PREVALENCE AND ASSOCIATED DETERMINANTS OF MODIFIABLE RISK FACTORS FOR CHRONIC NONCOMMUNICABLE DISEASES IN MIZAN AMAN TOWN, SOUTH-WEST ETHIOPIA, 2015

BY

TEKLEMARIAM ERGAT YARINBAB (BSc)

A THESIS SUBMITTED TO JIMMA UNIVERSITY; COLLEGE OF HEALTH SCIENCES, DEPARTMENT OF EPIDEMIOLOGY, IN PARTIAL FULFILLMENT FOR THE REQUIREMENTS OF MASTER'S OF PUBLIC HEALTH (MPH) DEGREE IN EPIDEMIOLOGY

April, 2016

JIMMA, ETHIOPIA

JIMMA UNIVERSITY

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF EPIDEMIOLOGY

PREVALENCE AND ASSOCIATED DETERMINANTS OF MODIFIABLE RISK FACTORS FOR CHRONIC NONCOMMUNICABLE DISEASES IN MIZAN AMAN TOWN, SOUTH-WEST ETHIOPIA, 2015

BY

TEKLEMARIAM ERGAT YARINBAB (BSc)

Contact address

Mob. Number: (+251) 913989882

Email: teklemariam36@gmail.com

Advisors:

1. Dr. Fessahaye A (MD, MPH, Associate professor of epidemiology)
2. Lamessa D (BSc, MPH /epidemiology)

Abstract

BACKGROUND: Chronic non-communicable diseases impose a large burden on human health worldwide. However, the burden of these chronic non-communicable diseases in Ethiopia is increasing significantly; their prevalence across different regions of the country is not known clearly. Similarly, there has been no research conducted in Mizan Aman town on the prevalence of chronic non communicable diseases.

OBJECTIVE: To determine the prevalence and associated determinants of modifiable risk factors for chronic non-communicable diseases in Mizan-Aman town, SW Ethiopia, 2015

METHODS: A cross-sectional study was conducted from October 10-30/2015 in Mizan-Aman town, South West Ethiopia. The data collection was conducted using WHO STEPs instruments translated into the local language (Amharic). Study subjects were selected by systematic random sampling technique for interviewing and physical examination. Data analysis was done by SPSS for Windows Version 20.0. Bivariate and multivariate logistic regressions were conducted to determine the factors associated with risk factors of CNCDs.

RESULTS: The prevalence of behavioral risk factors is 8.4% for smoking, 35.9% for alcohol consumption, 23.3% for consumption of fruits and vegetables below adequate level, 10.6% for low level of total physical activity and 14.1% for khat chewing. The prevalence of biological risk factors, on the other hand, is 12.1% for hypertension, 12.1% for overweight, 4.0% for obesity and 21.29% for central obesity. About half (50.5%) of the study population had at least one or more of the key risk factors. The multivariate logistic regression revealed that sex, age, educational status, marital status, work status and income were positive predictors of risk factors of CNCDs. It further showed that current alcohol drinking, low servings of fruits and/or vegetables and physical inactivity were associated with biological risk factors of CNCDs.

CONCLUSION: The magnitude of risk factors for chronic non-communicable diseases is considerably high in the study population. Therefore, appropriate preventive strategies should be designed and implemented to prevent and control the risk factors.

Key words: *Prevalence, CNCDs, Modifiable risk factors, Mizan-Aman Town, Ethiopia*

Acknowledgement

I would like to thank Jimma University; college of health sciences, and department of epidemiology for giving me the opportunity to come up with such important work.

My heartily gratitude also goes to my advisors Dr. Fessahaye A & Mr. Lamessa D for their unreserved guidance, encouragement and constructive comments throughout the thesis work. Finally, I would like to thank Mizan-Aman Health Science College, Bench Maji Zone health department and Mizan-Aman town administration health office for supporting the research activity financially and by supplying necessary materials.

This research thesis is dedicated to my darling wife Tiruwork G

and

to my dearest son Tewodros Teklemariam

Table of Contents

List of tables

List of figures

Acronyms

BP: Blood pressure

CDs: Chronic diseases

CNCDs: Chronic non-communicable diseases

COPD: Chronic obstructive pulmonary diseases

CVDs: Cardiovascular diseases

GGFRC: Gilgel Gibe Field Research Center

HBP: High blood pressure

HH: Household

HTN: Hypertension

LMICs: Low- and- middle income countries

SNNPRS: Southern Nations, Nationalities and Peoples regional State

SPSS: Statistical Package for Social Sciences

SSA: Sub-Saharan Africa

WHO: World Health Organization

CHAPTER 1: INTRODUCTION

1.1 Background

Chronic Non-Communicable Diseases (CNCD) refers to diseases or conditions that occur in, or are known to affect, individuals over an extensive period of time having slow progression and for which there are no known causative agents. (1) The four main non-communicable chronic diseases attributable to the most common risk factors are: cardiovascular diseases (such as heart attacks and stroke), cancer, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma), and diabetes. (2)

Chronic non-communicable diseases impose a large burden on human health worldwide; and are the major cause of mortality and morbidity. CNCDs were responsible for 68% of the 56 million deaths that occurred in 2012. The burden of chronic diseases, especially in developing countries, is increasing rapidly and is becoming a significant social, economic, and health consequences. (3) The increasing incidence of chronic diseases in low-income countries of Sub-Saharan Africa (SSA) poses a growing challenge to their national health systems, (4) given that infectious diseases are still highly prevalent in these settings. The increase is attributed to interrelated changes in demographic and socio-economic determinants, influenced by globalization. (5, 6) A reviewed literature on NCDs in SSA showed that the prevalence of stroke ranged from 0.07 to 0.3%, diabetes mellitus from 0 to 16%, hypertension 6 to 48% and current smoking from 0.4 to 71% (4). World Health Organization (WHO) estimated in 2011 that 34% of Ethiopian population is dying from non-communicable diseases, with a national cardiovascular disease prevalence of 15%, cancer and chronic obstructive pulmonary disease prevalence of 4% each, and diabetes mellitus prevalence of 2%.(7) A study conducted in Addis Ababa, on the other hand, revealed that the leading cause of death were cardiovascular diseases (CVD) (24%); hypertension (12%) and stroke (11%) were similar and constituted most of the CVD deaths. (8)

A 'risk factor' refers to any attribute, characteristic or exposure of an individual which increases the likelihood of developing CNCDs. (9) The risk factors of CNCDs stem from a combination of modifiable and non- modifiable risk factors. Modifiable risk factors refer to characteristics that societies or individuals can change to improve health outcomes. (3)

The two major Modifiable risk factors for NCDs are; **behavioral risk factors** such as tobacco use, harmful alcohol consumption, unhealthy diet (low fruit and vegetable consumption) and physical inactivity; and **biological risk factors** which includes overweight and obesity, raised blood pressure, raised blood glucose and abnormal blood lipids and its subset raised total cholesterol. (10)

The identification of major risk factors of NCDs is vital for its prevention and control. For example, up to 80% of heart disease, stroke, and type 2 diabetes and over a third of cancers could be prevented by eliminating shared risk factors; mainly tobacco use, harmful use of alcohol, unhealthy diet and physical inactivity. (11) Therefore, the objective of the study was determine the prevalence and associated determinants of modifiable risk factors for chronic non-communicable diseases in Mizan-Aman town, SW Ethiopia, 2015

1.2. Statement of the problem

The preventable and modifiable determinants of chronic non communicable diseases include biological and behavioral risk factors; such as, high blood cholesterol, high blood pressure, obesity, physical inactivity, unhealthy diet, tobacco use and inappropriate use of alcohol. Regular and repeated intake of Khat, also, has recently been reported to be associated with increased risk of high blood pressure. These risk factors result in various long-term disease processes, culminating in high mortality rates attributable to stroke, heart attack, tobacco- and nutrition-induced cancers, obstructive lung diseases and many others. (1, 12)

Tobacco use and exposure comes in both smoking and smokeless forms. Smoking tobacco contains over 4000 chemicals, of which 50 are known to be carcinogenic. The carcinogenic chemicals in tobacco markedly increased risk of multiple cancers; it causes about 71% of all lung cancer deaths, 42% of chronic respiratory disease and nearly 10% of CVDs. Tobacco use/smoking is the fourth most common risk factor for disease and the second major cause of death worldwide; accounts for one in six of all deaths resulting from NCDs. Global health statistics report showed smoking is prevalent; globally 41% of males & 9% of females and in Africa 18% of males & 3% of females aged 15 years and older are current smokers. (14,15) Literature reviews, on the other hand, revealed current smoking in Addis Ababa was reported to range from 2.2% to 9% while the lifetime prevalence of smoking in the SNNPR was reported to be 2.1%. (16)

