WOLKITE UNIVERSITY COLLEGE OF MEDICINE AND HEALTH SCIENCE DEPARTMENT OF NURSING

PREVALENCE OF HYPERTENSIVE CRISIS AND ASSOCIATED FACTORS AMONG HYPERTENSIVES PATIENTS IN GURAGE ZONE SELECTED PUBLIC HOSPITAL, ETHOPIA, A CROSS SECTIONAL STUDY, 2015E.C

INVESTIGATORS: EYOAS TEHERKU.....98/12

FIKIRU GIRMA.....84/12

ATITEGEB ENDALE.....140/12

ADVISOR: MR MAMO SELEMON AND TADESSE SAHILE

A RESEARCH THESIS TO BE SUBMITTED WOLKITE UNIVERSITY COLLEGE OF MEDICINE AND HEALTH SCIENCE DEPARTMENT OF NURSING PARTIAL FULFILLMENT OF BACHELOR DEGREE IN NURSING

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ABSTRACT

Background: Hypertension is one of the major health problems that can cause significant morbidity and mortality in the world. Since HTN is a silent killer for which the majority of hypertensive patients are unaware of their symptoms. It affects about 1.13 billion world population. 1-2% of this population have hypertensive crisis. Hypertensive crisis is becoming the main health issue in both high and low-income level countries. However, studies are scarce in developing countries such as Ethiopia.

Objective of the study: To assess the prevalence of hypertensive crisis and associated factors among hypertensive patients who visit gurage zone public hospitals.

Method: An institution-based cross-sectional study design was conduct in gurage zone during data collection period from May1/6/2015 to Jun1/9/2015e.c using structure and pretested questionnaire by reviewing of data and face to face interview. Additionally, weight, height, and blood pressure of participants were measured following standard procedures. Systematic Random sampling technique was used to select a total number of 422 participants. Data was entered in to Epi data version 4.6 and exported to SPSS version 26 for analysis. All variables in the multi-variable logistic analysis were candidate with a bi-variable at $p < 0.25$. The multi-variable logistic regressions was performed to determine the predictors of hypertensive crisis,and the significance level was established with $p < 0.05$.

Result: The prevalence of hypertension crisis in gurage zone selected public hospitals was 22.7% (95% CI: 1.73-1.81). Male prevalence of HTN crisis were 12.7% (53) and female prevalence of HTN crisis were 10% (42). The mean (1.74) and range of ages of the participants were 24-80 year. Age categories from 45-65 years olds were high prevalence of HTN crisis; it accounts 9.2% (39). From all respondents 45.7% (193) participants have comorbid among those 107 were males and 86 were females. The highest prevalence of participant comorbid was DM 22.3% (94). Participants who drink alcohol were 56.4% (240) from this percent participant develop HTN crisis were 9.2% (39) (AOR=2.109, 95% CI: 1.303-3.415), participants who have family history were 51.2% (216) from this percent participant develop HTN crisis were 8.5% (36) (AOR=1.649, 95% CI: 1.010-2.693) were significantly associated with hypertensive crisis.

Conclusion: The prevalence of HTN crisis was significant proportion for this study. Hence, hypertensive patients should be strictly managed accordingly, and promoting screening programs could reduce the risk of target organ damage. According to this study although hypertensive crises affects wider range of population age group about 53.1% are those with the age of 45-65. Majority of patients had already existing hypertension and Diabetes mellitus is the most common co morbid. For our study Participant having family history and drinking alcohol were significantly associated with HTN crisis. There for, there is an urgent need to create healthy awareness, frequent healthy screening and implementation of effective interventions targeting on the hypertensive patients.

Keywords: hypertension, hypertensive emergency, hypertensive urgency, wolkite, Ethiopia

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ACRONYM AND ABBREVIATION

AHA: American Heart Association

DBP: Diastolic Blood Pressure

DM: Diabetes Mellitus

ETB: Ethiopian Birr

HTN: Hypertension

SBP: Systolic Blood Pressure

SPSS: Statistical Package for Social Sciences

Chapter 1

1 INTRODUCTION

1.1 Background

Hypertension is one of the major health problems globally that can be diagnosed when systolic blood pressure is ≥140mmHg and/or diastolic blood pressure is ≥90mmHg with 2-3 measurements of 1-4 week time gap or by only single measurement when blood pressure is ≥180/110mmHg and there is evidence of organ damage like cardiovascular diseases[1]. Hypertension is mainly an increased arterial blood pressure and it is the major contributing factor for the occurrence of morbidity and mortality both in low-income and high income countries[2]. Blood Pressure ≥180/110mmHg is severe elevation and the patient will be diagnosed as hypertensive crisis [3],[4]. HTN-crisis can be categorized into two namely hypertensive urgencies and hypertensive emergencies based on the presence or absence of target organ damage.

HTN-emergency was initially defined by Volhard and Fahr since 1914[5], denotes a condition of severe hypertension usually BP of ≥180/120mmHg which is related to serious injury to vital organs; mostly the heart, brain, kidney, eye, lung or blood vessels that necessitates rapid diagnosis and proper management to reduce or avoid end-organ damage, whereas

HTN-urgency is a condition described by the existence of severe increased BP without evidence of acute organ damage that can be better managed by oral drugs with the aim of BP decrement over days to weeks ([1],[6]. Hypertensive crises mostly associated with discontinuation or poor adherence to anti-hypertensive medications and previous history of hypertension; others risk factors include vascular diseases, drug and substance abuse, glomerulonephritis, brain injury[7], being female, high body mass index, cardiac illness, presence of mental illness[8]. It can also be connected with psych emotional stress, inappropriate consumption of salt and fluid, consumption of stimulant substances, excess alcohol intake and history of preeclampsia in women[9]. It is also associated with endocrine disorders especially Diabetes mellitus and pheochromocytoma[10].

Patients with hypertensive crisis can show sign and symptoms depending on the organs damaged like chest pain, headache, epistaxis, shortness of breath, dizziness, flank pain, oliguria, bloody urine, blurred vision, nausea, vomiting, palpitation, altered mental status, diaphoresis, anxiety and

other manifestations[11]. These clinical features differ from patient to patient depending on organ injury and sometimes occur irrespective of organ damage[5]. In hypertensive crisis patients, immediate use of anti-hypertensive medications should be started as soon as possible. BP should be monitored carefully to prevent target organ damage and hypotensive effect of the BP-lowering agents in emergency[12].

1.2 Statement of the problem

Epidemiological data on prevalence and clinical features of patients with hypertensive crises are lacking in spite of their relevance from public health perspectives.

Hypertension is a common clinical problem affecting, approximately 1 Billion individuals worldwide and Hypertensive crises are among the most miss managed acute medical problems seen today and it is also very Important to know that reflex of rapidly lowering BP Is associated with poor patient outcomes[13].

Hypertensive crisis accounts 1.2% of worlds HTN prevalence[9] and among known hypertensive patients who had been treated previously .acute sever HTN which includes HTN emergency and HTN urgency accounts for 1.5 %[14].

Around 25% of all medical emergency visited due to HTN emergencies and consequences on the different organs account 36% of cardio vesicular condition including acute heart filure,24% of cerebral infraction 16% of hypertensive encelopathy 12% of acute coronary syndrome and 4.5% of eclampsia during pregnancy 4% intra cerebral or subarachnoid hemorrhage and 2%of aortic dissection[10]. HTN related emergency annual death rate is >79% with the median 10.4 month length of survival if not managed properly[3].

The prevalence in the USA is > 65 million or about 45% of adult population and even a third of the population. Off these, around 30% are not diagnosed and only 14-29% had proper BP regulation. It is mainly related to main organ impairment, majorly myocardial infarction, heart disease, stroke, and renal disease[15]. It also affects 27 - 40% of the adult population in Europe[8],[14] and 40% of adult Russians[9]. HTN is also a common health problem that affects 29.6% of Chines[16].

In Africa, its prevalence is more than other continents specifically in the Sub-Saharan region and the Eastern Mediterranean area, it rises to 30% and 26% of the total population respectively[17], [18].

1.3 Significance of the study

HTN-crisis is an advanced and complicated medical condition with many complications involving vital organs and leaves permanent disabilities up to death. To reduce and prevent these conditions and related consequences, clinicians have to understand the, socio-demographic, comorbid and behavioral determinants of HTN-crisis.

Although HTN-crisis is life threatening cardiovascular condition, there are no sufficient researches which indicate its determinants in the past. Therefore, the result of this study will fill this gap and gives some other evidences.

This study will identify determinants of HTN-crisis and will help for public education about the prevention of those modifiable factors. It will help health care workers to act on those factors which have an association with the condition. It will also be used as an evidenced data for health planners and policymakers. Furthermore, the result will be important for the Federal Ministry of Health, gurage zone Health Bureau, the study areas and other hospitals to develop, revise or amend their guidelines. Since the study is the first in gurage zone, it will be used as a baseline for future similar and related studies and probe researchers' interest for further studies.

