ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

MAGNITUDE AND ASSOCIATED FACTORS OF DEPRESSION AND ANXIETY AMONG PEOPLE WITH HYPERTENSION IN ADDIS ABABA, ETHIOPIA: A HOSPITAL BASED CROSS-SECTIONAL STUDY.

BY

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Abbreviations and acronyms

ALERT	All African Tuberculosis and Leprosy Rehabilitation and Training Hospital
BSC	Bachelor of Science
CDC	Centers for Disease Control and Prevention
CSA	Central Statistical Agency
COVID-19	Coronavirus Disease 2019
FMOH	Federal Ministry of Health
HAD	Hospital Anxiety and Depression Scale
HAD-A	Hospital Anxiety and Depression Scale, Anxiety sub-scale
HAD-D	Hospital Anxiety and Depression Scale, Depression sub-scale
HTN	Hypertension
IRB	Institutional Review Board
JNC	Joint National Committee
LMICs	Low and Middle Income Countries
NCD	Non-Communicable Diseases
OR	Odds Ratio
PHQ	Patient Health Questionnaire
SD	Standard Deviation
SPH	St Paulos Hospital
SPSS	Statistical Package for Social Science

STEPS Stepwise approach to Surveillance

TB Tuberculosis

WHO World Health Organization

Abstract

Background:

Hypertension is one of the leading risk factors for global mortality, being highly prevalent in low and middle income countries. Among people with chronic illnesses, like hypertension, the burden of depression and anxiety are higher. Presence of depression and anxiety among hypertensive patients lead to lack of adherence to treatment and poor compliance to lifestyle adjustments, which increase patient's risk of morbidity and mortality. Unlike in high income countries, there is paucity of information on the burden of depression and anxiety among hypertensive patients in low income countries.

Objectives:

To assess proportion and factors associated with depression and anxiety among hypertensive patients attending selected public hospitals of Addis Ababa, Ethiopia, 2020.

Methods:

Institution based cross-sectional study was conducted in three randomly selected public hospitals. Through a systematic random sampling, a total of 416 hypertensive patients visiting anti-hypertensive clinics with in the study period of the selected hospitals participated in the study. Data were collected through structured questionnaire administered by an interviewer. Depression and anxiety were assessed through Hospital Anxiety and Depression Scale. The collected data were cleaned, edited and entered in to epi-data version 3.1. Descriptive and bi-variable and multivariable logistic analysis were done by using the statistical software, SPSS version 25.

Results

According to the study, the prevalence of anxiety, depression and comorbid anxiety and depression were found to be 37.8%, 29.5% and 16.5% respectively. Factors found to have significant association with depression were female sex, presence of chronic comorbid illnesses, longer duration of hypertension, current alcohol drinking, family history of depression, marital status and uncontrolled blood pressure. Factors found to have significant association with anxiety were female sex, presence of chronic comorbid illnesses, longer duration

of hypertension, current alcohol drinking, retired and non-paid job. Factors which were found to have significant association with comorbid anxiety and depression were female sex, presence of chronic comorbid illnesses, longer duration of hypertension, family history of depression, ever alcohol drinking.

Conclusion

Higher proportion of depression and anxiety were observed in public health hospitals in Addis Ababa. They are also significantly associated with socio-demographic, clinical and behavioral characteristics. Clinicians should consider mental health status of hypertensive patients.

1. Introduction

1.1.Background

Non-Communicable Diseases(NCDs), including cardiovascular diseases, cancer, chronic respiratory diseases and diabetes, are the leading causes of morbidity and mortality in today's world (1). In 2016 NCDs were estimated to account for 71% of the 57 million global deaths in addition to that 78% of all NCD deaths, and 85% of premature adult NCD deaths, occurred in low- and middle-income countries (LMICs) (2).

Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure. Raised blood pressure is a major cardiovascular risk factor. If left uncontrolled, hypertension causes stroke, myocardial infarction, cardiac failure, dementia, renal failure and blindness and leads to human suffering and imposing severe financial and service burdens on health systems (3).

Raised blood pressure is one of the leading risk factors for global mortality and is estimated to have caused 9.4 million deaths and 7% of disease burden, as measured in disability-adjusted life years in 2010 (4). In 2010, the highest prevalence of hypertension was observed in the African Region at 46% of adults aged 25 and above (5).

In Ethiopia NCDs are estimated to account for 39% of all deaths, in 2016, around 275,000 death due to NCDs estimated and in 2015 nearly 24% of adults 18 years and over are expected to have raised blood pressure (1, 2).

Depression is a significant contributor to the global burden of disease and affects people in all communities across the world. Today, globally around 350 million people affected by depression with a 7% lifetime risk. By 2020, 5.7% increment is expected in the global burden of disease because of depression and by 2030 it become the leading cause of disability worldwide, reduce individual's productivity at work or school daily activities of life at severe stages it can lead to suicide. In addition to that, depression often presents with symptoms of anxiety (6).

Worldwide, anxiety disorders are ranked as the sixth largest contributor for non-fatal health loss (6). Significant anxiety is presented in about 85% of patients with depression disorder and

depression is presented in 90% of patients with anxiety disorder, 25% of general practice patients have comorbid depression and anxiety (7).

Although the causal mechanism of depression and hypertension have not been proven yet, relationship of depressive symptoms with vascular diseases, such as hypertension and cardiovascular disease and increased risk of depressed patients to many illnesses related to vascular disease is known (8). However, so far there is no evidence to definitively state which condition occurs first (8).

Epidemiological studies suggest that relationship of psychological features, such as anxiety and depression and cardiovascular diseases may involve impaired regulation of the heart by autonomic nervous system (9).

It is important to understand factors that influence depressive symptoms so that appropriate interventions can be developed to treat them in patients with cardiovascular disorders. Both depressive symptoms and hypertension are psycho-physiologic phenomena (8). High number of prescribed medications are also listed as some of the contributing factors for the development of depressive symptoms in hypertension (10).

The relationship between comorbid anxiety-depression and chronic physical conditions examined in data from 17 countries that completed World Mental Health surveys (11). Those with non-comorbid depressive disorder, non-comorbid anxiety disorder, and comorbid depression-anxiety were all more likely to have hypertension compared to persons with neither a depressive nor an anxiety disorder (11).

1.2. Statement of the problem

When psychological and psychosocial issues co-occur with physical illness, particularly with chronic diseases like hypertension and diabetes, made the diagnosis and management difficult (12). Patients with chronic illnesses are at risk of developing mental illness (12). Differently from the general population, depression is consistently higher in people affected by chronic diseases (13). Like patients with other chronic medical conditions, hypertensive patients experience many profound emotions which increase their risk for the development of mental health disorders, particularly anxiety and depression(14). Even though studies are scarce in the area, unpublished document from WHO shows higher prevalence of major depression in hypertensive patients (13).

In 2015, a meta-analysis showed that prevalence of depression among hypertensive patients was 26.8% (15), which was higher than the same year WHO supported study which estimated global prevalence of depression to be around 4.4% (6).

Depression in hypertensive patients is associated with poorer health status, including lower quality of life (16), increased medical resources (17), lower rate of treatment compliance (18) and even increased mortality (19). People with depression could suffer from lack of occupational and social role function and it is easier for hypertensive patients with depression to further develop depressive symptoms (15). Similarly, anxiety in hypertension associated with an increased fatality and morbidity as a result of fast cardiovascular events (20), and also patients with anxiety symptoms are more likely to have severe hypertension (21).

The control of hypertension and cardiovascular risk, rely on individuals being adherent to measures to reduce behavioral risk factors and drug treatment as prescribed (2). Patient non-adherence with medical advice is one of the major problems in the management of chronic diseases, like hypertension (14). Patients with comorbid depression are less likely to adhere to medical treatment or recommendations, and are at increased risk of disability and mortality. It has been shown that depressed patients are three times more likely not to comply with medical regimens than non-depressed patients (13).

Comorbid anxiety in hypertensive patients results in poor medication adherence which may limit treatment choice, worsen patients prognosis and increased their morbidity and mortality (20). When uncontrolled blood pressure and poor adherence to antihypertensive medication recognized among hypertensive patients, it is important to consider depression as a co-factor (22).

Unhealthy lifestyles, such as intake of alcohol, smoking, unhealthy diet and physical inactivity are associated with anxiety and depression in patients at risk of cardiovascular disease in both sexes (23). So, hypertensive patients with those disorders have increased risk of complication (10).

1.3. Rationale of the study

Studies claim that presence of major physical diseases affect the mental health of individuals as well as entire families (14). Even though HTN is a multifactorial disease it can be effectively controlled using lifestyle interventions and pharmacotherapy (24). A recent trend shows that, in spite of improved detection and treatments, burden of hypertension is increasing (24). Comorbid anxiety and depression reduce patient's compliance to medication which contributes to minimize safety and effectiveness of treatment and raise disability and mortality (14). However, comorbid mental disorders are often unrecognized and not always effectively treated (14). Considering increasing prevalence and mortality of hypertension, there is a need for further research on psychological aspects of those diseases in Ethiopia. The prevalence and determinant factors of anxiety and depression in hypertensive patients show inconsistent findings in studies from abroad (15). In Ethiopia, depression and anxiety are not well explored and fully understood in its prevalence and associated factors. This study hence, aims to fill this knowledge gap.

1.4.Significance of the study

Estimation of the prevalence of depression and anxiety in hypertensive patients gives a clear picture of its burden. Identifying and addressing factors associated with depression and anxiety among hypertensive patients helps to improve patient's compliance to the recommended life style and adherence to anti-hypertensive treatment they are on, so that major life threatening complications can be averted (14). The results of the study will contribute for the achievement of government strategies to prevent and control morbidity and mortality from non-communicable diseases. It serves as an input for policy makers and concerned bodies to prepare programs which make hypertensive patients able to get the comprehensive clinical care which take mental state of the patients in to consideration. The study will give baseline information for others to explore more about it.

2. Literature review

2.1.Depression and anxiety

Depression is a common mental disorder that presents with depressed mood, decreased energy, loss of interest, feelings of guilt or low self-worth, disturbed sleep or appetite, and poor concentration (3). The World Mental Health Survey conducted in 17 countries found that on an average about 1 in 20 people reported having an episode of depression in the previous year (11) Eight studies pooled prevalence of depression in Ethiopia in 2014 was found to be 11%, with females in general and divorced and widowed women in particular having a higher risk of depression than men's and unmarried/married women (25). In Ethiopia, in 2015, WHO estimated the prevalence of depression to be 4.7% (6).

Anxiety disorders are a group of mental disorders in which patients are characterized by feelings of anxiety and fear, it includes generalized anxiety disorder, social anxiety disorder, phobias, panic disorder, obsessive-compulsive disorder and post-traumatic stress disorder. Panic disorder, generalized anxiety disorder and social anxiety disorder are the commonly reported symptoms in subjects with diagnosis of hypertension (26). In 2015, worldwide proportion of population affected by anxiety disorder was estimated to be 3.6%, similar with depression, it is higher in females (6). According to the WHO regional estimates, in Ethiopia, the prevalence of anxiety were estimated to be 3.3% in 2015 (6).

2.2.Magnitude of depression among hypertensives

Many studies show higher prevalence of depression among hypertensives than in the general population (13) and also higher prevalence of hypertension is observed in subjects with major depression (26). Health facility based cross-sectional study conducted among hypertensive patients in 2017 found the prevalence of depression to be 41% (27). Another study in the same year conducted in Pakistan outpatient department found that 40.1% of the study participants had depression of various levels (28).

A study conducted in the outpatient clinic among hypertensive patients in Afghanistan in 2016 (29) showed 58.1% of the participants had depression. Two studies conducted in Saudi Arabia also found high magnitude of depression among hypertensives (30, 31). A single hospital based cross-sectional study conducted in Ghana and Nigeria in 2013 (32) also found prevalence of depression to be 41.7% and 26.6% respectively. In 2014, a hospital-based cross-sectional study in Ghana at two major teaching hospitals (20), found that the prevalence of depression among hypertensive patients was 11%. Another study conducted in Ethiopia found the prevalence of depression to be 24.7%, among hypertensive subjects (33).

