

**ORIGINAL ARTICLE****PREVALENCE OF HYPERTENSION AND ASSOCIATED FACTORS IN BEDELE TOWN, SOUTHWEST ETHIOPIA****Feyie Bonsa<sup>1</sup>, Esayas Kebede Gudina<sup>1</sup>, Kifle Woldemichael Hajito<sup>2</sup>****ABSTRACT**

**BACKGROUND:** Hypertension is the leading cause of death in the world and is the commonest cause for outpatient visits to physicians. The objective of this study was to assess the prevalence of hypertension and its risk factors among adults in Bedele Town, South-west Ethiopia.

**METHOD:** A community-based cross-sectional survey was conducted by interviewing participants regarding their socio-demographic characteristics, history of hypertension, its risk factors and knowledge of its complications and treatment. Measurements of their blood pressure, body weight, height, and waist circumferences were also done on the same day. The data were analyzed using SPSS Version 16 statistical software. Chi-square test and odds ratio with 95% CI were used to assess the association between dependent and independent variables. Logistic regression model was used to determine the independent risk factors for hypertension. P-values of < 0.05 were considered statistically significant.

**RESULTS:** A total of 396 adults of whom 67.4% were males participated in the study. Prevalence of hypertension, defined as systolic blood pressure  $\geq 140$  mmHg or diastolic blood pressure  $\geq 90$  mmHg or reported use of anti-hypertensive medication, was 16.9%. However, only 44.8% of those with hypertension were aware of their status, and the overall control rate of hypertension was only 22.4%. Only age and waist circumference were found to be independent predictors of hypertension in the community.

**CONCLUSION:** Hypertension was found to be prevalent in the community. However, the respondents' awareness about the problem and the overall control rates were very low. Activities targeted at increasing awareness of hypertension in the community and its risk reduction are very important for intervention. There should also be a national strategy for early detection and treatment of hypertension and related cardiovascular diseases.

**KEYWORDS:** Hypertension, Cardiovascular disease, Ethiopia

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**INTRODUCTION**

Hypertension is a serious public health problem worldwide (1). It is the leading cause of death in the world and is the commonest cause for outpatient visits to physicians (2).

Hypertension is a major contributor to the growing global pandemic of cardiovascular disease and stroke. It is behind only under-nutrition and unsafe sex in its contribution to the burden of disease worldwide (3). Globally, about

62% of cerebrovascular diseases and 49% of ischemic heart disease are attributable to elevated blood pressure (BP) that could have been reduced by antihypertensive drug therapy (4).

Hypertension in Africa has now changed from a relative rarity to a major public health problem (5). It is a widespread problem of immense economic impact because of its high prevalence in urban areas, its frequent under-diagnosis and the severity of its complications (6). It has become the commonest cause of

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cardiovascular disease on the continent. If nothing is done about it, by 2020, three-fourth of all deaths in Africa will be attributable to hypertension (1). Despite the high prevalence of hypertension, awareness and BP control of the patients is very low worldwide (7-10). The detection rates in most high-income countries vary from 32%–64% (11, 12), while in many low-income countries, the reported detection rates are substantially lower (13).

An up-to-date and comprehensive assessment of the evidence concerning hypertension in Ethiopia is lacking. One community-based cross sectional study done in urban Addis Ababa showed that the age adjusted prevalence of high blood pressure was 31.5% among males and 28.9% among females (10). However, only 35.2% of the hypertensive subjects were aware of their high blood pressure and only 11% were on treatment with target blood pressure attained in 25.6% (10).

Other hospital-based studies done in Tikur Anbessa Hospital in Addis Ababa showed that hypertension is the leading cause of cardiovascular diseases such as stroke and ischemic heart diseases (14, 15).

Despite evidence for its burden in the community, prevalence of hypertension, its community awareness and the priority given to its prevention and control by the communities and government is very low in Ethiopia.

The main objective of this study was thus to assess the prevalence, risk factors and control of hypertension in Bedele Town in South-west Ethiopia to avail the information for health care providers and policy makers for appropriate interventions.

## METHODS AND MATERIALS

A community-based cross-sectional survey was conducted in Bedele Town between July and September 2011. Bedele Town is located in the south-west of Ethiopia, 480 km from the capital Addis Ababa. At the time of the study, the projected total population was 26, 373. The town has one public hospital, one health center and few private medium clinics. In most of them, the health care providers were nurses, health officers and rarely general practitioners. Selection of study participants was based on the following criteria:

age 15 years and older, with or without known previous history of hypertension and not severely ill (no cardio-respiratory distress and able to sit).