CHAPETR TWO (2)

2. LITRACTURE REVIEW

2.1 Prevalence of hypertensive crisis

The prevalence of hypertension in general increases with advancing age, and it is higher in urban than rural areas due to differences in lifestyle[19].

A study done from newyork bêth Israel medical center the prevalence of hypertensive crisis was 11.4%[20]. A study done from Uganda mulago national referral hospital the prevalence of hypertensive crises was 5.1%[21]. A study conducted on the prevalence of hypertensive crisis among Indian adults reported an overall prevalence of 30%[22]. A study from Ghana showed a 13% prevalence of hypertensive crisis [23], and in Kenya, 24% of the population was hypertensive[24]. Factors reported as having associations with hypertension comprise older age, being male, being married, overweight, added sugar intake, alcohol drinking, and fruit consumption[25]. Evidence from the national non-communicable diseases STEPS survey of Ethiopia showed a 15% overall prevalence of hypertension[26].

In Ethiopia reported prevalence rates ranging from 28% to 35%[27]. In some places of southern Ethiopia, the prevalence of hypertension ranged from 22% to 35%[28],[29]. The prevalence of hypertension in general increases with advancing age, and it is higher in urban than rural areas due to differences in lifestyle. Its prevalence in urban areas is practically as high as that in the developed world, ranging from 5% to 20% overall[30]. An increasing burden of hypertension in this region will thus result in grave consequences, as only very few people get treatment, and control is likely to be low[31],[19]. The epidemiology of hypertension in Ethiopia is not well studied. Some community-based surveys have shown that the prevalence of hypertension in the country varies from 1.8% in the rural community15% to 30% in urban areas of Addis Ababa and Gondar.16–18 Being obese or overweight, as well as physical inactivity, were strong predictors of hypertension in urban dwellers in Ethiopia[32].

2.2 Associated factor of hypertensive crisis

2.2.1 Socio-demographic character

Institutional based cross sectional study was conducted at Newark Beth Israel Medical Center in USA indicated that the prevalence of HTN-crisis was 11.44%. The mean age was almost similar (59.29 ± 15.03 vs 59.91 ± 15.33). HTN-crisis was more prevalent among participants with the age group of 45-65 years with a proportion of 45.3%. There were more males than females in both groups. There were more than 40% increased odds among males of having HTN emergencies (OR 1.43, 95% CI 1.16–1.76, p<.007). Patients 65 years and older had 80% increased odds of developing HTN emergencies (OR 1.8, 95% CI 1.3–2.8, p=.002)[20].

The multi-center study conducted in Italy, logistic regression analysis, after adjustment for age, patients with hypertensive emergencies had higher risk of being men (OR= 1.34, 95% CI 1.06–1.70)[33].

The study conducted in Tuzla incorporating 180 HTN patients (60% females), 85 (47.22%) were presented with HTN-crisis. More than half of the HTN-crisis cases were females. There was no age group difference in HTN-emergency and HTN-urgency. Control groups comprised of 52.78% of the participants. Statistically, there was no difference in proportions according to their distribution by gender. 69% were hypertensive previously for less than 10 years, 26.76% of participants were hypertensive for 11-20 years and only 4.23% were hypertensive for the more than 20 years[34].

A study done in Brazil, the multi nominal logistics regression showed that participants whose age was older than 60 years were less likely to develop HTN-emergency and HTN-urgency(OR=0.50, 95%CI= 0.27, 0.92, p= 0.042[35].

The study conducted in Uganda among 100 hypertension and 203 HTN-crisis participants indicated the mean age of all participants was 55.3 ±17.1. The majority of them (41.4% and 42%) were at the age b/n 45 and 65 years both among HTN and HTN- crisis respectively. The proportion of participants at the age of less than 45 and greater than 65 years was equal in proportion (29.6%) in both groups. Regarding sex, proportion of females was more than males (53.2% vs 55.0 %%) respectively. When we see their educational status, the largest proportions were those with primary education (32% and 47%). Those with none educated and secondary education level were almost equal ((25.4%) vs 24.6% respectively for HTN-crisis. Those unemployed participants were more

than employed among the groups (64% vs 62%). Their marital status shows more than half of the participants were married in both the groups followed by widowed with less proportion of divorced and single (53.7%, 54%, 25.1 % and 26 %) respectively[21].

In Tanzania, a hospital-based study was conducted among 203 HTN-crisis patients aged above 18 years. Males account for less proportion of participants (46.8%). More proportion of participants were married than widowed, single, and divorced with the proportion of (71.9%, 12.8%, 8.4% and 6.9%) respectively. Coming to their educational level more proportion were with primary school level (54.7%). Those with secondary school were (22.2%), university levels were (10.3%) and none educated (6.4%). 46.8% were unemployed. The mean heart rate and SpO2 at room air were 93% and 98% respectively[36].

abuse A study conducted in eastern Sudan among 81 HTN-crisis patients revealed that 45.7% were males and 61.7% were from urban area[17].

According to the study conducted in Mekele Ayder hospital among 141 HTN-crisis patients, those with history of known HTN had less likely to develop HTN-emergency (AOR=0.405; 95% CI: 0.176-0.933; p=0.034) and the odds of female was 2.5 times higher (AOR=2.494; 95% CI: 1.111–5.596; p=0.027) than male[12].

2.2.2 Comorbidities

A study conducted in USA indicated that about 52% of patients had DM and there was 1.6 times higher odds of developing HTN-emergency (OR= 1.6, 95% CI= 1.3–1.97, P<.0001). Acute coronary syndrome was also increasing 4.05 times the risk of developing HTN-emergency (OR=4.05, 95% CI= 3.22–5.10, P<.0001). Heart failure and CKD were 7.07 times (OR=7.07, 95% CI=5.65– 8.99, P<.0001) and 3.71 times (OR= 3.71, 95%CI=2.99–4.62, P<.0001) higher odds of having HTN-emergency. The odds of ischemic stroke were also 2.77 times higher[20].

As a study employed in Switzerland among 85 participants, comorbidities like DM, stroke, and hyperthyroidism were more common among cases than controls with proportion of (30.8% vs 19.4%, 23.1% vs 4.2% and 7.7% vs 0.0% respectively. Variables which were significantly associated with HTN-crisis were a hypertensive heart disease (HR=4.14: 95% CI 1.16, 14.8), coronary artery disease (HR= 3.73: 95% CI 1.09, 12.80) and thyroid disease (HR=1.74: 95% CI 0.52, 5.82)[37]

Another study was conducted at the emergency room of Rajavithi hospital, a tertiary care center in Bangkok, Thailand among 307 HTN-crisis patients age above 18years. Most of the participants were males and females account only (37.5%). Previous HTN was the most common comorbidity (80.8%). Less commonly, DM (35.8%), CKD (15%), ACS (7.2%) and stroke (6.5%) were recorded. Their mean SBP and DBP were 200 and 110±21 with mean heart rate of 85±21[38].

that 17.7% of participants had little HTN knowledge and it was significantly associated with non-adherence to anti-hypertensive treatment[38]. Similarly, a study from Turkeye indicates that the majority of A study done from Jan to oct 2015, 9900 Patients admitted to the emergency room at kassala teaching hospital in Sudan 81(.81%) patients met criteria for hypertensive crisis. Their age ranging between 28 to 85 years and the mean age ±SD was 58± (12.7)[18]. Among 50 patients who presented with features suggestive of Hypertensive emergency during the study period18(22.2%) patients had hemorrhagic stroke while 7(8.6%) patients had ischemic stroke, 13(16%) patients were identified to have renal failure, retinopathy was noticed in 9(11.1%) and only 2(2.5%) patients presented with features suggestive of hypertensive encephalopathy. 18(22.2%) patients had heart failure, 11(13.6%) patients had acute coronary syndrome, stroke was detected in 25(30.8%) , of them[18].

Most of the HTN-crisis participants (86.9%) had history of previous HTN with the mean duration of 37 ± 67 months according to a study conducted at Gondar university hospital. The study also tried to show the major comorbidities. Heart failure was reported among 24.2% of the participants. About 17% had CKD and DM. Other less common comorbid conditions were migraine, ACS, asthma and other conditions with the proportion of 4%, 3.6%, 3.2% and 2.8% respectively[39]

2.2.3 Behavioral and other variables

Hypertensive patient with good knowledge are scarce in the developing and developed world.
A study done in the USA revealed that about 22% of participants had lower HTN knowledge[37]. In the New York study, 93.4% had history of previous HTN, 61.5 %. Only 0.2-2.2% of Participants smokes cigarette and other substances. 15% of cigarette smokers had less likely to develop HTN-emergency[40].

Another study done from Brazil showed participants didn't have adequate knowledge, in which one-third of the study participants were found to have a low level of knowledge about HTN[40].

