ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

RISK FACTORS AND DISABILITIES OF HYPERTENSION IN METTU KARL HOSPITAL, SOUTH-WEST ETHIOPIA: A CASE -CONTROL STUDY

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Dedication

This paper is dedicated to my spouse, S/r Desta Assefa, not only for she has been the very source of inspiration from the beginning to join this program but also for her sacrifice to take over all the burden of taking care of our son, Natanim Muluneh and the responsibility of managing the household alone.

Table of contents

List of Tables Page

List of figures

Page

Acronyms

AAU	Addis Ababa University
AOR	Adjusted Odds Ratio
BMI	Body Mass Index
BP	Blood Pressure
CHF	Congestive Heart Failure
CI	Confidence Interval
COC	Combined Oral contraceptives
COR	Crude Odds Ratio
CVA	Cardio Vascular Accident
CVD	Cardio Vascular disease
DBP	Diastolic Blood Pressure
DM	Diabetes Mellitus
DS	Digital Scale
FMOH	Federal Ministry of Health
Ht	Height
HTN	Hypertension
KG	Kilo Gram
KM	Kilo Meter
M	Meter
mmHg	Millimeter of mercury
MI	Myocardial Infarction
NCDs	Non Communicable Diseases
PAD	Peripheral Arterial Disease
SBP	Systolic Blood Pressure
SD	Standard Deviation
SPH	School of Public Health
SSA	Sub Saharan Africa
Wt	Weight
WHO	World Health Organization
WHODAS	World Health Organization Disability Assessment Schedule

Abstract

Background: Hypertension has been one of the greatest public health problems in all parts of the world, particularly, being double burden among developing nations with predominantly alarming trends. It is one of the top leading causes of morbidity and mortality among adults in Ethiopia, exactly as it is in the whole world. However, there is no adequate study pertaining to hypertension in general or factors associated with it particularly in a rural community setting.

Objectives: The main purpose of this study was to assess the risk factors and levels of disabilities related to hypertension.

Methods: A case - control study was conducted in Mettu Karl hospital. The study populations were patients who visited the hospital for medical care. Data were collected on a face to face using structured questionnaire by interviewer administrated questions. Anthropometric and blood pressure measurements were taken through standardized procedures. Data were entered, cleaned, analyzed, in EPi Info version 3.5.3.and exported to SPSS version 16.0 statistical software packages.

Results: Participants involved in this study were (n = 114) cases and (n = 228) controls. This study revealed that there is statistically significant association between various risk factors and HTN. According to the finding; Residence, Income, cigarette smoking, alcohol consuming, khat chewing, family history of HTN, family history of central obesity, less physical activity, regular animal fat intake, sleep duration, nature of sleep, nature of routine work and BMI were significantly associated with the occurrence of HTN. Disabilities observed among hypertensive patients ranged from severe to extreme in performing a given activity.

Conclusion: The study found out statistical significant level association between different risk factors and hypertension occurrence. Hypertensive patients have suffered from a range of disabilities to the level of extreme and severed situation. To prevent and control HTN as well as its complications lifestyle modification of the community, particularly the urban population is the big issue. Community at large, stake holders, mass media should pay attention against HTN. Since hypertension is a disabling disease infrastructures for disabled patients should be provided adequately. The government body and policy makers expected to work against hypertension occurrence. Further study is encouraged.

1. Introduction

1.1. Background

Hypertension (HTN) has been one of the greatest public health problems in all parts of the world, with predominantly alarming trends. It is considered as one of the top leading causes of morbidity and mortality among adults globally. Moreover, risk factors of hypertension are fundamentals associated with an increased likelihood of this disease. The prevalence of HTN is proportional to the rate of the incidence of cardiovascular diseases. This is resulting in a dramatic increase in morbidity and mortality (1). It causes seven million deaths each year, which is a considerable proportion of the total deaths; of these deaths, Cerebral-vascular and ischemic heart diseases are the most consequences of HTN (2).

According to the analysis of global burden of hypertension, over 26% of the world's adult population are living with HTN (3). It is a common health problem without symptom until undergoing with high complication and advancement which is the most important risk factor for main organs morbidity such as heart, brain, kidney and eye (3).

In developing countries, morbidity and mortality attributed to HTN increasing from time to time due to various risk factors like a change in life style, unplanned urbanization, rapid undergoing transitions (nutrition, epidemiologic and demographic). Until recently, hypertension has been given low priority in Africa. The condition is now being widely reported in many parts of Africa and is considered as the most common cause of cardiovascular disease (CVD) on the region (4). Studies conducted in Africa have shown that a prevalence hypertension ranging from 7.5% in Sudan to as high as 37.7% in Tanzania (5). It is estimated that more than 20 million people are affected in the African Region, where prevalence ranges from 25 percent to 35 percent in adults aged 25 to 64 years. In Ethiopia, HTN accounted for considerable proportion of all deaths and estimated to be one of top ten leading cause of death in the country (4, 6).

In Illu - Ababora Zone, though the life styles of the community are similar to other Ethiopian Communities in terms of being exposed to risk factors of HTN, no research has been done on the exploration of the factors contributing to HTN and its consequences. Therefore, this study will attempt to find out the risk factors responsible to the development of HTN among peoples visiting Mettu Karl hospital and come up with important recommendation which could help in enhancing actions towards prevention and control of HTN.

1.2. Statement of the Problem

Risk factors for occurrence of HTN are multiple and complex in nature across the world. These risk factors vary from person to person which makes the intervention difficult and are accelerated by rapid transition of epidemiological, nutrition and demography, particularly in middle income and developing nations. Change in life styles, unhealthy behaviors and socio demographic factors are attributable to the incidence of hypertension.

Hypertension is one of the most important public health challenges worldwide. The attributed risk factors are highly distributed across all continents. It has been identified as a leading risk factor for mortality and cause of disability-adjusted life-years (7).

HTN is ranked fourth by prevalence globally. Usually it is readily detectable, easily treatable condition and if left untreated may lead to serious complications. In considerable proportion of cases the disease tends to be symptomless for prolonged time and because of this situation it is labeled as 'Silent Killer'. Essential HTN is the most prevalent form of HTN accounting for greater than 90% of all cases of HTN. The disease leads to hazardous complications such as CHF, MI, angina pectoris, CVA, stroke, hypertensive retinopathy, hypertensive, hypertensive nephropathy and multiple organ failure. HTN is also considered as an 'Iceberg' disease' because unknown morbidity far exceeds the known morbidity (8).

There are various factors considered to be responsible for the prevalence of hypertension such as undergoing very rapid transition of (epidemiologic, nutrition and demographic) characterized by; decreased infectious diseases, aging, un planned urbanization, including adoption of unhealthy life style such as; physical inactivity, nutritional behaviors, substance abuse. The cost of these problems is being another burden on top of the health issues across the general population. Moreover, these factors are fueling the frequency of adverse effect on the country growth and development through multiple scenarios (9, 10).

1.3. Rationale of the study

The primary purpose of this study is intended to explore the risk factors responsible for the development of hypertension among patients with hypertension and non hypertensive patients, and also to assess the level of disability among hypertensive patients.

Hypertension involves lifelong medical care and social support that may accelerate socio – economic burden to the individual and community at large besides its fueling risk factors are widely distributed because of rapid transition (epidemiological, nutrition, demographic) particularly in developing countries including Ethiopia.

Because hypertension is hidden 'silent killer' understanding its determinants and amount of disabilities related to it help support prevention, care, treatment services for individuals with hypertension and to provide recommendation on the aspect of prevention and control of hypertension.

No such research was conducted in the study area previously. Hence, it was intended to conduct this study there. The study findings will help health care professionals and community at large towards prevention and control of hypertension effectively. It will also assist policy makers in developing context specific and relevant policies capable of improving the prevention and control of the disease in general. Furthermore, it is hoped that, this study could contribute an effort to implement an effective and efficient strategies that may lead to improved, awareness, appropriate knowledge and understanding the independent risk factors of hypertension at all levels.

2. Literature Review

Magnitude of Hypertension

HTN is now recognized as an important public health issue worldwide. Its consequences have been rapidly increasing and attributed to the prevalence of cardiovascular diseases. This is resulting in a dramatic increase in morbidity as well as leads to more than 7 million deaths yearly, estimated to be about 13% of the total deaths globally (2, 3).

In developing countries, its morbidity and mortality are increasing from time to time due to various factors like a change in life style and rapid undergoing transition as of shift in communicable diseases and nutritional deficiencies, and behaviors like smoking and sedentary life styles. Until recently, HTN has been given low priority in Africa. The condition is now being widely reported in many parts of Africa and is the most common cause of CVD on the continent (9). Recent studies conducted in Africa have revealed that a prevalence ranging from 7.5% in Sudan to as high as 37.7% in Tanzania (5). It is estimated that more than 20 million people are affected in the African Region, where prevalence ranges from 25 percent to 35 percent in adults aged 25 to 64 years(4). In Ethiopia, HTN accounted for considerable proportion of all deaths and estimated as one the ten top leading cause of death in the country (4).

Risk Factors of HTN

Many studies have shown risk factors for occurrence of HTN are multiple and complex in nature across the world. The risk factors vary from person to person which makes the intervention difficult. The risk factors are accelerated by rapid transition of epidemiological, nutrition and demography particularly in middle income and developing nations. The risk factors mostly associated with life styles, unhealthy behaviors and socio demographic factors. There are known and unknown risk factors among known risk factors the most important are listed as follows.

Alcohol Consumption

Evidences have shown a linear relationship between alcohol consumption and HTN prevalence and is resulted in a risk factor for heart failure, ischemic stroke, heart disease, and acute MI (11). The analysis confirmed that the known risk of HTN associated with recent daily intake of two drinks per day, which was more than doubled compared with abstainers. While a low-to-moderate habitual consumption of alcohol is associated with a lower risk of HTN while heavy alcohol use is a independent risk factor for HTN (9, 12).

Cigarette Smoking/ Tobacco

Smoking causes an immediate increase in blood pressure and heart rate that persists for more than 15 minutes after one cigarette. Cigarette smoking also increases blood pressure by stiffening arteries, with particularly harmful effects on chronic smokers (13). Smoking in youth is associated with arterial changes and increased common carotid artery intima-media thickness in adulthood. Smoking in adults is also associated with progression of atherosclerosis, and these adverse effects may be cumulative and irreversible (14). Smoking found to be associated with malignant HTN. Nicotine acts as an adrenergic agonist, mediating local and systemic catecholamine release and possibly the release of vasopressin (15, 16).