2.3.Burden of anxiety among hypertensives

Studies showed high prevalence of anxiety among hypertensive patients in different countries of the world; this shows despite of cultural difference the increased magnitude of anxiety in hypertensives (20). A study conducted in an outpatient clinic in Afghanistan showed that 42.3% had anxiety and 28.2% had comorbid anxiety-depression (29). Higher prevalence of anxiety was found in a study in Ghana among hypertensive patients (20), lower prevalence was reported in south china (21). Study was conducted in Saudi Arabia in 2015, the prevalence of anxiety was reported to be 38.4% (31). A study conducted in Ethiopia, in 2015, showed the prevalence of anxiety to be 28.5% among hypertensive patients (34).

2.4.Factors associated with depression and anxiety among hypertensives

2.4.1. Demographic

Age

Cross-sectional studies among hypertensives show significant association of depression in those whose age were greater than or equal to 65 years (27, 35), The study conducted in Afghanistan hypertensive subjects showed anxiety, depression, and comorbid anxiety-depression were more common among those over 60 than other age groups (29). The study from Pakistan also shows the same higher risk of depression among the elderly (28). The study conducted in Ghana and Nigeria showed different results from the previous studies, in Ghana age has no association with the risk of depression, but in Nigeria depression is common among young age and the risk of

depression is decreased with increase in age (32). A study conducted in Ethiopia founds anxiety to be the same across age groups (34) and depression to be significantly associated with increasing age among hypertensive patients (33).

Sex

In the general population depression has increased incidence among women in both high and low income countries (3). A study conducted in South Africa also showed that females are twice high likely to have depression(OR= 2.2) and anxiety (OR=2.3) and seven times of comorbid depression and anxiety (OR =7.4) compared to males (26). Studies among hypertensive subjects also showed significant association of depression (26-28, 33, 35) and anxiety (21, 26) with female gender . Contrary to this, a study from Afghanistan showed no association of gender with depression and comorbid anxiety-depression but has showed positive association with anxiety, put females at higher risk (29). Similarly, the study in Nigeria and Ghana show sex has no independent association with depression (32).

Marital status

In a study from hypertensive India subjects revealed being married is protective from depression than others who didn't (OR=0.459)(27). Similarly a study in Bosnia and Herzegovina showed that married are significantly protected from depression, with highest risk on widowed than unmarried or singles (35), on the other hand some studies show no significant association of depression (26, 28, 29, 32, 33) and (29, 34) anxiety with marital status.

2.4.2. Socio-economic

Economic status

The studies from India (27), Saudi Arabia (31) and Pakistan (28) show hypertensive subjects with low socio-economic status are at increased risk of depression. In contrary to this, studies found anxiety (34) and depression (32, 33) are not associated with economic status.

Employment

The study conducted among hypertensive patients in Pakistan found significant positive association of depression with unemployment (28). On the contrary, studies didn't show association of employment status with depression (29, 32, 33) and anxiety(29, 34).

Education

A study conducted in Pakistan showed risk of depression is increased with decreased level of education (28), although, the same finding is not observed from a study by Ademola et al (32). Similarly, a study from Afghanistan showed, depression, anxiety and comorbid anxiety and depression didn't significantly associated with the level of education in hypertensive subjects (29). Studies in Ethiopia among hypertensive Subjects show higher risk of anxiety (34) and depression (33) with decreased level of education.

2.4.3. Behavioral characteristics

Alcohol

Many of the studies which assess depression and anxiety among hypertensive patients don't consider alcohol drinking status of subjects. Only a study conducted in Pakistan showed that alcohol drinking is significantly associated with depression (28), contrary to that studies found that alcohol drinking behavior is not associated with depression (26, 33) and anxiety (26).

Smoking,

Smoking didn't show significant association with depression among hypertensives (33, 35). A study from Afghanistan showed significant association of smoking with anxiety but not with depression and comorbid anxiety and depression (29). In spite of that, the study from Pakistan found significant association between smoking with depression (28).

Physical activity

Only a study conducted in Pakistan showed significantly lower risk of depression among physically active hypertensive patients (28), the rest of the studies didn't find association.(27, 33, 35).

2.4.4. Psychosocial and Clinical

Comorbidities

Studies show significant association of depression (27) and anxiety (26) with the presence of comorbid illness among hypertensives. Hypertensive subjects with comorbid diabetes found to have statistically significant association with depression (OR=22.74), anxiety (OR=4.9) and comorbid anxiety and depression (OR=10.24) compared to subjects with no comorbidities(29). Similarly, Mebtatu et al showed hypertensive patients with comorbid diabetes has 2.98 times increased risk of anxiety than subjects with no comorbidities (34). On the contrary, studies showed depression is not significantly associated with comorbidities among hypertensive subjects (33, 35).

Blood pressure control

Many of the studies didn't found significant difference in risk of depression among hypertensive patients with controlled and uncontrolled blood pressure (Controlled systolic <140 or diastolic<90 and uncontrolled systolic≥140 or diastolic≥90) (27, 28, 32), although, Gebre et al found uncontrolled blood pressure was independent predictor of depression (33). Compared to non-anxiety Patients average systolic blood pressure found to be higher in patients with moderate to severe anxiety symptoms (21).

Family history of hypertension and depression

A study from India showed significantly higher risk of depression among subjects with family history of hypertension (27), which is similar with finding of a study from Pakistan (28). A study conducted in Ethiopia showed hypertensive subjects with positive family history of depression are 7 times more likely to be depressed than their counterparts (33).

Duration of hypertension

A study showed that as increasing duration of the disease the level of depression became higher (35). Similarly a study in India shows significantly lower risk of depression in subjects with duration of hypertension less than 6 year (27). History of hypertension of more than 3 years serves as an independent predictor for anxiety (21).

2.5.Conceptual frame work

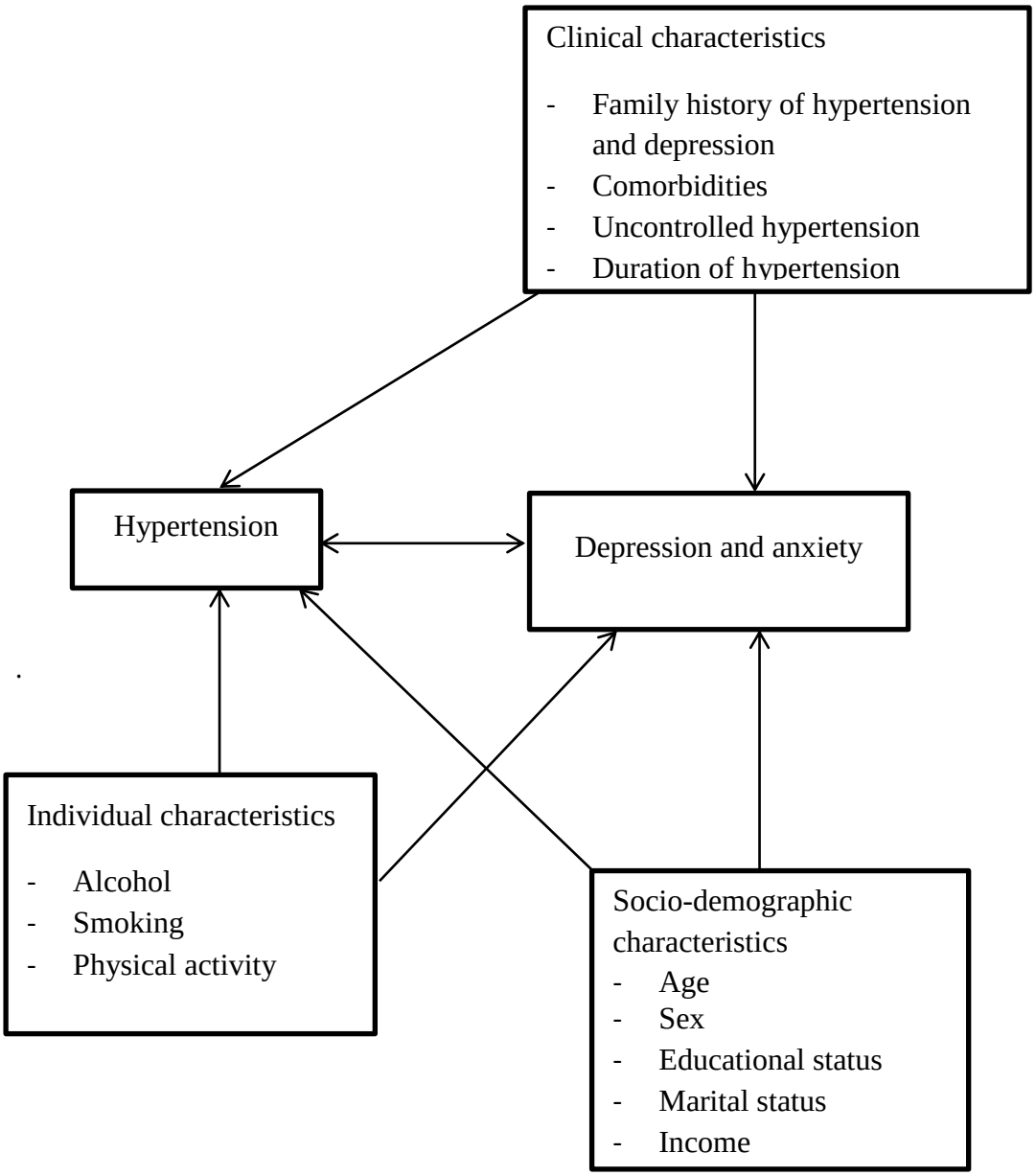


Figure 1: Conceptual frame work on the determinants of depression and anxiety among hypertensive patients developed from different literatures.

3. Objective

3.1.General objective

- To assess prevalence and factors associated with depression and anxiety among hypertensive patients in selected public hospitals in Addis Ababa in 2020.

3.2.Specific objectives

- To assess the prevalence of depression among hypertensive patients attending selected public hospitals.
- To assess the prevalence of anxiety among hypertensive patients attending selected public hospitals.
- To identify factors associated with depression among hypertensive patients attending selected public hospitals.
- To identify factors associated with anxiety among hypertensive patients attending selected public hospitals.

4. Research methods and procedures

4.1.Study design

A hospital based cross-sectional study design was employed.

4.2.Study area and period

Ethiopia is a federal state administratively divided into ten regional states and two city administrations. Addis Ababa is one of the city administrations and the capital city of Ethiopia. According to the CSA, July 2015 estimate, Addis Ababa's total population was about 3.3 million people (36). In Addis Ababa there are 12 public hospitals, of them 10 give chronic care. The study was conducted on three randomly selected public hospitals, including St. Paul's Hospital, Yekatit 12 Hospital and ALERT Hospital. St. Paul's Hospital is one of the specialized referral public hospitals in Addis Ababa with a bed capacity of about 350. The Hospital has outpatient and inpatient wards that provide different services. The Hospital receives referrals from all over the country (37). Yekatit 12 Hospital is a public referral teaching hospital which consists of nine departments and six units and has 265 beds (38). The other one is All African Tuberculosis and Leprosy Rehabilitation and Training (ALERT) Hospital is a Referral Teaching Hospital with 240 beds and consists of dermatology, ophthalmology, surgery and orthopedic departments. It also has an orthopedic workshop and a rehabilitation program. The Hospital provides service to patients coming from all regions of the country (39). The Ras Desta Hospital was selected to conduct only the pre-test. The study was conducted between May 11, 2020 and June 25, 2020.

4.3. Population

4.3.1. Target population

The target population included, all patients diagnosed to have high blood pressure who were visiting hypertension follow up clinics of public hospitals in Addis Ababa.

4.3.2. Source population

The source population included, all patients diagnosed to have high blood pressure who were visiting hypertension follow up clinics of the selected public hospitals in Addis Ababa.