The study conducted in Switzerland, the proportion of alcohol abusers was approximately equal among cases and controls which were 15.4% and 16.7% respectively. The proportion of cigarette smokers is high among controls than cases (48.6% vs 38.5 “Some factors were significantly associated with the occurrence of HTN-crisis: female sex ($P < 0.01$ and no adherence to medication (76.9% vs 22.2%, $P = 0.02$)[37].

The Tanzania’s study showed that among 203 HTN-crisis cases, 80.2% had HTN history. 21.8% were current alcohol users and previous users were 26.7%. HTN-crisis was more prevalent among previous cigarette smokers than current smokers (26.7 % vs 7.4%). More proportions of the participants were paste cigarette smokers as well as past alcohol abusers. Even though exercise is important to prevent as well as to control and to reduce high blood BP only 20.5% had regular exercise; of these, some of them (39 %) do their exercise daily, 29.5% of them do 2-3 times per week and 22% only once a week. Jumping and walking were the exercise done by the participants 34.1% vs 29.3%). Adherence to antihypertensive medications and having regular follow-up are also the most important to prevent HTN-C, but only 59% of them had good adherence to medication, and only 36.4% had regular follow up[36].

According the study conducted in Uganda, 79.3% of HN- crisis and 94 % of HTN participants had history of HTN (OR=0.24, CI= 0.10 – 0.60, P= 0.002). DM was nearly association (OR=0.59, 95% CI= 0.38 – 1.04, P= 0.067).Stroke, CKD, drinking alcohol and cigarette smoking had no association with HTN-crisis (OR= 1.24, CI= 0.76 – 2.00, P= 0.387and (OR= 1.32, CI= .68-2.59, P= 0.411) respectively[21].

A study done from Iran and Ethiopia indicate females and elders have lower HTN knowledge in comparison to male and younger age groups respectively. Similarly, those with lower income, non-employees, and those have no regular physical activities were more likely to have lower HTN knowledge. Moreover living in rural areas and dietary risk factors were significantly associated with the low level of HTN knowledge.

Several studies showed that educational level is significantly associated with knowledge status in which patients with a low level of education were found to have low hypertension knowledge than their counter parts.[41]

2.2 conceptual frame work

This conceptual framework is developing after systematic and careful review of different literatures which are related to hypertensive crisis.

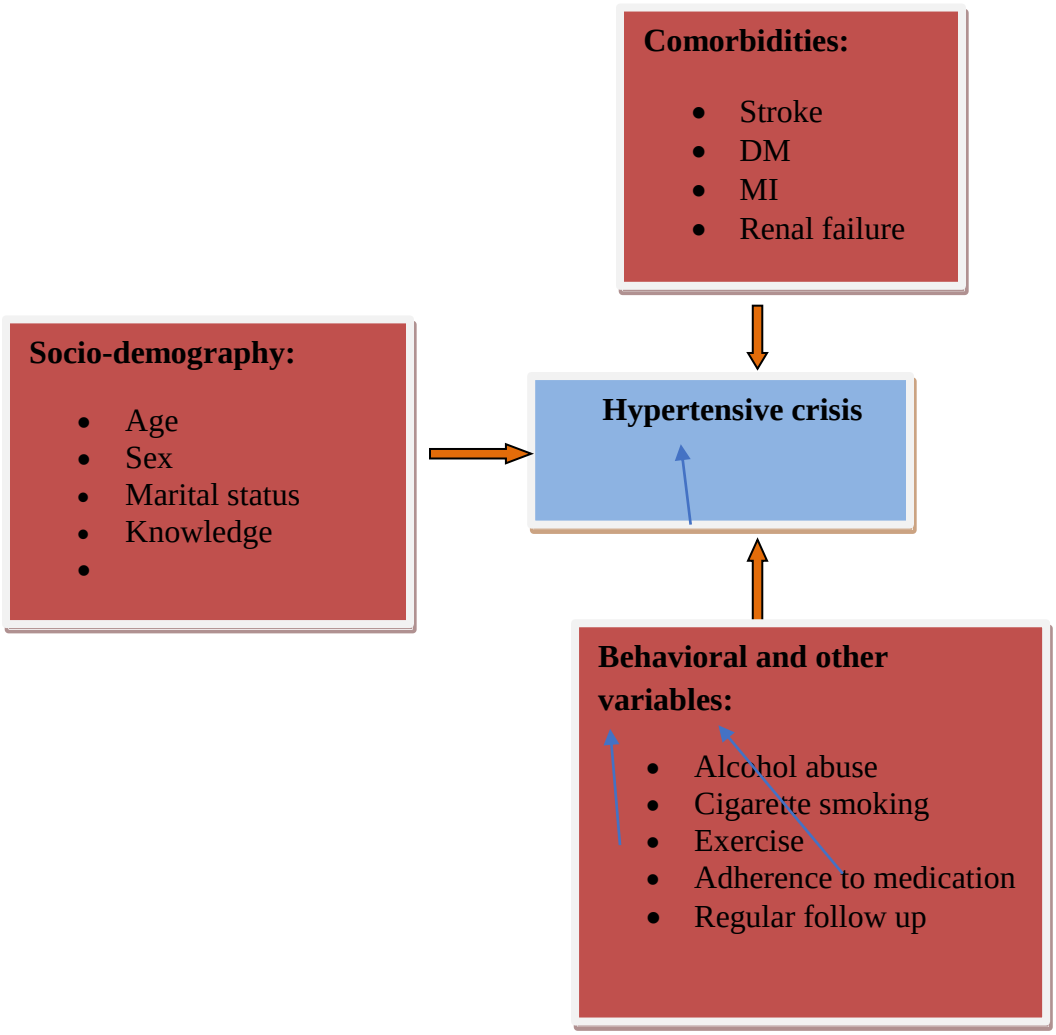

Figure1-conceptual frame work shows factors associated with hypertensive crisis.

CHAPTER 3

3. OBJECTIVE OF THE STUDY

3.1 General objective

- The major objective of this study was to assess the prevalence of hypertensive crisis and associated factors among hypertensive patients in guraghe zone, Ethiopia.

3.2 Specific objectives

- To determine magnitude of hypertensive crisis among hypertensive patient in guraghe zone selected public hospital.
- To identify associated factor of hypertensive crisis among hypertensive patient in guraghe zone selected public hospital.

CHAPTER 4

4. METHODOLOGY

4.1 The study area:

The study was conduct in gurage zone, southern region, south west, Ethiopia. It is found around 158km far from Adiss Abeba (the capital city of Ethiopia) and has the total number of 16 woredas and 7 public hospitals. Wkush found in Gubre sub city far 7km from wolkite. It has total staff number of 229 which are 119 nurse, 42doctor, 24midwife, 23 pharmacist and 19 specialists.Atat primary hospital found in Cheha woreda far 15km from wolkite and far 5km from Gubre subcity, Gunchere primary hospital found in Enemor woreda far from 40km the capital city of gurage zone (wolkite).

4.2 study period:

- May 1/2015 to June 1/2015

4.3 study design:

- Institutional based cross-sectional study was conduct.

4.4 source of population:

The source of population is all adults with hypertension

4.5 study population:

The study population is all adults with hypertensive patients presented to gurage zone selected public hospitals during data collection period.

4.5.1 Inclusion Criteria:

- ✓ The study inclusion criteria's were including all adult hypertensive patients.

4.5.2 Exclusion Criteria

- ✓ Patients who have seriously ill during the study period.
- ✓ Patient who have unable to communicate (listen and talk).
- ✓ Pediatrics,pregnant and immediate post postpartum patients.

4.6 Sample Size Determination and sampling technique

The required sample size of the study is determined using a formula to estimate single population proportion with the following assumption; Confidence interval assumed 95%, margin of error 5%, and proportion =50%.

So, $n=z^2p\ (1-p)/w^2$ where, n=required sample size

Z= critical value for normal distribution at 95% confidence interval which is equal to 1.96(at alpha 0.05)

P= an estimate of the proportion of prevalence of HTN crisis (50%) W= margin of error which is 5%

$n=z^2\ p\ (1-p)/w^2$

$n= (1.96)^2\times0.5(1-0.5)/\ (0.05)^2$

n=384

Then finally we considering 10% non-respondents from the participant

nf= n+10×n/100

nf= 384+10×384/100

Final sample size 422

4.7 data sampling technique

Systematic random sampling technique was used to select the study subjects. Simple random Sampling technique was used to select three public hospitals from gurage zone by lottery method from the selected gurage zone public hospitals. After proportional allocation, the study was includes patients and finally data was analyzed manually.

4.8 Study variables

4.8.1 Dependent variables

Hypertensive crisis

4.8.2 Independent variables

Socio demographic characteristic: Age in years, Sex, Residence, Educational status, occupation, marital status, etc.

Disease related factors: DM, Stroke, Coronary syndrome, Congestive heart failure, Chronic renal disease, Asthma, Hyperthyroidism, Migraine, etc.