Harmful use of alcohol has causal relationship with morbidity and mortality associated with CVDs, cancers and liver diseases. It is also found there is a direct link between high levels of alcohol consumption and the risk of cancers of the mouth, nasopharynx, oropharynx, larynx, esophagus, colon, rectum, liver and female breast. The level of alcohol consumption worldwide in 2010 was estimated at 6.2 liters of pure alcohol per person aged 15 years and above. In 2012, an estimated 3.3 million deaths, or 5.9 % of all deaths worldwide, were attributable to alcohol consumption. More than half of these deaths resulted from NCDs. (17, 18)

The prevalence of excessive alcohol-use ranged from 23% to 62% in Addis Ababa, while it was 6.5% for SNNPRS. (16)

Unhealthy diet is responsible for 26.7 million deaths worldwide; of the burden attributable to low fruit and vegetable intake, about 85% was from CVDs and 15% from cancers. There is convincing evidence that the consumption of high levels of high-energy foods, such as processed foods that are high in fats and sugars, promotes obesity compared to low-energy foods such as fruits and vegetables. Adequate consumption of fruit and vegetables reduces the risk for CVDs, stomach cancer and colorectal cancer. (11)

Insufficient physical activity is the fourth leading risk factor for mortality. It is a major risk factor in promoting obesity, and causing about 3.2 million deaths each year globally. It also accounts for 21.5% of ischemic heart diseases, 11% of ischemic strokes, and 14% of diabetes. People who are insufficiently physically active have a 20–30% increased risk of all-cause mortality compared to those who engage in at least 30 minutes of moderate intensity physical activity on most days of the week. Regular physical activity reduces the risk of ischemic heart disease, stroke, diabetes and breast and colon cancer. Additionally, it is a key determinant of energy expenditure and is therefore fundamental to energy balance, weight control and prevention of obesity. In 2010, 23% of adults aged 18 years and over were insufficiently physically active globally and about 21% in Africa. (19-21)

Khat: More than 20 different compounds including, Cathinone/amino propiophenone/, Cathine/nor pseudoephedrine/ and nor ephedrine have been isolated from Khat. (23) The consumption of fresh khat leaves causes the release of the active constituent, cathinone, which causes sympato-mimetic effects and induces symptoms such as euphoria and hyperactivity. Regular and repeated intake of Khat has recently been reported to be associated with increased risk of high blood pressure. In areas where a large amount of khat is consumed frequently, such as Yemen and Ethiopia, significant associations have been reported between khat chewing and risk for acute myocardial infarction. (12, 24) In a systematic review in Ethiopia; a higher khat-chewing prevalence of 9.2% was reported from SNNPR and, in Addis Ababa, it ranged from 7.3% to 8.5%. (16)

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 in 2010. Its global prevalence in adults aged 18 years and over was around 22% in 2014; the highest in Africa, at 30% for all adults combined. If left uncontrolled; hypertension causes stroke, myocardial infarction, cardiac failure, dementia, renal failure and blindness. Studies showed that a reduction in systolic blood pressure of 10 mmHg is associated with a reduction in 22%, 41%, and 41–46% of coronary heart disease, stroke and cardio metabolic mortality; respectively. (25) In Addis Ababa, hypertension prevalence ranged from 4.1% among adult workers in 1984 to 30% among a sampled population in 2009. (16) The hypertension prevalence in the Southern Nations, Nationalities, and Peoples Region accounted for about 10% in 2011. (26)

Overweight and obesity lead to adverse metabolic effects on blood pressure, cholesterol, triglycerides and insulin resistance. Risks of coronary heart disease, ischemic stroke and type 2 diabetes mellitus increase steadily with increasing body mass index (BMI). Mortality rates increase with increasing degrees of overweight, as measured by BMI. Worldwide, 2.8 million people die each year as a result of being overweight /obese and an estimated 35.8 million (2.3%) of global DALYs are caused by overweight or obesity. To achieve optimal health, the median BMI for adult populations should be in the range of 21 to 23 kg/m^2, while the goal for individuals should be to maintain a BMI in the range 18.5 to 24.9 kg/m^2 . (27-29) The prevalence of being overweight in Addis Ababa accounted for 30.5%; while that of obesity was 7.2% of the adult population in general in 2009. Similarly, the prevalence of overweight in SNNPR was 8.7%. (16)

In addition to the burden of disease attributed to single chronic behavioral or biological risk factors, a growing body of evidence also suggests the co-occurrences of these risk factors and that their combinations yield greater risks for CDs than the sum of their individual independent effects. For instance, nearly 35% of all cancers could be preventable by reducing or avoiding exposure to risk factors such as tobacco use, physical inactivity, unhealthy diet, alcohol use and being overweight or obese. (30-32)

Changes in the social, demographic and economic environment and lifestyles have resulted in widespread of risk factors for NCDs. In developing countries, CDs is becoming a growing problem, and as part of rapidly developing countries, the life style of the Ethiopian population is also changing due to economic development, urbanization and demographic transition.

Due to this, the burden of CNCDs is increasing significantly. Despite this fact; a wide gap exists between the reality of the chronic disease burden and the response to it. (33-36)

Most of the CNCDs share similar behavioral and biological risk factors which could be largely preventable; so the morbidity and mortality related to CNCDs can be significantly reduced through identification, prevention and control of these major common risk factors. (37) The magnitude of the risk factors of chronic non-communicable diseases in Mizan Aman town is not known.

CHAPTER 2: LITERATURE REVIEW

2.1. Socio-demographic factors of CNCDs

Risk factors for CNCDs are any characteristics and /or exposure lead to the development of the risk of CNCDs. Not only is the burden of chronic disease, but the burden of life style and reported risk factors are also upsurge including tobacco use or smoking, alcohol consumption, unhealthy diets, sedentary life, and khat chewing. (38)

Most developing countries are facing a double burden of diseases that is hindering development efforts. Working age (15–64 years) of global population accounts 4.6 billion in 2011, is hoped-for to grow to 5.9 billion in 2050, contributes to demographic dynamic and disease distribution, particularly in LMIC. The rapid rise of NCDs represents one of the major health challenges to global development in this century, threatens economic and social development as well as the lives and health of millions of people. (39, 40)

In sub-Saharan Africa (SSA); urbanization, changing lifestyles, socio-cultural factors, poverty and poor maternal, foetal and infant nutrition, which forms the basis of the developmental origins of NCDs, are some of the drivers of this epidemic. Non-communicable diseases and their risk factors were gender related, with tobacco smoking, alcohol consumption and raised blood pressure being more frequent in males than females whereas overweight, obesity and raised cholesterol were more frequent in females than males. In SSA, being overweight/obese could be perceived as being rich in males or sexually attractive in females. (41-44)

As the leading cause of death in low- and middle-income countries (LMIC), NCDs have costs for individuals and families, health systems and economies, and also for sustainable development. The two main factors accounting for the macroeconomic impacts are productivity loss - nearly 30 percent of NCD-related deaths in low-income countries occur in people under 60 years of age and costs of treatment, which pose particular challenges in LMIC where resources and health systems are already overstretched. (45)

In the last few years, life style of the Ethiopian population has been changing due to rapid urbanization and demographic transition. (46, 47) Therefore, as a result of these lifestyle changes and influence of socio-demographic factors; such as age, sex, educational status and income status- the burden of CNCDs and its risk factors could be predicted to mount.