Khat/chat

The prevalence of HTN was significantly higher among Khat chewers (17). Cathinone may have a more pronounced effect on diastolic blood pressure which leads them for development of high blood pressure and other cardiovascular morbidity. Some studies have shown that comparison of the physical measurements between Khat chewers and non-chewers the mean diastolic blood pressure was significantly higher among Khat chewers, than non-chewers (4). Similarly, the mean heart rate per minute was significantly higher among Khat chewers (15).

Dietary Salt Intake

Researchers have shown consumption of large quantities of dietary salt is significantly associated with high blood pressure and leads to development of HTN and its complications (18). The researchers argued that a conservative estimate indicates that a reduction of 3g/day would reduce strokes by 13% and ischemic heart disease by 10%. In conclusion there are evidences that dietary salt intake is positively associated with high blood pressure and that blood pressure can be lowered to acceptable level with a reduction in sodium intake less than 4gm per day in both hypertensive and non hypertensive persons (15, 19).

Overweight/Obesity

Overweight/obesity is a major and well-known modifiable risk factor for occurrence of HTN (9). A study conducted in Benin found that abdominal obesity was positively associated with increased probability of metabolic syndrome. Abdominal obesity also proved to be an important risk factor for heart failure. Across many SSA countries, obesity has been linked to both urban residence and wealth – the more wealth a person has, the more likely he or she is to

be overweight or obese due to nutritional transition and transitions in energy expenditure due to urbanization. There is a direct association between blood pressure and body weight and/or abdominal adiposity (20). Studies have shown that weight loss has been associated with considerable high blood pressure reductions. Hence, it showed that blood pressure reduction is proportional to weight loss(9). Another study conducted in Chine revealed over weight/ obesity were independent risks for HTN incidence (21).

Physical Inactivity

Studies have shown people who do not take enough aerobic exercise, such as brisk walking, running, cycling, swimming or dancing are more likely to have or to develop HTN (11). Large cross-sectional and longitudinal studies have shown a direct positive correlation between habitual aerobic physical inactivity and HTN. For example, in a study following up male college alumni over many years, those who were habitually active were up to 30% less likely to have HTN than their inactive colleagues (14, 22, 23).

Family History (Hereditary)

Researchers found if parents or other close blood relatives have HTN the families are more likely to develop it and they are also at great risk in development of CVD, as well as death may occur among men under 55 years old and women under 65 years old of CVD (19). Research done on twins suggested that up to 40% of variability in blood pressure may be explained by genetic factors. However, studies in developing countries and in various ethnic groups showed that genetic predisposition is relatively weak compared with the powerful influences of lifestyle and environment (14).

Some studies have shown that a strong family history of HTN is observed among most patients with the disease. Researchers reported the discovery of three variants of a kidney gene thought to be responsible for primary HTN (15). The gene variants, collectively named *G protein* coupled receptor kinase type 4 acts individually or in association with other variant genes, and are believed to contribute to the body's inability to excrete sodium and leads to HTN development. Thus, the discovery has shown significant public health implications towards the control of HTN (18, 20, 23).

The prevalence of HTN increases with age. A higher percentage of men have high blood pressure (BP) up to the age of 45years old while women overtake men after 54 years of age (5). For an individual with normal BP at the age of 55 years, the risk of developing HTN during the

remainder life is estimated to be 90% (2). Diastolic blood pressure (DBP) related with age presents the higher values in the age of 55 years old, while systolic blood pressure continues to increase with advancing age. Systolic blood pressure (SBP) is one of the most powerful indicators for cardiovascular risk in the elderly (24, 25).

Gender

Some studies have shown women tend to have a lower Systolic Blood Pressure (SBP) than men up to 65 years. After 65 years of age, women tend to have a higher systolic blood pressure (5). Diastolic blood pressures are about the same in both sexes for any given age. In terms of prevalence, in England the proportion of the population with HTN increases from 6% of men and 2% of women aged 16-24 years, to 64% in men and 64% of women aged 65-74 years, respectively. Prevalence in Scotland also increases with age, from 10% in men and 4% in women aged 16-24 years, to 74% in men and 76% in women aged 65-74 years respectively. The pattern in Wales and Northern Ireland showed a similar trend (23).

Psychosocial Stresses

Studies have shown chronic poverty-related stressors, such as inadequate housing, water, sanitation, crowding, crime, air pollution, environmental conditions, low educational status, job insecurity, unemployment contributes to the development of HTN (26, 27). In the short term; blood pressure is increased at times of ‘stresses. It rises with anxiety, anger or mental effort as part of the physiological adrenalin-driven ‘fight or flight’ response and some other stressful situations, including stress at work (9, 28).

Urbanization

According to some study major psychosocial stressor was associated with establishment of urbanization (24). Because of the exploding growth of cities’ often resulting in mega-slums in many sub-Saharan Africa (SSA) countries may substantially lead to deterioration in the health and well-being of people due to poor quality of urban housing, sanitation issues, and limited access to efficient health care systems. Hence, urbanization directly contributes for the occurrence of h HTN and plays a significant role in increasing the burden of cardiovascular disease (10, 29).

2.3. Consequences of Hypertension

The burden of HTN has been major public health problem both in developed and developing countries. Particularly the developing nations are increasingly faced with the double burden of HTN and other cardiovascular diseases. HTN places an excessive financial burden on populations and health systems, consuming scarce resources. This situation leads the poorer countries to difficult challenges which cannot be solved easily and, hence plays a great role in being a barrier to growth and development (8).

Health Related Consequences

The prevalence of non-communicable diseases is increasing in SSA that includes CVD and metabolic diseases such as hypertension, diabetes and obesity. Much less research has been conducted on non communicable diseases (NCDs). However, as in other low- and middle-income regions, individuals in SSA suffer from the dual burdens of infectious diseases and NCDs (20, 27).

According to some studies hypertensive patients were 2 to 3 times more likely to develop coronary heart disease (angina pectoris, myocardial infarction, and sudden death) compared to the healthy or non-hypertensive population group (8). The risk is estimated to be 3 times greater for cerebro-vascular diseases and 3.5 times greater for heart failure. More specifically, it has been reported that individuals with blood pressure values of 130-139/85-89 mmHg were significantly in higher risk of developing cardiovascular diseases compared to subjects with lower blood pressure values (30).

Stroke

HTN is the most important risk factor for stroke (31). The two reasons for a stroke are the rupture (hemorrhagic stroke) and the blockage (ischemic stroke) of a blood vessel in the brain. High blood pressure also increases atherosclerosis, the formation of cholesterol plaque in the blood vessels. When they rupture, the blood clots and such a thrombus can block a blood vessel as a result the important supplies to brain will be stopped and the brain will become damaged irreversibly (ischemic stroke).Stroke is a fatal condition and it can seriously affect life leading to non fatal situations like handicaps and reduced quality of life (15, 26, 31).

Reduced Kidney Function

High blood pressure destroys the tiny filters in the kidneys that are responsible for cleaning the blood. If too many of the filters are destroyed, the kidneys will do their job less and

less efficiently until the filtration is not sufficient that leads to renal failure or end stage and will put life in danger (27).

Damage to Eyes

HTN can damage the blood vessels in the retina of the eyes. When there is a damage to the blood vessels in the retina the path ways will be seriously affected which may reduce the ability to see or even can lead to blindness totally (15, 31).

Damage to the Blood Vessels

HTN can damage all blood vessels. However, the damage done to blood vessels by HTN is the most serious in the heart and the brain because both have a big impact on the quality of life and is often life threatening. If the legs are affected, walking can cause pain because the leg muscles are not supplied with enough oxygen and nutrients. This is called peripheral arterial disease (PAD). Badly functioning blood vessels can also cause erectile dysfunction (15, 31).

Heart Attack

HTN is a major risk factor for heart attacks and heart failure. Atherosclerosis promoted by HTN can also affect the blood vessels providing the blood to the heart muscle. If such an artery is blocked by a thrombus and the access of the heart muscle to oxygen and nutrients is reduced it causes angina pectoris (a pain sensation and the feeling of narrowness in the breast area). If the blood vessel is blocked to a larger extent it leads to an incidence of a heart attack. The affected area of the heart muscle will die and will be replaced by scar tissue. If the area is large, the heart attack is fatal. Although the treatment of a heart attack has improved greatly during the last years this condition continuing and being a reason for fatal and non fatal heart attacks often cause dangerous problems like arrhythmia and heart failure (15, 19, 31).

Diabetes Mellitus

HTN is more prevalent in people with Type 1 and Type 2 diabetes than in the non diabetic population, whether or not they are overweight. With the much less common Type 1diabetes, hypertension is mostly a consequence of type 2 diabetes by facilitating the condition which enhances the insulin resistance or ‘metabolic syndrome (15, 31).

2.4. Socio- Economic Effects of Hypertension

HTN was also found to be more prevalent among illiterate persons, retired persons, and persons with large family size as well as widows (18, 28). The prevalence was lowest in the rural areas and increased with socioeconomic status due to life styles. Some differences were also

noted with different geographic areas. The prevalence of HTN increased from rural to urban areas almost consistently across all reports reviewed, and rates were higher in the urban setting (9, 27).

The Costs of Hypertension

In addition to the suffering caused to patients, care givers and their families challenged by the consequences of HTN, there is also a considerable cost burden to the national health system, social care and the wider economy (32). The distribution of costs to direct healthcare, social and informal care, and lost productivity estimated to be high, though varies from disease to disease (22, 23).