Behavioral determinants: Known hypertension, Patients knowledge of HTN, Regular follow up, Started taking antihypertensive medications, Adherence to antihypertensive medication, Cigarette smoking, Alcohol abuse, Family history of HTN, Exercise, etc.

4.9 Data collection instrument

The data was collected by using structured questionnaire which is adapted from socio-demographic, comorbidities, knowledge, behavioral determinants, medication adherence scale and physical measurement. The questionnaire were prepared in English and translated to Amharic, then back translate to English to check the consistency. The questionnaire was adapted from a WHO STEPWISE survey for developing countries and from different literatures. Both Amharic and English languages was be used during data collection period. Participants' height and weight was be measured as part of the physical examination by trained and experienced BSc nurses recruited as data collectors working in different sites. Height and weight were measured by a Standiometer and weighing scale. Blood pressure was measured using a manual or digital sphygmomanometer when the participants taking rest before measuring.

4.10. Data collection technique.

Data was collected through face to face interview and physical measurements. The questionnaire is adapted from previous similar studies and the WHO STEPS wise approach guidelines on non-communicable disease risk factor surveillance questionnaire. It contains information about socio demographic characteristics, behavioral characteristics, comorbidity, hypertension related knowledge, medication adherence scale questions and physical measurements such as weight, height and blood pressure.

4.11 Data quality assurance

The data was checked for any inconsistencies, coding errors, out of range, completeness, accuracy, clarity, missing values, and appropriate corrections were made by the principal investigator and

supervisors. 5% of the questionnaire was carried out among patients in gurage zone selected public hospitals. During the pretest, the questions were documented for further considerations which are frequently asked. Both the interviewers and supervisors were planning to assess for clarity, understandability and completeness of questions. After the result of the pretest, some correction and changes were done made as necessary. And also the collected data was checked daily for completeness and appropriateness.

4.12 Data processing and analysis

Data was checked for completeness and entered into Epi data version 4.6 then exported to SPSS version 26 for analysis. Descriptive statistics were done to see the distribution of variables and presented using texts, frequency tables, charts and graphs. Pearson Chi-square test was done to assess association between determinant factors and HTN-crisis. Binary logistic regression was done for each variable and variables with p-value less than 0.25 were eligible for the final model. Correlation between independent variables was checked. Multivariable logistic regression was perform to identify the independent predictors of HTN-crisis and to control the effect of potential confounding variables using adjusted odds ratios with the corresponding 95% confidence intervals. Model fitness was also check with Hosmer-Lemeshow fitness test. Finally, statistically significant level was declared at a p-value less than 0.05.

4.13 Ethical consideration

Permission letter was obtained from Wolkite University College of medicine and health science. At the time of data collection, a verbal consent was asked for the participant to give the right to do so. Confidentiality and privacy of responses were ensured (the names of respondents was not be included and ensuring to participants that their identification was not be public. also clearly putting the objective of this study to respondents may help to keep the confidentiality of the respondents) throughout the research process.

4.14 Operational definition

Hypertension: - is blood pressure that is higher than normal. Our blood pressure changes throughout the day based on our activities above 140/90mmHg[42].

Hypertensive crisis: - case is confirmed when patients had admission SBP record of above 180 mmHg and DBP of over 110 mmHg[42].

Hypertension urgency: - is characterized by sever elevation of blood pressure without any evidence of organ damage[42].

Hypertension emergency:- are characterized by severe elevations in the Blood Pressure complicated by evidence of progressive Target organ damage such as hypertensive encephalopathy, hemorrhagic and ischemic strokes, acute myocardial infarction, acute left ventricular failure with pulmonary edema, unstable angina etc.[17].

Chapter 5

5. RESULT

5.1 associated factor of HTN crisis

5.1.1 Socio demographic characteristics of participant

From the total 422 participants of participants were responded to the questioners that produce a response rate of 100%. From this 22.7% (96) of participants were develop HTN crisis, 82% (326) didn't develop HTN crisis. The mean (1.74) and median ages of the participants were 24 and 80 year respectively. From 422 participants 60.7% (256) were males and HTN crisis, from this 53 participants were develop HTN crisis and 39.3% (166) were females, from this 42 participants were develop HTN crisis. More than half 64.9% (274) of the participant were urban in origin of residency from this 14.2% (60) participants were develop HTN crisis and 35.1% (148) were rural from this 8.3% (35) participants were develop HTN crisis. Those all participants were from WKUSH 43.4% (183) and 40 HTN crisis, Atat 29.9% (126) and 21 HTN crisis, Gunchere 26.8 % (113) and 15 HTN crisis.

Table 1- socio-demographic characteristics of participants in gurage zone selected public hospitals 2023.

No	variables		Frequency	percent
1	**Age cat**	18 – 45 years old	154	36.5
		46 – 65 years old	224	53.1
		>65 years old	44	10.4
2	**sex**	Male	256	60.7
		female	166	39.3
3	**residency**	Urban	274	64.9
		Rural	148	35.1
4	**Education**	Illiterate	95	22.5
		Primary school	108	25.6
		Secondary school	104	24.6
		Collage and above	115	27.3
5	**Monthly income**	<1000	20	4.7
		1000 - 2000	39	9.2
		2000 – 5000	180	42.6
		5000 - 10000	176	41.1
		10000 – 15000	6	1.4

		>15000	1	0.2
6	**Marital status**	Single	30	7.1
		Married	369	87.4
		Divorce	23	5.5
7	**Occupation**	Farmer	119	28.2
		Merchant	177	41.9
		Gov't employee	78	18.5
		other	48	11.4

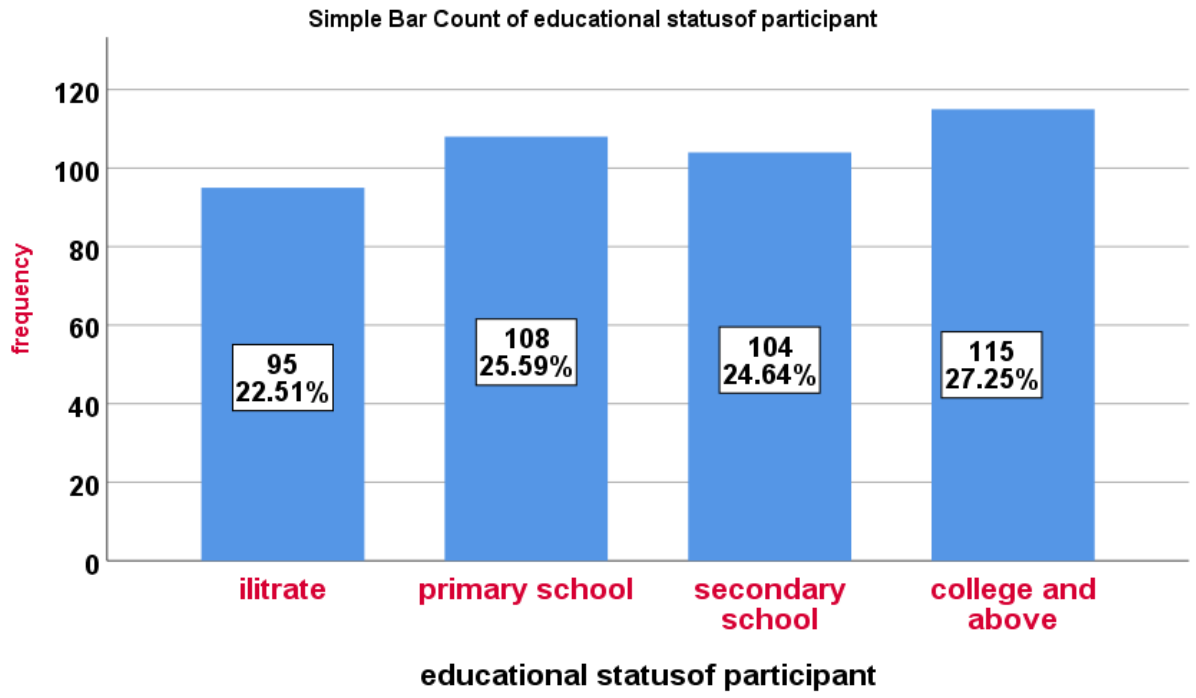

Figure 2 educational status of participant

5.1.2 Comorbid

Based on our survey from 422 participants 42.4% (179) participants have comorbid 50% (211) have no comorbid. From those participants who have comorbid 103 were males and 76 were females and those who have visited health institution were 99 males and 74 females. Highest prevalence of participant comorbid was DM 20.1% (85), heart failure 15.6% (66), stroke 5.2% (22) and other 1.4% (6). from those participants were 36.5%(154) taking medication related to comorbid but 5.9% (25) participants were not taking medication for their comorbid. Related to this participants who have comorbid 25.4% (107) have history of admission.