The required sample size was determined using the formula for estimating sample size for single population proportion with 95% confidence level and 0.05 degree of accuracy required. Since the prevalence of hypertension is not known in the area, a proportion of 50% was used. With these assumptions, a sample size of 384 was obtained. By adding 10% for non-responses, a total sample of 422 was obtained.

Systematic random sampling technique was used to select the study participants. The first household was selected by lottery method and then the subjects living in every third house were recruited. In case the third households refrained, the next house was taken. Where there were multiple eligible persons in a household, only one of them was selected by lottery system.

The data were collected using a pre-tested structured questionnaire which was prepared specifically for this study. The data were collected by nurses who had received a-one-day training. Participants were interviewed about their socio-demographic characteristics, history of hypertension, risk factors for hypertension and knowledge of hypertension related complications and its treatment. Then, measurements of their blood pressure, weight, height and hip-waist circumference were recorded.

Blood pressure was measured using mercury sphygmomanometer and stethoscope after the participants rested for at least 5 minutes. The measurement was done in both arms at sitting position with back supported. Two consecutive measurements of blood pressure were taken 5 minutes apart from all study participants. The average of the two measurements was used for analysis. Height and waist circumferences were measured using stadiometer and tape meter respectively; weight was measured using standardized weight scale.

Data were cleaned, entered into computer and analyzed using SPSS Windows Version 16. Descriptive analysis was done using numbers and percentages. Presence of statistical association between dependent and independent variables was assessed using Chi-square tests and student t-test was used to compare the means of continuous variables. Logistic regression analysis was done to

assess independent risk factors for hypertension. P-values of  $< 0.05$  were considered statistically significant.

To ensure data quality, the questionnaire was prepared in English and translated to a local language (Afan Oromo). A one-day training was offered to data collectors and supervisors. Data were checked for completeness and internal consistencies just after collection.

Ethical clearance was secured from the Ethical Review Committee of the College of Public Health and Medical Sciences, Jimma University. Written permission was also obtained from Bedele Town Municipality and written informed consent was received from the participants before data collection. Subjects with high BP were linked to health facilities for care and follow-up.

For convenience, during data collection, the following operational definitions were used. BP measurements of  $\geq 140$  mmHg for systolic blood pressure (SBP) and/or  $\geq 90$  mmHg for diastolic blood pressure (DBP) were considered as **high blood pressure** (7). **Hypertension** was defined as presence of persistently elevated blood pressure or history of treatment with antihypertensive agents. BP measurements  $< 140/90$  mmHg while on treatment for hypertension were considered as **controlled hypertension**. **Regular exercise** was considered if a person practiced any activity including walking for more than 30 minutes a day. Individuals who reported **khat** (*Catha edulis* leaves) **use** for 5 days or more in a week were considered as regular khat chewers, and this was considered as clinically significant.

## RESULTS

**Socio-demographic characteristics:** A total of 396 participants took part in this study with a response rate of 93.8%. The mean age was  $29.6 \pm 15.5$  years with range between 15 and 70 years. Two-thirds, 67.4%, of them were men. The majority of the study subjects, 331 (83.5%), were in the age category of 15-44 years. Most of them had completed at least elementary school education (Table 1).

Table 1: Socio-demographic characteristics of the study participants, Bedele Town, Southwest Ethiopia.

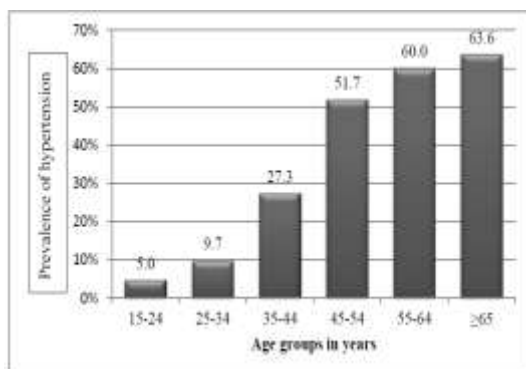
Variables	N	%
<i>Sex</i>		
Male	267	67.4
Female	129	32.6
<i>Marital Status</i>		
Never married	191	48.2
Married	189	47.7
Others	16	4.1
<i>Occupation</i>		
Student	114	28.8
Merchant	67	16.9
Government	49	12.4
Daily labourer	46	11.6
Housewife	43	10.9
Private	33	8.3
Farmer	29	7.3
others	15	3.8
<i>Education</i>		
Illiterate	47	11.9
Elementary	131	33.1
Secondary	139	35.1
Tertiary	79	19.9

**Prevalence of hypertension:** The mean SBP and the mean DBP were  $118.23 \pm 16.78$  mmHg and  $78.36 \pm 10.54$  mmHg respectively. They were found to be comparable between both genders. The prevalence of hypertension defined as persistent elevation of SBP  $\geq 140$  mmHg and/or DBP  $\geq 90$  mmHg or previous diagnosis of hypertension was 16.9%. It was found to be 24.8% among women and 13.1% among men with significant difference ( $p = 0.004$ ).

