Undiagnosed and Uncontrolled Hypertension among Adults in the Community: Recent Evidence from a Rural District in Northwestern Tanzania

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Abstract

Background

Hypertension is a silent killer. Therefore, its early detection and control is very essential. Unfortunately, there is limited information on the hypertension awareness, treatment and control rates in low and lower-middle income countries.

Broad Objective

This study determined the prevalence of undiagnosed hypertension and hypertension treatment and control rates among adults in Magu district.

Methods

This was a cross sectional community survey, which enrolled 300 adults. Participants self-reported their socio-demographic characteristics, previous diagnosis of hypertension and current use of antihypertensive drugs. Blood pressure (BP) was measured using aneroid sphygmomanometer. SPSS was used for data analysis. Chi-square or Fisher's exact tests were used to compare prevalence of hypertension by various factors.

Results

The overall hypertension prevalence was 29%. Among the hypertensive patients, 78.2 % were not aware of their diagnosis and were thus untreated. Undiagnosed hypertension was associated with increased age, low education level, being employee and family history of hypertension. Among those who were aware of their diagnosis, 63.2% were on medication with only 25% of them having controlled BP.

Conclusions and Recommendations

Majority of hypertensive patients in rural areas remain undiagnosed and therefore untreated. Among those who are diagnosed, majority of them are either inadequately treated or not treated at all. Therefore, urgent intervention measures are required to avoid morbidity and mortality from potentially preventable complications of hypertension.

Key Words: *Undiagnosed hypertension, uncontrolled Blood Pressure, Rural Tanzania.*

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Introduction

Hypertension (HPT) refers to a persistently elevated blood pressure (BP) to a level of 140/90mmHg and above or BP that is controlled to guideline recommended levels by use of antihypertensive drugs (1-3). HPT is the leading cause of morbidity and mortality worldwide (1, 4, 5). It is the main modifiable risk factor of cardiovascular diseases which commonly leads to death (1, 6). HPT is well known to cause organs damage, the target organs being the heart, kidney, brain, and arterial blood vessels. Uncontrolled hypertension accelerates the damage to these organs and results in eventual organ failure and cardiovascular death and disability (7).

Early detection of HPT and initiation of medication is crucial because reduction in BP reduces hypertensive complications and significantly slows down the progression to organ failure if it had already started. Early detection of hypertension can also enable BP control through adoption of lifestyle changes (4). Therefore, individuals understanding their hypertensive status is of great importance for intervention of morbidity and mortality associated with it.

Few studies in Sub-Sahara Africa, have shown that most of hypertensive patients are not aware of their status and therefore not treated and those who are aware of their diagnosis are inadequately treated (8). Generally, there is limited information on the HPT awareness, treatment and control rates in low and lower-middle income countries (9). We therefore conducted a survey in rural setting of Tanzania to determine the prevalence of undiagnosed HPT and BP control among hypertensive patients in Magu district.

Methods

Study site

The study was carried out in Magu district, Mwanza. Magu is largely a rural district situated along the southern shores of Lake Victoria, in the northwest part of Tanzania. The district has a population of about 300,000 and is administratively divided into four divisions, namely Itumbili, Kahangara, Ndagalu and Sanjo.

Study design and subjects

This was a cross sectional household survey which enrolled adults aging 18 years and above. Individuals who lived in Magu for less than six months were excluded from this study.

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Sampling Technique

Convenient sampling technique was used to enroll study participants. Household to household visit was done to recruit the participants who met the inclusion criteria. Although visit was done to all four divisions of the Magu district, only the households, which were near reach from Magu town centre were visited.

