,  $p<0.001$ ), female sex (aOR: 3.3, 95% CI: 2.3–6.3,  $p<0.001$ ), being widowed (aOR: 10.4, 95% CI: 1.25–87.14,  $p=0.03$ ), secondary (aOR: 0.4, 95% CI: 0.20–0.85,  $p=0.016$ ) and tertiary (aOR: 0.2, 95% CI: 0.09–0.64,  $p=0.005$ ) education, unemployment (aOR: 3.0, 95% CI: 1.11–7.96,  $p=0.03$ ), tobacco use (aOR: 2.9, 95% CI: 1.83–4.53,  $p<0.001$ ), having had at least one blood pressure measurement during antenatal visit (aOR: 4.7, 95% CI: 1.97–11.33,  $p<0.001$ ) or medical checkup (aOR: 10.7, 95% CI: 6. Table 3).

**Table 2** Bivariate Analysis of Factors Associated with Self-Reported Hypertension (N=565)

Variable	All (N=565) Freq (%)	Self-Reported Hypertension		P value
		No (n=458) Freq (%)	Yes (n=107) Freq (%)	
<b>Age(years), median (IQR)</b>	38 (26–52)	35.5 (25–51)	43(33–59)	<0.001
<40	300(53.1)	257(56.1)	43(40.2)	<0.001
40–59	189(33.5)	150(32.8)	39(36.5)	
≥60	76(13.4)	51(11.1)	25(23.3)	
<b>Parish</b>				
Budde	159(28.1)	137(29.9)	22(20.6)	0.265
Gwatiro	145(25.7)	115(25.1)	30(28)	
Kibugga	126(22.3)	100(25.1)	26(24.3)	
Lugala	135(23.9)	106(23.1)	29(27.1)	
<b>Biological sex</b>				
Female	302(53.5)	219(47.8)	83(77.6)	<0.001
Male	263(46.5)	239(52.2)	24(22.4)	
<b>Marital status</b>				
Divorced	17(3)	16(3.5)	1(0.9)	<0.001
Married and together	447(79.1)	359(78.4)	88(82.2)	
Single	63(11.2)	60(13.1)	3(2.8)	
Widowed	38(6.7)	23(5)	15(14)	
<b>Education level</b>				
No school	115(20.4)	87(19)	28(26.2)	0.002
Post graduate	4(0.7)	4(0.9)	0(0)	
Primary	264(46.7)	203(44.3)	61(57)	
Secondary	111(19.7)	98(21.4)	13(12.2)	
Tertiary	71(12.6)	66(14.4)	5(4.7)	
<b>Occupation</b>				
Government	48(8.5)	43(9.4)	5(4.7)	0.006
Private	189(33.5)	151(24)	38(35.5)	
Self employed	149(26.4)	131(28.6)	18(16.8)	
Unemployed	179(31.7)	133(28)	46(43)	
<b>Alcohol, ever used</b>				
No	366(64.8)	303(66.2)	63(58.9)	0.177
Yes	199(35.2)	155(33.8)	44(41.1)	
<b>Alcohol use</b>				
Current	178(89.5)	139(89.7)	39(88.6)	0.787
Previous	21(10.5)	16(10.3)	5(11.4)	
<b>Tobacco smoking</b>				
No	439(77.7)	373(81.7)	65(60.8)	<0.001
Yes	126(22.3)	84(18.3)	42(39.2)	
<b>Frequency of tobacco use</b>				
Daily	92(73)	63(75)	29(69.1)	0.601
Occasional	34(27)	21(25)	13(30.9)	

(Continued)

**Table 2** (Continued).

Variable	All (N=565) Freq (%)	Self-Reported Hypertension		P value
		No (n=458) Freq (%)	Yes (n=107) Freq (%)	
<b>High salt intake</b>				
No	62(11)	48(10.5)	14(13.1)	0.491
Yes	503(89)	410(89.5)	93(86.9)	
<b>Physical activity</b>				
Active	279 (49.4)	230 (50.2)	49 (45.9)	0.601
Inactive	48 (8.5)	37 (8.1)	11 (10.2)	
Moderately active	238 (4.2)	191 (41.7)	47 (43.9)	
<b>Diet</b>				
Healthy	252 (44.6)	207 (45.2)	45 (42.1)	0.321
Moderately healthy	247 (43.7)	202 (44.1)	45 (42.1)	
Unhealthy	66 (11.7)	49 (10.7)	17 (15.9)	
<b>Family history of hypertension</b>				
No	159(28.1)	149(32.5)	10(9.4)	<0.001
Yes	406(71.9)	309(69.5)	97(90.7)	

**Table 3** Multivariable Analysis of Factors Associated with Self-Reported Hypertension (N= 565)

Variable	Adjusted Odds Ratio (95% CI)	P value
<b>Age</b>		
<40	1.0	0.066
40–59	1.6(0.97–2.58)	
≥60	2.9(1.64–5.23)	
<b>Biological sex</b>		
Female	1.0	<0.001
Male	0.3(0.16–0.43)	
<b>Marital status</b>		
Divorced	1.0	0.188
Married and together	3.9(0.51–29.97)	
Single	0.8(0.08–8.22)	
Widowed	10.4(1.25–87.14)	
<b>Education level</b>		
No formal education	1.0	0.793
Primary	0.9 (0.56–1.56)	
Secondary	0.4 (0.20–0.85)	
Tertiary	0.2 (0.09–0.64)	
<b>Occupation</b>		
Government	1.0	0.127
Private	2.2 (0.80–5.84)	

(Continued)