2.2. The prevalence of behavioral risk factors for CNCDs

Chronic non-communicable diseases (CNCDs) are mainly associated with four shared behavioral risk factors including; tobacco use, unhealthy diets, insufficient physical activity and the harmful use of alcohol. (48)

Tobacco use/smoking: In 2012, 21% of the global population aged 15 and above smoked tobacco; with higher rate among men (36%), than among women (7%). (49) Men in lower-middle-income countries had the highest smoking prevalence at 39% & in upper-middle-income countries (35%). (8) A report on cardiovascular risk factors burden in SSA showed 40% were smokers, and a study in Kenya, on the other hand, revealed 9% uses tobacco or smoking. In a pilot surveillance project among 1,383 diabetes patients in rural Uganda; the prevalence of smoking was 2 times higher among males compared to female patients (16.6% Vs 8.3%). Similarly, findings from a risk-factor profile for chronic lifestyle diseases in three rural Free State towns at South Africa indicated that 39.2% were current tobacco users or smokers. A result of the study on modifiable CVDs risk factors in apparently healthy Nigerian population, on the other hand, revealed that the prevalence of Cigarette smoking was 14 (4.7%) of whom 11 (79%) were males. (49-54)

Comparable findings from Ethiopia on rural-urban gradient of CVDs risk factors showed; current daily smoking among men was 11 % in Addis and 7 % in Butajira, (55) and assessment of risk factors for selected chronic diseases among higher education students in Addis Ababa also revealed the current smokers were 7.2% among which approximately three-fourth were daily smokers. (48) Another recent finding from a study on Cigarette smoking and Khat chewing among college students in North West Ethiopia, the prevalence of smokers among college students was 13.1 %. It also revealed that ever smoking or khat chewing had a significant association with sex, age, religion and educational status. (57) A survey in South West Ethiopia, on the other hand, showed that the prevalence of smoking was 9.3 %. (56)

Harmful Alcohol consumption: The global prevalence of alcohol consumption is 38.3%; those drink 17 litres of pure alcohol annually. (58) Findings from a survey in Mekong Delta, Asia, showed that the prevalence of ever alcohol consumers, alcohol consumers in the last 12 months, and current alcohol consumers were; 46.6%, 41.6%, and 18.06%, respectively; whereas, a study in Maharashtra, India, on the other hand, revealed the current alcohol consumers was 37.7 % among males and none use of alcohol was reported by females. (59, 60) A pilot survey among 1,383 diabetic patients in rural Uganda and findings from risk factors study in Mombasa, Kenya, showed the prevalence of alcohol users was 19.9% and 5%, respectively; however more risky alcohol consumers in the latter. (51,52) In particular, according to a study on CVDs risk factors (rural-urban gradient) in Ethiopia; 69% of males and 57% of females in Addis, and 23 % of males and 19 % of females in Butajira were reported consumed alcohol in the past 12 months. In the similar study, 33% & 7% in Addis Ababa and 17% & 5 % in Butajira, males & females respectively reported binge drinkers. (55) Findings of a research on association of smoking and khat use with high blood pressure among adults in Addis Ababa revealed that 69% of men and 57% of women reported current alcohol consumption (drinking within the preceding 12 months). Heavy drinking of alcohol was reported by 10.4% (95% CI, 9.0%–11.9%) of men. (61) A CNCDs risk factor survey in south west Ethiopia, on the other hand, showed that the Current alcohol consumption at the time of study was 7.1% which was higher among men (8.7%) than among women (5.7%). (56)

Fruit and vegetable consumption: World health organization identified low fruit and/or vegetable intake as one of the top 10 risk factors for chronic diseases; and according to the study- the consumption was very low in SSA (27–114 kg/capita per year), which was far below the WHO/FAO recommendation. (62) A study on 1978 participants in Mekong Delta showed that only 24.3% had >5 Servings of fruits and/ or vegetables per day, whereas the majority (75.7%) practiced low servings of fruits and/or vegetables/day. (59) Similarly, non-communicable disease risk factors surveillance in Jordan also showed that 17% of the study participants consumed 5 or more servings of fruits and/or vegetables per day. (63)

Chronic disease risk factors surveillance in Mozambique, on the other hand, revealed that 17.8% of the study participants consumed at least two servings of fruits per day, and 18.7% consumed at least two servings of vegetables. However, only 4.2% of the participants consumed at least 5 servings of fruits and vegetables per day. (64) Similarly, in the cardiovascular disease risk factors study (the rural-urban gradient) in Ethiopia; no one reported consuming >5 servings of vegetables and/or fruit on a daily basis. (55) In contrary, to the other findings, a study in South West Ethiopia revealed that only 27 % of the study population ate less than five servings of fruit and vegetables a day, i.e. the rest 73 % consumes at least five or more servings of fruits and/or vegetables per day. (56)

Physical inactivity: In 2011, WHO country profile report revealed that 41% men and 48% women in high-income countries were physically inactive; whereas, 18% & 21% men & women respectively, were physically inactive in low-income countries. (13) In contrary, a chronic non-communicable disease risk factors study in Kenya showed that 42% of the participants were physically inactive; which is similar to prevalence report in high-income countries. Among these, majority (79%) were aged 15-19 years and nearly half (49%) of these had primary education only. It also revealed that physical inactivity had a significant association with age, educational status and work status. (51) A physical activity and cardiovascular disease risk factors study in Urban Mwanza, Tanzania, on the other hand, revealed that the majority (78.9 %) of the participants were involved in moderate intensity occupations; whereas, the rest 21.1% were physically inactive. The overall physical activity energy expenditure did not show any significant association with age, level of education or income. (65)

A cardiovascular disease risk factors survey in Ethiopia (Addis Ababa & Butajira: the rural-urban gradient) revealed that; overall, an estimated 9 % of males and 25 % of females, or 11% of rural and 20 % of urban populations had insufficient level of physical activity. (55) Similarly; findings of a survey at GGFRC showed 16.9% of the population had low level of physical activity which peaked among urban women (24.8%). (56)

Khat use: Globally, the number of people who use khat is estimated to be from 5 to 10 million; predominately in Yemen, Somalia and Ethiopia. (66) Studies in Yemen have estimated the prevalence of khat use to be 80% for males, and 50% for females in the capital Sana'a at age fifteen and above. (67) A community based study on khat chewing in Ethiopia revealed that khat chewing had a significant association with sex, age, religion, ethnicity, marital status, educational status and occupation. (57, 75) A study on association of smoking and khat use with HBP in Addis Ababa showed 15.9% (95% CI, 14.1%–17.6%) of the men participated in the study chewed khat regularly. (61) Similarly, finding of a survey in South West Ethiopia, at GGFRC also showed the prevalence of khat chewing was 38.6%. (56)

2.3. The prevalence of biological risk factors for CNCDs

The major modifiable biological risk factors responsible for high morbidity & mortality globally, as reported by WHO were high blood pressure, overweight and obesity. (13)

Hypertension: Globally, the overall prevalence of raised blood pressure in adults aged 25 and over was around 40% in 2008. (68) In a study conducted on 1000 adults aged 25-64 years in north-west Iran, and CNCDs risk factors study in Mekong Delta, Vietnam, the prevalence of hypertension were 18% and 30.4%; respectively. (59, 69) Similarly, a study on association between BMI & BP in three populations across Asia and Africa revealed that the prevalence of HTN was highest among women and men in Indonesia, 25 and 24%; respectively, followed by men in Vietnam (19%) and Ethiopia (12%). The lowest prevalence was observed among women in Vietnam (9%) and Ethiopia (8%). The prevalence of HTN showed a consistent gradient across the three countries, lowest in Ethiopia and highest in Indonesia. (70) A cross sectional study on hypertension and its correlates in sub-Saharan Africa showed the prevalence of hypertension was 22% and that of pre-hypertension 44%. (71) A study conducted in Nepal revealed that gender, age and literacy were predictors of hypertension. (76) In a pilot surveillance in rural Uganda the mean systolic blood pressure was (128.4 ± 12.5) and the mean diastolic blood pressure was (81.1 ± 13.0). Most of the diabetic patients were hypertensive, (37.5%) or pre-hypertensive (33.8%). (53) A study in Mombasa, Kenya, also found the prevalence of hypertension was 24%. (51) In a population based study at GGFRC, South West Ethiopia, three hundred (9.3%) of the study participants had raised blood pressure. The prevalence of raised blood pressure was higher among men than women and urban than rural area, with highest prevalence among urban men (20.8%). (56) A community based cross-sectional study in Northwest Ethiopia showed age and family histories of hypertension were associated with hypertension. (77) Another study in Central Development Region of Nepal revealed that sex, physical inactivity, BMI, smoking and alcohol consumption were significantly associated with hypertension. (76)

Overweight & Obesity: In 2008, globally, 35% of adults aged 20 and above were overweight (34% male, 35% women); whereas, 10% and 14% of men and women, respectively were obese. (72) A study in Mekong Delta on 1976 study subjects showed 8.8% of men and 12.6% of women were overweight and 2.3% of men and 1.5% of women were obese. (59) Another study on association between BMI and BP across three populations in- Indonesia, Ethiopia, and Vietnam - on the other hand, showed that 93 (10.0%) & 222 (25.0%), 44 (2.5%) & 44 (2.2%), 18 (1.8%) and 21