4.3.3. Study population

The study population included, all hypertensive patients who were visiting the selected public hospitals hypertension follow up clinics in Addis Ababa during the data collection period and fulfilling the study inclusion criteria.

4.3.4. Study unit

Individuals diagnosed to have hypertension and selected based on the inclusion criteria and sampling technique applied for the study.

4.3.5. Inclusion criteria

The study included all adult hypertensive patients who were older than 18 years and under treatment for hypertension in the selected health facilities for at least six months

4.3.6. Exclusion criteria

Critically ill patients and patients with severe psychiatric disorder were excluded. Pregnant mothers who could have gestational hypertension which can be resolved after delivery were also excluded.

4.4.Study variables

4.4.1. Dependent variables

Depression, anxiety and comorbid depression and anxiety

4.4.2. Independent variables

Socio-demographic and economic characteristics

Age in years, sex, marital status, monthly income, employment, level of education

Behavioral characteristics

Alcohol consumption, cigarette smoking, physical activity

Psychosocial and clinical characteristics

Comorbidities, blood pressure control, duration of hypertension, family history of hypertension and depression,

4.5.Sample size

For the first and second objectives, sample size was determined using a single population proportion formula.

$$ni = \frac{(Z(a/2))^2 pq}{d^2}$$

Where ni = required initial sample size,

$Za/2$ =critical value for normal distribution at 95% confidence interval which equals to 1.96 (Z value at alpha = 0.05),

P = proportion of success; the prevalence of depressive symptoms among hypertensive patients

q = proportion of failure; hypertensive patients not having comorbid depression and

d = marginal error (0.05):

Because there is no study which determines prevalence of depression among hypertensives in Ethiopia, the sample size was calculated based on the figure found from a study conducted in Ghana that showed a prevalence of depression to be 41.7% among hypertensives.(32)

$n=(1.96)^2(0.417)(0.583)/(0.05)^2$

n=374

For the second objective, the sample size was calculated using prevalence of anxiety from previous study in Ethiopia which was 28.5% (34).

$n=(1.96)^2(0.285)(0.715)/(0.05)^2$

n=313

For the third objective, the sample size was determined for common factors that are found to significantly associate with depression among hypertensive patients, according to studies in the area. EPI-info 7 statistical software was used to calculate the sample size.

Table 1: Factors commonly associated with depression among hypertensive patients

Variable as exposure	Assumptions						References
	OR	P	Ratio	Power	CI	Sample size(case+control)	
Low socio-economic status	2.81	26.5%	1:1	80%	95%	146	(27)
Comorbid DM	22.74	15.3%	1:1	80%	95%	28	(29)
Family history of HTN	3.56	25.9%	1:1	80%	95%	98	(27)
Longer duration of hypertension	0.0015	85.9%	1:1	80%	95%	14	(27)

For the fourth objective, the sample size was determined for common factors that are found to significantly associate with anxiety among hypertensive patients, according to studies in the area. EPI-info 7 statistical software was used to calculate the sample size.

Table 2: Factors commonly associated with anxiety among hypertensive patients

Variable as exposure	Assumptions						References
	OR	P	Ratio	Power	CI	Sample size(case+control)	
Older age	5	48.65%	1:1	80%	95%	72	(29)
Female sex	2.57	22.01%	1:1	80%	95%	188	(34)
Unable to read and write	2.72	24.93%	1:1	80%	95%	158	(34)
Comorbid DM	2.98	52.78%	1:1	80%	95%	138	(34)
Smoking	2.95	32.86%	1:1	80%	95%	126	(29)

So the largest sample size was taken which is 374.

After that it was adjusted for 10% nonresponse rate,

$$nf = \frac{ni}{1\text{-non-response}}.$$

nf=374/1-0.1

nf=415.55≈416

So, the final sample size was 416.

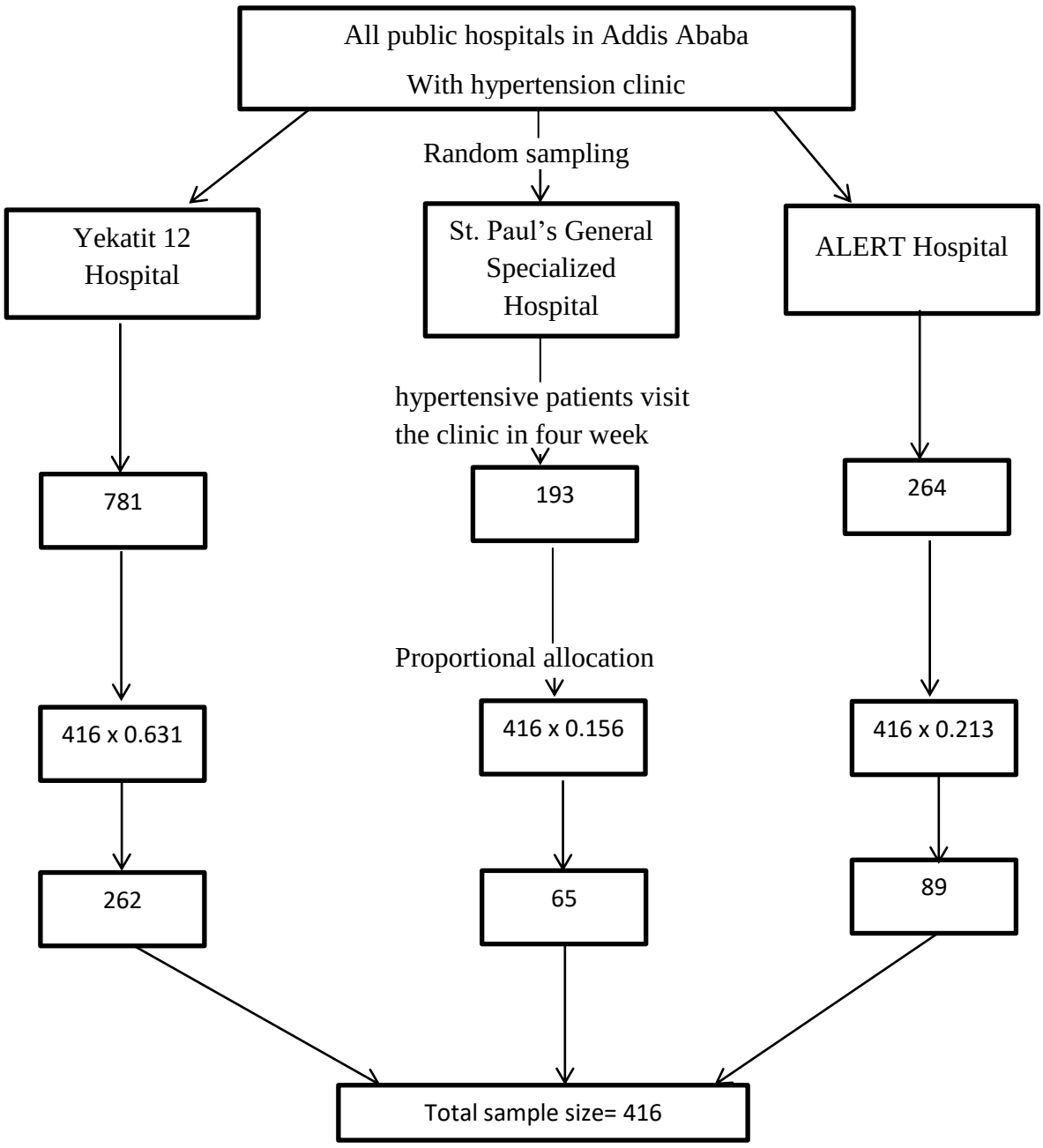
4.6.Sampling procedures

In Addis Ababa City there are 10 public hospitals that give hypertension follow-up services, of those three were selected using a lottery method for simple random sampling:

The hospitals were St Paul's Hospital, Yekatit 12 Hospital and All African Tuberculosis and Leprosy Rehabilitation and Training Hospital.

The study was conducted in hypertension follow up clinics of the selected hospitals. The number of study units from each hospital was proportionally allocated from the three months' patient visit load according to the register. Accordingly, from ALERT Hospital, St. Paul's Hospital, and Yekatit 12 Hospital 89, 65 and 262 were allocated respectively to obtain 416 study units.

Figure 2: Schematic presentation of sampling procedure



Since we have no sampling frame of participants for the selection, systematic random sampling procedure was utilized. We estimated expected number of patients for one month and we divided the number of patients for the one month by the required sample size to find the interval that we were going to take our sample. After we got the interval, we took participants from the clinic every observed interval of the patients. The starting point was randomly selected.

Interval (K) for ALERT hospital is $264/89 = 2.966 \approx 3$

Interval (K) for St. Paul's hospital is $193/65 = 2.969 \approx 3$

Interval (K) for Yekatit 12 hospital is $781/262 = 2.981 \approx 3$

So that all the hospitals have the same interval,

After a random number between 1 and 3 was selected, subjects were taken every 3 interval of the selected number until the required number was reached.

4.7.Data collection procedures

After participants finished clinical assessment, got their medication refilled, got the necessary consultation with their physicians, the interview followed. Then, the interviewer explained the objective of the study and got informed consent to conduct the interview and did the exit interview.

To avoid risk of COVID-19 transmission necessary measures were taken by data collectors such as sanitizing their hands, wearing mask properly and keeping their social distance. Considering increased risk of depression and anxiety before the interview patients were told to relax and briefly counsel about COVID-19 related facts to help to reduce psychological stress according to CDC mental health and coping with stress (40).

Data were collected through structured questionnaire based on face to face interview by 4 BSc nurses in the clinic who received two days of training before the study about aim of the study, data collection procedures and measurements to be taken. The questionnaire, included socio-economic and demographic characteristics (age, sex, educational status, marital status, permanent residence employment and income) behavioral characteristics (alcohol consumption, cigarette smoking, and physical activity) and Clinical characteristics (family history of hypertension, family history of depression and duration of hypertension). The participant's blood pressure and comorbidities were taken from their medical records.

The data collection questionnaire has three parts

The first part: socio-demographic and behavioral characteristics.

The questionnaire was modified from the World Health Organization instrument for stepwise surveillance (WHO STEPS) of chronic disease risk factors(41).

The second part: clinical characteristics of participants.

The third part: depression and anxiety were evaluated using the Hospital Anxiety and Depression Scale (HADS) (42).

HADS has 14 questions, seven of them are about anxiety (HAD-A) and the rest of them are about depression (HAD-D). Based on subject's response, score for each of the question in the sub-scales are sum up. In each of the sub scales the scores range from 0 to 21 and the items have four points scale. The higher the score is the more severe the symptoms.

The scores are classified as follows:

Normal (0–7),

Mild depression or anxiety (8–10),

Marked depression or anxiety (11–21) (23).

Both depression and anxiety were scored separately.

A study showed that the HADS is a very effective tool for diagnosis of depression and anxiety symptoms in outpatients of a general hospital (28). HADS primarily focuses on non-physical symptoms so that we can apply it for the diagnosis of depression, regardless of subject's significant physical ill health (42). The tool has been validated in Ethiopia (43).

For participants who were found to be markedly depressed or anxious in the screening tool, additional information were given by the interviewers and a link was provided with psychiatric clinic of the hospitals for the confirmation of the diagnosis.

4.8.Data Analysis procedures

After data were collected, it were checked for completeness, cleaned, edited, coded and entered to epi-data 3.1 version and exported and analyzed using SPSS version 25. The data were descriptively analyzed through frequencies, means, median and proportions. Bivariate analysis using Chi-square test and Fisher's exact test were calculated to examine association of independent variables with dependent variable. Variables with P-value <0.25 were entered to multivariable logistic regression model to see the association of each predictor variable in the outcome variable and control the effects of confounding variables for both depression and anxiety separately and their comorbidities using odds ratios, with 95% confidence interval. Co-founders, interaction and multi-collinearity checked. Model of goodness of the test was checked by Hosmer-Lemeshow goodness of fit test. Independent variables with P-value of <0.05 were considered as having statistical significant association with the outcome variable and the crude and adjusted odds ratios, confidence intervals, p-values and the overall finding presented in the form of texts, tables and diagrams.