**Table 3** (Continued).

Variable	Adjusted Odds Ratio (95% CI)	P value
Self employed	1.2 (0.41–3.37)	0.755
Unemployed	3.0 (1.11–7.96)	0.030
<b>Alcohol use</b>		
No	1.0	
Yes	0.7 (0.48–1.13)	0.157
<b>Tobacco smoking</b>		
No	1.0	
Yes	2.9 (1.83–4.53)	<0.001
<b>Frequency of tobacco use</b>		
Daily	1.0	
Occasional	1.3 (0.59–3.05)	0.479
<b>If 'yes' on having had at least one blood pressure measurement, Reason for testing</b>		
Sickness	1.0	
Antenatal	4.7 (1.97–11.33)	<0.001
Medical check up	10.7 (6.06–18.77)	<0.001
<b>Family history</b>		
No	1.0	
Yes	4.7 (2.37–9.23)	<0.001

## Discussion

In this study, we aimed to determine the community-level prevalence and factors associated with self-reported HTN among adults in Butambala District, Uganda. We found that the prevalence of self-reported HTN was 18.9%. The population prevalence of self-reported HTN was estimated at 7.8/1000 persons. Nearly half (48.5%) of the participants were unaware of their blood pressure status. Factors that demonstrated independent associations with self-reported HTN were age 60 years or older, female sex, being widowed, secondary and tertiary education, unemployment, tobacco use, having had at least one blood pressure measurement during antenatal visits or medical visits, and a family history of HTN.

Our findings are consistent with studies conducted in various countries, which reported relatively similar prevalence rates of self-reported HTN estimated at 13.6% in Zimbabwe,<sup>16</sup> 15.7% in China,<sup>17</sup> 16.8% in Iran,<sup>14</sup> 23.6% in South Africa<sup>18</sup> and 24.1% in Brazil.<sup>19</sup> However, studies in the United States and South Africa reported higher prevalence rates of 32.4% and 30.3%, respectively.<sup>13,20</sup> Conversely, a recent study in Nakaseke District by Siddharthan et al reported a relatively low prevalence of self-reported HTN of 6.3%.<sup>21</sup> These variations highlight the considerable differences in self-reported HTN prevalence across different populations, possibly influenced by various factors such as methodological differences, socioeconomic status, and sociocultural norms.

The high prevalence of self-reported HTN observed in our study can be attributed to several factors. Age emerged as a significant independent factor, with a higher likelihood of self-reported HTN among older individuals.<sup>19</sup> An increase in blood pressure with age is mostly related to changes in arterial and arteriolar stiffness. Large artery stiffness is mainly due to arteriosclerotic structural alterations and calcification. The increase in life expectancy and the transition to a more sedentary lifestyle may contribute to the higher prevalence among older individuals. Furthermore, women were more likely to report being hypertensive. This could be due to higher healthcare-seeking behaviors among females compared to

males, leading to better detection and reporting of HTN.<sup>22</sup> In addition, our study showed an association between unemployment and higher self-reported HTN prevalence, aligning with previous studies such as by Qin et al in Nanjing that have established a link between socioeconomic status and HTN risk.<sup>19,23</sup> Unemployment poses a significant risk for developing hypertension due to multiple interconnected factors, including financial strain, psychological stress, and the adoption of unhealthy lifestyle behaviors such as sedentary habits, poor dietary choices, and substance abuse.<sup>24</sup>

Tobacco use has been shown to have detrimental effects on cardiovascular health, as it increases the risk of developing HTN among users.<sup>19,25,26</sup> In our study, individuals who reported using tobacco had almost 3 times higher odds of hypertension than nonusers, which is comparable to findings by Solomon et al who reported a fourfold increase in the risk of developing HTN among smokers compared to their counterparts.<sup>27</sup> Smoking causes an acute increase in blood pressure and heart rate and has been found to be associated with malignant HTN. Nicotine acts as an adrenergic agonist, mediating local and systemic catecholamine release and possibly the release of vasopressin.<sup>28</sup> Furthermore, individuals who reported a family history of HTN had almost 5-fold higher odds of HTN than those without, which is relatively similar to findings from a study in Southwest Ethiopia where a family history of HTN was associated with an approximately threefold increase in the risk of developing HTN.<sup>27</sup> Blood relatives tend to have many of the same genes that can predispose a person to HTN and share some habits, such as diet, exercise, and smoking, that can lead to high cholesterol, high body fat, and being more sensitive to the effects of salt on raising blood pressure.<sup>29</sup>

This study has some limitations. Self-reporting of HTN may have introduced the possibility of information bias that might have contributed to underreporting of the prevalence of HTN. Blood pressure measurements were not taken during the study to confirm the self-reported data. The cross-sectional design limits the establishment of causal relationships between the identified factors and HTN. Furthermore, the study was conducted in a specific district in Uganda, which may limit the generalizability of the findings to other regions of the country.

## Conclusion

We observed a high prevalence of self-reported HTN, affecting approximately one in five adults, with a significant proportion of adults being unaware of their blood pressure status. There is an urgent need for enhanced routine screening, health education, and improved accessibility to HTN services, especially in rural areas, with a particular emphasis on implementing HTN prevention and control strategies to effectively reduce the prevalence of HTN.

## Abbreviations

HTN, Hypertension; WHO, World Health Organization; RUNCD, Rural Uganda noncommunicable disease.

## Data Sharing Statement

All relevant data are within the manuscript.

## Ethics Approval and Consent to Participate

Ethical approval was obtained from the Gulu University Research Ethics Committee before data collection (Approval number GUREC-2022-233). Written informed consent was obtained from every participant. The study was conducted in accordance with the Declaration of Helsinki-2013.

## Author Contributions

All authors made substantial contributions to the conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

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## Disclosure

All authors declare that they have no conflicts of interest for this work.

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