Data collection

Closed ended questionnaire was used to collect socio-demographic as well as hypertension and antihypertensive medication history. Participants self-reported their socio-demographic characteristics (age, gender, occupation and education level), previous diagnosis of HPT and current use of antihypertensive drugs. Casual arterial BP was measured using adult sized cuff aneroid sphygmomanometer (Wuxi Medical Instrument Factory, China) and a Littmann Classic II S.E stethoscope (3M Health Care, USA). The accuracy of the aneroid sphygmomanometer was verified by comparing its readings with table mercury sphygmomanometer's readings for ten subjects. Verification was done once before the start of data collection. Verification was not repeated because data were collected within short period (three weeks). BP was measured with standardized protocols as previously described (1, 10). In brief, subjects were required to seat quietly for at least 5 minutes in a chair with the arm flexed and rested on a table. Subjects who reported to have smoked or used caffeine or doing exercise in the last half an hour were given at least 30 minutes resting before taking their BP. In this study systemic arterial BP was recorded from the right arm. The cuff was wrapped around the upper arm with the cuff's lower edge about one inch above the ante-cubital fossa. The cuff was rapidly inflated while palpating radial pulses and observing the manometer gauge. After disappearance of radial pulses, the cuff was further inflated to about 20 mm Hg above this level. The cuff was then slowly deflated at a relatively constant rate of about 2 mm Hg per second while auscultation with stethoscope's bell over the brachial artery just below the cuff's edge was done. Systolic BP (SBP) was estimated as the point in the gauge at which the first Korotkoff sound was heard, and the disappearance of Korotkoff sounds was used to define diastolic BP (DBP). SBP and DBP measurements were repeated twice for each subject and the average recorded. We defined HPT as BP above 160/95 mmHg or an average of 140/90mmHg and above based on three readings on separate occasions or self-reported use of antihypertensive medicine (1, 2). Blood pressure control was defined as having SBP of less than 140 mmHg and DBP of less than 90 mmHg, among people who were known to be hypertensive.

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Data analysis

Statistical analyses were done using SPSS software version 20. Data were cleaned, edited, coded and entered into Microsoft Excel and then exported to SPSS for analysis. Chi Square or Fisher's exact tests were used (depending on appropriateness) to compare prevalence of HPT by various independent variables. Statistical significance levels were fixed at two-tailed *p*-value of 0.05.

Ethical Considerations

Ethical clearance was sought and provided by the joint Catholic University of Health and Allied Sciences and Bugando Medical Centre Research Ethics and Review Committee. Subjects voluntarily participated in the study, and they signed written informed consents.

Results

Characteristics of Study Participants

A total of 300 subjects with median age of 43 years (interquartile range 18 – 64 years) participated in this study. Among these, 193 (64.3%) were females and 107 (35.7%) were males.

Among the participants 110 (36.7%) had completed primary school education, 97 (32.3%) had completed secondary education and 61(20.3%) had never gone to school. More than three-quarter of the participants, 241 (80.3%) were peasants and 59 (19.7%) were employees.

Hypertension Status and Awareness

Among the 300 participants, 87 (29.0%) were hypertensive (having BP ≥ 140/90 mmHg or normal BP but on antihypertensive medication). Nineteen of those with HPT (21.8%) had previously been diagnosed to be hypertensive while 68 (78.2%) were diagnosed during this study. This implies that, the overall prevalence of HPT in the studied population was 29% and prevalence of undiagnosed HPT accounted 78.2% of the cases and 22.7% of this study population (Table 1).

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Table 1: Blood Pressure Status and Awareness among the Study Participants

	Sex		Total
Blood Pressure Status	Male	Female	
Normotensive	82 (76.6%)	131 (67.9%)	213 (71.0%)
Hypertensive	25 (23.4%)	62 (32.1%)	87 (29.0%)
Total	107 (100.0%)	193 (100.0%)	300 (100.0%)
Hypertension Awareness (n = 87)	Male	Female	
Previously diagnosed	4 (16.0%)	15 (24.2%)	19 (21.8%
Not previously diagnosed	21 (84.0%)	47 (75.8%)	68 (78.2%)
Total	*25 (100.0%)*	*62 (100.0%)*	*87 (100.0%)*
Hypertension was defined as BP ≥ 140/90 mmHg or being on antihypertensive Medication			

Table 2: Factors Associated with Undiagnosed Hypertension (n = 281)

