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COLLEGE OF HEALTH SCIENCIES AND MEDICINE

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PREVALENCE OF HYPERTENSION AND ITS DETERMINANTS AMONG RESIDENTS OF GUNCHIRE TOWN, GURAGE ZONE, SNNP, ETHIOPIA 2021

A RESEARCH PAPER TO BE SUBMITTED TO WOLKITE UNIVERSITY COLLEGE OF HEALTH SECNCE AND MEDICINE DEPARTMENT OF PUBLIC HEALTH FOR PARTIAL FULFILLMENT FOR BACHLOR OF SCIENCE DEGREE IN PUBLIC HEALTH

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ABSTRACT

Background: Hypertension is easily identifiable, largely asymptomatic, common, modifiable risk factor for cardiovascular diseases at the population level. It is a silent killer and most patients are detected to have it incidentally when they are admitted to hospital for unrelated disease or subjected to pre-employment or preoperative medical checkups. Information on the prevalence of hypertension and its associated factors is to be considered vital to focus and improve prevention and control of cardiovascular diseases.

Objective: This study is designed to assess the prevalence of hypertension and its determinants among residents of Gunchire town, Gurage zone, SNNP Ethiopia.

Methods: A Cross-sectional community based survey was conducted from August to October, 2021 among 360 sampled adults aged 18 years or more. A pretested structured questionnaire was used by three data collectors during data collection. The data was edited, cleared, entered into software version with SPSS for windows version 20 and was analyzed to valuable information based on set of variables

Results: The overall prevalence of hypertension in the study population was 15.28% from whom the prevalence in males was 10% while it was 5.28% in females. Crude odd ratio and adjusted odd ratio was done and shows significant association between hypertension family history of HTN (AOR=2.67 95%CI: 1.044-6.854 P=0.004), history of DM (AOR=18.947 95%CI:4.599-78.052 P=0.000), smoking(AOR=45.834 95%CI:6.598-318.381P=0.000), alcohol use(AOR=6.968 95%CI:0.873-55.59 P=0.047), chat chewing(AOR=0.207 95%CI:0.066-0.651 P= 0.007) and BMI (AOR=18.947 95%CI;4.599-78.092 P=0.000).

Conclusion: The prevalence of hypertension in this study was found to be high. Males were highly affected than females. The study has demonstrated that among the determinants; sex, age, smoking, family history, diabetes mellitus and alcohol drinking were prevalent in the hypertensive population so that further large scale studies has to be done looking at its public health importance.

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ABBREVIATIONS

AHA- American heart association

BP – blood pressure

BMI – body mass index

CVA – Cerebrovascular accident

DBP – Diastolic blood presume

DM – Diabetes Mellitus

HTN – Hypertension

ISH - International society of hypertension

JAMA – Journal of American heart association

NCHS – National community health statistics

SBP – Systolic blood pressure

WHO- World health organization

CHAPTER ONE- INTRODUCTION

1.1 Background information

Hypertension is defined as arterial blood pressure that exceeds 140/90mmHg at several determinations. This is an arbitrary definition because a diastolic pressure of even 85mm Hg may be associated with increased cardiovascular morbidity and mortality. So it should be flexible. It is common, asymptomatic, readily detectable, usually easily treatable, and often leads to lethal complications if left untreated. Hypertension is the most important modifiable risk factor for: coronary heart disease, Stroke, congestive heart failure, end-stage renal disease and, peripheral vascular disease. (1)

Prior to effective development of treatment, hypertension was known to decrease the life expectancy by about 10-20 years by causing target organ damage and atherosclerotic complications. Untreated hypertensive patients will develop organ damage in about 50% of cases in seven years and atherosclerotic complications in 30% of cases. High blood pressure is an important cause of both broad categories of stroke – hemorrhagic and ischemic. Although cigarette smoking, diabetes, dyslipidemia, obesity, and underlying cardiac diseases such as atrial fibrillation, rheumatic heart diseases and cardiomyopathy all increase the risk of stroke, the most powerful, highly prevalent, independent risk factor is high blood pressure. Epidemiological data shows that in middle-aged people, a 10mmhg increase in SBP is associated with about 40% more stroke and the risk of stroke approximately doubles for every 7.5mmHg increase in DBP. Furthermore, Patients with DBP of 105 mmHg have a 10fold increased risk of stroke and sometimes increased risk of other Coronary events compared to subjects with DBP of 76mmHg. However, within 3-5 years of effective lowering of SBP by 10mmHg, most, if not all, of the increased risk of stroke is eliminated, as for other coronary events. This benefit has also been noted for DBP. (2, 3)

Hypertension is broadly classified in to two categories; primary or essential and secondary hypertension. Primary hypertension is the most common and accounts for about 95% of cases and occurs in age groups 35-55 years. The etiology is still obscure. Until now, there is no definitive preventive or curative measure available. In spite of this, some associated risk factors have been isolated epidemiologically. These are family history, overweight, excess salt/ alcohol intake, sedentary life styles, advancing age, etc. (4)

Hypertension is most important public health problem in developing countries like the western countries causing an estimated 7.1 million deaths a year worldwide or 13% of total deaths/mortality. Also, it is the commonest CVD leading to a major public health challenge to societies who are in socio-economic transition and affects the development of countries as a whole. (4)

1.2 Statement of the problem

Hypertension is a highly prevalent risk factor for CVD throughout the industrialized world and becoming an increasingly common health problem worldwide because of increasing longevity and prevalence of contributing factors such as obesity, physical in activity and an unhealthy diet. The current prevalence in many developing countries, particularly in urban societies, is already as high as those seen in the developed countries. Worldwide, HTN is estimated to cause 7.1 million premature deaths and 4.5% of the disease burden [(64million disability adjusted life years (DALYS)]. The proportion of global disease burden attributable to hypertension is substantial. (5)