4.9.Data quality management

A Properly designed data collection tool was prepared. The questionnaire was assessed for simplicity and clarity. The English version of the questionnaire was translated in to the local language, (Amharic) and translated back to English, to check for consistency. The original and translated questionnaires were compared and the discrepancies were reviewed and resolved accordingly. Pretest was made in 5% (21 hypertensive patients) of the target population in Ras Desta Hospital and necessary modifications were done. Two days intensive training was given on data collection instrument for the data collectors and supervisors by the principal investigator. The data collected were reviewed and checked for completeness and relevance by supervisor and principal investigator each day.

4.10. Operational definitions

Hypertension: Is defined as a rise in blood pressure when systolic blood pressure ≥140 mm Hg and/or diastolic blood pressure ≥90 mm Hg (44).

Depression: score of greater than or equal to 8 for HAD depression sub-scale.

Anxiety: score of greater than or equal to 8 for HAD anxiety sub-scale.

Controlled blood pressure is systolic<140 or diastolic<90 and **uncontrolled blood pressure** is systolic≥140 or diastolic≥90) (45).

Adults categorized as **current smoker** when they are using cigarette in the past one month and When individuals smoked at least once in their life time they were categorized as **ever smoker**. Adults categorized as **current drinker** when they are using alcohol in the past one month and when individuals drink alcoholic beverages at least once in their life time they were categorized as **lifetime drinker** (41).

Physically active: those who are doing moderate to vigorous activity at work or leisure time for at least 30 minutes, for 4 or more days in a week (46). In accordance with WHO typical physical activities (41).

Comorbid illnesses: arthritis, HIV/AIDS, Leprosy, stroke, heart attack, heart disease, asthma, any other chronic lung disease (COPD or emphysema), chronic kidney disease, chronic liver disease, diabetes, thyroid disease, neurological problems (seizure, epilepsy, parkinson's), cancer.

4.11. Ethical consideration

Ethical clearance was received from the Institutional Review Board (IRB) of the Addis Ababa University, College of Health Sciences, ALERT Hospital, St Paul's Hospital and Addis Ababa Public Health Research and Emergency Management Directorate before the study began. The aim and purpose of the study were explained for the participants. All information collected during the course of the research was kept strictly confidential. No information on name and address of participants were collected. The data collected for this study were stored securely and only the researchers conducting this study had access to the data. Participants were informed that their participation in the study was completely voluntary and they can withdraw from the study anytime they want, and also the study has no any physical risk to them. Those who decided to take part were asked to sign a written consent form. For subjects who were markedly depressed and anxious a link to the psychiatric clinic was provided to confirm the diagnosis and for further treatment.

4.12. Dissemination of findings

Final result of the study shall primarily be submitted to the Addis Ababa University, College of Health Sciences, as partial fulfillment of my master's Degree. The result will also be submitted to St. Paul's Hospital, Yekatit 12 Hospital, ALERT Hospital, Addis Ababa public health research and emergency management core process and other concerned bodies. I will make contact with journals to publish and make our findings accessible to the scientific community. It will be also presented in various seminars and conferences whenever necessary and will be used as a resource for further researches.

5. Results

5.1. Description of the socio-economic, demographic, clinical and behavioral characteristics of respondents

5.1.1 Description of the socio-economic and demographic

The total study sample was 416 of which 407 hypertensive patients were interviewed, which make the response rate to be 97.8%. Out of the total respondents 219 (53.8%) were males. Mean age was 49.47 years (SD=11.46), with majority 137 (33.7%) were in the age group 48-57 years (Table 3).

Regarding the educational status of respondents 56 (13.8%) were unable to read and write, while 94 (23.1%) attended primary education. More than two third 276 (67.8%) were married and nearly everyone 403 (99%) were permanent residence of Addis Ababa. The monthly median average income was 2500 birr (inter-quartile range of 1500 birr), One hundred fourth-two (34.9%) were government employee.

Table 3: Description of socio-economic and demographic characteristics of hypertensive patients attending public hospitals in Addis Ababa, Ethiopia, 2020 G.C.

Variables		Frequency (n=405)	Percent (%)
Sex	Male	219	53.8
	Female	188	46.2
Age	18-27 years	10	2.5
	28-37 years	55	13.5
	38-47 years	117	28.7
	48-57 years	137	33.7
	58-67 years	65	16
	68 and above years	23	5.7
Educational status	Unable to read and write	56	13.8
	Primary education	94	23.1
	Secondary and preparatory education	91	22.4
	College and above	166	40.8
Employment status	Non-governmental employee	26	6.4
	Government employee	142	34.9
	Self-employed	29	7.1
	Non-paid job	15	3.7
	Homemaker	53	13
	Retired	74	18.2
	Unemployed (able to work)	28	6.9
	Unemployed (unable to work)	40	9.8
Marital status	Married	276	67.8
	Single	31	7.6
	Widowed	28	6.9
	Divorced	72	17.7
Residence	Urban	403	99
	Rural	4	1
Monthly average income	<1,000 birr	95	23.3
	1,000-3,599 birr	272	66.8
	3,600-10,799 birr	28	6.9
	≥10,800 birr	12	2.9

5.1.2 Clinical and individual characteristics of respondents

As it is shown in table 4, at least one or more comorbid illnesses are presented in two fifth (41.3 %) of the respondents and blood pressure is under control in more than half (57.5%) of them. Duration of hypertension in 124 (30.5%) of the participants is greater than 10 years. Family history of hypertension and family history of depression reported by 52 (12.8%) and 80 (19.7%) of the respondents respectively. From all the respondents 40 (9.8%) of them smoke cigarette at least once in their life and 17 (42.5%) of them are current smokers. In addition to this, 287 (70.5%) of the participants drink alcohol in their life at least once and 185 (64.5%) of them currently drink alcohol. About one tenth (14%) of the respondents do physical activity at leisure time or work (Table 4).

Table 4: Description of clinical, behavioral and individual characteristics of hypertensive patients attending public hospitals in Addis Ababa, Ethiopia, 2020 G.C.

Variables		Frequency (n=405)	Percent (%)
Comorbid illness	Yes	168	(41.3)
	No	239	(58.7)
Blood pressure control	Yes	234	(57.5)
	No	173	(42.5)
Duration of Hypertension	<5 years	131	(32.2)
	5-10 years	152	(37.3)
	>10 years	124	(30.5)
Family history of hypertension	Yes	52	(12.8)
	No	355	(87.2)
Family history of depression	Yes	80	(19.7)
	No	327	(80.3)
Ever smoke	Yes	40	(9.8)
	No	367	(90.2)
Current smoke	Yes	17	(4.2)
	No	390	(95.8)
Ever alcohol	Yes	287	(70.5)
	No	120	(29.5)
Current alcohol	Yes	185	(45.5)
	No	222	(54.5)
Physical activity	Yes	59	(14.5)
	No	348	(85.5)

5.2. Prevalence of depression, anxiety and comorbid depression and anxiety among hypertensive patients

5.2.1 Prevalence of depression among hypertensive patients

The prevalence of depression among hypertensive patients was found to be 37.8% [95% CI (33.4%-42.5%)] with 24.6% of them were mildly depressed and 13.2% were markedly depressed (Figure 3).

5.2.2 Prevalence of anxiety among hypertensive patients

The prevalence of anxiety among hypertensive patients was found to be 29.5% [95% CI (24.8%-33.9%) with 22.6% of them were mildly anxious and 6.9% were markedly anxious ((Figure 4).

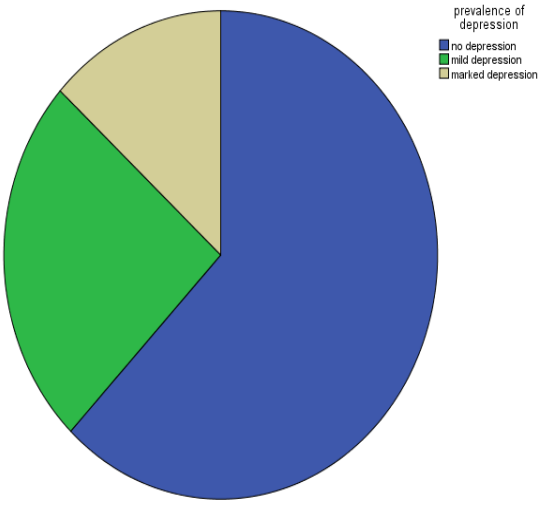


Figure 3: The prevalence of depression among hypertensive patients visiting selected public hospitals in Addis Ababa, Ethiopia 2019/2020 G.C.

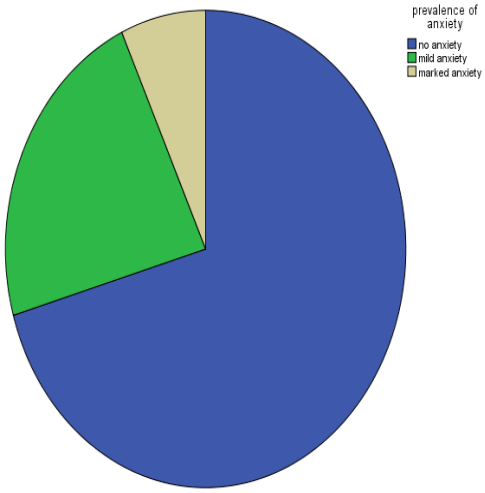


Figure 4: The prevalence of anxiety among hypertensive patients visiting selected public hospitals in Addis Ababa, Ethiopia 2019/2020 G.C.

5.2.3 Prevalence of comorbid anxiety-depression among hypertensive patients

From the total participants of the study 16.5% [95% CI (13.3%-19.9%)] of them had comorbid anxiety and depression and 50.9% [95% CI (45.9%-55.8%)] of the participants had either anxiety or depression. In addition to this, 43.5% of hypertensive patients with depression had comorbid anxiety and 55.8% of hypertensive patients with anxiety had comorbid depression (Figure 5).

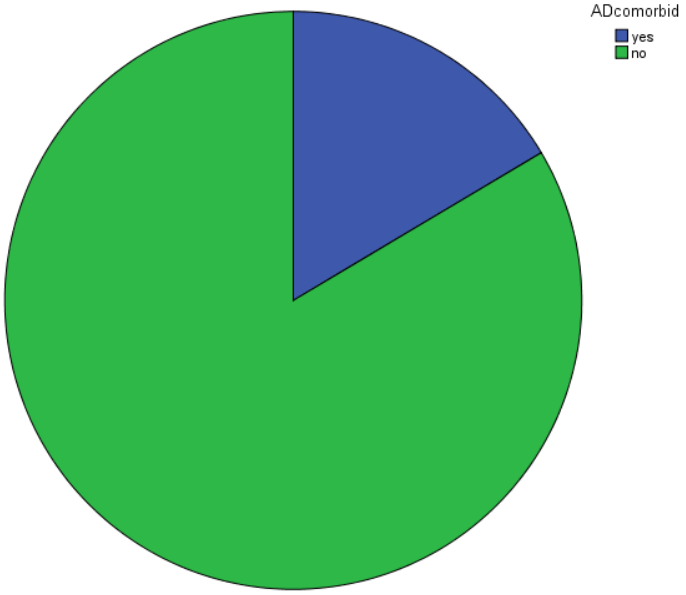


Figure 5: The prevalence of comorbid anxiety and depression among hypertensive patients visiting selected public hospitals in Addis Ababa, Ethiopia 2019/2020 G.C.

5.3. Factors associated with depression, anxiety and comorbid anxiety and depression among hypertensive patients.

5.3.1 Factors associated with depression

Bivariate logistic regression analysis was done to examine the association of each independent variable with depression. Variables with P-value of less than 0.25 on bivariate logistic regression, sex, marital status, monthly income, presence of comorbidities illness, blood pressure control, duration of hypertension, family history of depression, and current alcohol drinking status, were entered into multivariable logistic regression. In the final model the strength of association was measured by OR with 95% confidence interval and variables associated with depression with P-value <0.05 considered as significantly associated.