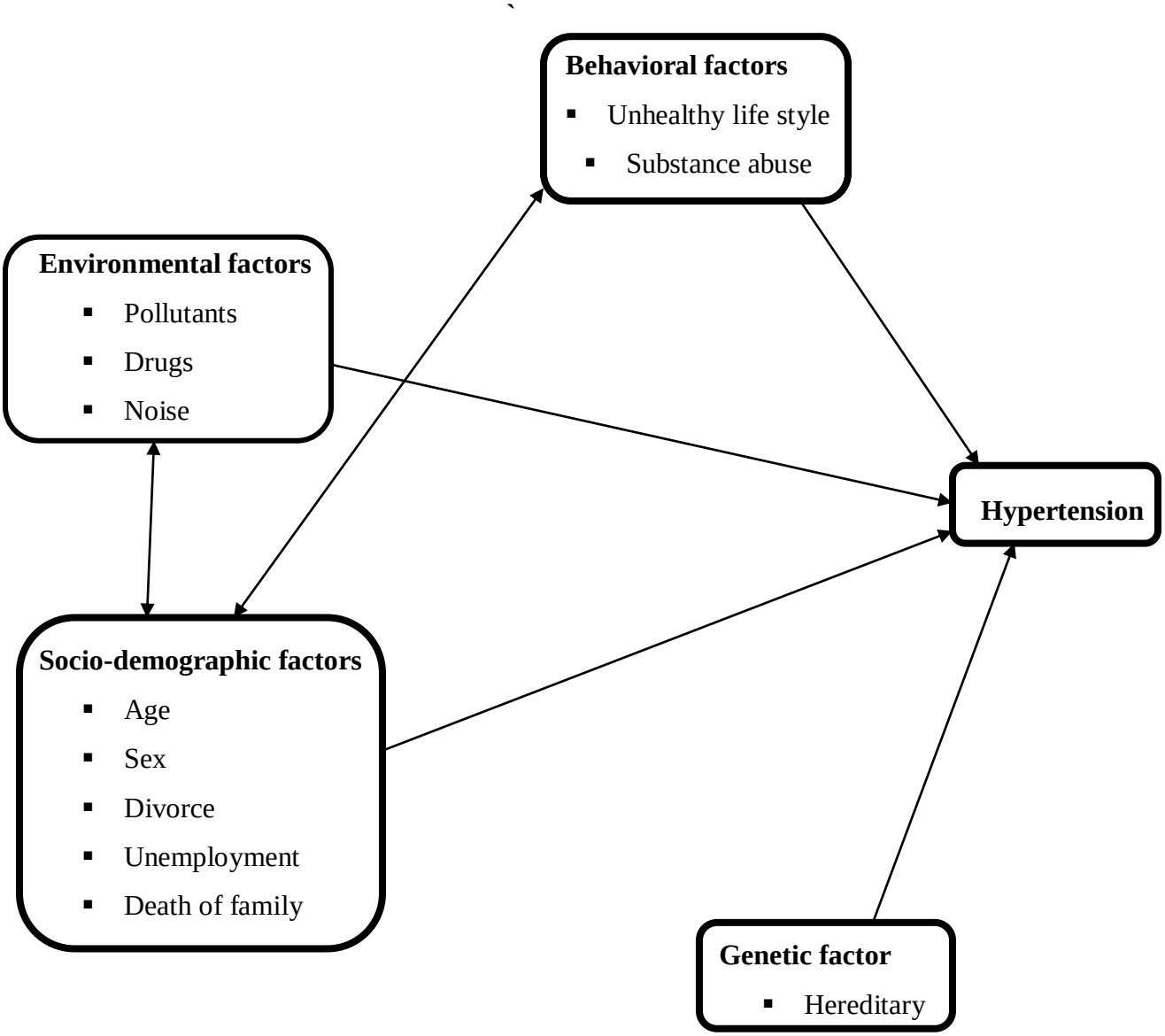

Figure 1: Conceptual framework of risk factors of hypertension

3. Objectives

3.1. General objective

To determine the magnitude and to assess the risk factors of hypertension, and its disability in Mettu Karl Hospital, Illu Ababora Zone, Oromia Regional State, South-West Ethiopia. March to April 2013.

3.2. Specific objectives

- To identify the risk factors of hypertension among patients
- To assess the level of disability among hypertensive patients

4. Materials and Methods

4.1. Study Area

This case control study was conducted in Mettu Karl hospital, Mettu town, Illu - Ababora Zone, Oromia Regional State, South-West Ethiopia, which is 620 Kilo Meter away from Addis Ababa, the capital city of Ethiopia.

The zone has two city administrations and twenty two rural district administrations. Mettu town, which is the capital of the zone, has an estimated population of 53,899 of which (51%) are females. The town is divided in to three urban administrative kebeles (smallest administrative structure). It occupies a land area of about 5,320 hectares.

As to governmental health facilities, the town has six urban health posts, one health center and one zonal referral hospital (Mettu Karl hospital). Concerning teaching institutions, Mettu University, Mettu Teachers training college and Mettu College of Health Sciences are the major institutions found in the town.

Mettu Karl hospital, which is the only general Referral hospital in the Zone, serves about 2.1 million people from Illu-Ababora Zone, Gambella Regional State and adjacent Southern Nation and Nationalities Peoples region. The Hospital health service covers, outpatient department, Intensive Care Unit, Obstetrics and Gynecology, while the department includes in patient (medical, pediatrics and surgical wards). The hospital also has medical, surgical and gynecological referral clinics and emergency intervention unit. Mettu Karl hospital has 123 technical and 157 supportive staffs. Patients of hypertension, as chronic illness, are served at outpatient department on a regular base and seriously ill hypertensive patients are admitted and treated as inpatient.

4.2. Study period

April to March 2013

4. 3. Study Design

A case control study was conducted in Mettu Karl hospital to identify determinant factors of HTN among known hypertensive patients and patients without hypertension, and also to assess the level of disability among hypertensive patients related to hypertension.

4.4. Source of Population

All people aged ≥ 20years old visited the hospital to seek medical care during the period of data collection were source population.

4.5. Study Population

The study populations were all known hypertensive patients and controls aged ≥ 20years old, matched for sex and age, who visited the hospital during data collection. Cases were hypertensive patients with a diastolic blood pressure of ≥ 90 mmHg diagnosed in the hospital, while controls were patients at outpatient department without HTN and DBP < 80 mmHg, but matched for age and sex in the same hospital.

4.6. Inclusion criteria

- All hypertensive patients aged ≥ 20 years old visited the hospital at outpatient or inpatient departments were legible (cases).
- All patients aged ≥ 20 years old without hypertension (with DBP of < 80 mmHg measured on two occasions or more) and matched for sex and age ± 5years were eligible (controls).

4.7. Exclusion criteria

- Controls with a diastolic blood pressure between 80 – 89 mmHg.
- Unconscious or mentally ill patients and too chronic illness
- Pregnant women
- Refused to participate in the study

4.8. Sample Size Determination

Sample size was determined based on sample size calculation for two populations in unmatched case control using on open Epi software (version 2, open source) calculator using the following assumptions.

Assumptions:

- Two-sided confidence level (1-alpha) = 95 %
- Power (% chance of detecting) = 80 %
- Ratio of Controls to Cases = 2:1
- Hypothetical proportion of controls with exposure of alcohol consumption = 49.6 % (1)
- Hypothetical proportion of cases with exposure of alcohol consumption = 66.3 % (1)

- Odds ratio:2.00

In addition to the software calculation, the proportion of weighted number of women and men for alcohol consumption in controls or general population was used to calculate the sample size.

$$N = \frac{n1p1+n2p2}{n1+n2}$$

Where:

N = sample size

n1= weighted number of women **P1**= proportion of women

n2 = weighted number of men **P2**= proportion of men

Sample size was calculated for exposure status in different variables. The most significant predictor for hypertension (alcohol consumption) was used (1).

Hence, Exposure for controls calculated as;

$$\text{Weighted mean} = \frac{n1p2+n2p2}{n1+n2} = \frac{16{,}515*45+14{,}110*55}{30{,}625} = 49.6\%$$

Based on (open Epi) kelsey et al, methods in observational Epidemiology(33) and adding 10% for non-response 114 cases and 228 controls has been taken as sample size.

4.9. Sampling Procedure

Initially the governmental hospitals were assessed for adequacy of eligible study population. Finally, Mettu Karl hospital was found to be eligible and purposively assigned as study site.

All patients aged ≥20 years old visited the hospital to seek medical care were the source population and patients with a diastolic blood pressure (DBP) measurement of 90 mmHg or more and measured for 2 or more occasions were considered as cases, while patients with diastolic blood pressure of < 80 mmHg were considered as non cases of HTN (controls).

Since finding cases of HTN would be difficult, conveniently, all patients who met the inclusion criteria during the study period visited the hospital were included in the study as cases and those patients who met the inclusion criteria were considered as controls, but matched for sex and age of $\pm$ 5 years. Data collection was continued until the desired sample size achieved.

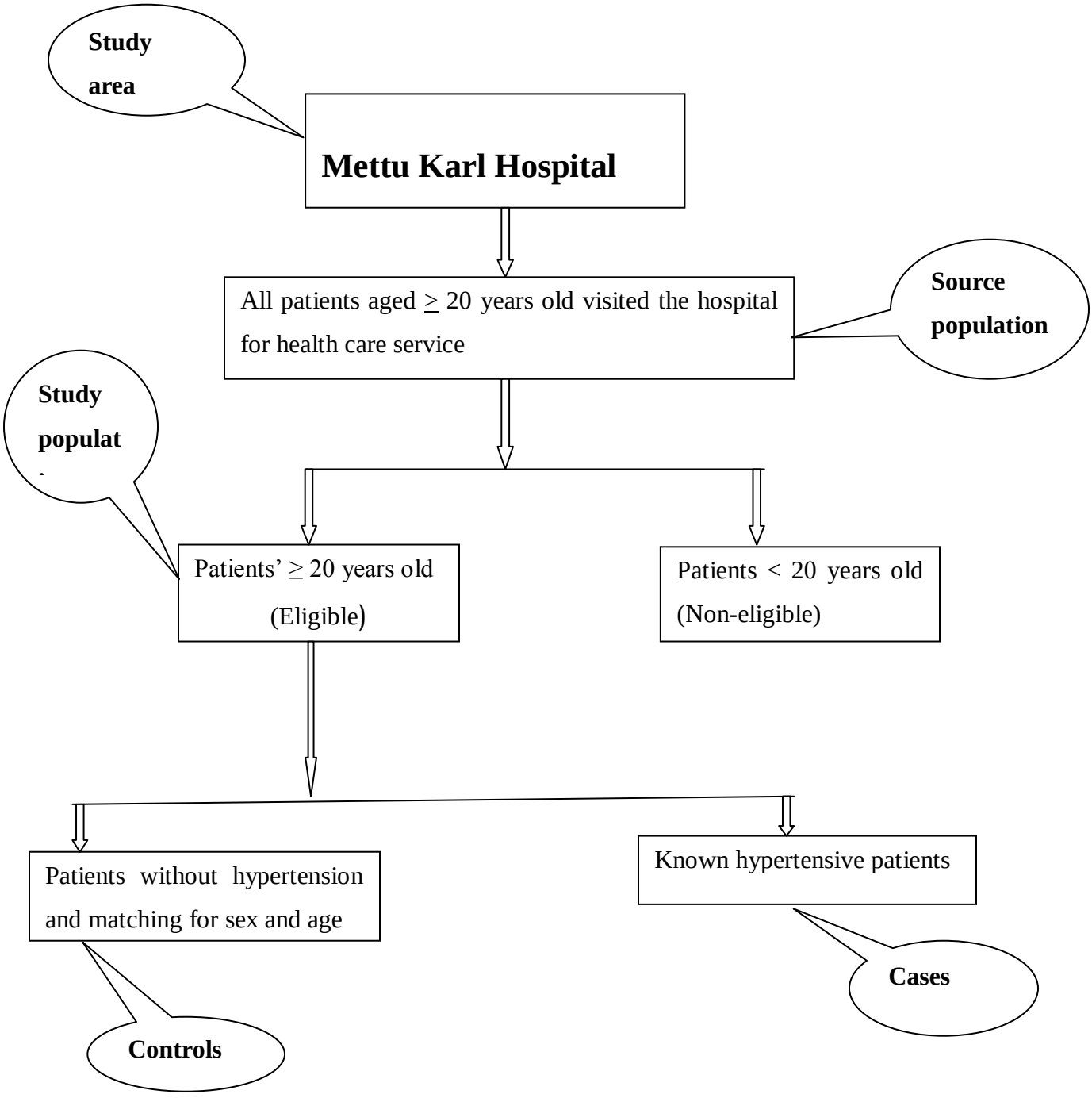

Figure 2: The scheme of sampling procedure

4.10. Data Collection

Data was collected using a structured questionnaire which was prepared in English and translated to Amharic and Afan Oromo (since eligible participants may prefer either Amharic or Afaan Oromo but choose only one language) and translated back to English to ensure the language consistency and clarity. The data was collected from primary source. The questionnaire was included information on: Socio- demographic, hypertension status, risk factors of HTN(such as cigarette smoke, Alcohol, khat, family history of HTN, family central obesity, BMI, sleep duration, sleep nature, routine work nature, animal fat intake, physical exercise and level of disabilities related to hypertension). The questionnaires adapted from similar studies which were published and EDHS 2011.