Treating hypertension has been associated with about a 40% reduction in the risk of stroke and about a 15% reduction in the risk of myocardial infarction. Although the treatment of HTN has been shown to prevent CVD and to extend and enhance life, hypertension remains inadequately managed everywhere. In addition, hypertension often coexists with other cardiovascular risk factors such as tobacco use, diabetes, hyperlipidemia and obesity, which compound the cardiovascular risk attributable to hypertension. Worldwide, these coexistent risk factors are inadequately addressed in patients with hypertension, resulting in high morbidity and mortality. According to one finding in the United States, the total cost of HTN was estimated at $ 37 billion in 1999 i.e. $ 26 billion by direct medical costs and $ 11 billion in lost earnings. (5, 6)

In Ethiopia national surveillance for hypertension has not been conducted but the problem is growing as few small scale hospital based and community survey indicate it as a disease of public health importance. As the prevalence of hypertension increases, more working people become sick depending on others. Hence, the overall mortality and morbidity resulting from uncontrolled or poorly controlled hypertension will have impact on the economy of the country. A prospective study of patient in the 60+ age category found CVDs especially hypertension and its complication in 20% of patients. (7)

Hospital based data on small scale community does not reflect the general picture of the problem. Thus in our country Ethiopia, a large population based studies has to be conducted so as to know the magnitude of the problem and its impact on the individual and hence to highlight a new management approach for policy makers, other concerned organizations and individuals. (8)

1.3 SIGNIFICANCE OF THE STUDY

Hypertension prevalence is on the rise in Africa and commonly exceeds 25% in rural areas and is over 30% in urban and semi-urban areas the same is true in Ethiopia (9, 10).

This study will Show the magnitude of hypertension and identify risk factors for future interventions like health education, regular screening and medical management & help the community to understand the importance of knowing status of level of blood pressure and compliance to treatment. Last but not least, it will serve as a base line for the government, policy makers and public health workers to conduct further nationwide studies looking at the increasing public health importance of HTN in the community.

CHAPTER -TWO

LITERATURE REVIEW

From an epidemiologic perspective, there is no obvious level or cut off point for blood pressure that defines hypertension. In adults, there is a continuous, incremental risk of CVD, stroke and renal disease across levels of both systolic and diastolic blood pressure. Hence, there is no sharp division in to hypertension or normotension. As a result, arbitrary levels have been taken to define those who have an increased risk of developing a morbid CVS-event and/or to those who will clearly benefit from the treatment (11).

It is important to take in to account not only the pathologic consequences of hypertension but the psychological and social effects of labeling patients as hypertensive.

The 2004 working party of the British hypertension society recommends treatment in patients with sustained Grade 2 hypertension (>160/100mmHG) for uncomplicated hypertension and for patients with grade 1 HTN (SBP 140-159 mmHg or DBP 90-99mmHg, or both) if there is any complication of hypertension or target organ damage, or diabetes, if there is an estimated 10year risk of CVD of > 20% despite life style a advice after several measurement (12). In contrast the most recent guidelines from the AJNC on prevention, evaluation and treatment of hypertension defines and recommends treatment for hypertension when the average of two or more seated blood pressure during each of two or more out patients visits is $\geq$140/90 mmHg (3). Cut –off points vary from study to study and some studies use estimates of hypertension prevalence based on casual blood pressure measurement which over estimates.

Hypertension is an important public health problem worldwide. Analysis of the global burden of hypertension revealed that over 25% of the world's adult population had hypertension in 2000 and the proportion is expected to increase to 29% by 2025 (11, 13). According to world health report 2002, CVD accounted for 9.2% of total deaths in the African region in 2001, and hypertension remains the most important risk factor with national Prevalence levels ranging from 25% to 35% in adults aged 25-64 years. Growing evidence suggests that hypertension constitutes the basis for CVD epidemic in sub-Saharan Arica and is a wide spread problem of economic importance because of its high prevalence in urban areas, its frequent under diagnosis, and the severity of its complications (14, 15).

Limited data on the trends of prevalence of hypertension suggest that it has increased in economically developing countries in recent years while it remained stable or decreased in developed countries. Thus, the world's most hypertensive people live in developing countries where CVD has an early onset and

higher mortality than in developed countries. Given that more than 80% of the world's population lives in economically developing nations, it is very likely that the world's wide burden of illness due to hypertension will continue to escalate unless measures are taken to blunt the expected increase in prevalence of hypertension(16, 17).

The prevalence of hypertension varies between 15-35% in urban adult population of Asia while it is two to three times lower in rural populations than in urban subjects. There has been a rapid increase in prevalence of hypertension in India, china, Philippines, Thailand, Srilanka, Iran, Pakistan and Nepal and it occurs at a relatively younger age. The prevalence varies from one country to another country and from one community to another community in the same country depending up on the economic development and affluence (17).

A recent cross-sectional study of china estimated 129 million people aged 35-74 years have hypertension. Previous estimates found 30 million persons with hypertension in china in 1960, 59 million in 1980, and 94 million in 1990. This represents that the continuance of a trend in which the prevalence and absolute number of persons with hypertension has increased at a steep rate (18)

The WHO/ISH 2003 reported HTN to be an important public health problem in developing countries and in adults aged 40-55 years, BP were the highest among Indian men as compared to those of 20 other developing countries. The overall prevalence of hypertension in India ranges from 4.5%-69% which is higher for elderly and in urban areas significantly. Few studies were carried out for comparing different socio-economic group and prevalence was reported to be higher in low and middle socio-economic groups (based on house hold income, occupation and dietary pattern) but didn't differ significantly between sexes. Important correlates of hypertension prevalence were higher BMI, higher educational status, prevalent DM and urban residence where as physical activity and current smoking has not related to the prevalence of hypertension (19).

Research in Japan estimated more than 33 million adult to have hypertension which reached 45% of the adult population. The prevalence of hypertension increases as population ages in both men and women. More than half of middle-aged men and women and almost three-fourths of elderly men had hypertension (20).

According to research done in 1990s on hypertension prevalence and blood pressure levels in 6 European countries, Canada, and limited states, 'prevalence was highest in Germany (55%), followed by Finland (44%), Spain (47%), England (42%), Sweden (38%) and Italy (38%). Prevalence in United States and

Canada were half of the rate in Germany (28% and 27% respectively). The prevalence of hypertension for the European average was 44.2% compared with 27.6% in North America (21).