(1.9%) women and men were overweight and obese, respectively. (70) In SSA, currently, 23% of men and 30% of women are overweight or obese, and childhood overweight/obesity rate (8.7%) is already higher than the global average (6.7%). (73) In a cross sectional study in Northern Nigeria, overweight and obesity were found 53.3% and 21.0%; respectively, with a significantly higher prevalence in females compared to males (overweight: 62.0% Vs 41.9%, $p < 0.001$; obesity: 29.8% Vs 9.3%, $p < 0.001$). (54) Similarly, in a study on 305 subjects in Mombasa, Kenya, 11 % were overweight or obese. It also revealed that socio-demographic characteristics including gender, age, being a student and low socio-economic status were found to be positive predictors of risk factors of CNCDs. Besides, female gender was seen to be positive predictor for overweight /obesity with a 71% majority compared to a 29% male composition (p=0.01). (51) A pilot surveillance in rural Uganda also showed; of 1383 participants 42.4% had a normal BMI, while 9.5% were underweight and 6.3% were obese. (52) A population based survey of CNCDs at Gilgel Gibe Field Research Center, South West Ethiopia, showed that prevalence of overweight among men and female was 5.7 % and 7.2 %, respectively. While the same for obesity was 0.3 and 0.7 %. (74)

2.4 Conceptual framework

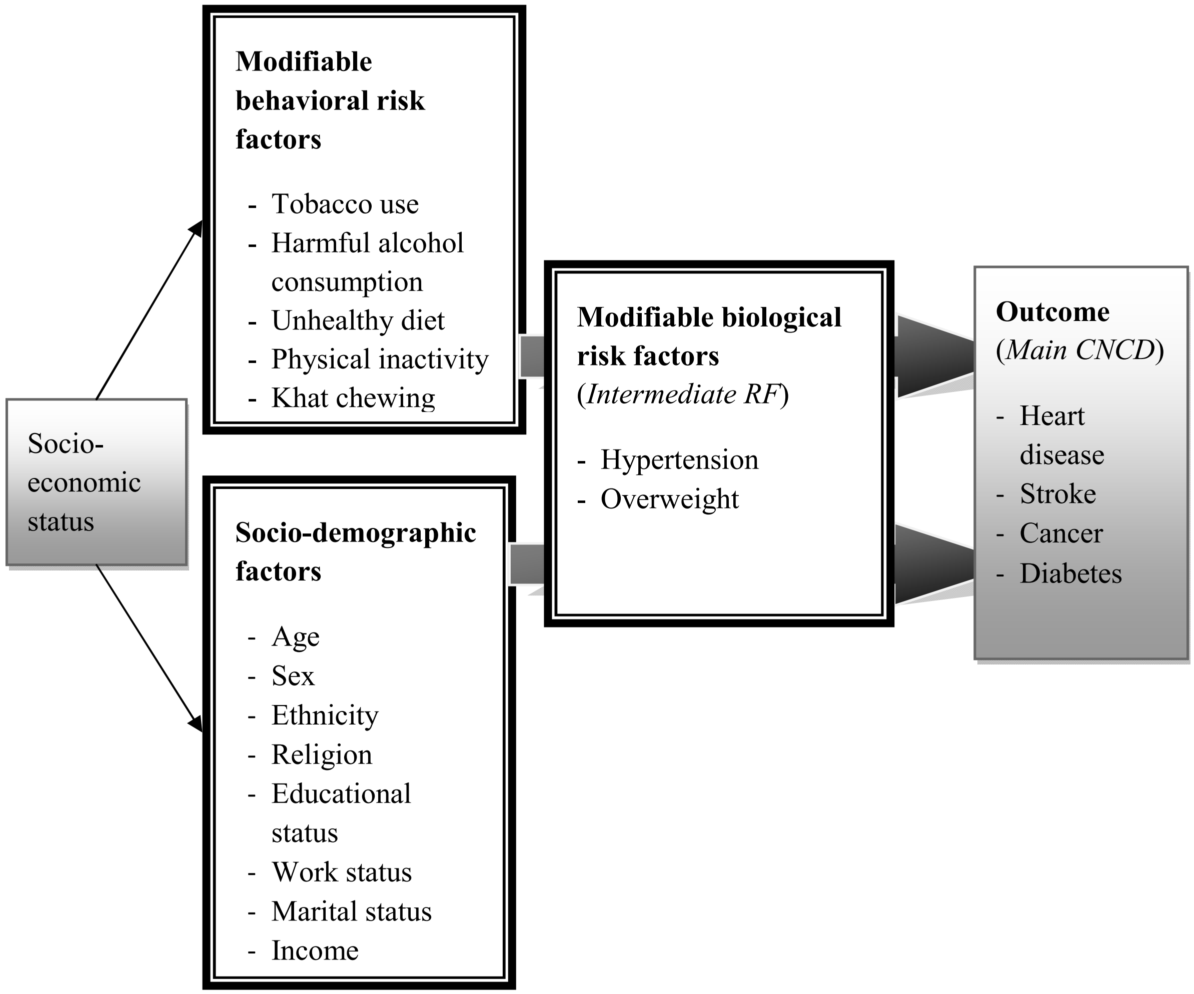


Figure 1: Conceptual framework of risk factors of CNCDs

Source: Adapted from WHO STEPS Manual

****NB: The "shaded" are not focus of this study.***

CHAPTER 3: SIGNIFICANCE OF THE STUDY

The study was carried out to assess the prevalence and associated determinants of modifiable risk factors for CNCDs among adults aged 25-64 years in Mizan-Aman Town, South West Ethiopia.

The reviewed literatures showed the need for further research on basic risk factors of chronic non-communicable diseases; so as to provide baseline data for successful intervention.

The findings of the study elucidated the magnitude of the risk factors of chronic non-communicable diseases in the community to BMZ health department, SNNPRS health bureau, FMOH and different organizations working in the area of prevention & control of CNCDs. Hence, along with other research findings, it would contribute for effective plans and implementation of prevention strategies.

It can also enable different stake holders to realize the facts about the magnitude of the risk factors of chronic diseases in the population and give necessary support in the intervention activities. Besides; the findings of the research would help political leaders, policy makers and higher experts in making right decisions and design policies for prevention and control of risk factors of chronic non-communicable diseases.

Finally; hopefully it provides baseline data for researchers & pave the way for further studies on major risk factors of CNCDs in the area.

CHAPTER 4: OBJECTIVES

4.1 General objective

To determine the prevalence and associated determinants of modifiable risk factors for chronic non-communicable diseases among adults aged 25-64 years in Mizan-Aman town, from October 10 – 30/2015, South West Ethiopia.

4.2 Specific Objectives

To determine the prevalence of behavioral risk factors of CNCDs among adults aged 25-64 years

To determine the prevalence of biological risk factors of CNCDs among adults aged 25-64 years

To identify factors associated with risk factors of CNCDs among adults aged 25-64 years

CHAPTER 5: METHODS AND MATERIALS

5.1 Study area & Period

The study was conducted in Mizan-Aman Town from October 10-30/2015. The town is the capital and administrative center of Bench Maji zone; located 561 KMs South West of Addis Ababa. Bench Maji is a second -order administrative division amongst the administrative zones found in SNNPRS. It is bordered on the South by the Ilemi Triangle, on the West by South Sudan, on the North West by Gambela Region, on the North by Sheka and on the North East by Kaffa.

Mizan-Aman Town has a latitude and longitude of $7^{0}0'$N $35^{0}35'$E / 7.000^{0}N 35.583^{0}E and an elevation of 1451 meters. It has an estimated total population of 49,591 and 10,331 households. The town lies on a plot of land measuring 19.2 KM^{2}. It is subdivided in to five kebeles' (the smallest governmental administrative units) namely Edget, Kometa, Addis Ketema, Hibret and Shesheka; with the population of 11156, 7921, 11937, 8784, & 9793, respectively. The town has two governmental health institutions, 20 private clinics and 15 private drug stores; which provides different health care services for the residents of the town and beyond.

5.2 Study design

A community based Cross-sectional study was conducted.