WHO-DAS 2.0 employed which involves scale covering ten item disability variables. Disability was assessed based on over 30-day prevalence preceding the actual initiation of this study among hypertensive patients. The questionnaire were answered on a 5-point likert type scale (1= none, 2= mild, 3=moderate, 4 = sever, 5= extreme), which grades the difficulty experienced to performing a given activity.

BP was measured using standardized sphygmomanometer apparatus and weight was measured using an adult scale (Detecto DS) and height was measured using a meter available with the weighing scale.

BP measurement employed, based on WHO guidelines (34) in a sitting position after the participant rested for at least 5 min. Three measurements were taken with intervals of 5 min between consecutive measurements. In addition, participants were asked whether they were taking any medications for the treatment of hypertension. Average systolic BP (SBP) and diastolic BP (DBP) were determined from the second and third measurements

Weight and height were measured with (34) participants standing without shoes and wearing light clothing. Participants stood upright with the head in Frankfort plane for height measurement. Height was recorded to the nearest 0.5 cm, and weight was recorded to the nearest 100g. BMI was calculated as weight in kilograms over height in meters squared weight (kg)/height (m) $^{2.}$

Three data collectors, health workers who were serving in Mettu Karl hospital and could speak fluently and understand clearly Afaan Oromo and Amharic, and familiar with the local culture were recruited. Two supervisors recruited from Zonal Health Office. Three days training

provided for both data collectors and supervisors on procedures, techniques and ways of data collection, and related topics using prepared training manuals. Pretest was undertaken at Mettu Health center five days prior to the actual initiation of data collection using prepared questionnaire and due correction was performed. Data was collected through March 2013 and April 2013. Then the data was appropriately entered, coded, cleaned and analyzed using EPI info (version 3.5.3 and SPSS (16.0 for windows) soft ware packages.

4.11. Variables

- **Dependent variable**
  - HTN
- **Independent variables**
  - Socio-demographic characteristics (Age, Sex, Marital status, Educational status, residence area, Income)
- BMI
- Risk factors characteristics (Alcohol, cigarette and/or similar substance smoking, khat, physical activity, Animal fat intake, family history of (HTN, central obesity), nature of sleep, sleep duration, nature of work.

4.12. Ensuring data quality

Appropriateness of the questionnaire on content, consistency, language and organization, checked thoroughly and modified in line with standards, guidance and comments from advisors and colleagues. Pre-test was performed on 20 subjects at Mettu health center five days preceding the study and due adjustment was employed accordingly. Data collectors and supervisors were trained for 3 days on; data collection process, accuracy and completeness so that everything has been cleared up. While data collecting conducted, close supervision was undertaken on daily bases by supervisors and the principal investigator, and each questionnaire were checked by supervisors during data collection for completeness. The overall activity was monitored and evaluated by the principal investigator throughout the study period. To reduce non-response rate and confusion, necessary information and description was given to participants prior to initiation of interviewing. Generally, data quality was assured through designing the appropriate data collection materials and close supervision as well as monitoring. Information collected was checked and cleaned up before and after data entry.

4.13. Data management, Analysis and Interpretation

Template for data collection was prepared, and then data was collected, coded and cleaned using simple frequencies, Proportions and percentages subsequently, entered in to EPI info 3.5.3 version and exported to SPSS 16.0 for windows. Data was cleaned using simple frequency and sorted before analysis. Proportions and percentages were used, and cross tabs with chi square employed as appropriate statistical measures of associations employed. Odds ratio with 95% confidence intervals was used. To assess for possible risk factors of hypertension, bivariate analysis using cross tabulation and logistic regression has been done and all variables associated during bivariate analysis were entered in to multivariate logistic regression to assess the significance and strength of association. Results were interpreted as significant at a p-value of < 0.05, adjusted OR and (95% CI).

4.14. Ethical Consideration

Ethical clearance was obtained from the School of Public Health, Addis Ababa University. Support letter was also obtained from Regional health Bureau, Zonal Health office, and Zonal Administrative Office. The information obtained from the respondents were kept confidential and identified by their code numbers. The study was conducted entirely on voluntarily consent of the participants. Respondents were told that, they would have full right to withdraw from the study any time or may refuse to respond to some of the questions in the questionnaires. Oral informed consent was obtained from each participant after the explanation of the purpose of the study. The participants have been informed that, the method used in this study would not cause any harm to them, the community.

After the measurement of weight and height, the BMI was calculated and they were advised accordingly. Participants (controls) with elevated BP were advised by the principal investigator to seek medical intervention and follow up after all consideration of ethical concerns undertaken.

4.15. Operational Definition

Body Mass Index (BMI) - Calculated by formula, BMI = Weight (Kg) / Height ($m^{2)}$ (35).

- Under weight = BMI < 18.5 kg/m^2
- Normal = 18.5 – 24.9kg/m^2
- Over weight = 25 – 29.9kg/m^2
- Obese = $\geq$ 30kg/m^2

Disability - A physical or mental condition one cannot use a part of his body completely or easily or the state of not being able to use a part of his body completely or easily.

Family history - Refers to first degree relatives (mother and father).

Height - The subject's height at standing position stand with the back against the wall and heels touching the ground, arms on the side and eyes in front parallel to ground. Reading co-inciding the occipital edge noted in cm. with the help of standard measuring tape.

Hypertension - Is defined as the persistent systolic blood pressure ≥140 mmHg and/or persistent diastolic blood pressure ≥ 90 mmHg or current use of antihypertensive medication, regardless of the recorded blood pressure (36).

Income - Refers to total monthly expenditure of a household as a whole.

Physical activity - Physical activity or exercise indicates any movement of body or part of body produced by skeletal muscles that require energy expenditure It includes brisk walking, doing works involving physical movements and sports. Regular exercise ≥ hours per week or less active (37).

Restless - Unable to stay still or be happy (38).

Stressful - A physical or mental pressure or worry caused by the problem in some body's life.

Weight - Is the subject's weight with minimum clothes on the body recorded in kilograms with the help of standard weight scale marked weighing machine which is adjusted to 'zero' weight.

4.16. Dissemination and Utilization of result

The finding of this study will be disseminated to the zonal health office, Metu Karl hospital, Regional health bureau, and to all concerned bodies who utilize the findings in one way or another. It will also be published in Ethiopian journal of health development after being reviewed by responsible body.

5. Results

5.1. Socio-Demographic characteristics of the study subjects

In this study a total of 114 cases and 228 controls were included. Of the total cases 56 (49.1%) were male, while controls 111 (48.7%) were male with 100 % response rate. The majority 73(64.0%), 129 (56.6%) of age distribution fail in the category of 60 or more years old among cases and controls, respectively. The mean (± SD) age among cases was (58.24 ± 12.89) compared to (57.25 ± 13 71) among controls. Likewise, the mean (± SD) of BMI for cases was calculated to be (24 ± 1.84), whereas (24 ± 3.32) among control groups. The majority 81 (71.1%) of cases were from urban settings compared to 112 (49.1%) of controls, (χ^2 = 14.866, P- value < 0.001).

The major ethnic groups were, Oromo followed by Amhara 81 (71.1%), 25 (21.9%), respectively, among cases compared to 142 (62.3%), 56 (24.6%), respectively, among controls. (χ^2 = 3.698, df = 2, P-value = 0.157). The dominant religion group was Orthodox followed by Muslim 65 (57.0%), 27 (23.7%), respectively, accounted for cases while 97 (42.5%), 72 (31.6%), respectively, for controls. (χ^2= 6.39, df = 2, P-value = 0.041). About 80 (70.2%) of the cases and 192 (84.2%) of the controls were currently married, (χ^2 = 8.355, P- value = 0.004).

Regarding occupational status, of the total cases government employees, house wives, merchants and peasants were 29 (25.4%), 30 (26.3%), 27 (23.7%), 28 (24.6%), respectively, compared to 29 (12.7%), 56 (24.6%), 48 (21.1%), 95 (41.2%) controls, respectively. (χ2 = 13.764, df = 3, P-value = 0.003). The majority of cases and controls were non educated or primary level 80 (70.2%) and 159 (69.7%), respectively. This study showed educational status has no association with the development of HTN, (χ^2 = 0.000, P- value = 1.000). Out of the total cases 63 (55.3%) earned less than 1797 birr monthly income compared to 59 (25.9%) of controls, (χ^2= 27.334, P value = 0.001) [Table1].

Table 1: Socio-demographic characteristics of hypertensive patients and patients without HTN: Mettu Karl hospital, South-West Ethiopia. March – April 2013.