In 2005-2006, 29% of all United States adults 18 years and older were hypertensive. It was nearly equal between men and women. The prevalence increased with age from 7% among those aged 18-39 years to 67% among those aged 60% years and older. The non-his panic black population had a significantly higher prevalence of hypertension than the non-his panic white and Mexican American population (41%) vs. 28% and 22% respectively). Among them 78% were aware of their condition, 68% using anti-hypertensive medication and 64% achieved Bp<140/90 mmHg while on anti-hypertensive medication (23).

Until recently, hypertension was thought to be rare in Africa. However, more recent data such as those from Tanzania, Ghana, Egypt and South Africa, suggest that HTN prevalence is one the rise in Africa and commonly exceeds 20%-25% in rural areas and is over 30% in urban and semi-urban areas. A study of two linked cross-sectional based survey of a middle-income urban district and a relatively prosperous rural area in Tanzania Edwards et al reported an age -standardized hypertension prevalence of 37.3% among men and 39.1% among women in urban district and 26.3% among men and 27.4% among women in the rural area (24).

The overall prevalence of hypertension in Ghana was 28.7% being comparable in men and women 29.9% vs. 28%. It was more prevalent in semi – urban than rural villages 32.9% vs. 24.1%. The prevalence rate increased with age in both men and women and in both rural and semi urban participants. According to this study 22.0% were aware of being hypertensive 11.3% were on Anti- hypertensive treatment but only 2.8% of the total had their blood pressure adequately controlled (i.e.<140/90mmHg) (23).

According two cross-sectional surveys conducted between 1994 and 2003 at the same sites in Cameroon, mean BP levels were higher in men compared with women. Irrespective of sex and place of residence the prevalence of hypertension significantly increased with age and BMI. The highest odds of having hypertension after adjusting for all other risk factors were seen in the oldest subjects, aged 55-74 years. Classes of BMI were tightly associated with hypertension in men than women. Being overweight was associated with hypertension significantly in urban participants but not in rural ones. There was a different association of hypertension with alcohol consumption across sites, with appositive association in the rural area (significant only in men) and negative association in the urban area (significant only in women). Educational level was inversely associated with hypertension in women, although significant only in the urban area (24).

According to epidemiologic studies done from 1991-1994, the national estimates or prevalence of hypertension in Egyptians was 26.3%, slightly more prevalent in women 28.9% than in men, 25.7%. The prevalence of hypertension increased progressively with aging reaching a peak in the age group of 65-75 where more than 50% of individuals have high blood pressure. Before the age of 45 years hypertension was more prevalent in men while the reverse was true after 45 years. According to the study 37.5% of Egyptians were aware being hypertensive, 23.9% were receiving treatment and it was controlled only in 8% (25).

The most comprehensive estimates of the prevalence of hypertension in South Africa shows overall prevalence rate of 55%, with 59% of black African people, 55% of Indian and colored people and 50% of white people. Differences in urban /rural prevalence were no longer apparent. Factors correlated positively with hypertension were age, smoking, waist-hip ratio, obesity, increased salt intake, decrease in fruit and vegetables and higher intake of Alcohol (26).

To date, Ethiopia has no national strategy for the prevention and control of chronic diseases but studies done on Ethiopian general population to determine CV risk factors found that hypertension is common particularly in urban areas like Addis Ababa the prevalence being as high as 32.5% in males and 27.9% among females. Both the men SBP and DBP were significantly higher in males than females in Addis Ababa. The associated risk factors for CVD were drinking alcohol, smoking cigarettes, chewing chat and adoption of western lifestyle (27, 28, 29 and 30).

According to recent study done in Addis Ababa by, the prevalence of isolated systolic hypertension was 9.9% in males and 8.3% in females. Isolated diastolic hypertension was 5.8% in males and 6.0% in females combined systolic and diastolic hypertension was 16% in males and 13.6% in females.

Hypertension prevalence and age related changes of BP in semi – nomadic and urban Oromos of Ethiopia were very low in semi nomadic groups where as an 8 fold increase in the urban population. SBP and DBP were significantly higher in both men and women and progressively increase with age in women but not in men (31).

According to a small scale study done on 2003 by Admassu Fekadu in Jimma town, the prevalence of hypertension was 21.2% for which only a quarter of the study subjects aware their illness and only 58.6% undergoing regular medical follow up.

There was no statistically significant association between hypertension and the socio economic variable like age, sex, educational status and marital status. But there have been statistically significant association between HTN and the risk factors like smoking, family history of HTN, chewing and drinking coffee.

CHAPTER THREE - OBJECTIVES

3.1 General objective

To determine the prevalence of hypertension and its determinants among residents of Gunchire town, Gurage zone, SNNP, Ethiopia.

3.2 Specific objectives

- To assess the prevalence of hypertension in Gunchire town
- To assess the determinants of hypertension in the Gunchire town

CHAPTER 4 - METHODS AND MATERIALS

4.1 Study area and period

Our study was conducted in Gunchure town, Enamorenaener woreda, Gurage zone, SNNPR, Ethiopia from September 10 to October 20, 2021. The town is located 200 KM from Addis Ababa and 42 km from Wolkite. The town bordered on the south with hured kebele, on the west with kochira kebele, on the north shanka kebele and, on east with Gaswude kebele. The town is divided in to two kebeles and the climate is woina dega. In this town there is one primary Hospital, but there is no health center. Hospital has three private clinics and two pharmacies. Gunchure primary hospital has been started since 2008. It has seven OPD, four wards with 30 beds for inpatients and two pharmacies.

4.2 Study design

A cross-sectional community based survey was conducted.

4.3 Source population

The total population of Gunchire town

4.3.1 Study population

All adults 18 years and above whom were living in Gunchire town during data collection.

4.3.2 Sample size

The sample size was calculated using the following formula with 95% CI

$n = \frac{2^Z pq}{d^2}$, where

$q = 1 - p$

n = desires sample size
d = degree of error
P = estimated proportion

z = the standard normal variables at (1-∂) % confidence level and ∂% i.e. with 0.05% CI = 1.95, p= 0.39 addis ababa

$ni = \frac{2^Z pq}{d^2} = (1.95)2x(0.39)(0.61)/(0.05)2=362$

Since the total number of our study population is less than 10,000, i.e. our total no of study population is 3945, we need a correction formula.