As shown in table 5, in multivariable logistic regression analysis, females were 5.4 times more likely to have depression compared to males. Married subjects had 75% reduced odds of having depression compared to those who were single. Those who had comorbid illnesses are 3 times more likely to have depression compared to those with no any comorbid illness, those with uncontrolled blood pressure are 2.8 times more likely to have depression compared to those with controlled blood pressure, subjects with duration of hypertension 5 to 10 years are 3.2 times and more than 10 years are 5.8 times more likely to have depression compared to patients with less than 5 years of hypertension duration. Subjects with positive family history of depression are 4.5 times more likely to have depression compared to their counterparts. Currently alcohol drinker subjects are 1.8 times high likely to have depression compared to those who are not alcohol drinkers currently.

Table 5: Factors associated with depression among hypertensive patients attending public hospitals in Addis Ababa, Ethiopia, 2020 G.C.

Variables	Depression n n(%)	No depression n(%)	COR(CI)	AOR(CI)	P value
Sex					
Male	56(25.6)	163(74.4)	1	1	
Female	98(52.1)	90(47.9)	3.17(2.09-4.81)	5.37(3.08-9.35)	0.000***
Marital status					
Married	62(22.5)	214(77.5)	0.40(0.17-0.99)	0.25(0.08-0.78)	0.017*
Divorced	26(36.1)	46(63.9)	0.78(0.47-1.38)	0.94(0.48-1.83)	0.860
Widowed	7(25)	21(75)	0.46(0.20-1.15)	0.42(0.12-1.41)	0.159
Single	13(41.9)	18(58.1)	1	1	
Monthly average income					
<1,000 birr	53(55.8)	42(44.2)	1.77(0.52-5.97)	0.80(0.17-3.80)	0.779
1,000-3,599 birr	81(29.8)	191(70.2)	0.59(0.18-1.93)	0.32(0.07-1.38)	0.126
3,600-10,799 birr	15(53.6)	13(46.4)	1.62(0.41-6.34)	0.57(0.10-3.24)	0.528
≥10,800 birr	5(41.7)	7(58.3)	1	1	
Comorbid illness					
Yes	88(52.4)	80(47.6)	2.88(1.90-4.37)	3.03(1.78-5.16)	0.000***
No	66(27.6)	173(72.4)	1	1	
Blood pressure control					
Yes	60(25.6)	174(74.4)	1	1	
No	94(54.3)	79(45.7)	3.45(2.27-5.25)	2.80(1.65-4.75)	0.000***
Duration of Hypertension					
>10 years	66(53.2)	58(46.8)	4.83(2.75-8.45)	5.81(2.90-11.65)	0.000***
5-10 years	63(41.4)	89(58.6)	3.00(1.75-5.16)	3.17(1.61-6.23)	0.001**
<5 years	25(19.1)	106(80.9)	1	1	
Family history of depression					
Yes	53(66.3)	27(33.7)	4.39(2.61-7.38)	4.53(2.37-8.66)	0.000***
No	101(30.9)	226(69.1)	1	1	
Current alcohol					
Yes	77(41.6)	108(58.4)	1.34(0.90-2.00)	1.77(1.02-3.07)	0.041*
No	77(34.7)	145(65.3)	1	1	

*Statistically significant at p-value<0.05, ** statistically significant at p-value<0.01, *** statistically significant at p-value<0.001
COR = crude odds ratio at 95% confidence interval; AOR = adjusted odds ratio at 95% confidence interval.

According to table 6, the model fits the data well, since Hosmer and Lemeshow goodness of fit test is non-significant (p=0.321). Omnibus tests of model coefficients show we have a significant (p=0.000) model that means our model is a good predictor of depression status (Table 6).

Table 6 Hosmer and Lemeshow test for factors associated with depression among hypertensive patients attending public health hospitals in Addis Ababa, Ethiopia, 2020 G.C.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	9.261	8	.321

5.3.2 Factors associated with anxiety

Bivariate logistic regression analysis was done to see the association of each independent variable with anxiety. Variables with P-value of less than 0.25 on bivariate logistic regression, sex, employment status, monthly income, presence of comorbid illness, blood pressure control, duration of hypertension, family history of depression, current cigarette smoking, current alcohol drinking and physical activity, were entered into multivariable logistic regression. In the final model the strength of association was measured by OR with 95% confidence interval and variables associated with anxiety with P-value <0.05 considered as significantly associated.

As seen in table 7, in multivariable logistic regression analysis, female hypertensive subjects are 3.1 times more likely to have depression compared to males. Those who are retired are 6.4 and with non-paid job are 6.5 times more likely to have depression compared to subject's work in non-governmental organization. Subjects with comorbid illness are 3.1 times more likely to have depression compared to subjects with no other comorbid illnesses. Duration of hypertension 5 to 10 years are 2.7 and more than 10 years 4.9 times more likely to have depression compared to those with duration of hypertension less than 5 years. Those who currently drink alcohol are 2.2 more likely to have depression compared to their counterparts.

Table 7: Factors associated with anxiety among hypertensive patients attending public hospitals in Addis Ababa, Ethiopia, 2020 G.C.

Variables	Anxiety n(%)	No anxiety n(%)	COR(CI)	AOR(CI)	P value
Sex					
Male	43(19.6)	176(80.4)	1	1	
Female	77(41)	111(59)	2.84(1.82-4.42)	3.10(1.77-5.42)	0.000***
Employment status					
Unemployed (unable to work)	14(35)	26(65)	2.96(0.85-10.32)	1.62(0.40-6.61)	0.504
Unemployed (able to work)	1(3.6)	27(6.6)	0.20(0.02-1.96)	0.25(0.02-2.74)	0.259
Retired	28(37.8)	46(62.2)	3.35(1.05-10.73)	6.35(1.73-23.32)	0.005**
Homemaker	17(32.1)	36(67.9)	2.60(0.77-8.72)	1.34(0.32-5.60)	0.693
Non-paid job	4(26.7)	11(73.3)	2.00(0.42-9.55)	6.54(1.18-36.41)	0.032*
Self-employed	9(31)	20(69)	2.48(0.66-9.31)	1.87(0.41-8.48)	0.417
Government employee	43(30.3)	99(69.4)	2.39(0.78-7.35)	2.71(0.78-9.47)	0.117
Non-governmental employee	4(15.4)	22(84.6)	1	1	
Monthly average income					
<1,000 birr	39(41.1)	56(58.9)	2.09(0.53-8.22)	1.74(0.36-8.45)	0.494
1,000-3,599 birr	68(25)	204(75)	1.00(0.26-3.80)	1.06(0.24-4.72)	0.943
3,600-10,799 birr	10(35.7)	18(64.3)	1.67(0.37-7.61)	1.54(0.27-8.86)	0.630
≥10,800 birr	3(25)	9(75)	1	1	
Comorbid illness					
Yes	69(41.1)	99(58.9)	2.57(1.66-3.97)	3.13(1.79-5.47)	0.000***
No	51(21.3)	188(78.7)	1	1	
Blood pressure control					
Yes	54(23.1)	180(76.9)	1	1	
No	66(38.2)	107(61.8)	2.06(1.34-3.17)	1.22(0.71-2.09)	0.474
Duration of Hypertension					
>10 years	49(39.5)	75(60.5)	2.92(1.65-5.16)	4.85(2.29-10.26)	0.000***
5-10 years	47(30.9)	105(69.1)	2.00(1.14-3.50)	2.71(1.35-5.43)	0.005**
<5 years	24(18.3)	107(81.7)	1	1	
Family history of depression					
Yes	29(36.3)	51(63.7)	1.48(0.88-2.47)	1.79(0.95-3.39)	0.072
No	91(27.8)	236(72.2)	1	1	
Current smoke					

Yes	0(0)	17(100)	0.00(0.00-)	0.00(0.00-)	0.998
No	120(30.8)	270(69.2)	1	1	
Current alcohol					
Yes	62(33.5)	123(66.5)	1.425(0.93-2.19)	2.23(1.29-3.87)	0.004**
No	58(26.1)	164(73.9)	1	1	
Physical activity					
Yes	13(22)	46(78)	1	1	
No	107(30.7)	241(69.3)	1.57(0.82-3.09)	2.12(0.95-4.71)	0.065

*Statistically significant at p-value<0.05, ** statistically significant at p-value<0.01, *** statistically significant at p-value<0.001
COR = crude odds ratio at 95% confidence interval; AOR = adjusted odds ratio at 95% confidence interval.

According to table 8, since Hosmer and Lemeshow goodness of fit test is non-significant (p=0.132) we are not going to reject the null hypothesis that the model adequately fits the data. Omnibus tests of model coefficients show we have a significant (p=0.000) model that means our model is a good predictor of anxiety status.

Table 8 Hosmer and Lemeshow test for factors associated with anxiety among hypertensive patients attending public health hospitals in Addis Ababa, Ethiopia, 2020 G.C.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	12.452	8	.132

5.3.3 Factors associated with comorbid depression and anxiety

As described in table 9, bivariate logistic regression analysis was done to see the association of each independent variable with comorbid depression and anxiety. Variables with P-value of less than 0.25 on bivariate logistic regression, sex, monthly income, presence of comorbidities illness, blood pressure control, duration of hypertension, family history of hypertension, family history of depression, current smoking and ever alcohol drinking status, were entered into multivariate logistic regression. In the final model the strength of association was measured by OR with 95% confidence interval and variables associated with comorbid depression and anxiety with P-value <0.05 considered as significantly associated.

Multivariable logistic regression analysis found female hypertensive subjects were 9.9 times more likely to have comorbid depression and anxiety compared to males. Subjects with comorbid illness are 2.4 times more likely to have comorbid depression and anxiety than subjects without any comorbid illness. Those with duration of hypertension more than 10 years are 5.2 times more likely to have comorbid depression and anxiety compared to subjects with duration of hypertension less than 5 years. Family history of depression increase likelihood of having comorbid depression and anxiety by 4.5 times compared to no family history of depression. Those who ever drink alcohol are 3.3 times more likely to have comorbid depression and anxiety compared to those with no lifetime alcohol drinking status (Table 9).

Table 9: Factors associated with comorbid depression and anxiety among hypertensive patients attending public hospitals in Addis Ababa, Ethiopia, 2020 G.C.

Variables	comorbid anxiety-depression n(%)	No comorbid anxiety-depression n(%)	COR(CI)	AOR(CI)	P-value
Sex					
Male	12(5.5)	207(94.5)	1	1	
Female	55(29.3)	133(70.7)	7.13(3.68-13.82)	9.88(4.44-21.96)	0.000***
Monthly average income					
<1,000 birr	31(23.6)	64(67.4)	1.45(0.37-5.75)	0.90(0.15-5.59)	0.911
1,000-3,599 birr	25(9.2)	247(90.8)	0.30(0.08-1.20)	0.26(0.05-1.56)	0.142
3,600-10,799 birr	8(28.6)	20(71.4)	1.20(0.26-5.61)	0.75(0.10-5.59)	0.776
>10,800 birr	3(25)	9(75)	1	1	
Comorbid illness					
Yes	39(23.2)	129(76.8)	2.28(1.34-3.88)	2.35(1.18-4.70)	0.016*
No	28(11.7)	211(88.3)	1	1	
Blood pressure control					
Yes	22(9.4)	212(90.6)	1	1	
No	45(26)	128(74)	3.39(1.95-5.90)	1.89(0.92-3.89)	0.082
Duration of Hypertension					
>10 years	34(27.4)	90(72.6)	5.81(2.57-13.15)	5.21(2.01-13.49)	0.001**
5-10 years	25(16.4)	127(83.6)	3.03(1.32-6.97)	2.33(0.88-6.16)	0.087
<5 years	8(6.1)	123(93.9)	1	1	
Family history of hypertension					
Yes	4(7.7)	48(92.3)	0.39(0.13-1.11)	0.84(0.24-3.02)	0.794
No	63(17.7)	292(71.7)	1	1	
Family history of depression					
Yes	26(32.5)	54(67.5)	3.36(1.90-5.95)	4.51(2.10-9.71)	0.000***
No	41(12.5)	286(87.5)	1	1	
Ever alcohol					
Yes	54(18.8)	233(81.2)	1.91(0.99-3.64)	3.34(1.48-7.52)	0.004**
No	13(10.8)	107(89.2)	1	1	
Current smoking					
Yes	0(0)	17(100)	0.00(0.00-)	0.00(0.00-	0.998
No	67(17.2)	323(82.8)	1	1	

*Statistically significant at p-value<0.05, ** statistically significant at p-value<0.01, *** statistically significant at p-value<0.001
COR = crude odds ratio at 95% confidence interval; AOR = adjusted odds ratio at 95% confidence interval.