Individuals with hypertension were found to be much older than those who were normotensive. The mean age was  $44.7 \pm 5.4$  year among hypertensive and  $26.6 \pm 10.9$  years in those without ( $p < 0.001$ ). The prevalence of hypertension was 5% among 15 to 24 years olders whereas nearly two-third of those 55 years or older participants had hypertension (Figure 1).

**Assessment of risk factors for hypertension:** Bivariate analyses showed that older age, female gender, lower literacy status, marital inconvenience, smoking, lack of physical exercise and high waist circumference were associated with risk of hypertension (Table 2). However, controlling for other variables on multivariate logistic regression, only age and waist

circumference remained independent predictors of hypertension (Tables 2).



**Figure 1:** Prevalence of hypertension among different age groups in Bedele Town, Southwest Ethiopia

**Table 2:** Bivariate and Multivariate Logistic regression analysis for common risk factors of hypertension in Bedele Town, Southwest Ethiopia, \* = p-value <0.005

Variables	Hypertension		Crude OR (95% CI)	Adjusted OR (95% CI)	
	Yes, N (%)	No, N (%)			
Age	<35	18 (6.3)	269 (93.7)	1.00	1.00
	35-55	29 (36.7)	50 (63.3)	8.67 (4.48-16.79)*	10.37 (4.06-26.47) *
	>55	20 (66.7)	10(33.3)	29.89 (12.19-73.27)*	32.517 (9.52-111.04) *
Sex	Male	35 (13.1)	232 (86.9)	1.00	1.00
	Female	32 (24.8)	97 (75.2)	2.19 (1.28-3.73) *	1.25 (0.52-2.98)
Marital status	Single	11 (5.8)	180 (94.2)	1.00	1.00
	Married	49 (25.9)	140 (74.1)	5.73 (2.87-11.42) *	1.36 (0.527-3.49)
	Others	7 (43.8)	9 (56.2)	12.73 (3.99-40.61) *	1.15 (0.21-6.39)
Level of education	Illiterate	19 (40.4)	28 (59.6)	1.00	1.00
	Elementary	16 (12.2)	115 (87.8)	0.21 (0.09-0.45) *	0.20 (0.07-1.06)
	Secondary	15 (10.8)	124 (89.2)	0.18 (0.08-0.39) *	0.656 (0.20-2.15)
	Tertiary	17 (21.5)	62 (78.5)	0.40 (0.18-0.89) *	1.33 (0.39-4.56)
Smoking	Yes	2 (4.8)	40 (95.2)	1.00	1.00
	No	65 (18.4)	289 (81.6)	4.50 (1.06-19.09) *	3.89 (0.69-22.14)
Khat use	Yes	15 (12.6)	104 (87.4)	1.00	1.00
	No	52 (18.8)	225 (81.2)	1.60 (0.86-2.98)	0.81 (0.35-1.88)
Alcohol consumption	Yes	55 (17.2)	265 (82.8)	1.00	1.00
	No	12 (15.8)	64 (84.2)	0.90 (0.46-1.79)	0.79 (0.30-2.08)
Additional salt	yes	4 (8.9)	41 (91.1)	1.00	1.00
	No	63 (17.9)	288 (82.1)	0.45 (0.15-1.29)	0.56 (0.16-1.95)
Physical Exercise	Yes	5 (7.6)	61(92.4)	1.00	1.00
	No	62 (18.8)	268 (81.2)	2.82 (1.09-7.32) *	3.10 (0.97-9.97)
Waist circumference	Normal	33 (11.4)	257 (88.6)	1.00	1.00
	High	34 (32.7)	70 (67.3)	3.78 (2.19-6.54) *	1.71 (1.07-3.95)*

**Control of hypertension:** Over 80% of the participants demonstrated some knowledge of how hypertension is diagnosed and treated. However, only 33.3% of the participants reported having their BP ever measured before.

Among the 67 participants identified as having hypertension, 68.7% reported to have had their blood pressure measured at least once before. However, only

Twenty (7.5%) of the men participants had waist circumference  $\geq 94$ cm, whereas 65.1% of the women had waist circumference  $\geq 80$ cm which is considered high for them. The mean waist circumference is significantly higher in individuals with hypertension,  $94.6 \pm 51.5$ cm versus  $81.9 \pm 7.3$ cm in those with normal BP ( $p < 0.001$ ). When analysis was done independently for both genders, the association between waist circumference and hypertension was seen only in men ( $p = 0.001$ ).