$nf = \frac{ni}{}$

1+ni/n = 332

nf = 332

The sample size will be calculated considering this research as a base line for the study area. Adding 10% for contingency the sample size becomes 365.

4.3.3 Sampling technique

After determining the number of individuals to be studied in the two kebele (kebele 01 and 02), the number of households in the kebele was divided by the sample size to determine the proportion of individuals to be studied in each selected kebele (1084/360). After getting the sampling fraction in the selected kebeles, systematic sampling was used to select the households and a lottery method was used to select the first household. Then, every 3rd households was visited to get the required number of study participants in all selected kebeles of the town then, eligible adults aged between 18 and above were identified. If more than one eligible adult was present in the selected household, one household member was selected randomly using lottery method. The included sample size was contains only urban part of the town.

4.4 Variables

4 .4.1 Dependent variables

Blood pressure

4.4.2 Independent variables

Age, sex, weight, height, family history of hypertension, educational status, income, smoking, dietary habits, and diabetes millets

4.5 Data collection and measurements

4.5.1 Data collection plan (Measurement)

4.5.1.1 Instrument

Structured questionnaire that includes the dependent variables like blood pressure, level of awareness to the disease and independent variables like age, sex, weight etc

4.5.1.2 Procedures

Blood pressure was measured twice in a sitting position (using a standard sphygmomanometer blood pressure cuff with an appropriate size to cover two-thirds of the upper arm) after the participant rested for at least 5 minutes. The second measurement was taken 5 minutes after the first measurement. Finally, the

mean of the two measurements was taken to determine hypertension. Weight and height was measured using weighing scale and measuring tape respectively after which the BMI was calculated.

4.5.2 Data collection

Data was collected by three data collectors after the main investigator trained them for one hour before the survey so as to assure consistency. Data collection procedure was thoroughly explained to the other data collectors with practical demonstration.

4.5.3 Data quality control

To ensure data quality first data collectors were trained thoroughly. Data collectors were conduct intensive discussion before starting data collection. Questionnaires were checked for completeness on a daily basis. In order to crosscheck the collected data and to maintain the quality of data randomly rechecking five percent of all completed questionnaires was conducted daily.

4.6 Data analysis

Data was edited, cleared and entered in to software and analysis was carried out using SPSS for windows version 20 and results will be displayed using tables and test of association was used whenever possible using chi-square table after cross tabulation.

4.7 Ethical considerations

Permission was secured from the municipality and kebeles. In addition, verbal consent was obtained from the respondents. During the time of data collection a proper counseling was made to all individuals under study. Finally, information was given to people involved in the study to aware their problem and to seek early intervention before life threatening problem supervenes.

4.8 Dissemination of the data

Different strategies will be used to disseminate the information contained in the result paper. The result of this study will be circulated among groups or sectors who extremely participated in the implementation of health program so that the recommended solution will be put in to action in a desired manner. Effort will be made to present the findings of the study in seminar and conference.

4.9 Limitations

The main limitation of this study is that it is a simple cross-sectional, and didn’t include variables such as psychological stress and biochemical measurements. Hence other analytic studies that incorporate biochemical measurements should be carried out in order to assure the temporal relationship between hypertension and the explanatory variables.

4.10 OPERATIONAL DEFINITIONS

Per capita income: calculated from the total family income according to family size within one year

Smoking: smoking is a practice in which a substance is burned and the resulting smoke breathed in to be tested and absorbed in to bloodstream.

Smoker: those who smoke cigarette at least 5 cigarettes per day for at least 3-4 years

Chat chewers: Those who chew chat at least 3 days per week for at least 5 years.

Coffee consumer: Those who consume coffee at least 3 cups daily.

Alcohol: Local or fabricated alcoholic beverage

Alcohol consumer: those who consume at least 2 units or bottles/ day

First degree relative: Refers to parents; siblings and off springs.

Second degree relative: Refers to first degree relative of the siblings, the parents or off spring of an individual.

Hypertension: Those people with blood pressure $\geq$ 140/90mmHg measured in two or more outpatient visits.

Physical activity

- Vigorous physical activity = heavy lifting, digging, aerobics or fast bicycling
- Moderate physical activity = carrying high loads, bicycling at a regular pace
- Minimal physical activity =walking

CHAPTER FIVE – RESULTS

5.1 Socio-demographic characteristics

Three hundred sixty respondents participated in the study giving a response rate of 98.6%. From the study subjects enrolled in the study, 195 (54.16%) were males while the remaining 165 (45.84%) were females. 34.72% was in the age ranges of 25-44. With regard to their educational status, the majority (30.56%) was tertiary education and least had illiterate. Just over half of the study subjects were married (53.06%) while 10(2.78%) were widowed. Nearly a third of the study populations were merchants but 2.22% were unemployed while the least (1.67%) were house maid. See table 3.The total family income summed up according to 2009 world bank GNP calculated using world bank atlas method was 831-3287 birr/month in 199(55.28%) and 76(21.11) of the study subjects had income <830 birr/month.

Table 1 Distribution of the demographic and socio-economic feature of adults >18 years living in gunchire town 2021

Demographic characteristics	Categories	No (%)
Sex	Male	195(54.16)
	Female	165(45.84)
Marital status	Married	191(53.06%)
	Single	142(39.44%)
	Divorced	17(4.72%)
	Widowed	10(2.76%)
Age groups	18-24 years	94(26.11)
	25-44 years	125(34.72)
	45-64 years	111(30.83)
	65+ years	30(8.33)
Educational status	Illiterate	56(15.56)
	Read and write	57(15.83)
	grade 1- 6	66(18.33)
	Grade 7-12	71(19.72)

	Tertiary education	110(30.56)
Occupation	Government employee	96(26.67)
	Merchant	117(32.5)
	House maid	6(1.67)
	Private employee	23(6.38)
	House wife	19(5.28)
	Daily laborer	9(2.5)
	Unemployed	8(2.22)
	Other	82(22.78)
Per capita income	<830 birr/month	76(21.11)
	831-3287 birr/month	199(55.28)
	3288-10162.50 birr/month	85(23.61)