Our survey show that 92.7% (391) participants have taking anti-hypertensive medication and from them 15.2% (64) of participant were develop HTN crisis. Most of participants were taking mono therapy 76% (321), and 16.6% (70) were taking two drugs combination, those who have taking medication more than half of them 48.8% (206) were taking one times per day and 43.8% (185) were taking two times per day. Related to taking medication 41.2% (174) participants were not missing or stop their medication and 51.7% (218) participants were stop their medication due to reason of forget 27.5% (116), leave home 9% (38), hassled 5.9% (25), financing problem 3.1% (13) and other 0.7% (3). When the participants forget their medication they have to do jump 36.3% (153) and buy 9.7% (41). Difficulty related to taking medication participants have never difficulty 46.4% (196), sometimes has difficulty 41.9% (177) and always has difficulty 4.5% (19).

5.1.3 Behavioral and other

In our study participants have previous HTN were 77.7% (328) from those 76.3% (322) of them were taking anti-hypertensive medication immediately. More than half 77.7% (328) of the participants have regular follow up. From the total 422 participants who have family history of hypertension were 51.2% (216).

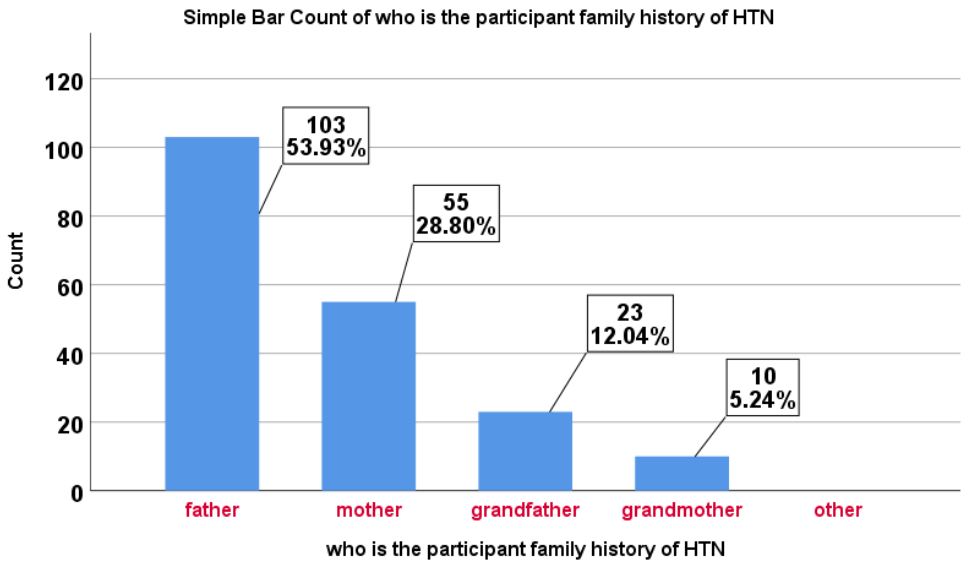

Figure 3 participant family history of HTN

The study shows that 24.2% (102) of participants were smoke cigarette but more than half of participants were not smoking cigarette. From those smokers currently 21.8%(92) participants smoke cigarette with frequency of 2-3/ week 9.7% (41), daily 9% (40), 3-5/ week 3.4% (12) and once a week 2.1% (9). Related to this 41.3% (42) participants were smoke 2 pieces of cigarette/day, 23.5% (23) participants were smoke 1 piece of cigarette/day, 21.5% (22) participants were smoke 3 pieces of cigarette/day, 13.7% (14) participants were smoke 4 pieces of cigarette/day.

Other hand from the total 422 participants 56.9% (240) were drinking alcohol those who drink alcohol 1-2days/week 27.9% (118), 3-4 days/week 12.5% (53), 5-6 days/week 9.7% (41), daily 6.6% (28). The most used type of alcohol was traditional drinking 28.9% (122), beer 24.1% (102), and win 3.8% (16). 76.5% (323) of participants were not doing physical exercise. The rest 23.5% (99) of participants who have done the most type of exercise were jogging 16.6% (70), walking 5% (21), swimming 1.4% (6) and other 0.5% (2).

5.1.3.1 Participant knowledge about HTN

Table 2- participants' knowledge about HTN in gurag zone selected public hospital,2023,Ethiopia

s.no	Variables	Yes in frequency	percentage	No in frequency	Percentage
1	Know Normal range of BP	226	53.6%	190	46.4%
2	Is Headache symptom	353	83.6%	69	16.4%S
3	Is HTN along with age	287	68%	135	32%
4	Both sex have equal chance to HTN	184	43.6%S	238	56.4%
5	Is HTN curable	342	81%	80	19%
6	Is Family history risk factor	160	37.9%	262	62.1%
7	Is Smoking risk factor	202	47.9%	220	52.1%
8	Is Fatty food risk factor	195	46.2%	227	53.8%S
9	Is too much drinking Alcohol risk factor	181	42.9%	241	57.1%
10	Is overweight risk factor	272	64.5%	150	35.5%
11	Exercise	239	56.6%	183	43.4%

12	Is more salt consumption risk factor	377	89.3%	45	10.7%
13	Is anti HTN medication only control HTN	249	59%	173	41%
14	Is HTN can lead life threatening condition	379	94.1%	25	5.9%
15	Is anxiety risk factor	342	81%	80	19%

our study shows that participants who have good knowledge about HTN were 75.6% (319) from those participant develop HTN crisis were 15.6% (66) and participant have poor knowledge about HTN were 24.4 %(103) from those 6.9%(29) were develop HTN crisis.

5.1.3.2 Physical measurement

Table 3- participants body Max-index (BMI) and BP measurement in gurage zone selected hospitals

No	variables	catagory	frequency	percent	HTN crisis	
					yes	No
1	BMI	<18 (under weight)	0	o	0	0
		18.5-23(normal)	237	56.2	48	189
		>23(obesity)	185	43.8	47	138
2	Systolic BP	<120	123	29.1	13	110
		120-139	235	55.7	86	149
		140-159	64	15.2	15	49
	Diastolic BP	<80	131	31	15	116
		80-89	234	55.5	81	153
		90-99	57	13.5	9	48

5.2 Prevalence and associated factor of hypertensive crisis among hypertensive patient

Table 4- participants' prevalence of HTN crisis in gurage zone selected public hospital 2023 Ethiopia

no	variables	catagory	Frequency	percentage	HTN crisis	
					yes	**No**
1	Age catagory	18-45	154	36.5	35	119
		45-65	224	53.1	39	185
		>65	44	10.4	21	23
		Total	422	100	95	237
2	Sex	Male	256	60.7	53	203
		Female	166	39.3	42	124
		Total	422	100	95	237
3	residency	Urban	274	64.9	60	214
		Rural	148	35.1	35	113
		Total	422	100	95	327
4	Educational status	illiterate	95	22.5	18	77
		Primary school	108	25.5	25	83
		Secondary school	104	24.6	28	76
		College and above	115	27.3	24	91
		total	422	100	95	327
5	Occupational status	Farmer	119	28.2	27	92
		Merchant	177	41.9	35	142
		Gov't employee	78	18.5	25	53
		Other	48	11.4	8	40
		total	422	100	95	327
6	Marital status	Single	30	7.1	10	20
		Married	369	87.4	80	289
		Divorced	23	5.5	5	18
		total	422	100	95	327
7	comorbid	Yes	179	42.4	47	132
		No	243	57.6	48	195
		total	422	100	95	327
8	knowledge	Good	319	75.6	66	253
		Poor	103	24.4	29	74
		Total	422	100	95	327

9	stop anti HTN med'n	Yes	218	51.7	29	189
		No	173	41	36	138
		total	391	92.7	95	327
10	Regular follow up	Yes	328	77.7	75	253
		No	94	22.3	20	74
		total	422	100	95	327
11	Family history	Yes	216	51.2	59	147
		No	206	48.8	36	180
		total	422	100	95	327
12	Smoking cigarette	Yes	102	24.2	25	77
		No	320	75.8	70	250
		total	422	100	95	327
13	Smoke frequency	Daily	40	9	8	32
		Once/wk	9	2.1	2	7
		2-3day/wk	41	9.7	10	31
		3-5day/wk	12	3.4	5	7
		Total	102	24.2	25	77
14	Smoke cigarette pieces	1	23	23.5	8	17
		2	42	41.1	12	30
		3	22	21.5	2	20
		4	14	13.7	3	10
		Total	102	100	25	77
15	Drinking alcohol	Yes	240	56.9	56	126
		No	182	43.1	39	201
		total	422	100	95	327
16	How often participant drink alcohol	Daily	28	6.6	4	24
		5-6day/wk	41	9.7	4	37
		3-4day/wk	53	12.5	5	48
		1-2day/wk	118	27.9	26	92
		Total	240	56.9	39	201
17	Type of alcohol	Beer	102	24.1	13	89
		Win	16	3.8	3	13
		Traditional	122	28.9	23	99
		Total	240	56.9	39	201
18	Regular exercise	Yes	99	23.5	25	74
		No	323	76.5	70	253

		Total	422	100	95	327
19	BMI	Normal	237	56.2	48	189
		Obesity	185	43.8	47	138
		total	422	100	95	327

5.3 Bi-variable regression analysis

Table 5- the bi-variable logistic regression analysis for factor associated with HTN crisis among HTN patient.