Variables	Hypertensive's (n= 114)	Non hypertensive's (n = 228)	χ^2 (P – value)
Sex			
Female	58(50.9%)	117(51.3%)	*NA
Male	56(49.1%)	111(48.7%)	
Age category			
20 – 29	5(4.4%)	14(6.1%)	
30 – 39	6(5.3%)	13(5.7%)	*NA
40 – 49	7(6.1%)	19(8.3%)	
50 – 59	23(20.2%)	53(23.2%)	
>= 60	73(64.0%)	129(56.6%)	
Residence			
Urban	81(71.1%)	112(49.1%)	14.866
Rural	33(28.9%)	116(50.9%)	(<0.001)
Ethnicity			
Amhara	25(21.9%)	56(24.6%)	3.698
Oromo	81(71.1%)	142(62.3%)	(0.157)
Others	8(7.0%)	30(13.1%)	(df = 2)
Religion			
Orthodox	65(57.0%)	97(42.5%)	6.395
Muslim	27(23.7%)	72(31.6%)	(0.041)
Protestant	22(19.3%)	59(29.9%)	(df=2)
Marital status			
Currently married	80(70.2%)	192(84.2%)	8.355
Currently not married	34(29.8%)	36(15.8%)	(0.004)
Occupation			
GOV. employee	29(25.4%)	29(12.7%)	
House wife	30(26.3%)	56(24.6%)	13.764
Merchant	27(23.7%)	48(21.1%)	(0.003)
Peasant	28(24.6%)	95(41.2%)	(df=3)
Educational status			
No education Primary	80(70.2%)	159(69.7%)	0.000
Secondary/ More than	34(29.2%)	69(30.3%)	(1.000)
Monthly income in birr			
<1797	63(55.3%)	59(25.9%)	27.334
≥1797	51(44.7%)	169(74.1%)	(0.001)
BMI (mean ± SD)	24 ± 1.84	24± 3.32	

* NA: Not applicable because of matching assuming that no difference between cases and controls

5.2. Host and environmental related variables of HTN among hypertensive patients and non hypertensive patients.

Out of the total cases, 52 (45.6%) were cigarette smokers while among controls only 30 (13.2%) were smokers, (χ^2 = 42.158, P-value < 0.001). The majority 95 (83.3%) of cases were drinkers as compared to 44(19.3%) controls, (χ^2 = 126.538, P- value < 0.001). Majority 75 (65.8%) of the cases were khat chewers, whereas only 24 (10.5%) of controls reported as khat chewers, (χ^2 = 26.815, P- value < 0.001).

Twelve (10.5%) cases had family history of HTN while eight (3.5%) among controls had family history of HTN, (χ^2 = 5.583, P-value = 0.018). The proportion of participants who had family history of central obesity was 27 (23.7%) among cases and 21 (9.2%) among controls, (χ^2 = 12.023, P-value < 0.001).

Seventy nine (69.3%) of cases and one hundred seven (46.9%) of the controls reported that they did not do regular physical exercise, (χ^2 = 14.440, P-value = 0.001). Of the total cases 69 (60.5%) had history of fat intake on daily bases while among controls 39 (17.1%) served on daily base (χ^2 = 64.323, P- value < 0.001). The proportion of individuals who had history of not sleeping well were 44 (38.6%) compared to 43 (18.9) controls, (χ^2 =14.585, P-value < 0.001). The proportion of individuals who slept less than eight hours with in twenty four hours among cases was 55 (48.2%) compared to 52 (22.8%) among controls, (χ^2 = 21.709, P-value < 0.001). About 54 (47.4%) cases reported that they had stressful routine work nature compared to 42(18.4%) among controls, (χ^2 =30.124, P-value < 0.001). The calculated BMI 25kg/m^2 or more among cases was 72 (63.2%) compared to 107 (46.9%) among controls, (χ^2 = 7.386, P-value = 0.007) [Table 2].

Table 2: Host and environmental risk factors associated with HTN among hypertensive patients and controls: Mettu Karl hospital, South-West Ethiopia. March – April 2013.

Variables	Hypertensive's n(114)	Non hypertensive's n(228)	χ^2 (P-value)
Cigarette smoke			
Yes	52 (45.6%)	30 (13.2%)	42.158
No	62 (54.4%)	198 (86.8%)	(< 0.001)
Alcohol consumption			
Yes	95 (83.3%)	44 (19.3%)	126.538
No	19 (16.7%)	184 (80.7%)	(0.001)
Khat chewing			
Yes	75 (65.8%)	24 (10.5%)	26.815
No	39 (34.2%)	204 (89.5%)	(0.001)
Family history of HTN			
Yes	12 (10.5%)	8 (3.5%)	5.583
No	102 (89.5%)	220 (96.5%)	(0.018)
Family history of central obesity			
Yes	27 (23.7%)	21 (9.2%)	12.023
No	87 (76.3%)	207 (90.8%)	(< 0.001)
Regular physical exercise			
Yes	35 (30.7%)	121 (53.1%)	14.440
No	79 (69.3%)	107 (46.9%)	(0.001)
Animal fat intake			
Always	69 (60.5%)	39 (17.1%)	64.323
Sometimes	45 (39.5%)	189 (82.9%)	(0.001)
Nature of sleep			
Calm	44 (38.6%)	185 (81.1%)	60.268
Restless	70 (61.4%)	43 (18.9%)	(< 0.001)
Duration of sleep			
< 8 hr/ 24 hrs	55 (48.2%)	52 (22.8%)	21.709
>=8 hr/24hr	59 (51.8%)	176 (77.2%)	(< 0.001)
Nature of routine work			
stable	54 (47.4%)	186 (81.6%)	40.880
stressful	60 (52.6%)	42 (18.4%)	(< 0.001)
BMI			
< 25kg/m^2	42 (36.6%)	121 (53.1%)	7.386
> = 25 kg/m^2	72 (63.2%)	107 (46.9%)	(0007)

5.3. Multivariate logistic regression analysis of socio-demographic risk factors associated with the development of hypertension.

Multivariate analysis was done after adjusted for residence, marital status, income, educational status, and ethnicity. The analysis has shown among socio-demographic risk factors of hypertension; residence and economic status were significantly associated with the development of hypertension. Accordingly, the likely hood of having HTN was higher among urban inhabitants compared to rural inhabitants (AOR= 4.053, 95% CI: 2.120, 7.749). The odds of HTN was significantly higher among those who earned less than 1797 birr monthly income compared to those who earned 1797 birr or more monthly (AOR = 6.476, 95% CI: 3.525, 11.895) [Table 3].

Table 3: Bivariate and multivariate logistic regression analysis of socio-demographic risk factors associated with HTN among hypertensive patients (n =114) and non hypertensive patients (n =228): Mettu Karl hospital, South-West Ethiopia. March – April 2013.

Variables	COR(95%CI)	AOR** (95%CI)
Residence		
Urban	2.542 (1.572, 4.112)	4.053(2.120, 7.749)*
Rural	1	1
Marital status		
Currently on marriage	1	1
Not in marriage	2.267 (1.326, 3.876)	1.117(0.406, 3.416)
Income		
< 1797 birr	3.538 (2.204, 5.681)	6.476 (3.525, 11.895)*
> = 1797	1	1
Ethnicity		
Oromo	1.674 (0.673, 4.164)	2.045 (0.506, 8.271)
Amhara	2.139 (0.936, 4.887)	1.816 (0.518, 6.365)
Others	1	1
Educational status		
No education/primary	0.979 (0.600, 1.600)	1.008 (0.452, 2.248)
Secondary/ higher	1	1

**Adjusted for; Residence, Marital status, Income, Educational status, Ethnicity.

*Significantly associated

5.4. Multivariate logistic regression analysis of host and environmental factors associated with the occurrence of HTN among hypertensive patients and controls.

Multivariate analysis was done after adjusted for residence, marital status, income, educational status, and ethnicity. Based on the analysis output substance abuse (alcohol consumption, cigarette smoking and khat chewing) were significantly associated with the occurrence of HTN. Family history of HTN and central obesity were statistically significant. Less physical activity, regular animal fat intake, sleeping duration, nature of sleep, nature of routine work and BMI were among the major risk factors of HTN episode.

The Odds of HTN was higher among cigarette smokers compared to non smokers (AOR = 5.497, 95% CI: 2.919, 10.352). This study has shown that the likely hood of having HTN was higher among alcohol drinkers compared to non drinkers (AOR= 6.834, 95% CI: 3.467, 13.469). The Odds of HTN was higher to statistically significant level among khat chewers compared to non chewers (AOR= 4.030, 95% CI: 2.065, 7.866).

According to our study the Odds HTN was higher among those with family history of HTN when compared to study subjects without family history of HTN (AOR= 4.717, 95% CI: 1.621, 13.722). The Odds of HTN was higher to statistically significant level among respondents having family history of central obesity compared to those respondents without family history of central obesity (AOR= 3.116, 95% CI: 1.455, 6.676).

The present study has shown that the likely hood of having HTN was higher among study subjects who did less physical activity compared to those study subjects who did regular physical activity (AOR = 2.096, 95% CI: 1.210, 3.631). The Odds of HTN was higher among study subjects who used to eat animal fat on regular bases compared to those study subjects who used to eat some times (AOR= 9.458, 95% CI: 4.972, 17.991).

The Odds of HTN was higher to statistically significant level among respondents slept less than eight hours with in twenty four hours compared to respondents slept eight or more hours with in twenty four hours (AOR = 7.150, 95% CI: 3.666, 13.946). The likely hood of having HTN was higher among study subjects with history of stressful nature of routine work compared to study subjects with history of stabled nature of routine work (AOR = 6.270, 95% CI:3.308, 11.886). The Odds of HTN was higher among respondents had history of restless nature of sleep compared to respondents with calmed nature of sleep (AOR = 6.749, 95% CI: 3.741, 12.178). The likely hood of having HTN was higher among respondents with BMI of 25kg/m^2 or more compared to respondents with BMI less than 25kg/m^2 (AOR = 2.753, 95%CI:1.537, 4.932) [Table 4].

Table 4: Bivariate and multivariate logistic regression analysis of host and environmental factors associated with the development of HTN among hypertensive patients (n= 114) and controls (n= 228). Mettu karl hospital, South-West Ethiopia. March – April 2013.

Variables	COR(95%CI)	**AOR(95%CI)
Cigarette smoke		
Yes	5.535 (3.251,9.426)	5.497 (2.919, 10.352)
No	1	1
Alcohol consumption		
Yes	4.421 (2.533, 7.718)	6.834 (3.467, 13.469)
No	1	1
Khat chewing		
Yes	4.420 (2.492,7.841)	4.030 (2.065, 7.866)
No	1	1
Family history of HTN		
Yes	3.235 (1.283, 8.158)	4.717 (1.621, 13.722)
No	1	1
Central obesity		
Yes	3.059 (1.641, 5.703)	3.116(1.455, 6.676)
No	1	1
Regular physical exercise		
Yes	1	1
No	2.552 (1.587, 4.106)	2.096 (1.210, 3.631)
Animal fat intake		
Always	7.431 (4.463, 12.372)	9.458 (4.972, 17.991)
Some times	1	1
Sleep duration		
< 8 hr/24hrs	3.155 (1.952, 5.100)	7.150 (3.666, 13.946)
> = 8 hr/24hr	1	1
Nature of routine work		
Stable	1	1
Stressful	3.986 (2.424, 6.553)	6.270 (3.308, 11.886)
Nature of sleep		
Calm	1	1
Restless	2.704 (1.637, 4.669)	6.749 (3.741, 12.178)
BMI		
<25kg/m^2	1	1
>= 25 kg/m^2	1.939 (1.223, 3.074)	2.753 (1.537, 4.932)

**Adjusted for; Residence, Marital status, Income, Educational status, Ethnicity.

5.5: Disability in different domains among hypertensive patients.