5.2 Prevalence of hypertension

The overall prevalence of hypertension in the study subjects was found to be 15.28% from whom 10% were found to be males and the rest were found to be females. Their BP records was 66.67% normotensive, 18.06% pre-hypertensive, 6.94%(25) stage I hypertensive, 1.9%(7) stage II hypertensive & 6.39%(23) isolated systolic hypertensive but from those registered to be hypertensive during data collection, 38.18%(21) were not aware of their problem so that had no regular medical follow up & appropriate management of their clinical condition.
Among 42(11.67%) subjects who had personal history of hypertension, it was diagnosed by symptoms in 22(52.38%) & during checkups for other reasons in 20(47.62%) patients for which more than half of them lived with the illness for <5 years. Among them, 81% had symptoms either during the data collection or prior to that historically. All of them had regular medical follow up in the hospital and around 62% were taking medications accordingly but the remaining were not taking medications due to fear of side effects, lack of knowledge and for other reasons.

The mean systolic and diastolic blood pressure was 127.6mmHg and 75.3mmHg respectively.

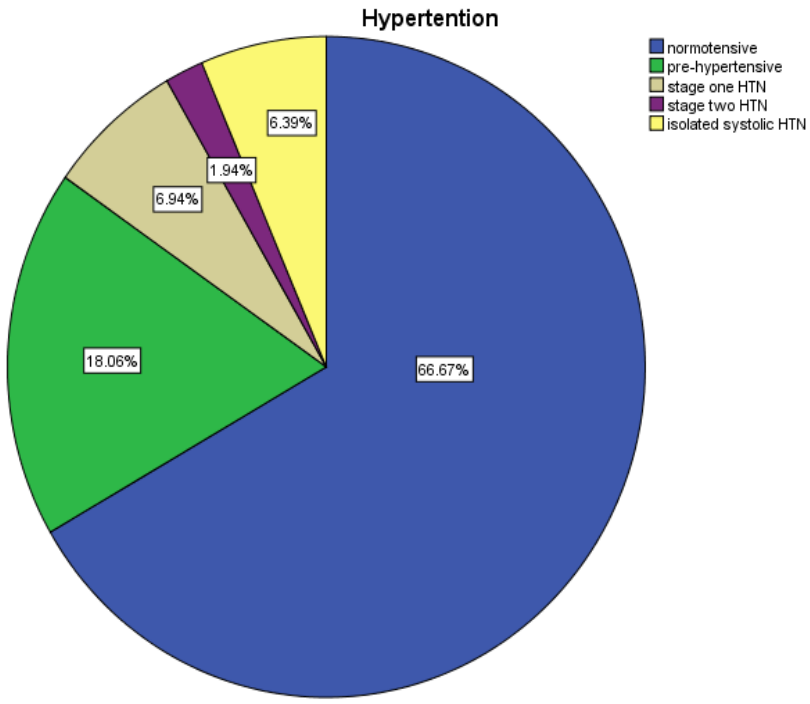


Figure 1 Prevalence of HTN among adults 18 years and above who were living in Gunchire town Gurage Zone, Ethiopia-2021

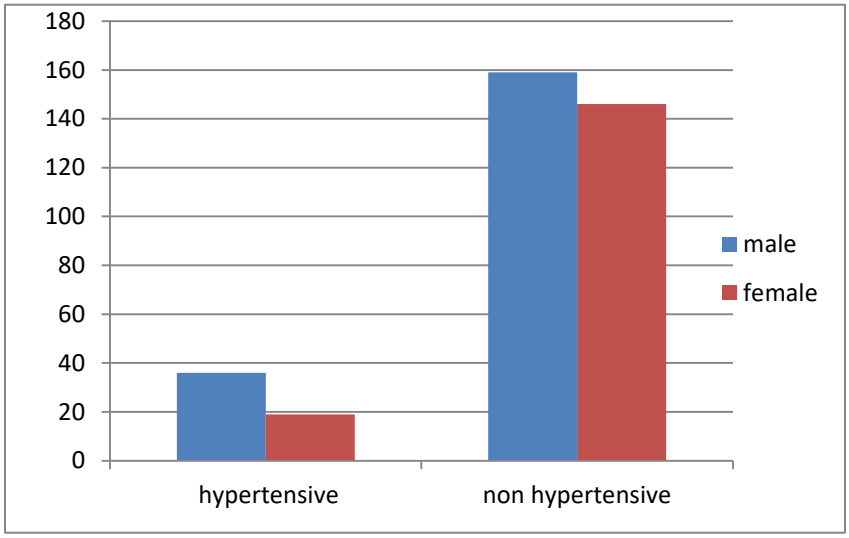


Figure 2 Distribution of prevalence of HTN in different sexes who were living in Gunchire town Gurage Zone, Ethiopia-2021