Undiagnosed Hypertension	Independent Factors					*p value*
Blood Pressure	**Sex**		Male	Female	Total	
< 140/90 mmHg			82 (79.6%)	131 (73.6%)	213 (75.8%)	0.257
≥ 140/90 mmHg			21 (20.4%)	47 (26.4%)	68 (24.2%)	
Total			103 (100%)	178 (100%)	281 (100%)	
	Age (years)					
Blood Pressure	< 20	20 - 29	30 - 39	≥ 40	Total	
< 140/90 mmHg	33 (100%)	68 (98.6%)	34 (94.4%)	78 (54.5%)	213 (75.8%)	< 0.001
≥ 140/90 mmHg	0 (%)	1 (1.4%)	2 (5.6%)	65 (45.5%)	68 (24.2%)	
Total	33 (100%)	69 (100%)	36 (100%)	143 (100%)	281 (100%)	
	Education Level					
Blood Pressure	Illiterate	Primary Education	Secondary Education	College/University	Total	
< 140/90 mmHg	29(50.0%)	78 (78.8%)	81 (85.3%)	25 (86.2%)	213 (75.8%)	< 0.001
≥ 140/90 mmHg	29(50.0%)	21 (21.2%)	14 (14.7%)	4 (13.8%)	68 (24.2%)	
Total	58 (100%)	99 (100%)	95 (100%)	29 (100%)	281 (100.0%)	
	Occupation					
Blood Pressure			employees	Peasants	Total	
< 140/90 mmHg			33 (63.5%)	180(78.6%)	213 (75.8%)	0.021
≥ 140/90 mmHg			19 (36.5%)	49 (21.4%)	68 (24.2%)	
Total			52 (100%)	229 (100%)	281 (100.0%)	

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		Family History of Hypertension				
Blood Pressure		Yes	No	Unknown	Total	
< 140/90 mmHg		28 (66.7%)	145 (73.2%)	40 (97.6%)	213 (75.8%)	< 0.001
≥ 140/90 mmHg		14 (33.3%)	53 26.8(%)	1 (2.4%)	68 (24.2%)	
Total		42 (100%)	198 (100%)	41 (100%)	281 (100%)	

High prevalence of undiagnosed HPT was observed among participants aged 40 years and above compared to younger participants ($p < 0.001$), illiterate and individuals with primary education compared to those with high education level ($p < 0.001$). High prevalence of undiagnosed HPT was also noted among employees than peasants ($p = 0.021$) and individuals with family history of hypertension ($p < 0.001$) as demonstrated in Table 2.

Hypertension Treatment and Blood Pressure Control

Among the 19 subjects who self-reported to be hypertensive, 12 (63.2%) were on medication (Table 3). Among 12 patients who were on medication, 3 (25%) had controlled BP (Table 3).

Table 3: Hypertension Treatment and Blood Pressure Control

	Sex		Total
Hypertension Treatment (n=19)	Male	Female	
On treatment	1 (25.0%)	11 (73.3%)	12 (63.2%)
Not on treatment	3 (75.0%)	4 (26.7%)	7 (36.8%)
Total	4 (100.0%)	15 (100.0%)	19 (100.0%)
Blood Pressure Control (n=12)			
Controlled	0 (0.0%)	3 (27.3%)	3 (25.0%)
Uncontrolled	1 (100.0%)	8 (72.7%)	9 (75.0%)
Total	1 (100.0%)	11 (100.0%)	12 (100.0%)
Controlled BP was defined as having SBP < 140 mmHg and DBP < 90 mmHg, among people who were known to be hypertensive.			

Discussion

This study has found a high prevalence (29%) of HPT among adults in the rural area of Tanzania, with most of the hypertensive patients (78.2%) being undiagnosed. Significant proportion of the few who knew their diagnosis were not on medication and most of those who were on medication had uncontrolled blood pressure. Prevalence of undiagnosed HPT was associated with age, low education level, being employee and a positive family history of hypertension.

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Overall prevalence of HPT is similar to the one recently reported in Northern Tanzania, where cross-sectional household epidemiological survey conducted from 2013 to 2015 found an overall HPT prevalence of 28% (11). It is also comparable to prevalence found in a population-based survey in 1999 among adults which were 30% and 28.6% among men and women of Ilala, respectively and 32.2% and 31.5% among men and women of Kilimanjaro rural areas, respectively (12). However, the overall prevalence of HPT observed in the present study is low compared to other cross sectional surveys which were done in Dar es Salaam (13) and Hai district (14). A cross-sectional household survey in Dar es Salaam between 2009–2011 reported a prevalence of 38% (13) while in another study, more than 69% of elderly individuals in the rural communities of Hai district of Tanzania were found to be hypertensive (14). The observed difference is likely to be due to age difference of the study participants between the present study and other studies. The participants in the present study were aged 18 – 64 years while the participants in the Dar es Salaam study were aged 35 years and above and the Hai district study enrolled elderly subjects aged 70 years and above.