According to table 10, since Hosmer and Lemeshow goodness of fit test is non-significant (p=0.300) we are not going to reject the null hypothesis that the model adequately fits the data. Omnibus tests of model coefficients show we have a significant (p=0.000) model that means our model is a good predictor of comorbid depression and anxiety status.

Table 10 Hosmer and Lemeshow test for factors associated with comorbid anxiety and depression among hypertensive patients attending public health hospitals in Addis Ababa, Ethiopia, 2020 G.C.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	9.520	8	.300

6. Discussion

In this section, we try to discuss the results according to the stated objectives. The present study was conducted to assess magnitude and factors associated with depression and anxiety among hypertensive patients attending selected public hospitals in Addis Ababa. This study revealed the prevalence of depression among hypertensive patients to be 37.8%, the finding is in line with the study in Ghana 41.7%(32), Pakistan 40.1%(28) and India 41%(27).

On the other hand, the current study finding is lower than a study in Afghanistan which found prevalence of depression among hypertensives to be 58.1% (29). As suggested by the researchers, the reason for higher magnitude could be the ongoing conflict in different parts of the country. Similarly, higher prevalence of depression observed in a study from Saudi Arabia 48.7%(31) and Bosnia and Herzegovina 46% (35). Ebtesam B found the highest prevalence of depression which is in two third (66.7%) of hypertensive subjects (30). On the contrary, lower prevalence observed in few studies, a study in Hawassa, Southern Ethiopia, in 2019 found a prevalence of depression to be 24.7% (33). The difference could rise from difference in residence, in the study almost half of the participants are from rural area but in our study 99% of participants are urban dwellers. Studies in Ghana and Nigeria found the prevalence of depression to be 11% (20) and 26.6% (32) respectively. The variations might be due to difference in environmental factors, genetically factors, sample size, method of assessment of depression and data collection tool (15). Higher magnitude of depression could be attributed to COVID-19 pandemic at the time of data collection (40).

In this study the prevalence of anxiety among hypertensive patients was found to be 29.5%, which is nearly similar with the study conducted in Menelik hospital, Ethiopia, in 2016, which founds 28.5% of subjects with hypertension to have anxiety (34). Nevertheless, smaller than a study in Afghanistan 42.3%(29) and Saudi Arabia 38.4%(31). The difference could arise from cultural and environmental difference. The above reason mentioned for the Afghanistan study also could explain the variation. Two fold higher (57%) prevalence is observed from a study in Ghana (20), despite this a community based study, in south china, with home to home interview founds much lower prevalence of anxiety which is 12%(21) the observed variations might originate from difference in the instrument and the setting the studies conducted (29). As that of depression, higher magnitude of anxiety could be contributed by COVID-19 pandemic (40).

Our study showed 16.5% of subjects have comorbid anxiety and depression and half of the participants suffer from either anxiety or depression. Higher prevalence of comorbid anxiety and depression reported from a study in Afghanistan which is 28.2%(29), Similarly a study in Saudi Arabia reported 29.5% to have comorbid anxiety and depression and prevalence of either of the disorders were 57.3%(31). The above mentioned reasons could explain the difference observed.

According to this study, hypertensive females are at 5.4 times increased chance to be depressed. This is higher from a study in South Africa a 3.5 times (26) and much higher from a study in Hawassa, Southern Ethiopia, a 2.6 times increased risk (33). Similarly majority of studies in the literature suggests the same findings (27, 28, 30, 31, 35). Sociocultural variation could be the reason for the difference. In addition to this, higher magnitude of depression in females could rise from changes in sex hormone and influences in females related to social norms and gender issues, which is parents restrictive behavior towards their daughter than their sons affects their daughters senses of self-control and self-esteem and make them vulnerable to depression. Sexual and domestic violence could also contribute for the higher risk in females (25).

With respect to marital status, hypertensive subjects who are married have 75% reduced chance of being depressed. The study in India (27) and Bosnia and Herzegovina (35) reported the same finding. Differently from this, studies in Ethiopia (33), South Africa (26), Pakistan (28), Afghanistan (29) and Ghana (32) found that marital status of hypertensive individuals have no association with their depression status. The reason for reduce risk of depression among married could be being settled, sharing the increasing burden of living cost and retaining positive health behaviors (47).

In terms of comorbid illnesses, our study revealed hypertensive patients with comorbid illnesses are 3 times more likely to be depressed. In an Afghanistanian study reported, hypertensive subjects with comorbid diabetes are 22.7 times more likely to have depression (29). Similar to this, Vishnu G and et al found higher magnitude of depression among hypertensives with comorbidities (27). A plausible explanation for this could be, the sadness and consistent hardship the comorbid illnesses bring together (13).

In respect to blood pressure control, this study also found hypertensive subjects whose blood pressure is uncontrolled are 2.8 times more likely to be depressed. This finding is in accordance

with a study in Saudi Arabia (30). It could be because of poor adherence of depressed subjects to their medications result in poor blood pressure (13).

Regarding duration of hypertension, this study showed with increased duration of hypertension likelihood of being depressed increased. Subjects with duration of hypertension 5 to10 years and more than 10 years have 3.2 and 5.8 times increased chance of being depressed respectively. This finding is comparable to a previous study which was conducted in Pakistan (27). It is also supported by Kosana S et al report, depression is significantly more expressed in hypertensives with prolonged duration of the disease (35).

With respect to family history of depression, this study found hypertensive participants with family history of depression are 4.5 times more likely to have depression. This association is demonstrated by a study in Hawassa, Southern Ethiopia, hypertensive subjects with positive family history have 7 times higher chance of being depressed (33). Similarity in Genetical factors could the reason (15).

Besides, our study also showed hypertensive subjects who drink alcohol have 1.8 times increased chance of being depressed. This finding is comparable with a study conducted in South Africa, a 1.9 times higher risk of being depressed (26). A review by Tesera B revealed higher odd of depression among substance abusers than their counterparts (25). The possible explanation could be influence of health effect, social problem, economic and productivity loss associated with alcohol increase the risk of depression and anxiety (48).

According to this study, female hypertensives are 3.1 times more likely to be anxious. This finding is consistent with the study in Ethiopia (34) and South Africa (26), a 2.57 times and 3.2 times higher chance of anxiety among female hypertensives respectively. In addition to this, a study in South China found significant association with occurrence and severity of anxiety among female hypertensive patients (21). This finding also supported by previous studies (29, 31). The reason for higher burden in females could be, as that of depression, associated with social norms. In addition to this intimate partner, domestic and gender based violence could also contribute (25).

With respect to employment, this study showed subjects who are retired and with non-paid job are more likely to be anxious. Few studies contradict this, no association of occupational status with subject's chance of being anxious were reported (21, 26). This might be attributed to, retired peoples are less interact with other peoples because of their limited movement which makes them unable to share their idea and feelings (49) and lead them to feeling of being isolated and ignored. Increased risk of depression among subjects with non-paid job could be attributed to inability to full fill one's economical need which could lead them to hopelessness.

Regarding comorbid illnesses, subjects having comorbid illness with hypertension are 3.1 times more likely to be anxious. Consistent result reported by Anna G et al, subjects with comorbid illnesses are 2.3 times more likely to have anxiety (26). Mohammad SH et al found subjects with comorbid diabetes only had 4.9 times and two or more comorbid diseases are 5.66 times more likely to have anxiety (29). In addition to this, Mebrat A et al showed 3 times higher likelihood of depression among hypertensive subjects with comorbid diabetes. The above suggested reason for depression might attribute for the higher odds of anxiety among subjects with comorbid illnesses.

In respect of duration of hypertension, this study sowed subjects with duration of hypertension 5 to 10 years and more than 10 years are 2.7 and 4.9 times more likely to be anxious respectively. This finding is consistent with a study which found increased likelihood of anxiety with duration of hypertension more than 3 years (21).

Although, many of studies among hypertensive participants didn't consider alcohol drinking status (21, 29, 31), our study showed current alcohol drinker hypertensive subjects have 2.2 times increased likelihood of being anxious. This could be explained with the same reason for depression. However, Anna G et al didn't found difference in risk of anxiety, regardless of their level of alcohol drinking (26). The difference could be attributed to recall bias introduced in the study, since they assesses presence of anxiety disorder in subject's in the previous 12 months.

Only few studies are there about comorbid anxiety and depression. According to this study, similar for anxiety and depression we found hypertensive female subjects have higher odd of depression. Hypertensive females are 9.9 times more likely to have comorbid anxiety and depression. Anna G et al also found female hypertensive subjects had 12.5 higher chance of

being comorbid anxious and depressed compared to male hypertensive subjects (26). The above suggested reasons could explain the higher odd of females to have comorbid anxiety and depression.

With respect to comorbid illnesses, this study finds the presence of comorbid illness with hypertension to increase the chance of being comorbid anxious and depressed by 2.4 times. This result is supported by Mohammad SH et al study which reported hypertensive subjects with comorbid diabetes are 10.2 times and two or more comorbid illness are 4 times more likely to have comorbid anxiety and depression respectively (29). Regards to duration of hypertension, this study reveals duration of hypertension more than 10 years are 5.2 times more likely to be comorbid anxious and depressed. Hypertensive subjects with positive family history of depression showed 4.5 times higher chance of being comorbid anxious and depressed. This study also reported that ever alcohol drinker hypertensive subjects are 3.3 times more likely to have comorbid anxiety and depression compared to their counter parts.

7. Strength and limitation of the study

This study has several strengths some of them are

- It was conducted in representative hospitals selected from Addis Ababa.
- Using trained nurses who work in the selected hospitals as data collector helped to keep the privacy of the respondents because of this they can provide the required information comfortably.
- Outcome variables (depression and anxiety) are assessed through a validated tool (HADS), and

The following potential limitation of the study should also be considered in the interpretation of the finding of the study

- Cross-sectional nature of the study may not allow showing temporal relationship.
- Assessment of depression and anxiety was measured regarding their past emotions, there is a possibility of recall bias, and
- Since the study was done in institutions, it might not be generalized to the general population with hypertension.

8. Conclusion

High prevalence of depression, anxiety and their correlate were observed in public hospitals of Addis Ababa. Depression is significantly associated with female gender, being married, presence of comorbid illnesses, uncontrolled blood pressure, duration of hypertension five to ten and more than ten years, family history of depression and current alcohol drinking. On the other hand, anxiety was found to be significantly associated with female gender, presence of comorbid illnesses, duration of hypertension five to ten and more than ten years, current alcohol drinking, retired and people with non-paid job. Comorbid anxiety and depression were also found to have significant association with female gender, presence of comorbid illnesses, duration of hypertension more than ten years, family history of depression and drinking alcohol ever.

9. Recommendation

Based on the findings, the following recommendations are forwarded.

Federal Ministry of Health

- Prepare trainings for health professionals to widen their understanding about higher burden and determinant factors of depression and anxiety among hypertensives.
- Provide hypertension clinics with depression and anxiety screening tool.

Health professionals

- Educate hypertensive patients the depression and anxiety risk associated and modifiable factors like alcohol drinking.
- Providing depression and anxiety screening for those who are at more risk and link to a psychiatric clinic those who are in need.