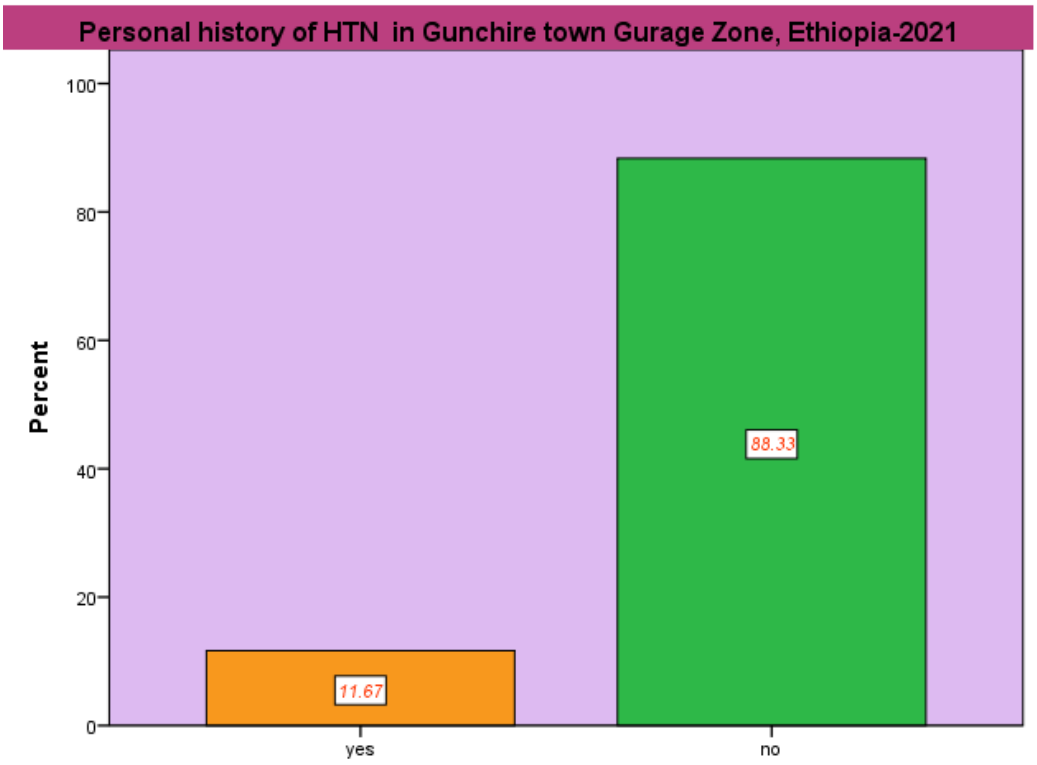


Figure 3 Distribution of personal history of HTN of respondents in Gunchire town Gurage Zone, Ethiopia-2021

Table 2 Distribution of the determinants of HTN among residents of Gunchire town Gurage Zone, Ethiopia-2021

No.	Independent variables		Hypertensive		Total
			Yes	No	
1	Family history of hypertension	Yes	32(8.89%)	51(14.17%)	83 (23.06%)
		No	23(6.39%)	254(70.56%)	277(76.94%)
2	Alcohol drinking	Yes	6(1.67%)	6(1.67%)	12(3.34%)
		No	49(13.61%)	299(83.06%)	348(96.67%)
3	Cigarette smoking	Yes	10(2.78%)	4(1.11%)	14(3.89%)
		No	45(12.5%)	301(83.61%)	346(96.11%)
4	Coffee drinking	Yes	39(10.83%)	183(50.83%)	222(61.66%)
		No	16(0.04%)	122(33.89%)	138(38.34%)
5	Chat chewing	Yes	10(2.78%)	141(39.7%)	151(41.94%)
		No	45(12.5%)	164(45.56%)	209(58.06%)
6	History of diabetes mellitus	Yes	17(4.72%)	5(1.38%)	22(6.11%)
		No	38(10.56%)	300(83.33%)	338(93.89%)
7	Minimal physical activities	Yes	31(8.61%)	163(45.28%)	194(53.89%)
		No	24(6.67%)	142(39.44%)	166(46.11%)
9	OCP users among female respondents	Yes	4(2.42%)	39(23.64%)	43(26.06%)
		No	15(9.09%)	107(64.85%)	122(73.94%)

5.3 Determinants of hypertension

Out of 83 (p=0.04, AOR=2.675 95%CI: 1.044-6.854) of the study subjects who have family history of hypertension 68(81.9%) are in their first degree relatives while 15(18.1%) are in their second degree relatives.

The prevalence of alcohol drinking was found to be 3.3% (P=0.047, AOR=6.968 95%CI: 0.873-55.59) of whom 50% of them consuming >2 units or bottles/day while the prevalence of cigarette smoking was found to be 3.89% (AOR=45.83 95%CI: 6.59-318.38; P=0.00) among them 78.57% (11) were smokers. Among the study subject 41.9% were chat chewers (AOR=0.207 95%CI: 0.066-0.651; P=0.007) and also 61.67% (222) of them were coffee consumers (COR=1.625 95%CI: 0.869-3.037; P=0.128). Among the female study subjects 11.94% (43) were OCP users (COR=0.732 95%CI: 0.229-2.339; P=0.598). With regard to their physical activities, more than half of the subjects were involved in minimal physical activities.

Among the study subjects 71.67% (258) had BMI of 18.5-24.9, 16.11 %(58) of study subject's BMI was <18.5, 12.2 %(44) of study subject's BMI was 25-29.9 and no one was obese (BMI>30).

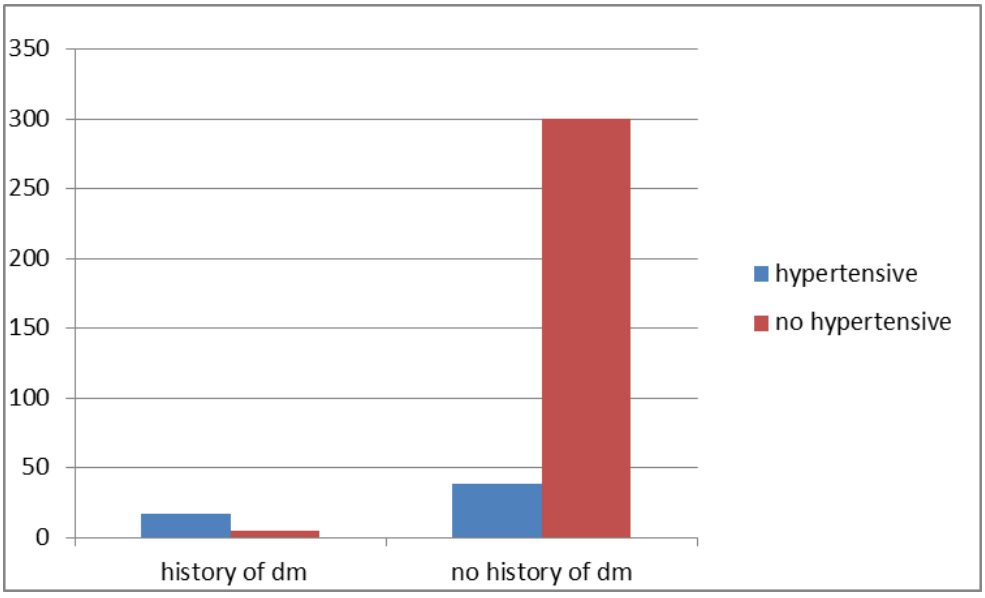


Figure 4 Distribution of prevalence of HTN in DM patients in gunchire town Gurage Zone, Ethiopia-2021