5.3 Population

5.3.1 Target population

All population who were residents of Mizan-Aman Town

5.3.2 Study population

All people aged 25-64 years included in the actual study

5.4 Eligibility criteria

5.4.1 Inclusion criteria

All individuals' aged 25-64 years, lived in the town at least for six months

5.4.2 Exclusion criteria

Pregnant women and persons' who were critically sick

5.5 Sample size determination and sampling technique

5.5.1 Sample size determination

There was no related study conducted in the study area. Therefore, to estimate the sample size a community based survey on risk factors for CNCDs conducted in South West Ethiopia (56), was used. In this research; by considering all the findings on behavioral and biological risk factors for CNCDs with the assumption to get adequate sample size, the prevalence of khat chewing (38.6%) was selected. Hence, the sample size for this study was calculated by taking the estimated average khat chewing 38.6%. Five percent margin of errors with 95% confidence of certainty of any outcome was used. Based on these assumptions, the sample size was calculated using the formula for single population proportion as follows;

$$\mathbf{n = \frac{(Z\ a/2)^2\ P\ (1-P)}{D^2} = \frac{(1.96)^2\ 0.386\ (1-0.386)}{(0.05)^2} = 364}$$

Assumptions:

P = Estimate of proportion of population who consume khat (38.6%)

D = Margin of sampling error tolerated 5% (0.05)

α = Critical value at 95% confidence interval of certainty (1.96)

After taking additional 10% contingency for non-response rate, the total sample size was:

$$\mathbf{N_f = 364/0.9 \approx 404}$$

Therefore, a total of **404** residents of Mizan-Aman town aged 25-64 were participated in this study.

5.5.2 Sampling technique and sampling procedure

Systematic random sampling technique was used. Samples were taken from all the five Kebeles' found in the town.

First, the sample size was **proportionally allocated** to each kebele; according to the number of households they possessed. Next, the interval to select the households for data collection was determined depending on the number of total households & samples required as follows:

K^{th}=N/n where: N= total households →10,331; n= sample size→404, K^{th}=10,331/404 ≈25 Therefore, the sampling interval was determined to be≈ **25**.

Then; after the **first** household was selected by **lottery method** among the first coming 25 HHs, every 25^{th} households were included in the study by **systematic random sampling** technique.

Only one participant was taken from a household. Whenever, the number of eligible individuals within a selected household was more than one, a participant had been selected by lottery method. When household members did not fulfill the inclusion criteria the next household had been taken and so on.

This process continued by taking an eligible participant from every 25^{th} household, until the sample size allocated for each kebele was satisfied.

5.5.3: Schematic presentation of the sampling procedure

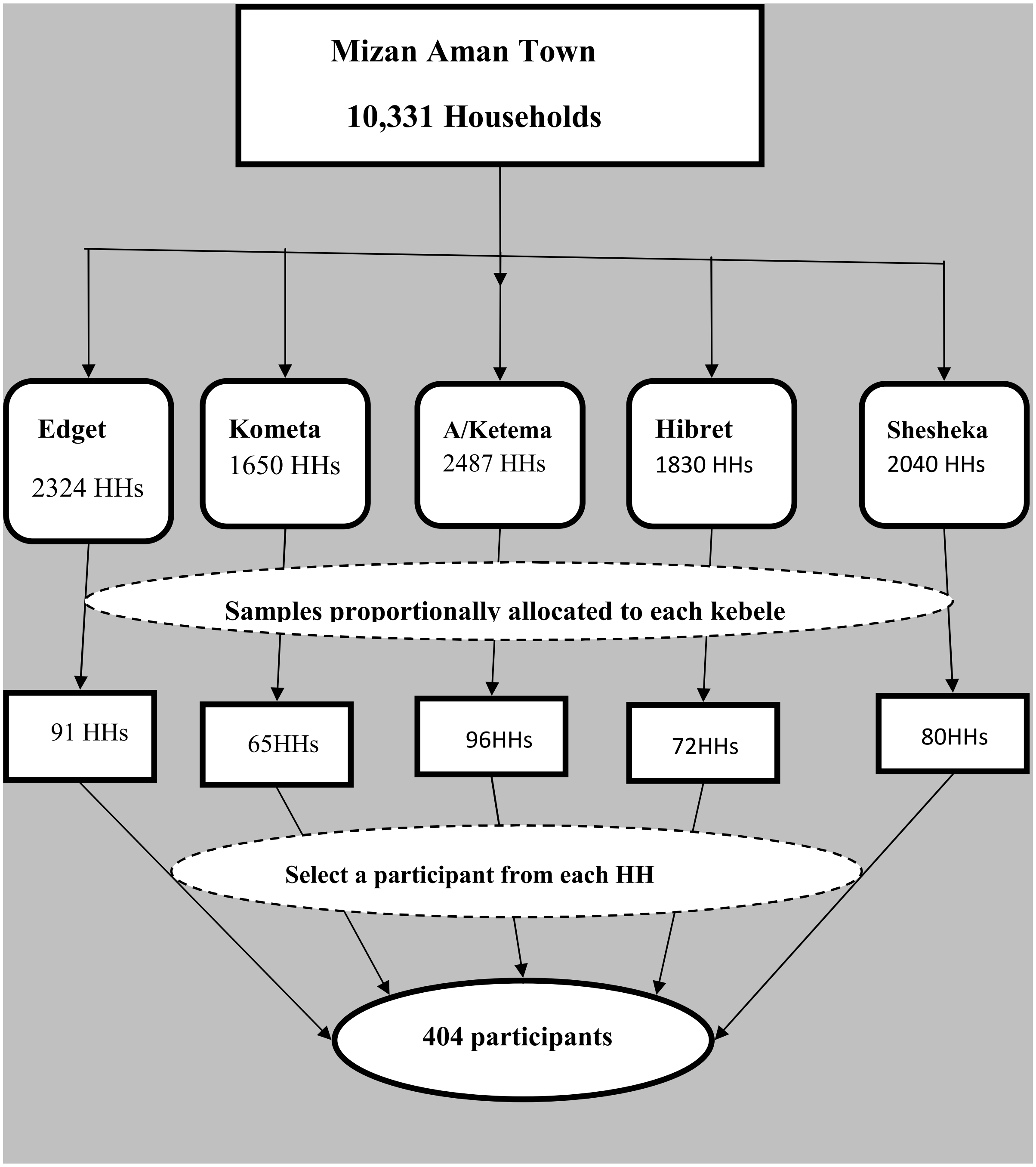


Figure 2: Schematic presentation of the sampling procedure

5.6 Study variables

5.6.1. Independent Variables

Socio-demographic variables:

- Age, sex, ethnicity, religion, marital status, educational status, income, & occupation

5.6.2 Dependent variables

Behavioral risk factors

- Smoking, alcohol consumption, low fruit&/or vegetable intake, physical inactivity, and khat chewing

Biological risk factors

- Hypertension, Overweight

5.7 Operational definitions

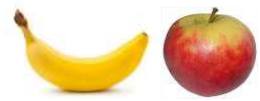
Modifiable behavioral risk factors: unhealthy diet, physical inactivity, smoking, khat chewing and harmful use of alcohol.

Modifiable biological risk factors: Hypertension, Overweight

Low Serving of Fruits and/ or vegetables: Serving of fruits and/or vegetables <5/day

Adequate fruit and vegetable intake: Daily consumption of fruit and vegetable at least five servings (400grams) → one standard serving = 80grams

Vegetables	1 serving =	Examples
Raw green leafy vegetables	1 cup	Salad, etc
Other vegetables, cooked or chopped raw	$^1/_2$cup	Tomatoes, carrots, corn, etc 
Vegetable Juice	$^1/_2$cup	if any

Fruits	1 serving =	Examples
Orange, banana, avocado, mango, apple	1 medium size piece	
Chopped, cooked, canned fruit	$^{1}/_{2}$cup	If any
Fruit Juice	$^{1}/_{2}$cup	Juice from fruits such as avocado, mango, papaya etc. but not artificially flavored

Current alcohol drinker: Reported consumption of alcohol up to 30 days before the survey.

One standard alcoholic drink- A certain amount of alcoholic drink contains 10 gm of ethanol. (*Net alcohol content of* ***a standard drink = 10 gram of ethanol)***

Example: ***One standard drink*** *= 330ml of regular beer (4 or 4.5% ethanol*); *1 single measure of spirits (30ml); 1 medium size glass of wine (120ml) or 1 measure of aperitif (60ml).*

Heavy drinker: for men ≥ 5 standard alcoholic drinks/day, and for women ≥4 standard alcoholic drinks/day

Current khat use: Reported consumption of khat at the time of the survey.

Smoking:

-**Current smoking**: Reported current smoking at the time of the survey.

-**Past smoking**- Previous history of cigarette smoking but quit at the time of the survey.

High level of total physical activity: A total of combination of walking, moderate- or vigorous intensity activities achieving a minimum of at least 3,000 MET-minutes per week.