Despite of variations of the overall HPT prevalence due to variations in the characteristics of the study populations, the low level of HPT awareness (high prevalence of undiagnosed HPT) is a global phenomenon (15-17) with lowest awareness in low-income countries particularly in rural areas. For instance, a study which involved four low income countries (Bangladesh, India, Pakistan, Zimbabwe) reported awareness rate of 25% - 38% (18). In a study which was done in Edo state of Nigeria, HPT awareness rate was found to be 18.6% (17). High prevalence of undiagnosed HPT has also been observed in many other studies done in Sub-Sahara African countries (19). A cross sectional survey done in Mwanza reported the general prevalence of HPT to be 16.4% in which 65.2% were undiagnosed accounting 10.9% of general population (20).

The high prevalence of undiagnosed HPT could be attributed to the presenting nature of HPT which is asymptomatic to most patients particularly the ones with essential form of HPT. Essential HPT accounts 90% to 95% of hypertensive cases while secondary hypertension accounts 5% to 10% of the cases. Different from secondary HPT in which symptoms of underlying conditions make patient to seek health services, patients with essential HPT may remain asymptomatic for years unknowingly. They are in most cases diagnosed accidentally when patient visits health facility for other complains. In individuals who do perform medical checkup regularly, it is diagnosed early during medical examination.

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Unfortunately, only few Tanzanians and Africans in general have a tendency of routine checkup without having medical complains.

In this study the prevalence of undiagnosed hypertension was high among subjects aged 40 years and above. Similar trend was observed in a population-based surveys in 1999 among adults in Dar es Salaam and Kilimanjaro rural areas (12). A similar trend was also observed in a study done in Nigeria where prevalence of hypertension was found to range from 5% in the age group less than twenty years to 80% in the age group ≥70 years (21). Generally, an age-related increase in BP in humans is a global phenomenon (22, 23). Both SBP and DBP progressively increase with age, with much increase in SBP than DBP (24, 25). For instance, in one study, it was noted that after the age of 40 years, SBP increased by about 7 mm Hg per decade among Caucasians (26). A rise in BP with age has been observed even in individuals involved in agricultural activities though the rise is substantially lower compared to other populations (27), probably due to the nature of their daily activities which involve physical activity.

High prevalence of undiagnosed hypertension among employees compared to peasants may be explained in part by the relatively sedentary lifestyle of the employees, dietary differences and decreased physical activities. WHO STEPS survey conducted in Tanzania demonstrated low physical activity level among employees, homemakers, retired and unemployed individuals compared to people who were self-employed (including peasants) (28). Most of the employees sit in one place and conduct their businesses compared to peasants whose nature of activity involves frequent movements, which can be counted as regular exercises.

Though there is scanty information on data about HPT treatment and control rates, low rates noted in the present study are consistent with previous reports from other low and middle income countries (18, 19). A study in 628 communities of 17 countries found hypertension control rate of less than 10% in lower middle income and low income countries (18). A systematic review of 33 cross sectional studies done in Sub Sahara Africa, demonstrated that among the HPT patients, only 7% - 56% were aware of their hypertensive status, 18% were receiving treatment and only 7% had controlled BP (19). Population-based surveys done in Tanzania in 1999 found that, more than 80 % of hypertensive subjects were not aware of their diagnosis. Only 10% of known hypertensive patients, were taking antihypertensive drugs and less than 1% of them had controlled BP (12). Another study done among elderly in northern Tanzania rural communities found high prevalence of

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undiagnosed HPT in which the population had HPT prevalence of 69% with only 38% being aware of their diagnosis. In those communities, only 6.1% of hypertensive patients were on medication and among those on medication only 14% had controlled BP (14). In India treatment and control rates ranged 9% – 36% and 2% - 21% respectively from 1991 – 2012 (29). The hypertension treatment and control rates in rural areas of Ashanti in Ghana were reported to be 6.9% and 1.7 % respectively (30).

Conclusion

Although successful treatment of hypertension reduces morbidity and mortality associated with HPT, many hypertensive patients who are aware of their diagnoses are also not treated for various reasons and those who are treated only few of them have controlled BP. Findings from this study call for urgent intervention. This calls for a need for more emphasis on education about importance of regular medical checkup, early diagnosis and treatment to avoid HPT related complications.

Study Limitations

Due to finding of small number of hypertensive patients who were on medication, the BP low control rates observed in this study may not be conclusive.

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Conflict of Interest

Authors have no conflict of interest to report.

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