There was statistically significant association between hypertension and the socio economic variables like age (p<0.00001) and marital status. There was also statistical significant association between hypertension and the risk factors like alcohol drinking (p=0.047, AOR = 6.968 95% CI: 0.873-55.59), family history of hypertension (p=0.04, AOR=2.675 95%CI: 1.044-6.854), personal history of DM (p=0.000, AOR=18.947 95%CI: 4.599-78.052), chat chewing (p=0.007 AOR=0.207; 95%CI: 0.066-0.651), Cigarette smoking (p=0.000, AOR= 45.834; 95%CI: 6.598-318.381) and BMI (P=0.000 AOR=18.947; 95%CI: 4.599-78.092)

Table 3 Factor associated with prevalence of hypertension among adults >18 years in gunchire town 2021

Characteristics	Characteristics	Hypertensive or not		COR(95% CI)	P. Value	AOR(95% CI)	P. Value
		Yes	No				
Age	18-24	2	92	6.929(3.748-12.809)	0.000	0.450(0.266-0.761)	0.003
	25-44	12	113				
	45-64	34	77				
	≥65	7	23				
Marital status	Married	38	153	1.225(0.795-1.889)	0.0043	1.065(0.593-1.914)	0.832
	Single	10	132				
	Divorced	4	13				
	Widowed	3	7				
Family history	Yes	32	51	6.929(3.748-	0.000	2.675(1.044-	0.04

of HTN	No	23	254	12.809)		6.854)	
Alcohol drinking	Yes	6	6	6.102(1.892-19.685)	0.02	6.968(0.873-55.59	0.047
	No	49	299				
Chat chewing	Yes	10	141	0.258(0.126-0.532)	0.0001	0.207(0.066-0.651)	0.007
	No	45	164				
History of DM	Yes	17	5	26.18(9.368-76.912)	0.000	18.947(4.599-78.052)	0.000
	No	38	300				
Cigarette Smoking	Yes	10	4	16.722(5.031-55.581)	0.000	45.834(6.598-318.381)	0.000
	No	45	301				
BMI	<18.5	2	56	0.025(0.011-0.058)	0.000	18.947(4.599-78.092)	0.000
	18.5-24.9	17	241				
	25-29.9	36	8				
	≥30	0	0				

CHAPTER SIX-DISCUSSIONS

The prevalence of hypertension is at an increasing rate resulting in higher CVDs and morbidity and mortality from their complications (1, 2, 3, 4, and 5).

The overall prevalence of hypertension in the study population (15.28%) is comparable with the overall prevalence in urban Asian populations & India which are 15-35% and 4.5%-69% respectively (6) but was found to be much lower than that found in most African countries and Addis Ababa which were 20-25% &37% respectively (7). This might be due to the lower prevalence of the risk factors in the study area like lesser western lifestyle, low smoking history etc as compared to other areas.

The prevalence of hypertension in males (10%) was higher than that of females (5.28%). This difference in sex is similar to the Addis Ababa in which the prevalence in males & females were 32.5% & 27.9% respectively. Also the same differences were observed in small scale study in Jimma town 2000&2003, in Ethiopia TB health center & in urban bank employee. (27, 29)

Nearly all of those, who know their illness, were under regular medical follow up and three fourth of them were taking Anti-hypertensive drug treatment. This figure is higher than studies done in Ghana and Egypt, 11.3% & 23.9% respectively (14, 16).

The possible reasons for this may be due to the presence of hospital & private clinics and health education given to the patients by the health professionals.

There is statistically significant association between hypertension and family history of hypertension, smoking, alcohol drinking, BMI and history of DM (see table 3).

In our study, individuals with positive family history of hypertension were more likely to be hypertensive. In agreement with this, many other previous studies [14–16] reported that family history of hypertension was significantly associated with being hypertensive in this study. This could be explained by the fact that genetic factors account for one-third to one-half of the risk of hypertension. Blood relatives tend to have many of the same genes that can predispose a person to high blood pressure, heart disease, or stroke [17, 18]. Moreover, the tendency of individuals to follow risky life styles of their family could have also played a role for this association.

Cigarette smoking causes activation of the sympathetic nervous system and oxidative stress associated with increase markers of inflammation leading to endothelial dysfunction, vascular injury, plague progression, and increased arterial stiffness leading to development of hypertension [24]. Many

researchers have reported that cigarette smoking is positively associated with hypertension [10, 18, 22,] which is similar to the results of our study that revealed lifetime cigarette smoking was significantly associated with hypertension.

In our study there is also a significant association between alcohol drinking and being hypertensive (p=0.047, AOR = 6.968 95% CI: 0.873-55.59). Drinking alcohol affects blood pressure in more than one way. Consuming alcohol affects the renin-angiotensin-aldosterone system (RAAS). The RAAS is controlled by the kidneys, and its function is to regulate blood pressure through three hormones: renin, angiotensin, and aldosterone. Alcohol increases blood levels of the hormone renin, which causes the blood vessels to constrict. This means that they get smaller in diameter (13). Renin also decreases how much fluid the body eliminates as urine. This combination of higher fluid levels in the body and smaller blood vessels increases blood pressure. Alcohol also reduces how much vasopressin the body makes. Vasopressin is an antidiuretic hormone. It causes the body to hold onto water, which typically limits how much urine the kidneys make. The action of suppressing this hormone exacerbates the diuretic effect and leads to dehydration (19). Another potential mechanism is the increase in cortisol levels. Cortisol is a hormone that regulates the body's response to stress. It also regulates metabolism, immune function, and inflammatory pathways (21).