No	**variable**	**category**	**Frequency/ percent**	**COR**	**95%CI**	**P- value**
1	sex	Male female	12.7%(53) 10%(42)	0.771	0.485-1.224	0.270
2	Age cat	19-45 45-65 >65	8.3%(35) 9.2%(39) 5%(21)	0.322 0.231	0.160-0.650 0.116-0.458	0.002 0.000
3	residency	Urban rural	14.2%(60) 8.3%(35)	0.905	0.563-1.456	0.681
4	occupation	Farmer Merchant Gov't other	6.4%(27) 8.3%(35) 5.9%(25) 1.9%(8)	1.467 1.252 2.358	0.614-3.509 0.530-2.867 0.963-5.776	0.389 0.628 0.060
5	Marital status	Single Married divorce	2.4%(10) 19%(80) 1.2%(5)	1.800 0.997	0.517-6.271 0.359-2.767	0.356 0.995
6	Stop anti HTN medication	Yes no	6.9%(29) 8.5%(36)	0.000 1.700	 0.995-2.906	0.998 0.052
7	Regular follow up	Yes no	17.9%(75) 4.8%(20)	1.097	0.628-1.915	0.745
8	Family history	Yes no	8.5%(36) 14.2%(59)	0.498	0.312-0.796	0.000
9	Smoking	Yes no	5.9%(25) 16.8%(70)	1.160	0.687-1.957	0.579
10	Smoking frequency					
11	Pieces of smoking cigarette	1 piece 2 pieces 3 pieces 4 pieces	6.5%(6) 13%(12) 2.2%(2) 3.3%(3)	0.706 0.800 0.250	0.133-3.748 0.172-3.728 0.033-1.885	0.683 0.776 0.179
12	Alcohol	Yes no	9.2%(39) 13.3%(56)	0.437	0.274-0.695	0.000
13	How often drink	Daily	0.9%(4)	1.024	0.104-10.105	0.984

	alcohol	5-6day/wk 3-4day/wk 1-2day/wk	1.4%(6) 2.4%(10) 7.3%(31)	0.500 0.514 0.652	0.041-6.082 0.046-5.802 0.061-6.936	0.587 0.591 0.723
14	Type of alcohol	Beer Win Traditional	4.5%(19) 0.7%(3) 6.9%(29)	1.224 0.728 0.735	0.715-2.095 0.382-1.387 0.212-2.984	0.462 0.334 0.796
15	Regular exercise	Yes No	5.9%(25) 16.8%(70)	1.221	0.722-2.064	0.456
16	BMI	Normal Obesity	11.4%(48) 11.3%(47)	0.746	0.472-1.179	0.209

Multi-variable regression analysis

Table 6- multivariable logistic regression analysis for factor associated with HTN crisis among hypertensive patients.

No	variables	category	Frequency/percent	AOR	95% CI	P-value
1	Age cat	18-45	8.3%(35)	1.402	0.828-2.374	0.209
		45-65	9.2%(39)	0.366	0.177-0.758	0.007
		>65	5%(21)			
2	Family history	Yes	8.5%(36)	1.649	1.010-2.693	0.046
		No	14.2%(59)			
3	Alcohol	Yes	9.2%(39)	2.109	1.303-3.145	0.002
		No	13.3%(56)			
4	BMI	Normal	11.4%(48)	0.678	0.417-1.102	0.116
		Obesity	11.3%(47)			

Chapter 6

6. DISCUSSION

This study was conducted to assess the prevalence and associated factor of hypertensive crisis among hypertensive patients in gurage zone selected public hospitals. The finding of our study showed that the prevalence of hypertensive crisis among hypertensive patient was found to be 22.7%.

However, our study is higher than that of a study done from newyork bêth Israel medical center, Uganda mulago national referral hospital, Mogadishu Somali Turkish traning and research hospital the prevalence of hypertensive crisis was 11.4%[20], 5.1%[21], 2.1% [43] respectively.

In our study, participants aged 45-65 years were found to be higher chance of having HTN crisis compared to patients who were aged 18–45 and > 65 years. This could be due to the biological effect of increased arterial resistance caused by arterial thickening and stiffness that occurs as one gets older. In our study HTN crisis among hypertension patient males have higher prevalence than females. This study show that HTN crisis prevalence remains high in urban setting with value of 14.2% (60) as shown in table 5. There is more HTN crisis in urban area than in rural areas found by many outers[28]. Our study shows in occupational status of participant merchants have higher prevalence than that of farmers and government employee. The impact of occupational stress on hypertension may be caused by changes in psychological state, which was caused by increased secretion of certain hormones (including norepinephrine, adrenaline, adrenal cortex hormones, etc.) in the body under stress. Therefore, working in a noisy environment for a long time will lead to increased occupational pressure on workers, and these workers will be more prone to hypertension[44].

In our study, participant develop HTN crisis due to stop anti hypertensiv medication was 6.9% (29). Previous retrospective studies have presumed that non-adherence to medication is an important risk factor for hypertensive crisis[45]. Our study shows participant develop HTN crisis was higher than participant haven’t comorbid than have comorbid 11.4% & 11.1% respectively.

Our study shows that participants develop HTN crisis due to drinking alcohol were higher prevalence than not drinking. Those who have drink alcohol 1-2days/wk have higher prevalence of

HTN crisis than others. Participants who have family history of HTN are higher prevalence than that of no family history HTN among those participants family first degree relatives (fathers) have higher prevalence of HTN crisis. This might be genetic predisposition of the condition. Participants whose family had HTN history might share similar environment and other exposure with their family which can be risk for hypertensive crisis.

Family history and drinking alcohol were significantly associated with HTN crisis in the study population with (P value=0.46, AOR=1.649, 95% CI=1.010-2.693 and p value 0.002, AOR=2.109, 95% CI= 1.303-3.415) respectively. About 64.9% (274) of the urban participants reported higher alcohol consumption. Previous research indicated that heavy alcohol consumption was a risk factor for high blood pressure[46].

Chapter 7

7. CONCLUSION AND RECOMMENDATION

7.1 conclusion

Generally, our study shows the proportion of prevalence of hypertensive crisis among hypertensive patients 22.7% (95% CI: 1.73-1.81). This study demonstrated statistically strong association of being family history and drinking alcohol. Hence, hypertensive patients should be strictly managed accordingly, and promoting screening programs could reduce the risk of target organ damage.

7.2 Recommendation

HTN patients

- They should checks blood pressure nearby health institution at least one or two times within a week and do regular physical exercise at least for 20-30 minutes per day.

Health care providers

- They should identify and treat HTN-crisis and associated chronic diseases early, schedule for follow-up care and educate patients about the preventive modalities of the conditions.

Researchers

- There is greater scarcity of researches on HTN-crisis. Therefore, further studies are very important in the area.

Chapter 8

8. STRENGTH AND LIMITATION OF THE STUDY

8.1 strength

- ✓ One of the strength of this study is being cross-sectional institution based, use of standardized tools to study the actual prevalence and associated factor of HTN crisis.

8.2 Limitations

- ✓ The first limitation may be recall bias of participant on some variables like duration of hypertension and daily average cigarette consumption. Similarly, some participants might not be happy to tell their net monthly income.
- ✓ The sample size was also high and this can be another limitation.
- ✓ Since this study is new in its design and very few studies conducted, it was very difficult to discuss with other work.

REFERENCE

[1] T. Unger *et al.*, "2020 International Society of Hypertension Global Hypertension Practice Guidelines," *Hypertension*, vol. 75, no. 6, pp. 1334–1357, 2020, doi: 10.1161/HYPERTENSIONAHA.120.15026.

[2] S. Salkic, S. Brkic, O. Batic-Mujanovic, F. Ljuca, A. Karabasic, and S. Mustafic, "Emergency Room Treatment of Hypertensive Crises," *Med. Arch. (Sarajevo, Bosnia Herzegovina)*, vol. 69, no. 5, pp. 302–306, 2015, doi: 10.5455/medarh.2015.69.302-306.

[3] P. K. Whelton *et al.*, *2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: Executive summary: A report of the American college of cardiology/American Heart Association task* , vol. 71, no. 6. 2018. doi: 10.1161/HYP.0000000000000066.

[4] G. Acosta *et al.*, "Clinical Determinants of Myocardial Injury, Detectable and Serial Troponin Levels among Patients with Hypertensive Crisis," *Cureus*, vol. 12, no. 1, pp. 1–16, 2020, doi: 10.7759/cureus.6787.