We used WHO-DAS 2.0 interviewer administered scale covering ten disability domains to assess over 30 day time preceding the actual initiation of this study among hypertensive patients. Accordingly, a problem of concentration on doing something for about ten minutes among the cases 66 (57.9%) was severe or extreme. About three - fourth 75 (65.8%) of the cases had history of difficulty on standing for a longer time to the extent of severe or extreme.

Seventy seven (67.5%) of the cases experienced sever or extreme problem to carry out house hold responsibilities and taking care. According to this our finding difficulty in society participation and getting along with people was about 69 (60.5%) sever or extreme. Of the total cases about 84 (73.7% had severe or extreme emotional health problems. Seventy three (64.0%) of the cases had history of difficulty of walking a long distance, such as a kilo meter to the level of severe or extreme. Sixty four (56.0%) of the cases had difficulty in performing self care like taking bath.

Sixty seven (58.8%) of hypertensive patients experienced difficulty of getting dressed to the level of sever or extreme. This study indicates that the problem of getting along with friends was severe or extreme among sixty four (56.1%) hypertensive patients. Majority 80 (70.2%) of the cases had a problem of performing a day to day to the level of severe or extreme [Table 5].

Table 5: Disability in different domains among hypertensive patients: Mettu Karl hospital, South-West Ethiopia. (n = 114). March – April 2013.

Types of disabilities	Number	Percent
Problems of concentration on doing something for ten minutes	66	57.9
Difficulty on standing for a long time such as 30 minutes	75	65.8
Unable to carryout house hold responsibilities and care	77	67.5
Problems in society participation	69	60.5
Emotional health problems	84	73.7
Difficulty of walking for a long distance. Such as a kilometer	73	64.0
Difficulty of self care. Such as taking bath	64	56.0
Difficulty in getting dressed	67	58.8
Problem in maintain a fried ship	64	56.1
Difficulty in day to day activities	80	70.2

6. Discussion

This case-control study had to identify risk factors associated with incidence of HTN among hypertensive patients and their counter controls and also to assess the level of disabilities among hypertensive patients in Mettu Karl hospital. In this study; residence, income, cigarette smoking, alcoholic beverage consuming, khat chewing, family history of HTN and central obesity were significantly associated with the development of HTN. Likewise, less physical exercise, regular animal fat intake, duration of sleep, nature of sleep, nature of routine work and BMI were significantly associated with the episode of HTN.

This study indicates that statistically significant association between urban residents and HTN as compared to rural residents (14). The study is in agreement with study conducted in some countries in Africa found that urban residents were more likely to develop hypertension than rural dwellers (39). Another systematic review conducted in sub-Sahara Africans revealed hypertension is more prevalent among urban residents than rural (29). This could be explained by the fact that; similar socio-economic and demographic backgrounds.

The present study shows that there is statistically significant association between low monthly income and HTN. As revealed by this study people who earned low monthly income would develop HTN more likely than who earned high monthly income. The findings of this study is in line with a similar study conducted in Palestine which revealed low monthly income significantly associated with incidence of HTN(40). Another similar study conducted in UAE has found that HTN is significantly higher among the lower income people (41). Possibly this might be due to the same study design.

The present study reveals that there is statistically significant association between HTN and cigarette smoking. This study is in line with study done in India and Iraq (8, 38) which also indicated smoking is associated to statistical level for the development of HTN. Another study conducted in sub Sahara African countries supported the current study and revealed that smoking was highly associated with the development of HTN(9). The present study is almost similar with these studies and it can be explained by the fact that; similar socio – demographic backgrounds and study design.

This study shows participants who were drinkers develop HTN more likely than non drinkers, which indicates consumption of alcoholic beverages is significantly associated with the development HTN. The study is in line with a similar study conducted in India (8). A similar

study conducted in Indonesia supported this finding and revealed that there is a strong association between alcohol consumption and incidence of HTN(42). The finding of this study is almost similar with these studies.

This study reveals that, statistically significant association between khat chewing and HTN than non chewers. The present study is consistent with a study conducted in Butajira, Ethiopia, found regular chewing of khat is associated with elevated BP, which may cause the peripheral vasoconstrictor effect of cathinone (4).

According to this study family history of HTN is significantly associated with the occurrence of hypertension. A case – control study conducted in Palestine is in agreement with this finding indicating that family history has been independent risk factor of HTN(40). A similar study done in China is consistent with the present study (21). Another study conducted in Rio de Janeiro supported our finding indicating that family history of HTN of the first degree parents both father and mother or from a single was significantly associated with the development of HTN(43) this could be due to the same study designs.

In this study a significant association between history of central obesity and HTN was observed. Thus, central obesity is significantly associated with the occurrence of HTN. A similar Study conducted in India is in agreement with our finding (44). Another similar study conducted in china is in agreement with our finding explained (21).

This study shows that there is statistically significant association between HTN and physical inactivity indicating that those who did less physical activity were more likely to develop hypertension than those who did regular physical activity. Therefore, this study provides evidence which reveals that significant association between physical inactivity and the incidence of HTN. This study is in line with study conducted in India (8) that found less physical activity is highly associated with the occurrence of HTN and also consistent with a similar study done in Indonesia (42) that showed less physical activity is among risk factors of HTN. Our study is consistent with a study conducted in Palestine, which showed low physical activity was significantly associated with the development of HTN (40). Another case-control study conducted in Iraq supported our finding (37).

The current study indicates that those study participants consumed animal fat on daily bases were more likely to become hypertensive. Hence, this study provides evidence that there is a statically significant association between regularly intake of animal fat and HTN incidence.

This is agreed with study conducted in Amsterdam, Netherlands found low dairy fat intake might contribute to prevent HTN (45).

In this study, statistically significant association was found between sleep duration of less than eight hours with in twenty four hours and HTN episode.

This study indicates stressful nature of routine work was significantly associated with the development of hypertension. The study conducted in south-western Nigeria Supported our finding indicated stress at working place is a dependent cause of HTN (46). Another study has shown that work place management intervention can produce clinically significant reduction in BP and would improves emotional health among hypertensive employees (47). Another similar study done in India (8) showed stress was associated with the development of HTN.

The present study demonstrates that people with nature of restless sleep subjected to develop HTN more likely than who had calmed nature of sleep. This study is consistent with a similar study conducted in India (8). A study done in Boston has found usual sleep duration less than six hours per night and restless in its nature is associated with the occurrence of HTN (48).

This study indicates that BMI $\geq$ 25kg/m^2 was significantly associated with the development of HTN compared to who had < 25kg/m^2 and consistent with a study conducted in Ethiopia, Indonesia and Vietnam (49). Another similar study conducted in India (8) indicated that BMI $\geq$ 25kg/m^2 was statistically associated with the occurrence of HTN. The study conducted in Gondar city, Ethiopia found obesity was significantly associated for the incidence of HTN (2). A similar study conducted in Brazil consistent with this study and provided evidence overweight or obesity was significantly associated with the occurrence of HTN (43). A similar case – control study conducted in Palestine was almost identical with our finding (40).

According to this finding, the assessment employed in different domains of disabilities among hypertensive patients indicated that majority of the hypertensive patients had severed or extreme level of disabilities. This study is consistent with a study conducted in Ghana that has found HTN could influence the overall quality of life in many various ways (50). Another study conducted at some where supported our findings that hypertension is highly associated with emotional health and difficulties in performing activities (47).

7. Strengths and limitations

7.1 Strengths

- No such study was done so far in the study area.
- The study has operational and public health relevance in terms of reducing complications from hypertension.
- Measures were taken to verify data validity throughout the research process.
- Absence of non response

7.2. Limitations

- Use of case control study design could not establish temporal relationship.
- Case control study can only identify association, could not proof causation.
- Since this study conducted on a facility level generalization to community is unreal.
- Recall and selection bias might be negatively affected the study result.
- Since there are a few similar studies we couldn't find adequate references from the respective countries.
- Disability might be confounded by old age

8. Conclusion

This study has found statistical significant association between various risk factors and HTN. Accordingly, residential area, economic status, cigarette smoking, alcohol consumption, khat chewing, family history of HTN, family history of central obesity, less physical exercise, regular animal fat intake, sleep duration, sleep nature, routine work nature and BMI were significantly associated with incidence of HTN. According to the present study hypertensive patients suffered from a range of disabilities to the level of severed and extreme circumstances. Further research has to be conducted pertaining to detailed exploration of risk factors.

9. Recommendation

Policy makers, programmers and stakeholders

- Expected to assure the implementation of activities against HTN
- Ensuring government commitment at all levels against HTN

- Facilitate adequate, conducive environment, infrastructures, support, prevention, control, care & treatment services for disabled & hypertensive pts

Media

- Raising awareness , messages, print advocacy through multimedia

Health system

- Capacity building through training, ME & program integration

Community

- Community mobilization, advocacy, increase awareness & commitment
- CBO, families and peers should move against risky behaviors.

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Annexes

Annex I: English version informed consent

Name of interviewer _____

ID Number_____

Respondent's ID Number_____

Date _____

Introduction

Hello! I am _____and here for a research being undertaken by Addis Ababa University. I would like to inform you that you and I would have a short discussion concerning this study. Be for we go to our discussion, I request you to listen carefully to what I am going to read you about the purpose and general situation of the study and tell me whether agree or disagree to participate in the study.

Information Sheet

The purpose of this study is to explore the factors responsible for the development of hypertension among peoples coming to Mettu Karl Hospital for health service seeking and those who are patient accompany for helping could be relatives or neighbor. The information obtained from this study could help to improve the health needs of hypertensive patients and could reduce the morbidity and mortality related to risk factors responsible to development of hypertension. The study design is facility based quantity method. The data will be collected through interview. The interview is voluntary and will take about 30-40 minutes. All information will kept confidential. It will never be connected to name of the study participants, code number identify every participant. If a report of this result is published only information about the total group will appear.