Moderate level of total physical activity- A total physical activity 600 ≥ MTPA < 3,000 MET-minutes/week; *where* ***MTPA****- Moderate Total Physical Activity*

Low level of total physical activity- A total physical activity < 600 MET-minutes/week

Pre-hypertension- Systolic BP 120-139 mmHg and/or Diastolic BP 80-89mmHg

Hypertension- Systolic BP ≥ 140mmHg or Diastolic BP ≥90 mmHg and/or currently on antihypertensive medication

Overweight: BMI 25-29.9 Kg/m2

General obesity: BMI ≥ 30kg/m^2

Central obesity: WHR > 1.0 for men and WHR > 0.85 for women

Raised Risk: Current daily smoking + Low servings of fruits and/or vegetables + Low physical activity + Overweight/obesity + Hypertension

5.8 Data collection instruments and procedure

5.8.1 Data collection instrument

The data was collected using structured interviewer administered questionnaires and available resources were assured by checklists. The questionnaires and checklists for this study were adapted from WHO STEPwise approach for CNCDs surveillance, prepared in English and translated in to local language and vice versa.

5.8.2 Data collection procedures

Fifteen data collectors were recruited; 15 senior diploma nurses and two supervisors were recruited and participated. Training was given to data collectors and supervisors on the details of the instruments, data collection processes, communication and supervisory roles based on the WHO STEPS surveillance manual. Then, socio-demographic and behavioral risk factors data were collected through structured interviewer administered questionnaires. Next, the physical measurements were conducted using the **tape meter, digital automatic BP apparatus, weight scales and height scales** immediately after the behavioral measurements; in the order of Blood pressure, Height, Weight, waist circumference, and lastly Hip circumference.

Blood pressure (mmHg) was measured using *Digital automatic* BP apparatus. Three BP recordings were taken. The first record was taken after the participant has rested for 15 minutes with their legs uncrossed. Then, the second and third measurements were taken at three minutes intervals, and average of the last two measurements was used to calculate the mean blood pressure.

Height (cm) was measured using vertical measuring board. The participant was requested to remove his/her heavy wearing (if dressed) and stand on flat surface/board with weight distributed evenly on both feet, heels together maintaining a fully erect position; and the measurement was read at the exact point & recorded to the nearest 0.5cm.

Weight (Kg) was measured using an ordinary bathroom scale. The participant was asked to remove their foot wear, Socks and heavy clothing. While standing in center of the platform with body weight evenly distributed between both feet, weight was recorded to the nearest 100 grams.

Waist circumference (cm) was taken with a tape measure. The participant was made stand comfortably with their feet together, place their arms at their side with palms facing inwards, and breathe out gently. Next, the data collector was located and marks the inferior margin (lowest point) of the last rib and the crest of the ilium (top of the hip bone) with a fine pen. Then, find the midpoint, measure the waist circumference and recorded to the nearest 0.5cm.

Hip circumference was taken with a tape measure. The participant was made stand comfortably with their feet together, place their arms at their side with palms facing inwards, and breathe out gently. Next, the data collector asked the participant to help place the tape around bellow their hips. Then, position the measuring tape around the *maximum circumference of the buttocks*, measure the hip circumference and record the measurement to the nearest 0.5cm.

All physical measurements were conducted in a private area or a separate room in the household or where possible, a separate area was screened off to provide privacy for waist and hip circumference measurements at minimum.

5.9. Data processing and analysis

Data was checked for incompleteness, inconsistency and outliers. The data analysis was done using SPSS for Windows version 20:00 after double data entry by EpiData version 3.1. The data was processed by descriptive statistical methods such as frequency distribution, cross tabulation and summary measures. Bivariate and multivariate logistic regression analyses were conducted to determine the association between dependent and independent variables.

5.10 Data quality management

Questionnaires were translated into the local language (Amharic). A pre-test was conducted on 5% of the sample. Data collectors were trained on how to conduct the physical measurements and correct application of the instruments. Instruments were checked for functionality before data collection. Daily supervision was held at all kebeles' by field supervisors and the investigator. Data collectors were enabled to rectify incomplete and inconsistent data by supervisors at the time of data collection. Supervisors used to check all procedures and completeness of formats randomly. The data was entered using a double entry method.

5.11 Ethical considerations

Before the actual data collection, the proposal was presented to Jimma University, and then ethical clearance letter was obtained from Jimma University, College of Health Sciences post graduate coordination office. The participants were well informed about the purposes of the study, and written consents were obtained accordingly. The participants' rights to refuse or withdraw from participating in the study and confidentiality issues were critically considered.

5.12: Dissemination of the study findings

The final report was presented to Jimma University, College of Health Sciences as a partial fulfillment of the requirements for degree of Masters of Public Health (MPH) in epidemiology. The result of the study was also communicated to Mizan-Aman town administration office, Bench Maji Zone health department, SNNPRs health bureau, and to other concerned bodies in the study area. Finally an effort is being made to publish the thesis in a scientific journal, so as to access the findings for different interested researchers and policy makers.

CHAPTER 6: RESULT

6.1 The socio-demographic characteristics

A total of 404 participants were involved in the study with 100% response rate. Among the study participants, 219 (54.2%) were men and 185 (45.8%) were women. Majority (78.5%) of the study participants' were in the age categories of 25-34 and 35-44. The dominant religion among the study participants was Orthodox, 199(49.3%), whereas the dominant ethnic group was Bench 168 (41.6%). (*Refer- Table 1)*

Table 1: Socio-demographic characteristics of the study participants in Mizan-Aman, Oct 2015

Variables	Men (n=219) № (%)	Women (n=185) № (%)
Age		
25 - 34	99(45.7)	86(46.5)
35 - 44	66(30.0)	66(35.7)
45 - 54	22(10.0)	22(11.9)
55 - 64	32(14.6)	11(5.9)
Educational status		
Primary educ & less	114(52.1)	64(34.6)
Secondary education	89(40.6)	31(16.8)
College/University	16(7.3)	90(48.6)
Ethnicity		
Bench	119(54.3)	49(26.5)
Kaffa	57(26.0)	83(44.9)
Amhara	22(10.0)	27(14.6)
Others	21(9.6)	26(14.1)
Religion		
Orthodox	112(51.1)	87(47.0)
Protestant	90(41.1)	84(45.4)
Muslim & others	17(7.8)	14(7.6)

Table 2: Socio-demographic characteristics…*continued*

Variables	Men (n=219) №(%)	Women (n=185) №(%)
Marital status		
Unmarried	61(27.9)	43(23.2)
Married	125(57.1)	100(54.1)
Divorced	22(10.0)	16(8.6)
Widowed	11(5.0)	26(14.1)
Work status		
Government employee	77(35.2)	90(48.6)
NG employee	16(7.3)	20(10.8)
Self-employee	93(42.5)	48(25.9)
Others	33(15.0)	27(14.6)
Income (USD)		
Below 1.25 USD/day	37(16.9)	36(19.5)
1.25 or more USD/day	182(81.3)	149(80.5)

6.2 The distribution of behavioral risk factors

6.2.1 Tobacco use

The number of current smokers' was 34 (8.4%). Among the current smokers 28 (82.4%) smoked manufactured tobacco products whilst 6 (17.6%) smoked hand-rolled cigarettes. The mean age at first started current smoking was 22 (SD± 6) whereas the mean age when stopped past smoking was 26 (SD± 3).

Sixteen (4%) of the study participants reported someone smoked in their home within the past seven days. Thirty (7.4%) participants, on the other hand, declared someone smoke at work place in their presence within the past seven days.

6.2.2 Alcohol consumption

Current alcohol consumers were 145 (35.9%). Among the current drinkers; 63 (54.8%) men were heavy drinkers whereas only one woman reported heavy drinking. Forty seven (32.4%) of current alcohol consumers drank alcohol for four or more days in the last week. Sixty eight (46.9%) consume alcohol usually with meals whilst 22 (15.2%) consume alcohol never with meals. Nearly all of alcohol consumer women, 29 (96.7%), reported usually consumption of alcohol with meals. (*Refer -Table 2*)

Table 2: Frequency distribution of alcohol consumption by sex in Mizan-Aman, Oct 2015

Variables	Men (n=219) *№ (%)*	Women (n=185) *№ (%)*
Ever consumed alcohol		
Yes	121(55.3)	32(17.3)
No	98(44.7)	153(82.7)
Current alcohol consumer		
Yes	115(52.5)	30(16.2)
No	104(47.5)	155(83.8)

6.2.3 Fruit and Vegetable consumption

The mean numbers of days' fruits and vegetables consumed in a typical week were 4 and 4.75, respectively. The mean number of fruit servings consumed on a typical day was 4 whilst the same for vegetable servings on a typical day was 3.5.