[5] D. B. Badesch, S. H. Abman, G. Simonneau, L. J. Rubin, and V. V. McLaughlin, "Medical therapy for pulmonary arterial hypertension: Updated ACCP evidence-based clinical practice guidelines," *Chest*, vol. 131, no. 6, pp. 1917–1928, 2007, doi: 10.1378/chest.06-2674.

[6] B. J. H. van den Born, J. J. Beutler, C. A. J. M. Gaillard, A. de Gooijer, A. H. van den Meiracker, and A. A. Kroon, "Dutch guideline for the management of hypertensive crisis - 2010 revision," *Neth. J. Med.*, vol. 69, no. 5, pp. 248–255, 2011.

[7] M. A. Daabiss, "Perioperative hypertensive crisis - the anaesthetic implications. A review of literature," *Br. J. Med. Pract.*, vol. 9, no. 3, 2016.

[8] D. P. Papadopoulos, I. Mourouzis, C. Thomopoulos, T. Makris, and V. Papademetriou, "Hypertension crisis," *Blood Press.*, vol. 19, no. 6, pp. 328–336, 2010, doi: 10.3109/08037051.2010.488052.

[9] Y. V. Evsyutina, "Hypertensive crisis in modern guidelines: how to avoid mistakes in diagnosis and treatment. Based on the materials of the XXVI Russian National «Human and Medicine» Congress and the III Cardiology Summit," *Russ. Arch. Intern. Med.*, vol. 9, no. 6,

pp. 407–412, 2019, doi: 10.20514/2226-6704-2019-9-6-407-412.

[10] V. Agrawal and Y. Mehta, “Hypertensive urgencies and emergencies,” *ICU Protoc. A Step-wise Approach, Vol I*, vol. 27, no. 1, pp. 259–268, 2019, doi: 10.1007/978-981-15-0898-1_26.

[11] J. F. Vilela-Martin, R. O. Vaz-De-Melo, C. H. Kuniyoshi, A. N. R. Abdo, and J. C. Yugar-Toledo, “Hypertensive crisis: Clinical-epidemiological profile,” *Hypertens. Res.*, vol. 34, no. 3, pp. 367–371, 2011, doi: 10.1038/hr.2010.245.

[12] D. M. Desta *et al.*, “Prevalence of hypertensive emergency and associated factors among hospitalized patients with hypertensive crisis: A retrospective cross-sectional study,” *Integr. Blood Press. Control*, vol. 13, pp. 95–102, 2020, doi: 10.2147/IBPC.S265183.

[13] J. Varon and P. E. Marik, “Clinical review: The management of hypertensive crises,” *Crit. Care*, vol. 7, no. 5, pp. 374–384, 2003, doi: 10.1186/cc2351.

[14] H. Guiga *et al.*, “Hospital and out-of-hospital mortality in 670 hypertensive emergencies and urgencies,” *J. Clin. Hypertens.*, vol. 19, no. 11, pp. 1137–1142, 2017, doi: 10.1111/jch.13083.

[15] K. K. Patel *et al.*, “Characteristics and outcomes of patients presenting with hypertensive urgency in the office setting,” *JAMA Intern. Med.*, vol. 176, no. 7, pp. 981–988, 2016, doi: 10.1001/jamainternmed.2016.1509.

[16] H. Ma *et al.*, “Clinical value of multiorgan damage in hypertensive crises: A prospective follow-up study,” *J. Clin. Hypertens.*, vol. 22, no. 5, pp. 914–923, 2020, doi: 10.1111/jch.13848.

[17] A. TajEldin M, I. Abdalazeem A, A. Ezeldein A, A. Elbashir G, and A. AbdelAziem A, “Clinico-epidemiological characteristics and survival outcome of patients with hypertensive crisis at Kassala Hospital, Eastern Sudan,” *J. Clin. Intensive Care Med.*, vol. 3, no. 1, pp. 029–034, 2018, doi: 10.29328/journal.jcicm.1001017.

[18] L. Mashford, *Manual of Hypertension*, vol. 33, no. 1–2. 2003. doi: 10.1046/j.1445-5994.2002.00310.x.

[19] L. H. Opie and Y. K. Seedat, “Hypertension in Sub-Saharan African populations,”

Circulation, vol. 112, no. 23, pp. 3562–3568, 2005, doi: 10.1161/CIRCULATIONAHA.105.539569.

[20] F. A. Waldron *et al.*, "Prevalence and risk factors for hypertensive crisis in a predominantly African American inner-city community," *Blood Press.*, vol. 28, no. 2, pp. 114–123, 2019, doi: 10.1080/08037051.2019.1568183.

[21] I. Nakalema, M. Kaddumukasa, J. Nakibuuka, E. Okello, M. Sajatovic, and E. Katabira, "Prevalence, patterns and factors associated with hypertensive crises in Mulago hospital emergency department; A cross-sectional study," *Afr. Health Sci.*, vol. 19, no. 1, pp. 1757–1767, 2019, doi: 10.4314/ahs.v19i1.52.

[22] S. Ramakrishnan *et al.*, "Prevalence of hypertension among Indian adults: Results from the great India blood pressure survey," *Indian Heart J.*, vol. 71, no. 4, pp. 309–313, 2019, doi: 10.1016/j.ihj.2019.09.012.

[23] O. A. Sanuade, S. Boatemaa, and M. K. Kushitor, "Hypertension prevalence, awareness, treatment and control in Ghanaian population: Evidence from the Ghana demographic and health survey," *PLoS One*, vol. 13, no. 11, pp. 1–18, 2018, doi: 10.1371/journal.pone.0205985.

[24] S. F. Mohamed *et al.*, "Prevalence, awareness, treatment and control of hypertension and their determinants: Results from a national survey in Kenya," *BMC Public Health*, vol. 18, no. Suppl 3, 2018, doi: 10.1186/s12889-018-6052-y.

[25] S. Mansoori, N. Kushner, R. R. Suminski, W. B. Farquhar, and S. C. Chai, "Added sugar intake is associated with blood pressure in older females," *Nutrients*, vol. 11, no. 9, pp. 1–12, 2019, doi: 10.3390/nu11092060.

[26] Y. F. Gebreyes *et al.*, "Prevalence of high bloodpressure, hyperglycemia, dyslipidemia, metabolic syndrome and their determinants in Ethiopia: Evidences from the National NCDs STEPS Survey, 2015," *PLoS One*, vol. 13, no. 5, pp. 1–18, 2018, doi: 10.1371/journal.pone.0194819.

[27] G. T. Geleta, M. C. Cheme, and E. M. Roro, "Physical, behavioral and sociodemographic determinants of hypertension among the adult population in Nekemte town, western Ethiopia: Community based study," *BMC Res. Notes*, vol. 12, no. 1, pp. 4–9, 2019, doi: 10.1186/s13104-019-4804-0.

[28] S. M. Abebe, Y. Berhane, A. Worku, and A. Getachew, “Prevalence and associated factors of hypertension: A crossectional community based study in Northwest Ethiopia,” *PLoS One*, vol. 10, no. 4, pp. 1–11, 2015, doi: 10.1371/journal.pone.0125210.

[29] B. Kebede, G. Ayele, D. Haftu, and G. Gebremichael, “The Prevalence and Associated Factors of Hypertension among Adults in Southern Ethiopia,” *Int. J. Chronic Dis.*, vol. 2020, pp. 1–7, 2020, doi: 10.1155/2020/8020129.

[30] WHO, “WHO_TRS_862.pdf.” 2021.

[31] J. Addo, L. Smeeth, and D. A. Leon, “Hypertension in sub-Saharan Africa: A systematic review,” *Hypertension*, vol. 50, no. 6, pp. 1012–1018, 2007, doi: 10.1161/HYPERTENSIONAHA.107.093336.

[32] F. Tesfaye, P. Byass, and S. Wall, “Populationbased prevalence of high blood pressure among adults in Addis Ababa: Uncovering a silent epidemic,” *BMC Cardiovasc. Disord.*, vol. 9, 2009, doi: 10.1186/1471-2261-9-39.

[33] G. Pinna *et al.*, “Hospital admissions for hypertensive crisis in the emergency departments: A large multicenter Italian study,” *PLoS One*, vol. 9, no. 4, pp. 1–6, 2014, doi: 10.1371/journal.pone.0093542.

[34] S. Salkic, F. Ljuca, O. Batic-Mujanovic, S. Brkic, D. Mesic, and S. Mustafic, “The frequency of hypertension crises in the emergency medical service department in tuzla,” *Med. Arch. (Sarajevo, Bosnia Herzegovina)*, vol. 67, no. 6, pp. 393–396, 2013, doi: 10.5455/medarh.2013.67.393-396.

[35] A. M. G. Pierin, C. F. Flórido, and J. Dos Santos, “Hypertensive crisis: clinical characteristics of patients with hypertensive urgency, emergency and pseudocrisis at a public emergency department,” *Einstein (Sao Paulo).*, vol. 17, no. 4, p. eAO4685, 2019, doi: 10.31744/einstein_journal/2019AO4685.