To researchers

- Researchers should conduct cohort studies to show a cause and effect relationship between mental health disorders and hypertension.
- Since this study was conducted in few hospitals, further nation-wide community based researches are needed to assure generalizability of the findings.

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Annex

Annex I: Study information sheet and consent form English version

Addis Ababa University, School of public health

Subject Information Sheet

Introduction

Hello, my name is ———————————————— I am here on behalf of Yonatan Asmare, a student in the Addis Ababa University, School of Public Health and conducting his study among hypertensive patients.

Hypertension is one of the leading risk factors for global mortality being highly prevalent in low and middle income countries. Among people with chronic illnesses, like hypertension the burden of depression and anxiety is higher. Presence of depression and anxiety among hypertensive patients lead to lack of adherence to treatment, poor compliance to lifestyle adjustments and increases risk of morbidity and mortality. So that, this study gives a clear picture of the high burden of those mental disorders and contributes for the development of prevention and treatment strategies.

Objective of the study

To assess prevalence and factors associated with depression and anxiety among hypertensive patients attending selected public hospitals.

Expected duration of participation and selection criteria

We are expected to complete the interview within 20-25 minutes.

Selection criteria

We randomly select three public hospitals from all public hospitals which provide chronic care. After counting total number of hypertensive patients in the selected hospitals we allocate required number of sample from each hospital proportionally. You are selected randomly from patients who visit anti-hypertensive clinic.

Risk and benefits for the subjects

The study has no any physical risk to the participants. Questions related with your socio-demographic status, individual characteristics and mental health state will be asked. There is no

procedure to be done and samples or measurements to be taken, except your current blood pressure level from your medical record. Involving in the study make participants able to know whether they are suffering from these conditions and allowing them to access care earlier in the course of their illness.

Confidentiality

Personal identifiers, including name and address will not be recorded. All information which is collected about you during the course of the research will be kept strictly confidential. The data collected for this study will be stored securely and only the researchers conducting this study will have access to this data.

Participation and non-participation

The participation in the study is completely voluntary; it is up to you to decide whether or not to take part. If you do decide to take part you will be asked to sign a consent form. And you have the right to refuse participation, refuse any question and withdraw any time you want on the interview without giving a reason. There is nothing less in the care provided to you because you are not involved in our study.

Contact address

For further information and suggestion you could contact:

The principal investigator Name: Yonatan Asmare

Email:yonatanasmare19@gmail.com

Pone.no.: +251 920 47 04 25

If you have a complaint and you don't want to tell the principal investigator, you could use these addresses.

Professor Ahmed Ali (Professor of Public Health & Epidemiology)

Email:Ahmedaa5050@yahoo.com

Pone.no.: +251 911 68 43 99

Name: Dr. Ayele Belachew

Email: kalayeleb@gmail.com

Thank you for taking the time to listen when we read this information sheet.

Annex II: Consent form

Centre.Number:_____

Subject identification number for the study:_____

Title of the study: Assessment of prevalence and factors associated with depression and anxiety among hypertensive patients visiting three selected public hospitals.

Name of Researcher: Mr. Yonatan Asmare

1. I confirm that I have read and understand the information sheet of the study and had the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.
3. I understand that the information I give may be looked at by responsible individuals from the research team or from regulatory authorities where it is relevant.
4. I agree to take part in the above study.

Signature of the Participant _____

Name of the interviewer _____ Signature_____

Date of interview _____

Annex III: English version of the questionnaire

Part I: Socio-demographic data

Please circle your possible answer in the response box.

1.1	Age_____years
1.2	Sex 1. Male 2. Female
1.3	What is your highest educational status? 1. Unable to read & write 2. Elementary (1-8 th) 3. 9 - 12 4. College and above> 12
1.4	What is your employment status? 1. Non-government employee 2. Government employee 3. Self-employed 4. Non-paid job 5. Student 6. Homemaker 7. Retired 8. Unemployed (able to work) 9. Unemployed (unable to work) 10. Refused
1.5	What is your average monthly income? _____ETH birr
1.6	What is your marital status? 1. Married 2. Single 3. Widowed 4. Divorced 5. Separated 6. Refused
1.7	Where is your permanent residence? 1. Urban

	2. Rural

Part II: Psychosocial and clinical questions

2.1 Do you have comorbidities? 1. Yes 2. no
2.2 Blood pressure_____.
2.3 For how long you are living with hypertension (years since diagnosis)? 1. <5 years 2. 5-10 years 3. >10 years
2.4 Do you have family history of hypertension? 1. Yes 2. No
2.5 Do you have family history of depression? 1. yes 2. no

Part III: Behavioral characteristics related questions

3.1	Did you ever smoke cigarette? 1. Yes 2. No If no skip to Q. 3.3
3.2	Do you currently smoke cigarette (in the past one month)? 1. Yes 2. No
3.3	Did you ever drink alcohol? 1. Yes 2. No If no skip to Q. 3.5
3.4	Do you currently drink alcohol (in the past one month)? 1. Yes 2. No
3.5	Did you do physical activity? 1. Yes 2. No

Annex IV: Depression and Anxiety questionnaire

Based on how you have been feeling in the past week reply the interviewer the following questions.

When you answer the questions don't take too long: your immediate is best.

HAD-A
1. I feel tense or 'wound up': 3 Most of the time 2 A lot of the time 1 From time to time, occasionally 0 Not at all
2. I get a sort of frightened feeling as if something awful is about to happen: 3 Very definitely and quite badly 2 Yes, but not too badly 1 A little, but it doesn't worry me 0 Not at all
3. Worrying thoughts go through my mind: 3 A great deal of the time 2 A lot of the time 1 From time to time, but not too often 0 Only occasionally
4. I can sit at ease and feel relaxed 0 Definitely 1 Usually 2 Not Often 3 Not at all
5. I get a sort of frightened feeling like 'butterflies' in the stomach: 0 Not at all 1 Occasionally 2 Quite Often 3 Very Often

6. I feel restless as I have to be on the move:

3 Very much indeed

2 Quite a lot

1 Not very much

0 Not at all

7. I get sudden feelings of panic:

3 Very often indeed

2 Quite often

1 Not very often

0 Not at all

HAD-D

8. I still enjoy the things I used to enjoy:

0 Definitely as much

1 Not quite so much

2 Only a little

3 Hardly at all

9. I can laugh and see the funny side of things:

0 As much as I always could

1 Not quite so much now

2 Definitely not so much now

3 Not at all

10. I feel cheerful:

3 Not at all

2 Not often

1 Sometimes

0 Most of the time

11. I feel as if I am slowed down:

3 Nearly all the time

2 Very often

1 Sometimes 0 Not at all
12. I have lost interest in my appearance: 3 Definitely 2 I don't take as much care as I should 1 I may not take quite as much care 0 I take just as much care as ever
13. I look forward with enjoyment to things: 0 As much as I ever did 1 Rather less than I used to 2 Definitely less than I used to 3 Hardly at all
14. I can enjoy a good book or radio or TV program: 0 Often 1 Sometimes 2 Not often 3 Very seldom

Annex V: Study information sheet and consent form Amharic version
የጥናት የመረጃ መሰብሰብያ ቅጽ

የጥናቱ መግቢያ

እንደምን አደሩ/ዋሉ

ስሜ..... እባላለሁ፡፡ በአዲስ አበባ ዩኒቨርስቲ በሕብረተሰብ ጤና ትምህርት ክፍል የድህረ ምረቃ ፕሮግራም ተማሪ የሆነና የምርምር ስራ እየሰራ ያለውን ዮናታን አስማረን ወክዬ ነው የመጣሁት::

የደም ግፊት በሽታ በአለም ላይ ቀዳሚ ከሚባሉት የሞት መንስኤዎች አንዱ ሲሆን ዝቅተኛና መካከለኛ ገቢ ባላቸው ሃገራት ላይ በስፋት ይገልፃ፡፡ እንደ ደም ግፊት ያሉ ተላላፊ ባልሆኑ ታካሚዎች ላይ የድባቴና ጭንቀት ስርጭት ከፍተኛ እንደሆነ ጥናቶች ያሳያሉ በመሆኑም ታካሚዎች አስፈላጊ የሆነ የመድሃኒት ክትትልና ጤናማ ባህሪያት እንዳያዳብሩ ስለሚያደረጉ ለጤና ቀውስ ብሎም ለሞት ይዳርጋሉ፡፡ የዚህ ጥናት ውጤት የደምግፊት ላለባቸው ታካሚዎች የሚሰጠው ህክምና የአእምሮ ጤናን ያገናዘበ እንዲሆን ማድረግና የታካሚዎችን የህክምና ክትትል ለማሻሻል ይረዳል፡፡

የጥናቱ አላማ

የድባቴና የመረበሽ በሽታ የደም ግፊት ታማሚዎች ላይ ያለው ስርጭትና ተያያዥ ጉዳችን በተመረጡ የመንግስት ሆስፒታሎች ላይ በ 2012 ዓ.ም መገምገም፡፡

ጥናቱ የሚወስደው ጊዜ

ጥያቄዎቻችንን ከ 20-25 ደቂቃ ውስጥ እንጨርሳለን ብለን እናስባለን፡፡

የተመረጡበት መስፈርት

አዲስ አበባ ላይ የደም ግፊት ህክምና ከሚሰጡ የመንግስት ሆስፒታሎች ውስጥ በእጣ ሶስት ሆስፒታሎችን መረጥን፡፡ በተመረጡት ሆስፒታሎች ባለፉት ሶስት ወራት ነበረውን የታካሚ ቁጥር መሰረት አድርገን ከሆስፒታሎቹ ምን ያክል ታካሚ እንደሚስፈልገን እናሰላለን፡፡ የሚያስፈልገንን ያክል ቁጥር ለመውሰድ በአጋጣሚ ናሙና አወሳሰድ ስሌት መሰረት እርሶ በጥናቱ እንዲሳተፉ ተመርጠዋል፡፡

የጥናቱ ጥቅምና ጉዳቶች

በጥናቱ ላይ ሲሳተፉ ምንም አይነት ለሰውነት (ለጤና) የሚያሰጋ ነገር አይከናወንም። የምንጠይቃቸው ጥያቄዎች ማኅበራዊ፤ የግለሰብ ባህሪያት እና የአዕምሮ ጤና ሁኔታን የሚመለከት ይሆናል። አሁን ላይ ያለውን የደም ግፊትዎን ልኬት ከህክምና ካርድ ላይ ከመውሰድ በቀር የሰውነት ልኬት ወይም ከሰውነት ላይ ናሙና አንወስድም።

ምስጢር ጠባቂነት በመረጃ አሰባሰብና ትንተና ወቅት

የግለሰቦች መግለጫ (ስምና አድራሻ) አይመዘገብም። በጥናቱ ወቅት አርስዎን በሚመለከት የሚሰበሰበው መረጃ ሁሉ ሚስጥራዊነቱ የተጠበቀ ነው ፤ የሚሰበሰበው መረጃ ደህንነቱ በተጠበቀ ሁኔታ ነው የሚቀመጠው። ጥናቱን የሚከናውነው ግለሰብ ብቻ ነው መረጃውን ማግኘት የሚችለው።

ስለ መሳተፍና አለመሳተፍ

በጥናቱ ላይ ተሳተፎዎ ሙሉ በሙሉ በእርስዎ ፍቃደኝነት ለይ የተመሰረተ ነው። ለመሳተፍ ፍቃደኛ ከሆኑ የስምምነት መጠየቂያ ማረጋገጫ ቅጽ ላይ እንዲፈርሙ ይጠየቃሉ። ያለመሳተፍ ፣ የፈለጉትን ጥያቄ ያለመመለስና በፈለጉት ሰዐት ምክንያትዎን መግለጽ ሳይጠበቅብዎት ቃለ-መጠይቁን ማቋዋረጥ ይችላሉ። ጥናቱ ላይ ባለመሳተፍዎ ሊደረግልዎት ከሚገባው የህክምና ክትትል ምንም የሚቀንስ ነገር አይኖርም።

የመገኛ አድራሻ

ለበለጠ መረጃ እና አስተያየት የዋናውን አጥኚ አድራሻ ይጠቀሙ

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ይህን ቅጽ ስናነብልዎ ጊዜዎን ወስደው ለማዳመጥ ፈቃደኛ ስለሆኑ እናመሰግናለን::

የስምምነት መጠየቂያ ማረጋገጫ ቅጽ

የማእከል ቁጥር.....