The mean number of combined servings of fruits and vegetables was 7.5. About 94 (23.3%) reported consumption of less than five servings of fruits and/or vegetables on a typical day. The proportion of low servings of fruits and vegetables was slightly higher among men (53.2%) than that of women (46.8%). (*See- Table 3)*

Table 3: Frequency distribution of fruit and vegetable servings in Mizan-Aman, Oct 2015

Variables	Men(n=219) *№ (%)*	Women(n=185) *№ (%)*
Fruits and vegetables servings/day		
Less than five servings	44(20.1)	50(27.0)
Five or more servings	175(79.9)	135(73.0)

6.2.4 Physical activity

Low level of total physical activity (< 600 MET-minutes/week) was 43(10.6%) in the study population. Majority, 361(89.4%), had adequate physical activity. Reasons for this may be the involvement of considerable proportion, 302 (74.8%), of the study participants in moderate intensity activities and the fact that about 363 (89.9%) reported walking at least for 10 minutes per day, but it needs further investigation. (*Refer- Table 4*)

Table 4: Frequency distribution of level of total physical activity by sex in Mizan-Aman, Oct 2015

LTPA*	**Men (n=219)** *№ (%)*	**Women (n=185)** *№ (%)*
High (≥ 3000 MET-min/week)	152(69.4)	98(53.0)
Moderate (600-2999 MET-min/week)	43(19.6)	68(36.8)
Low (<600MET min/week)	24(11.0)	19(10.3)

LTPA - Level of total physical activity*

6.2.5 Khat chewing

Current khat chewers were 57(14.1%); among which 44(77.2%) were men and 13(22.8%) were women. Above half (50.9%) of the current khat chewers were in the age category of 25-34. The frequency of khat chewing practice among current chewers measured as daily, usually and sometimes were 20.7%, 36.2% and 43.1%, respectively. (*Refer- table 5*)

Table 5: Frequency distribution of khat chewing by sex in Mizan-Aman, Oct 2015

Variables	Men (n=219) *№ (%)*	Women (n=185) *№ (%)*
Ever chew Khat		
Yes	55(25.1)	13(7.0)
No	164(74.9)	172(93.0)
Current chewer		
Yes	44(20.1)	13(7.0)
No	175(79.9)	172(93.0)
Frequency of chewing		
Daily	9(20.0)	3(23.1)
Usually	17(37.8)	4(30.8)
Sometimes	19(42.2)	6(46.2)

6.3 The distribution of biological risk factors

6.3.1 Hypertension

About 49(12.1%) study participants were found to be hypertensive. Thirty (7.4%) were found currently receiving anti-hypertensive drugs at the time of the study. The number of pre-hypertensive participants was 99 (24.5%). Majority (73.8%) of pre-hypertensive subjects were in the age range of 25-44; i.e. 46.5% in age group 25-34 & 27.3% in age group 35-44. The mean systolic and diastolic blood pressures were 117(SD±13) mmHg and 78(SD±7) mmHg, respectively. (*See-Table 6*)

Table 6: Frequency distribution of BP classification by sex in Mizan-Aman, Oct 2015

BP classification	Men (n=219) *№ (%)*	Women (n=185) *№ (%)*
Normal (SBP<120 and/or DBP<80)	141(64.4)	115(62.2)
Pre-hypertension (SBP 120-139 and/or DBP 80-89)	55(25.1)	44(23.8)
Hypertension(SBP>140 or DBP ≥90 mmHg and/or on anti-hypertensive medication)	23(10.5)	26(14.1)

6.3.2 Overweight/obesity

The study revealed that 49 (12.1%) study subjects were overweight (BMI 25-29.9) whereas 16(4.0%) were found being obese (BMI ≥30). The number of overweight women was significantly higher than that of overweight men (67.3% Vs 32.7%). The overweight subjects were mainly government employee (34.7%) and self-employee (65.3%). All obese (4.0%) study subjects were women and government employee; i.e. none men was found obese.

Eighty six (21.29%) women had central obesity (WHR > 0.85); whilst none men was found being at risk for central obesity (WHR>1.0). This implies that women are at more risk than men for obesity. (*See – Table 7*)

Table 7: Frequency distribution of BMI by sex in Mizan-Aman, Oct 2015

BMI	Men (n=219) *№ (%)*	Women (n=185) *№ (%)*
Normal weight (BMI 18.5-24.9)	203(92.7)	136(73.1)
Overweight (BMI 25-29.9)	16(7.3)	49(26.4)

6.4. Raised Risk

About half, 204(50.5%), of the study population had at least one or more of the key risk factors. The study revealed that the prevalence of raised risk increases across age groups, i.e., 42.1%, 55.6%, 61.4% and 62.8% for age groups 25-34, 35-44, 45-54 and 55-64, respectively. *(See – Table 8)*

Table 8: Combined key risk factors for CNCDs in Mizan-Aman, Oct 2015

Number of risk factors	Men (n=219)	Women (n=185)	Both sexes (n=404)
	№ (%)	*№ (%)*	*№ (%)*
0 risk factors	122(55.7)	78(42.2)	200(49.5)
1-2 risk factors	86(39.3)	101(54.6)	187(46.3)
3-5 risk factors	11(5.0)	6(3.2)	17(4.2)

Raised Risk *= Current daily smoking + Low servings of fruits and/or vegetables + Low physical activity + Overweight/obesity + Hypertension*

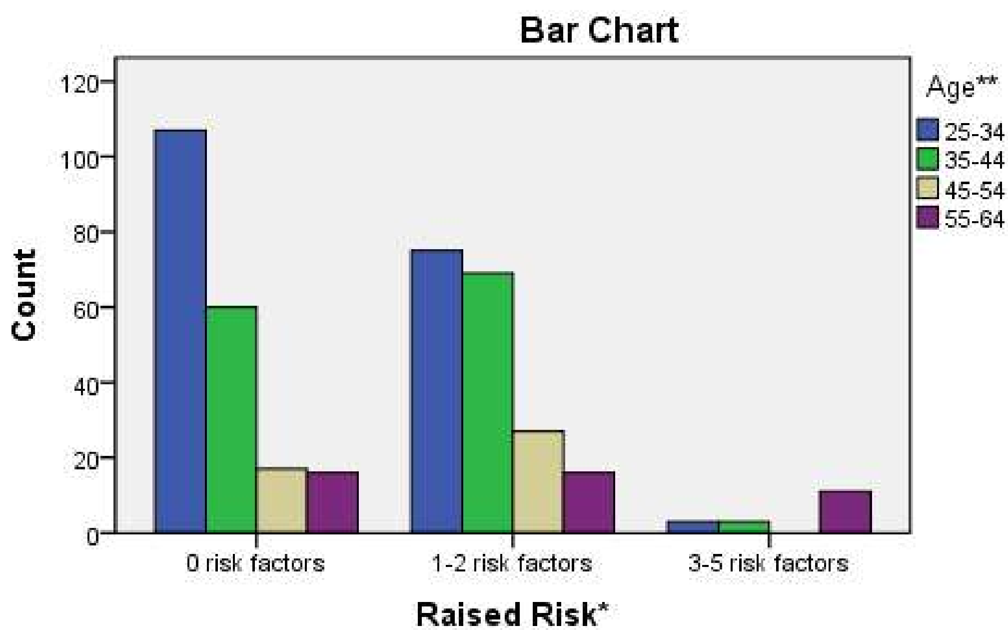


Figure 3: Combined risk factors of CNCDs by age group in Mizan-Aman, Oct 2015

6.5. Factors associated with the risk factors of CNCDs

The bivariate logistic regression showed that sex, marital status, educational status, work status and income were significantly associated with behavioral risk factors of CNCDs. It further revealed that sex, age, work status, current smoking, current alcohol drinking, low servings of fruits and/or vegetables and physical inactivity were associated with biological risk factors of CNCDs. Then, to control the effect of possible confounders, multivariate logistic regressions were computed with a confidence interval of 95%; to explore the association between independent variables and the risk factors/dependent variables. P-value <0.05 on a bivariate logistic regression was considered to select candidate variables for multivariate logistic regression analysis as well as to declare statistically significant variables.