44.8% were aware of their hypertension, and the overall control rate of hypertension was only 22.4%.

The rate of blood pressure control was significantly higher in women (40.6%) as compared to only 5.2% in men ( $p=0.001$ ). However, neither the age of the participants nor their literacy status affected the rate of hypertension control.

## DISCUSSION

Hypertension was found to be prevalent in the semi-urban population of Bedele Town in Southwest Ethiopia. However, awareness and control rate of hypertension in the community was low. Age and waist circumference were the only independent risk factors of hypertension identified. Even though this is a cross-sectional study from one community, it will complement the findings of the few previous studies in the country (10, 17).

The prevalence of hypertension of 16.9% is comparable with the prevalence estimate of 16.2% for sub-Saharan Africa in 2008 (16). Compared with recent studies in Ethiopia, our finding is much lower than that of 28.2% in Gonder (17) and 30.3% in Addis Ababa (10). However, the participants in these two studies were older. They were 35 years and older in the study conducted in Gonder and between 25 and 64 years in the one conducted in Addis Ababa. In the current study, the prevalence of hypertension in those aged 25 to 64 is 26.7%, which is much closer to the finding in Addis Ababa. When a similar analysis was done for those  $\geq 35$  years in our study, about 45% of them were found to be hypertensive, a staggering difference from the Gonder study of the same age group (17).

When compared with findings elsewhere in the world, prevalence of hypertension in this community is lower than that of 28.6% in USA (18), 44.2% in Europe (19) and 44.8% in India (20). Most of these studies involved similar age group as our study.

Even though prevalence of hypertension in this study can be considered lower than the global estimate of 26.4% (1), there is an alarming increase in the burden of hypertension in Ethiopia from 1.8% about 30 years ago (21).

Consistent increase in hypertension prevalence with age is an established fact (5, 7, 10, 18) and there is no exception in our study. With regards to gender differences, the global prevalence of hypertension is comparable between both sexes even though it is lower in women before menopause but increases after that (22). However, the overall prevalence was found to be higher in women in this study. This is probably due to the fact that more women reported previous diagnosis of hypertension than men and most of those women were normotensive during the study. When comparison was limited to elevated BP at the time of the survey, the prevalence in both genders was comparable. Moreover, multivariate analysis showed that gender is not an independent risk factor for hypertension in the community.

This study revealed a widespread prevalence of various cardiovascular risk factors among adolescents and adults in Bedele Town. Abdominal obesity (central adiposity) and high blood pressure were more prevalent

among females. Most people (83.3%) did not practice regular exercise. About 11% of the participants reported history of smoking whereas 30.1% and 80.8% of the participants gave history of khat use and drinking alcohol respectively. However, the influence of most of these risk factors on prevalence of hypertension was not seen in this study. This is probably because of the fact that the participants were asked about use of these substances without consideration of the amount consumed. As a result, only age and waist circumference were found to be independent risk factors identified. Most of the studies done in Africa used Body Mass Index (BMI) not waist circumference to assess obesity (10, 23). However, waist circumference is a better predictor than BMI for hypertension and cardiovascular diseases (24).

The total burden of hypertension worldwide is accentuated due to the silent nature of the disease. Hypertension causes few nonspecific symptoms if any, and most affected individuals are detected incidentally and after occurrence of complications (4, 6). As a result, self-awareness and control of hypertension worldwide is low (6, 10, 11). Similarly, only 44.8% of hypertensive individuals in our study were aware of hypertension and only 22.4% of them had control of their hypertension.

We believe that the findings of our study will contribute to the efforts made to uncover the burden of hypertension in Ethiopia. However, there are certain limitations worth mentioning. First of all, our study is a cross-sectional study with relatively small sample size and hence it is difficult to generalize the findings for the country. Besides, assessments for behavioral risk factors like smoking, alcohol intake and khat use were based on only history of use of these substances without assessment of the amount and duration of use. As a result, cause-effect relationship could not be established.

This study adds to the evidences that the prevalence of hypertension in Ethiopia is on the rise. Besides, knowledge about the risks imposed by hypertension, awareness of their status among hypertensive patients and level of BP control was quite low. Thus, extensive health education on cardiovascular risk reduction should be done by promoting healthy life style and motivating the community for adequate BP control. Furthermore, we suggest national strategy for hypertension screening at least for adults visiting health institutions for various reasons.

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