የተሳታፊው የጥናት የመለያ ቁጥር.....

በመረጃ ቅጽ ላይ የሰፈረውን መረጃ ማንበብ እና መረዳቱን አረጋግጣለሁ:: ጥያቄ የመጠየቅ እድል አግኝቼ ነበር:: ተሳትፎዬ በፈቃደኝነት ላይ የተመሰረተ እንደሆነ እና በማንኛውም ሰአት ምክንያቱን ሳልገልጽ ከጥናቱ ማቋርጥ እንደምችል በዚህም ምክንያት የህክምና አገልግሎት ላይ ወይም ህጋዊ መብቴ የማይጣስ እንደሆነ ተረድቻለሁ:: ከእኔ የሚሰበሰበው መረጃ አስፈላጊ ሆኖ ሲገኝ የጥናት ቡድኑ ውስጥ በሀላፊነት ያሉ ሰዎች በቁጥጥር ባለስልጣን ሊታይ እንደሚችል ተረድቻለሁ::

ከላይ በተጠቀሰው ጥናት ላይ ለመሳተፍ በሙሉ ፈቃደኛ ነኝ

የተሳታፊው ፊርማ .....

የጥናቱን መረጃ ቅጽ የሞላው ግለሰብ ስም.....ፊርማ.....

ቀን .....

Annex VI: Amharic version of the questionnaire

ክፍል 1፡ የግለሰብ መረጃ መጠይቅ

1.1. እድሜዎት ሰንት ነው?_____

1.2. ፆታ

1. ወንድ
2. ሴት

1.3. ከፍተኛው የትምህርት ደረጃዎ ምንድነው?

1. ማንበብና መፃፍ የማይችል
2. የመጀመሪያ ደረጃ(1-8ኛ ክፍል)
3. ከ 9-12 ኛ ክፍል
4. ከ 12ኛ ክፍል ወይም ኮሌጅና ከዛ በላይ

1.4. አማካይ ወርሃዊ ገቢዎ ምን ያህል ነው?

_____ብር

1.5. የስራዎ አይነት ምንድን ነው?

1. መንግስታዊ ያልሆነ ድርጅት
2. የመንግስት ሰራተኛ
3. የግል ስራ
4. ክፍያ የሌለው ስራ
5. ተማሪ
6. የቤት እመቤት
7. ጡረታ የወጣ
8. ስራ የሌለው (መስራት የሚችል)
9. ስራ የሌለው (መስራት የማይችል)
10. ለመመለስ ፍቃደኛ አይደለሁም

1.6. የትዳር ሁኔታዎ ምንድን ነው?

1. ያገባ
2. ያላገባ
3. ባለቤትዎ በሞት የተለይዎ

4. የተፋታ
5. የተለያየ
6. ለመመለስ ፍቃደኛ አይደለሁም

1.7. ቋሚ የመኖሪያ ቦታዎ የት ነው?

1. ከተማ
2. ገጠር

ክፍል 2፡ የቤተሰብና ተያያዥ የጤና መረጃዎች መጠይቅ

2.1. ተጓዳኝ በሽታዎች አለብዎት?

1. አዎ
2. አይ

2.2. የደም ግፊት ልኬት መጠን_____.

2.3. የደም ግፊት እንዳለብዎ ካወቁ ምን ያህል ጊዜ ሆነዎት?

1. <5 አመት
2. 5-10 አመት
3. >10 አመት

2.4. በቤተሰብዎ ውስጥ የደም ግፊት ህመም ያለበት ወይም የነበረበት ሰው ያውቃሉ?

3. አዎ
4. አይ

2.5. በቤተሰብዎ ውስጥ የድባቴ ህመም ያለበት ወይም የነበረበት ሰው ያውቃሉ?

1. አዎ
2. አይ

ክፍል 3፡ የግለሰብ ባህሪያት መጠይቅ

3.1. ሲጋራ አጭሰው ያውቃሉ?

1. አዎ
2. አይ

3.2. በአሁኑ ሰአት ሲጋራ ያጭሳሉ (ባለፈው አንድ ወር ጊዜ ውስጥ)?

1. አዎ
2. አይ

3.3. የአልኮል መጠጥ ጠጥተው ያውቃሉ?

1. አዎ
2. አይ

3.4. በአሁኑ ሰአት የአልኮል መጠጥ ይጠጣሉ (ባለፈው አንድ ወር ጊዜ ውስጥ)?

1. አዎ
2. አይ

3.5. የአካል ብቃት እንቅስቃሴ ያደርጋሉ?

1. አዎ
2. አይ

ክፍል 4፡ የአዕምሮ ጤና ሁኔታ መጠይቅ

ባለፈውሳምንት የተሰማዎትን ትክክለኛ ስሜት መሰረት በማድረግ የጤና ባለሙያው ቀጥሎ ለሚጠይቅዎት ጥያቄ ተገቢውን መልስ ይስጡ::

በተቻለ መጠን ሲመልሱ ብዙ ጊዜ አይውሰዱ፣ ምን አልባትም እንደተጠየቁ ወድያውኑ የመጣልዎት መልስ ትክክለኛ ስሜትዎን ሊገልጽ ይችላል::

HAD-A

4.1 የመጨነቅ ወይም የመወጠር ስሜት ምን ያህል ይሰማዎታል?

3. በጣም ብዙ ጊዜ
2. ብዙ ጊዜ
1. አልፎ አልፎ
0. ምንም ይሰማኝም

4.2 አንድ መጥፎ ነገር ሊየጋጥምዎ የተቃረበ የሚመስል የፍርሃት ስሜት ይሰማዎታል?

3. እጅግ በጣም ይሰማኛል
2. በጣም ይሰማኛል
1. በጥቂቱ ይሰማኛል
0. ምንም አይሰማኝም

4.3 ጭንቀትን የሚያጭሩ ሃሳቦች በአእምሮዎ ምን ያህል ጊዜ ይመላለሳሉ?

3. በጣም ብዙ ጊዜ
2. ብዙ ጊዜ
1. አብዛኛውን ጊዜ ባይሆንም አልፎ አልፎ
0. አንዳንድ ጊዜ ብቻ

4.4 ተረጋግተው መቀመጥና ዘና ማለት ይችላሉ?

0. ሁሌም እችላለሁ
1. አብዛኛውን ጊዜ አችላለሁ
2. ብዙውን ጊዜ አልችልም
3. ምንም አልችልም

4.5 ሆድ አካባቢ የሚስማ የመደንገጥ ወይም የመሸበር ስሜት ይሰማዎታል?

0. ምንም አይሰማኝም
1. አልፎ አልፎ
2. ብዙ ጊዜ
3. በጣም ብዙ ጊዜ

4.6 አንድ ቦታ መሄድ ያለብዎ ይመስል ተረጋግቶ መቀመጥ ይቸግርዎታል?

3. በጣም ብዙ ጊዜ ይቸግረኛል
2. ብዙ ጊዜ ይቸግረኛል
1. ብዙም አይቸግረኝም
0. ምንም አይቸግረኝም

4.7 በድንገት የመደነገጥ ወይም የመሸበር ስሜት ይሰማዎታል?

3. በጣም ብዙ ጊዜ ይሰማኛል
2. ብዙ ጊዜ ይሰማኛል
1. አልፎ አልፎ ይሰማኛል
0. ምንም አይሰማኝም

HAD-D

4.8 ቀደም ሲል ያስደስትዎ የነበሩ ነገሮች አሁን ምን ያህል ያስደስትዎታል?

0. አሁንም እንደ ድሮው ያስደስቱኛል
1. ከድሮው ትንሽ ቀንሰዋል
2. በጥቂቱ ያስደስቱኛል
3. ጭራሽ አያስደስቱኝም

4.9 መሳቅና የነገሮችን አስቂኝ ጎን ማየት ይችላሉ?

0. አብዛኛውን ጊዜ እችላለሁ
1. እነደ ድሮ ባይሆንም እችላለሁ
2. በጥቂቱ እችላለሁ
3. ምንም አልችልም

4.10 ደስተኛ ነዎት?

3. ምንም ደስተኛ አይደለሁም

2. ብዙ ጊዜ ደስተኛ አይደለሁም

1. ብዙም ባይሆን ደስተኛ ነኝ

0. አብዛኛውን ጊዜ ደስተኛ ነኝ

4.11 ስራዎን ሲያከናውኑ ወዘተ ፍጥነትዎ ምን ያህል የቀነሰ ይመስልዎታል?

3. እጅግ በጣም ብዙ ጊዜ

2. በጣም ብዙ ጊዜ

1. አልፎ አልፎ

0. ምንም አልቀነሰም

4.12 ለአለባበስዎ ትኩረትን መስጠት አቁመዋል?

3. አዎን ምንም ትኩረት እየሰጠሁ አይደለም

2. የምፈልገውን ያህል ትኩረት እየሰጠሁ አይደለም

1. ድሮ ከምሰጠው ትኩረት በጥቂቱ ያነሰ ትኩረትን እሰጣለሁ

0. ሁሌም የምሰጠውን ትኩረት እሰጣለሁ

4.13 መጪ ነገሮችን በደስታ ይጠብቃሉ?

0. አዎ ሁሌም በተለመደው ወይም በድሮው መጠን እጠብቃለሁ

1. ከድሮው ወይም ከተለመደው በጥቂቱ ባነስ መጠን እጠብቃልሁ

2. ከድሮው ወይም ከተለመደው ባነስ መጠን እጠብቃልሁ

3. ምንም በደስታ አልጠብቅም

4.14 በጥሩ መሃፍ፣ሬድዮ ወይም የቴሌቭዥን ፕሮግራሞች ራስዎን ያስደስታሉ?

0. አዎን ብዙ ጊዜ

1. ብዙም ባይሆን አዎ

2. አልፎ አልፎ

3. በጣም አልፎ አልፎ

Curriculum Vitae

1. PERSONAL INFORMATION

- Name Yonatan Asmare
- Sex Male
- Place of birth Addis Ababa
- Date of birth December 28/1993 E.C
- Nationality Ethiopian
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- Address Addis Ababa
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2. EDUCATION

Higher education

- 2012-2016 GC **Aksum University college of health science** Bachelor Degree in **Public Health** with cumulative GPA 3.49.

Preparatory and Secondary Education.

- 2001-2004 Millennium secondary and Preparatory School

Primary Education

- 1993-2000 Meserete Edget Primary School

3. WORK EXPERIENCE

- I have 2 year work experience in Worancha health center, Sidama zone, Ethiopia from 2009-2010 with one year of being OPD case team coordinator.

4. Qualification

- 2005-2008 **Aksum University college of health science** Bachelor Degree in **Public Health**

5. LANGUAGE SKILL

Language	Speaking	Listening	Writing	Reading
Amharic	Excellent	Excellent	Excellent	Excellent
English	V.good	Excellent	Excellent	Excellent
Sign language	Good	Good		

6. SLILLS

Basic computer skills and able to access some soft ware.

7. HOBBY

Reading books, playing table tennis and participating in outdoor activities.

8. REFERENCE

Dr,Abel Tadesse (Phd), Instructor at Aksum University College of Health Science, Tel: 09 13 75 59 64.

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School of Public Health

This is to certify that the thesis prepared by Yonatan Asmare entitled with "**Magnitude and associated factors of depression and anxiety among people with hypertension in Addis Ababa, Ethiopia: Hospital based study**", submitted for the partial fulfillment of the requirement of the Masters of public health in Epidemiology and Biostatistics fulfills rules and regulations of the university and meets the required standards. Hence, all the materials contained have been fully acknowledged.

Signed by;

Advisor:_____ signature:_____ date:_____