Informed Consent form

Take your time to understand and decide to whether or not to take part in the study. Your participation, not participation or refusal to respond to some of the questions or interruption from the study is possible at any time and will not cause any harm on your future career. I kindly request a little of your time about 30-40 minutes, to help in this study. At the end, it is hoped that the information you give us could help to design in preventing, controlling and hypertension. The interview involves intimate and private life questions. Therefore, I would like to assure you privacy should be maintained strictly throughout.

Would you be willing to participate?

Thank you!

Result code: 1. YES_____ 2. No_____

For any information it is possible to contact the principal investigator with the following address

- ❖ Muluneh Shuremu
- ❖ School of Public health, Medical Faculty, Addis Ababa University

- E –mail: **m.shuremu@yahoo.com**
- Mobile No: 0911912385
- Addis Ababa, Ethiopia

Annex II. English version Questionnaire

Respondent's ID Number _____

Table 1: Socio-demographic Characteristics

No	Questions	Coding category	Remarks
101	Sex of the respondent	1. Male 2. Female	
102	How old are you?	_____ year	
103	Where is your residential area?	1. Urban 2. Rural	
104	What is your marital status?	1. Never married 2. Married 3. Divorced 4. Separated 5. widowed	
105	Which religion do you follow?	1. Orthodox 2. Muslim 3. Protestant	
106	To which ethnic do you belong?	1. Amhara 2. Oromo 3. Tigre 4. Gurage Others	
107	What is your educational status?	1. No Education 2. Primary 3. Secondary 4. More than secondary	
108	What is your main occupation?	1. Government employee 2. House wife 3. Merchant 4. Peasant 5. Others	
109	How much is your household's total monthly income on average? in birr.	|_____|_____|_____|_____|_____|	
110	Do you suffered from HTN	1. Yes. 2.No	

2. BP and anthropometric measurement

		Reading 1	Reading 2	Reading 3	Code
201	Systolic blood pressure				1
202	Diastolic blood pressure				2
203	Weight in kilogram				3
204	Height in centimeter				4

Table 3: Risk factors characteristics of respondent's

No	Alcohol consumption	Coding category	Remarks
301	Have you ever consumed alcoholic beverage?	1.Yes 2.No	
302	Have you ever smoked cigarette/any types of smoking?	1.Yes 2.No	
303	Have you ever chewed Khat?	1. Yes 2. No	
304	Is there anybody suffered from hypertension among your family? (your mother/ father side)	1. Yes 2. No	
305	Is there anybody has got abdominal fat among your family? (your mother/ father side)	1. Yes 2. No	
306	Have you ever done physical exercise?	1.Yes 2.No	
307	How often did you take animal fat (from meat & butter) in your daily diet per week?	1. Always 2. Some times	
308	What is the duration of your sleep within 24 hours?	_____ hours	
309	Point out the nature of your sleep	1. Restless 2. Calm	
310	Mention the nature of your routine work	1. Stable/peaceful 2. Stressful	

Table 4: Level of disabilities among hypertensive patients

No	➢ In the past 30 days, how much difficulty did you have in;	None	Mild	Moderate	Sever	Extreme or cannot do
401	Standing for long periods such as 30 minutes?					
402	Taking care of your household responsibilities?					
403	How much of a problem did you have joining in community activities (for example, festivities, religious or other activities) in the same way as anyone else can?					

404	How much have you been emotionally affected by your health problems?					
405	Concentrating on doing something for ten minutes?					
406	Walking a long distance such as a Kilometer/equivalent to?					
407	Washing your body					
408	Getting dressed					
409	Maintaining a friend ship					
410	Your day to day work					

Annex III. Amharic version informed consent

የደም ግፊት መነሻ ምክንያቶችን አስመልክቶ በመቱ ካርል ሆስፒታል ለሚካሄደው ጥናት የተዘጋጀ ቃለ መጠይቅ፡፡

የመረጃ ሰብሳቢዉ ስም_____መለያ ቁጥር _____ቀበሌ___-

_____

የተሳታፊው መለያ ቁጥር_____ ቀን _____

ጤና ይስጥልኝ እኔ ስሜ _____ይባላል፡፡ የምኖረው እዚሁ መቱ ከተማ ሲሆን የምሰራውም እዚሁ መቱ ካርል ሆስፒታል ነው፡፡

በአዲስ አበባ ዩኒቨርስቲ የህብረተሰብ ጤና ትምህርት ክፍል አማካኝነት ለሚደረገው ምርምር ወይም ጥናት መረጃ ሰብሳቢ ሆኜ በመሥራት ላይ ነኝ፡፡ ጥናቱን በሚመለከት አጠር ያለ ውይይት በጋራ እናደርጋለን፡፡ በመሆኑም ከዚህ ቀጥሎ የማነብሎትን የጥናቱን ዋና ዓላማ እና አጠቃላይ ሁኔታ በፅሞና ያዳምጡኝና በጥናቱ ላይ ለመሳተፍ ወይም ላለመሳተፍ ያለዎትን ውሳኔ ይነግሩኛል፡፡

የመረጃ ቅጽ

የዚህ ጥናት ዋና ተግባር በአሁኑ ጊዜ እንደሀገርም ሆነ እንደአካባቢያችን በህብረተሰቡ ላይ ከፍተኛ የጤና ቀውስ እያስከተለና እንዲያውም ለስቀይና ለሞት አሳልፎ እየሰጠ ያለውን የደም ግፊት በሽታ መነሻ የሆኑትን ነገሮች መለየትና ለመቅረፍ ብሎም ማስወገድ ተገቢ መንገድ ለመቀየስ ነው፡፡በመሆኑም ከዚህ ጥናት የሚገኘው መረጃ ይህንን እያደባ በህብረተሰቡ ጤና ላይ ችግር እያደረሰ ያለውን በሽታ ለመከላከል፣ለመቆጣጠርና እያደረሰ ያለውን ተፅኖ ለመቀነስ ይረዳል፡፡

ይህ ጥናት የሚመለከታቸው ሰዎች ወደ መቱ ካርል ሆስፒታል ለመታከምና ለተለያዩ የጤና አገልግሎት ፍለጋ የሚመጡትን ሁሉ ይሆናል፡፡ መረጃው የሚሰበስበው በቃለ መጠየቅ ይሆናል፡፡ ይህም በሙሉ ፈቃደኝነት ላይ የተመሰረተ ይሆናል፡፡ ቃለ መጠየቅቁ ከ30-40 ደቂቃ ሊፈጅ ይችላል፡፡ የደም ግፊት መጠን ይለካል፤ ክብደት ይመዘናል፤ቁመትም ይለካል፡፡ የተጠያቂው ስም አይመዘገብም የተሰበሰበው መረጃም በምስጢር ይያዛል ምናልባትም ከዚህ ጥናት የሚኘው ውጤት ቢታተም አጠቃላይ የሆነ መረጃ ብቻ እንዲታተም ይደረጋል ጥናቱ ምንም አይነት ተፅዕኖ እና ጉዳት የማያስከትል መሆኑን አረጋግጥሎታለሁ፡፡

የስምምነት ቅጽ

ጊዜዎትን ወስደው ያገናዝቡና በጥናቱ ላይ ለመሳተፍ ወይም ላለመሳተፍ ይወስኑ፡፡ በማንኛውም ስዓት ጥናቱን ማቋረጥ እንዲሁም ለተወሰኑ ጥያቄዎች ምላሽ ያለመስጠት ይችላሉ፡፡ ይህንን በማድረግዎ የሚደርስብዎት ወይም የሚያጋጥምዎት ምንም አይነት ችግር አይኖርም፡፡

ቀደም ሲል እንደተገለጸው ከዚህ ጥናት የሚገኘው ውጤት ይህንን አስከፊ በሽታ ለመከላከል ብሎም ለመቆጣጠር የሚረዳ ይሆናል፡፡ በመሆኑም እርስዎ በዚህ ጥናት ላይ ቢሳተፉ ለወገንም ሆነ ለሀገር ከፍተኛ ፋይዳ አለዉ፡፡ ስለዚህ ለመሳተፍ ፍቃደኛ ነዎት?

- አዎን ቀጥል _____ ፊርማ_____
- አይሆንም አቁም
- ማንኛውምን መረጃ ለማግኘት የጥናቱ ዋና ኃላፊ አድራሻ እንደሚከተለው ነው፡፡
    - አቶ መሉነህ ሸሪሙ
    - ሞባይል ፡ 0911 91 23 85
    - ኢ-ሜይል m.shuremu@yahoo.com

Annex IV. Amharic version Questionnaire

የተሳታፊ መለያ ቁጥር_____

ክፍል አንድ:- መሰረታዊ የግል መረጃዎች

ተ.ቁ	ጥያቄዎች	መልስ	ይለፉ
101	ፆታ	1. ወንድ 2. ሴት	
102	ዕድሜ	_____ዓመት	
103	የጋብቻ ሁኔታ	1. ያላገባ/ች 2. ያገባ/ች 3. የፈታ/ች 4. አንድ ላይ የማይኖሩ 5. ባል የሞተባት	
104	የሚኖሩበት ሥፍራ የት ነው?	1. ከተማ 2. ገጠር	
105	የሚከተሉት ኃይማኖት ምንድን ነው?	1. ኦርቶዶክስ 2. እስልምና 3. ፕሮቴስታንት 4. ሌሎች	
106	የትኛው ብሔረሰብ አባል ነዎት?	1. አማራ 2. ኦሮሞ 3. ትግሬ 4. ጉራጌ 5. ሌሎች	
107	የትምህርት ደረጃ?	1. ትምህርት ቤት ያልገቡ 2. አንደኛ ደረጃ 3. ሁለተኛ ደረጃ 4. ከሁለተኛ ደረጃ በላይ	
108	ሥራዎት ምንድን ነው?	1. የመንግስት ሠራተኛ	

		2. የቤት እመቤት 3. ነጋዴ 4. ገበሬ 5. ሌሎች	
109	በአማካኝ የቤተሰብዎ የወር ገቢ ምን ያህል ነው?	ብር 88. አላውቅም	
110	የደም ግፊት በሽታ	1. አለብኝ 2.የለምብኝም	

ክፍል ሁለት፡- አንትሮፖሜትሪና የደም ግፊት መጠን

		ንባብ 1	ንባብ 2	ንባብ 3	ማስታወሻ
201	የላይኛዉ የደም ግፊት መጠን				
202	የታችኛዉ የደም ግፊት መጠን				
203	ክብደት በኪግ				
204	ቁመት በሴ.ሜ				