[36] P. J. Shao, H. R. Sawe, B. L. Murray, J. A. Mfinanga, V. Mwafongo, and M. S. Runyon, “Profile of patients with hypertensive urgency and emergency presenting to an urban emergency department of a tertiary referral hospital in Tanzania,” *BMC Cardiovasc. Disord.*, vol. 18, no. 1, pp. 1–7, 2018, doi: 10.1186/s12872-018-0895-0.

[37] A. M. Saguner *et al.*, “Risk factors promoting hypertensive crises: Evidence from a longitudinal study,” *Am. J. Hypertens.*, vol. 23, no. 7, pp. 775–780, 2010, doi:

10.1038/ajh.2010.71.

[38] A. J. H. Manag, “ClinMed,” vol. 2, no. 1, pp. 2–5, 2016.

[39] B. M. Gebresillassie and Y. B. Debay, “Characteristics, treatment, and outcome of patients with hypertensive crisis admitted to University of Gondar Specialized Hospital, northwest Ethiopia: A cross-sectional study,” *J. Clin. Hypertens.*, vol. 22, no. 12, pp. 2343–2353, 2020, doi: 10.1111/jch.14056.

[40] N. M. Bennett and S. Shea, “Hypertensive emergency: Case criteria, sociodemographic profile, and previous care of 100 cases,” *Am. J. Public Health*, vol. 78, no. 6, pp. 636–640, 1988, doi: 10.2105/AJPH.78.6.636.

[41] M. A. Yizengaw, K. Chemeda, K. Kumela, and B. T. Tesfaye, “In-hospital outcomes of patients with a hypertensive emergency at a medical center, Ethiopia: A prospective observational study,” *Heal. Sci. Reports*, vol. 5, no. 5, pp. 1–10, 2022, doi: 10.1002/hsr2.845.

[42] D. M. Desta *et al.*, “Prevalence of hypertensive emergency and associated factors among hospitalized patients with hypertensive crisis: A retrospective cross-sectional study,” in *Integrated Blood Pressure Control*, 2020, pp. 95–102. doi: 10.2147/IBPC.S265183.

[43] M. Farah and Y. Mohamud, “Clinico - epidemiological profile and risk factors of hypertensive crisis among patients attended at a tertiary care hospital in Somalia,” *Sci. Rep.*, pp. 1–9, 2023, doi: 10.1038/s41598-023-27683-4.

[44] Y. Lu, H. Yan, J. Yang, and J. Liu, “Occupational stress and psychological health impact on hypertension of miners in noisy environment in Wulumuqi, China: a case-control study,” *BMC Public Health*, vol. 20, no. 1, pp. 1–10, 2020, doi: 10.1186/s12889-020-09760-9.

[45] A. M. Saguner *et al.*, “Risk factors promoting hypertensive crises: Evidence from a longitudinal study,” *Am. J. Hypertens.*, vol. 23, no. 7, pp. 775–780, 2010, doi: 10.1038/ajh.2010.71.

[46] L. Chen, G. D. Smith, R. M. Harbord, and S. J. Lewis, “Alcohol intake and blood pressure: A systematic review implementing a mendelian randomization approach,” *PLoS Med.*, vol. 5, no. 3, pp. 0461–0471, 2008, doi: 10.1371/journal.pmed.0050052.

QUESTIONER

11. Information sheet

1. Name of the study area_____

2. Questionnaire identification no _____

Dear participants!!

My name is ……I am here on behalf of the researchers the researchers are Bsc students in wolkite university college of medicine and health science department of nursing. They are working there proposal on "prevalence and associated factors of hypertensive crisis among adult patients at gurage zone selected public hospitals in wkush, atat and gunchere; a cross sectional study". The purpose of this study is to assess prevalence and associated factors of hypertensive crisis among adult patients in gurage zone selected public hospitals. It has no any direct incentive but it will help to improve health services provided by health facilities. The study has no and will not cause any harm to you and others except it will take only maximum of 30 minutes for the interview. The information you will tell us will be kept confidential and never be exposed to anyone except the principal investigator. You have also the right to refuse and discontinue the interview. Are you willing to participate on the study? If you are willing to participate in this study, please sign the agreement form.

II: Informed Consent

I have read this form or it has been read to me in the language I understand. I understand that I can discontinue the interview without any problem. Therefore

1) I agree to participate

2) I refuse to participate

If the participant agrees to participate, skip to the next page. If no, skip to the next participant ……

Name of investigator: Eyoas teherku, Fikiru Girma, Atitegeb Endale

Address: Mob +251946640794, +251945838166, +251961936784

E-mail: 19921423e@gmail.com

Date of interview …….

III QUESTIONARY

Part one: socio-demographic status

No	Item	Response
1	Age in years?	----------year
2	Sex	1. Male 2. Female
3	Residency	1. Urban 2. Rural
4	Educational status	1. uneducated 2.Primary school 3.Secondary school 4. College and above 5. Others specify----------
5	Occupation	1. farmer 2. merchant 3. Governmental Employee 4. Private Sector
6	Income per month	----------ETB
7	Marital status	1. Single 2. Married 3. Divorced

Part two: comorbidities

No	Questions	Yes	No	Remark
8	Do you have any comorbid?			if say no skip the question No 9

9	Which type of comorbid do you have?			1.diabets mellitus 2.stroke 3.heart failure 4. Other specify----------
10	How long is that when it diagnosed?			----------year
11	Have you visited health institution for this comorbid?			If say no skip the question no11
12	Have ever admitted related to comorbid?			If say yes go to the next question, if say no skip the question.
13	Where is your admission place?			1.wkush 2.Atat 3.Gunchre 4. Other specify----------
14	Do you take additional medication related to comorbid?			

Part three: Other determinants

A. Medication Adherence Scale

No	Question	Yes	No	Remark
15	Do you take anti-hypertensive medication?			If no skip the question no 16
16	What type of medication do you take			1.monotherapy 2.twodrugs 3.trippletherapy
17	How many times do you take per day			1.once a day 2.twice a day
18	Have you ever stopped taking your medication without telling your doctor,			If no skip the question no 19

19	What is the reason that you didn't take your medication			1. forgetting 2. financial problem 3. leave home 4. hassled 5. Other specify----------
20	When you are far, what did you do?			----------
21	How often do you have difficulty remembering to take all your medications?			1.Never 2.Sometime 3.All the time

B. Patient's knowledge of hypertension

NO	Question	yes	No	
24	Do you Know the normal range of blood pressure?			----------
25	Headache is the symptoms of Hypertension?			
26	Hypertension can progress along with the age?			
27	Both sexes have equal chance of developing hypertension?			
28	Hypertension is a curable condition?			
29	Is that a family history of hypertension risk for developing hypertension?			
30	Is that Smoking is risk factor for hypertension?			
31	Eating fatty foods is a risk factor for hypertension?			
32	Too much drinking of alcohol can cause Hypertension?			
33	Overweight is a risk factor for hypertension?			
34	Regular physical exercise reduces hypertension?			

35	Is that More salt consumption increases blood pressure?			
36	Is that medication alones controlling hypertension?			
37	Is hypertension can lead to life-threatening condition?			
38	Anxiety or anger can cause hypertension?			

A. Behavior related determinants

No	**Question**	**yes**	**No**	**Remark**
39	Have you Previous known hypertension			if say no skip the next question no
40	How long do you have diagnose from hypertension			----------in year
41	Have you started taking medications immediately after diagnosis			
42	Do you have regular follow up			
43	Is there any Family history of hypertension?			
44	Who is your family?			1. Father 2. Mother 3. Grand father 4. Grand mother 5. Other specify----------
45	Have you ever smoke cigarette?			if the say no skip the next question no46
46	Are you currently smoking cigarette?			

47	For how long you smoke?			----------
48	How frequently do you smoke?			1. Daily 2. Once /wk 3. 2 -3 days/wk 4. 4-5 days/wks 5. Other specify----------
49	How much pieces do you smoke per day?			----------
50	Do you drink alcohol?			if the say no skip the next question no 51
51	How often do you take alcoholic drinks?			1. Daily 2. 5-6 days per week 3. 1-4 days per week 4. 1-3 days per week 5. Other specify----------
52	What type of alcohol you drink?			1. Beer 2. Win 3. Traditional drinks 4. Other (specify----------
53	Do you perform regular physical exercise?			
54	What type of exercise do you perform?			1. Walking 2. Jogging 3. Cycling 4. Swimming 5.other specify----------
55	Do you have HTN crisis			

Body Mass Index and Blood Pressure level

No	Question	Remark
56	Weight	----------kg
57	Height	----------m
58	BMI level	----------kg/m^2
59	First blood pressure measurement	Systolic----------mmhg
		Diastolic----------mmhg
60	Second blood pressure	Systolic----------mmhg
		Diastolic----------mmhg
61	Average blood pressure	Systolic----------mmhg
		Diastolic----------mmhg