Even though some argue that BMI along is not good predictor of cardiovascular disease indicating that adverse health consequences are associated with increased adiposity rather than an increase in body weight [8, 11], evidence showed that higher BMI accounts for 75% of the risk of primary hypertension which is intermediated by increased renal tubular sodium reabsorption that impairs natriuretic [49]. Participants with a BMI ≥ 24.9 were more likely to be hypertensive compared to those with a BMI of 24.9 or lower, which is consistent with multiple previous studies that have reported a strong association between hypertension and BMI [6, 22, 29–31]. Obesity is a well-established risk factor for hypertension [22–25]. Frequently used measures of obesity are BMI, skin fold thickness, estimation of per cent body fat and body weight and hip-waist ratio [26]. Obesity has been recognized as the most important risk factor for developing hypertension. Several epidemiological studies from different populations have reported a significant association between obesity and hypertension [23, 31]. The link between obesity and hypertension is through neuro-endocrine mechanisms and most recently, factors derived from adipose tissue are thought to play a major role.

A person with diabetes either does not have enough insulin to process glucose or their insulin does not work effectively. Insulin is the hormone that enables the body to process glucose from food and use it as energy. As a result of insulin problems, glucose cannot enter the cells to provide energy, and it

accumulates in the bloodstream instead. As blood with high glucose levels travels through the body, it can cause widespread damage, including to the blood vessels and kidneys (5, 9). These organs play a key role in maintaining healthy blood pressure. If they experience damage, blood pressure can rise, increasing the risk of further harm and complications. A meta-analysis appearing in the Journal of the American College of Cardiology (JACC) in 2015 looked at data for more than 4 million adults. It concluded that people with high blood pressure have a higher risk of developing type-2 diabetes. This link may be due to processes in the body that affect both conditions, for example, inflammation. The combined impact of diabetes and high blood pressure can increase the risk of cardiovascular disease, kidney disease, and other health problems (16).

CHAPTER-SEVEN

CONCLUSION AND RECOMMENDATIONS

7.1 Conclusions

This cross-sectional survey illustrated that the prevalence of hypertension was found to be high among males than females. A significant proportion of individuals were unaware of their illness. The study has demonstrated that among the determinants of hypertension; smoking, family history, BMI & chat chewing as well as history of DM were highly prevalent.

7.2 Recommendations

From this study the following recommendations are forwarded:-

Health information to the general population, hypertensive subjects and their families should be given about risk factors, life style modifications and complications of hypertension and the patients have to be informed about the importance of regular follow up and Anti-hypertensive treatment & build a habit of measurement of BP regularly by trained individuals while facilities are widely distributed.

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ANNEX

Questionnaire

Questionnaire: Across-sectional survey on the prevalence of hypertension and its determinants

Instruction to the interviewer:

Mark on the space provided (√)

Explain the purpose of the study to the interviewers and obtain verbal consent

Part I: Socio-demographic characteristics

1. Identification

Sex: a) Male _____ b) Female

Age: _____

Address: kebele_____ house no._____

2. Religion

_____a) Muslim

_____b) Orthodox Christian

_____c) Protestant

_____d) Catholic

_____e) other (specify)

3. Educational status

_____a) illiterate _____b) read and write

_c) grade 1-6 _____d) Grades 7-12 _____e) Tertiary education

4. Marital status

_____a) Married _____b) Single

_____c) Divorced _____d) widowed

5. Occupation

_____a) Government employee _____e) Unemployed

_____b) Private employee _____f) House maid

_____c) Merchant _____g) House wife

_____d) Daily laborer _____h) NGO employee_____

_____i) other specify _____

6. Income per –month

_____a) <830 birr

_____b) 831-3287birr

_____c) 3288-10, 162.50 birr

NB: This is according to World Bank classification of 2009 GNI per capita calculated using World Bank atlas method per family income summed up.

Part II Information on hypertension and related factors

7. Do you have family history of hypertension?

____a) Yes _____b) No

8. If yes to question 7, which family member? _____a) 1st degree relative; specify_____

_____b) 2nd degree relative

9. Do you have personal history of hypertension?

_____a) Yes _____b) No

10. If yes to Q9, how was it identified?

_____a) by symptoms _____b) during other checkups

11. If yes to question 9, how long do you have the problem?

_____a) less than five years

_____b) 5-10 years

_____c) >10 years

12. If yes to question 9, do you have a regular medical follow-up?

_____ a) Yes _____b) No

13. If yes to Q11, in which health institution?

_____a) Hospital _____c) Private clinic

_____b) Health center _____d) other

14. If yes to Q13, are you taking medications accordingly?

_____a) yes _____b) no

15. If no to Q14, what are reasons?

_____a) Lack of knowledge _____d) Fear of side effects

_____b) Negligence _____e) other specify_____

_____c) Cost

16. Do you have current or previous history of one of the following?

_____a) Headache _____e) Weakness of the body

_____b) Blurred vision _____f) Shortness of breath

_____c) Epistaxis _____g) others, specify

_____d) Loss of consciousness

17. Was any medical advice given for the above problem?

_____a) yes _____b) no

18. Do you use alcohol for recreational purpose?

_____a) Yes _____b) No

19. If yes, how many bottles of alcohol/day? _____

20. If yes, how many days a week? _____

21. Do you smoke cigarette? _____a) Yes _____b) No

22. If yes how many cigarette a day? _____

23. Do you chew “chat”?

_____a) Yes _____b) No

24. If yes, how many days in a week?

25. Do you drink coffee?

_____a) Yes _____b) No

26. If yes to Q25, how many cups a day? _____

27. If yes to Q26, How many days a week? _____

28. Do you use OCPs? (For females)

_____a) Yes _____b) No

29. Which one of the following physical activities do you exercise?

_____a) heavy weight lifting _____e) Caring light load

_____b) Digging _____f) Bicycling at regular space

_____c) Walking _____g) other (specify) _____

_____d) fast bicycling

30. Do you have history of diabetes mellitus?

_____a) Yes _____b) No

31. Dietary habit: how often you consume;

_____a) vegetables _____b) fatty food _____c) other specify

32. Weight _____ kgms

33. Height _____ meters

34. BP records:

1st measure: 1st systolic _____ 2nd: systolic _____

: Diastolic _____ : diastolic _____

After 4 hours;

2nd measure: 1st: systolic _____ 2nd systolic _____

: Diastolic _____ : Diastolic _____

Name of interviewer _____

Signature _____ Date _____