ክፍል ሶስት:- መነሻ ምክንያቶችን ይመለከታል

301	የአልኮል መጠጥ ጠጥተው ያውቃሉ?	1.አዎ 2.አይደለም	
302	ሲጋራ ወይም ማንኛዉንም መሰል ነገር አጭሰው ያውቃሉ?	1.አዎ 2.አይደለም	
303	ጫት ቅመው ያውቃሉ?	1. አዎ 2. አይደለም	
304	በአባት/እናት በኩል የደም ግፊት ያለው ሰው አለ?	1. አዎ 2. የለም	
305	በአባት/እናት በኩል በጣም ቦርጫም ሰው አለ?	1. አዎ 2. የለም	
306	የሰውነት ብቃት እንቅስቃሴ ሠርተዉ ያውቃሉ?	1.አዎ 2.አይደለም	
307	ጨማ ሥጋ፣ ቅቤ በምን ያህል ጊዜ ይበላሉ?	1.ሁል ጊዜ 2. አንዳንዴ	
308	በ24 ሰዓት ዉስጥ ምን ያክል ሰዓት ይተኛሉ?	---------- ሰዓት	

309	የእንቅልፍዎ ባህሪ/ሁኔታ ምን ይመስላል?	1. ያልተረጋጋ ነው 2. ሠላማዊ እንቅልፍ	
310	የዘወትር ሥራዎ ሁኔታ ምን ይመስላል?	1. ሠላማዊ/ ተረጋጋ ነዉ 2. ጭንቀት የበዛበት ነዉ	

ክፍል አራት፡- የጤንነት ሁኔታን የሚያሳይ መንጠረዥ

	ባለፉት 30 ቀናት በሚከተሉት ጉዳዮች ላይ ያጋጠመዎት ችግር ይግለጹ	የለም	መለስተኛ	መካከለኛ	ከባድ	በጣም ከባድ/ማከናወን አልቻልኩም
401	ለ30 ደቂቃ ወይም ከዚያ በላይ መቆም					
402	ለቤተሰብዎ እንክብካቤ በማድረግ በኩል ያለብዎትን ግዴታ ስለመወጣት					
403	ማህበራዊ ተሳትፎዎችን ወይም ክንዋኔዎችን በማድረግ በኩል (በዓላት፣ ድግስ...)					
404	በጤናዎ ምክንያት ስሜትዎ በመጎዳት ረገድ					
405	ለ10 ደቂቃ ተረጋግተው አንድን ሥራ በማከናወን ረገድ					
406	ረጅም የእግር ጉዞ በማድረግ በኩል (ለምሳሌ አንድ ኪሎ ሜትር ወይም እኩል የሆነ ርቀት)					
407	በራስዎ ገላዎን በመታጠብ ረገድ					
408	ልብስዎን በመልበስ ረገድ					
409	ከጓደኛዎ ጋር ያለው ግንኙነት					
410	የዕለት ተዕለት ተግባርዎን በማከናወን ረገድ					

Annex VI. Afaan Oromo version informed consent

Dhibee Dhiiibbaa dhiigaa sababoota fidan ilaalchisee hospitaala kaarl Mattuu tti qu,annaa taasifamuuf gaaffiwwaan qopha,an

Maqaa raga funaanaa_____Lakk. Addaa ----------Ganda_____

Lakk. Addaa Hirmaataa_____guyaa_____

Dursee nagaa isin gaafaadha!

An maqaan koo_____kan jedhamu jiraataa magaalaa Magaalaa mattuu yommuun ta'u bakkii hojii koos asuma hospitaala Kaarl Mattuu kana keessa. Yuuniivarsiitii finfinneetti kutaan barnoota fayyaa hawaasaatiin qu'annoo gaggeessamaa jiruf Ragaa fudhataa ta'een dalagaa jira. Qo'annoo kana ilaalchisee marii gabaabaa waliin ni Gaggeessina. Waan ta'eefis itti fufuun haala waliigalaa qo'anoochaa isiniifn dubbisaatii na Caqasaatii isaa booda hirmaachuu fi dhiisuu keessan na himtu.

Foormii odeeffannoo

Dhimmii qu'annoo kanaa yeroo ammaa kana dhibee fayyaa cimaa uummata irrattii kan fidaa jira dhibee dhiibbaa dhiigaatiif ka'umsa wantoota ta'an adaan baasuun dhibecha dhabamsiisuuf akkasumas to'achuun rakinaa uummata irra gahaa jiru kana hirrisuu fi dhabamsiisuu kayyeeffatee kan ka'eedha.kanaaf ragaan qo'annoo kana irraa argamu fa'idaa guddaa uummataaf buusuu ni danda'ama jedhamee amanama. Qo'annoon kun nama hunda hospitaala kana tajaajila yaalusaaf dhimmota biro tiif dhufana hunda ni ilaallata.

Ragaan kun kan fudhatamu gaaffi fi deebiidhan ta'a. kunis guutummaa fedhii keessan irratti kan hunda'eedha. Yommuu ragaan kun fudhatamu maqaan hirmataa hin galma'u. miidhaan qo'annoon kun geessisu hinjiru akka diqqaa ta'ee ragaan qo'annoo kana irraa argamu ni maxxansama yoo ta'e yadaa namaa tokkoo qofa osoo hin ta'in akka waliigalaatti akkaa ta'u ni taasifama.

Foormii waliigalteen itti mallattefamu

Yeoo keessan fudhadhachuun itti yaaduun qu'annoo kana irrattii hirmaachuu fi dhiisuu keessan murteesaa. Yeroo kamittu addaan kuutuu yookiin callissuu fi guutumaa guutuutti deebii kennuu dhiisuun ni danda'ama. Kan raawwachuu keessaniin miidhaan isin irra gahu gonkuma hin jiru. Gaaffi fi deebiin kun daqiiqaa 30-40 nu tursiisuu ni danda'a.

Galatoomaa jechaa mutii keessan na ibsaa.

- Eeyyee ittii fufii
- Lakii dhaabii
- Mallattoo hirmaataa_____

Odeeffannoo kamiif iyyuu

Maqaan gaggeessaan qu'annoo kanaa
Obb Mulunee Shuuramuu
Bilila 0911912385
E-mail: m.shuremu@yahoo.com
YKn abamilki2011gmail.com

Annex VII. Afaan Oromo version questionnaire

Gaaffiwwaan dhimmoota hawaasummaa fi dhuunfaa

Kodii deebii kennaame_____

Lakk	Gaaffiwwaan	Kodii	Yaadannoo
101	Saala	1. Dhi 2. Dha	
102	Umuriin kee meeqaa?	Wagaa_____	
103	Bakki jireenyaa kee eessa?	1. Magaala 2. Baadiyyaa	
104	Haalli fuudhaa fi eerumaa kee maali?	1. kan hinfuune/ hin eerumne 2. kan fuudhe/eerume 3. kan hiikee/hiikte 4. adda addaa kan jiran 5. kan abban waarraa irraa du'e	
105	Amantaa kam ordofta?	1. Ortoodoksii 2. Musilima 3. pirooteestaantii 4. kan biroo	
106	Sablamiin kee kamii?	1. Amaaraa 2. Oromoo 3. Tigiree 4. kanbiroo	
107	Sad. Barnoota keehangami?	1. Hinbaranne 2. sad. tokkoffaa 3. sad. Lammaffaa 4. sad. Lammaffaa ol	
108	Hojiinkee maali?	1. hoj. Mootummaa 2. haadha warraa 3. daldaalaa 4. Q/bulaa 5. kanbiroo	
109	Galiin maaatii keessanii gidugaleessaan ji'atti hangam?	Qr._____ta,a 88. hinbeeku	
110	Dhibee dhiibbaa dhiigaa	1. qaba 2. hinqabu	

2. Safara Antropoometrii fi safara dhiibbaa dhiigaa

		Dubbisa 1	Dubbisa 2	Dubbisa 3	Kodii
201	Dhiibbaa dhigaa isa irraa				1
202	Dhiibbaa dhigaa isa jalaa				2
203	Ulfina kiilogramaan				3
204	Dheerina aantimeetraan				4

3. wantoota ka'umsa dhiibbaa dhiigaatiif sababoota ta'an ilaalchisee

Lkk	Dhugaatii alkooliii ilaalchisee	Koodiii	
301	Dhgaatii alkoolii fayyadamtee ni beektaa?	1.Eeyyee 2.Lakkii	
302	Sijaaraa ykn KKF xuuxxee ni beektaa?	1.Eeyyee 2.Lakkii	
303	Caatii qamataanii beektuu?	1.Eeyyee 2.Lakkii	
304	Maatii kee keessaa karaa abbaa fi aadhaatiin kan dhibee dhiibbaa dhiigaa qabu jira turee?	1. Eeyyee 2.Lakkii	
305	Maatii kee keessaa karaa (abbaa fi haadhaa) kan borcii qabu jiraa?	1. Eeyyee 2. Lakkii	
306	Sochii jabina qaamaa hojjettee beektaa?	1. Eeyyee 2. Lakkii	
307	Foon cooma fi dhadhaa torabanitti hangam fayyadamaa turte?	1.yeroo Honda 2.Torbanitti altokko 3. Darbee darbee	
308	Sa'atii 24 keessatti hangam rafta?	Sa'atii_____	
309	Haalli rafiitii kee maal fakkaata ture?	1. Jeeqamaadha 2. Tasgabba'adha	
310	Haallii hojii idilee keetii maal fakaata?	1. Nagaa qaba 2. Muddamaadha	

4. Haala milka'ina jireenyaa ilaalchisee

No	Dhimmota arman gaditti tuqamanii irratti guyyota 30n darban keessatti rakkinni si quunname ibsaa?	Hinjiru	salphaadha	Giddu galeessa	hamaadha	Baayyee hamaadha/ Dalaguu hindandeenye
401	Yeroo dheeraf dhaabbachuu fkf , daq. 30f					
402	Itti gaafatamummaa kunuunsa maatii keetii bahuu irratti					
403	Jireenya hawaasummaa jiraachuu keessatti					

	rakkina hangamtu si quunname?					
404	Sababaa dhibee kanaatiin miirri kee hangam midhame?					
405	Tasgabbiin daqi. 10f hojii hojjechuu ilaalchisee?					
406	Miilaan karaa dheeraa adeemuu ilaalchisee (fkf. Km1ykn qixxee kan ta'u)					
407	Qaama kee dhiqachuu ilaalchisee					
408	Uffaanaa uffachuu ilaalchisee					
409	Saa'ibaan jiraachuu ilaalchisee					
410	Hojii guyyaa guyyaa ilaalchisee					

DECLARATION

I, the undersigned, declare that this thesis is my original work, has never been presented in this or any other University and that all sources of materials used for the thesis have been duly acknowledged.

Name principal Investigator Muluneh Shuremu

Signature _____

Date_____

This thesis has been submitted for examination with my approval as a University advisor.

Name of advisor Negussie Deyessa (PhD)

Signature _____

Date _____