The multivariate logistic regression analysis revealed that sex, educational status, marital status, work status and income were positive predictors of behavioral risk factors of CNCDs. The odds of smoking among those who had educational status of primary and below was nearly three times (AOR=2.9, 95% CI=1.37, 6.12) higher than that of among secondary and above. It also showed that the odds of alcohol drinking among women was nearly ten times higher than that of among men (AOR=9.76, 95% CI=5.43, 17.53). Work status was positive predictor of low servings of fruits and/or vegetables; i.e., the odds of low servings of fruits and/or vegetables among employed study participants was three times more likely (AOR=3.03, 95% CI= 1.69, 5.44) as compared to that of unemployed subjects. Educational status, work status and income were found to be positive predictors of physical inactivity. The odds of physical inactivity among those who had educational status of secondary and above was five times higher (AOR=5.02, 95%CI=1.40, 17.95) than among those who had primary education and below. The odds of khat chewing among women was nearly six times higher (AOR=5.88, 95% CI= 2.95, 11.71) when compared to that of among men. (*See: Table 9*)

Table 9: Factors associated with **behavioral risk factors** of CNCDs in Mizan-Aman, Oct 2015

Socio-demographic variables		**Current smoking** Yes	No	**Adjusted OR (95% CI)**
Educational status	Primary & below	23	115	2.9(1.37, 6.12)*
	Secondary& above.	11	215	1
		Current drinking		
		Yes	**No**	
Sex	Men	115	104	1
	Women	30	155	9.76(5.43, 17.53)*
Marital status	Married	112	115	1
	Not married	33	144	4.25(2.68, 6.73)*
		Low servings of fruits &vegetables		
		Yes	**No**	
Work status	Employed	69	275	3.03(1.69, 5.44)*
	Not employed	25	35	1
		Physical inactivity		
		Yes	**No**	
Educational status	Primary & below	33	145	1
	Secondary & above	10	216	5.02(1.40, 17.95)*
Work status	Employed	30	314	1
	Not employed	13	47	20.46(5.46, 76.69)*
Income	< 1.25 USD/day	33	40	169.08(38.17, 748.94)*
	≥1.25 USD/day	10	321	1
		Khat chewing		
		Yes	**No**	
Sex	Men	44	175	1
	Women	13	172	5.88(2.95, 11.71)*

Note: **Statistically significant (p<0.05)*

The multivariate logistic regression analysis also disclosed that sex, age, work status, alcohol drinking, low servings of fruits and/or vegetables and physical inactivity were positive predictors of biological risk factors of CNCDs. The odds of overweight among women was nearly five times (AOR= 4.89, 95% CI= 2.63, 9.08) higher than that of men. The odds of being overweight among current alcohol drinkers was two and half times higher (AOR=2.52, 95% CI = 1.47, 4.40) than that of not drinkers. Besides, the odds of hypertension among study participants in age group 25-44 was more than two times (AOR=2.16, 95% CI=1.13, 4.12) higher as compared to those of in age group 45-64; whereas the same among employed subjects was nearly four times (AOR=3.86, 95 % CI=1.97, 7.52) more likely as compared to among those unemployed. The odds of being hypertensive among current alcohol drinkers was more than two times higher (AOR=2.39, 95% CI=1.13, 5.09) as compared to that of not drinkers. The odds of hypertension among physically inactive subjects, on the other hand, was nearly six times more likely (AOR=5.60, 95% CI = 2.67, 11.77) as compared to those who had adequate physical activity. (*See: Table 10*)

Table 10: Factors associated with **biological risk factors** of CNCDs in Mizan Aman, Oct 2015

Variables		**Hypertension**		**Adjusted OR (95% CI)**
		Yes	**No**	
Age	25-44	32	285	2.16(1.13, 4.12)*
	45-64	17	70	1
Work status	Employed	32	312	3.86(1.97, 7.52)*
	Unemployed	17	43	1
Alcohol drinking	Current drinker	10	135	2.39(1.13, 5.09)*
	Not drinker	39	220	1
Low servings of fruits & Veg	Yes	17	77	1
	No	32	278	2.19(1.12, 4.28)*
Physical inactivity	Yes	15	28	5.60(2.67, 11.77)*
	No	34	327	1
		Overweight		
		Yes	**No**	
Sex	Men	16	203	1
	Women	48	137	4.89(2.63, 9.08)*
Age	25-44	44	273	1
	45-64	20	67	2.31(1.23, 4.35)*
Alcohol drinking	Current drinker	35	110	2.52(1.47, 4.40)*
	Not drinker	29	230	1

Note: **Statistically significant (p<0.05)*

CHAPTER 7: DISCUSSION

Assessment of the prevalence and associated determinants of major behavioral and biological risk factors for CNCDs is vital for its prevention and control. This, current, study had focused on determining the prevalence and determinants of known behavioral and biological risk factors for CNCDs. To assure the validity of findings; standardized methods recommended by WHO STEPS guideline and sampling methods were used. However; smoking and khat chewing could have been under-reported due to social desirability bias.

The prevalence of current smoking (8.4%) was significantly lower than the WHO report of 2012 global prevalence (49) and findings of an assessment on cardiovascular risk factors in SSA countries (50); but higher than findings of a study in Nigeria (54). This finding was almost consistent with the findings of a study in Kenya (51) and findings of a study on higher education students in Ethiopia. (48) All reported current smokers were men. This may be due to the effect of different socio-cultural factors. This finding, also, was consistent with findings of other studies where current smoking statuses were dominated by men. (49, 52)

The prevalence of current alcohol consumption (35.9%) was consistent with the findings of a study in Maharashtra, India (60), and the global prevalence of alcohol consumption; (58) whereas it was significantly higher than the findings of studies in Uganda, Kenya and Ethiopia. (51-52, 56) Here it's clear that considerable proportion of the population, due to alcohol consumption, is at higher risk of CNCDs; which calls for prompt action. The current alcohol consumption was higher among men (79.3%) than that of among women (20.7%). The results of studies on CVDs risk factors in Ethiopia (55), CNCDs risk factors survey in South West Ethiopia (56), and substance use and its association with high blood pressure among adults in Addis Ababa Ethiopia (61) revealed similar patterns. Among current alcohol consumers; the proportion of men (54.8%) reported heavy drinking was significantly higher than that of women heavy drinkers (3.3%). This is consistent with the findings of studies on CVDs risk factors, and substance use and its association with high blood pressure in Ethiopia (55, 61).

Nearly a quarter (23.3%) of the population reported consumption of fruits and vegetables below adequate level (below five servings per day), i.e. the rest 76.7% practiced consumption of five or more servings of fruits and vegetables on a typical day. This finding is consistent with the findings of a study in South West Ethiopia. (56) The proportion of the population who consumed fruits and vegetables below adequate level in this study was by far lower than the findings of studies in Vietnam, Jordan, Mozambique and Ethiopia (55, 59, 63-64); where the prevalence of low servings of fruits and vegetables were 75.7%, 83%, 95.8% and 100%, respectively. One of the possible reasons for the difference may be the abundant production of fruits and vegetables in the study area; but it needs further investigation for this study does not address such issues. The proportion of low servings of fruits and vegetables was slightly higher among men (53.2%) than that of women (46.8%).

Low level of total physical activity (< 600 MET-minutes/week) was 10.6% in the study population. This finding is significantly lower than the study findings in Kenya, Ethiopia and Tanzania. (51, 56, 65) One of the reasons for this may be the fact that majority, 89.4%, of the study population had adequate physical activity. The proportion of men with low level of total physical activity was higher than that of women (55.8% Vs 44.2%). The prevalence of current khat chewing was 14.1%. This study finding was lower than the study findings in South West Ethiopia (56); in which the prevalence of khat chewing was 38.6%.

The prevalence of hypertension (12.1%) was higher than the study findings in south west Ethiopia (56) whilst it was considerably lower than findings of the studies in Kenya, Uganda, Iran and Vietnam. (51, 53, 59, 69) This could be due to the differences in socio-economic status and lifestyles of the population in each country. One of the reasons, for this particular study, might be the fact that high proportion of the population was physically active and consumed adequate servings of fruits and/or vegetables per day. The prevalence of hypertension in the population was higher among women (53.1%) as compared to that of among men (46.9%). This is consistent with the study findings in Ethiopia (56). The mean systolic and diastolic blood pressures were (117±13) mmHg and (78±7) mmHg, respectively. This implies that majority of the study participants were in range of normal blood pressure. This may be due to the fact that majority of the study participants were physically active and exercised adequate consumption of fruits and vegetables. This finding is in line with the study findings in Uganda (53).

The prevalence of overweight (BMI 25-29.9) was 12.1%, whilst the prevalence of obesity (BMI≥30) was 4.0%. These findings were considerably lower than the global prevalence and study findings in Nigeria (54, 72). In contrary, the prevalence of overweight was also higher than the findings of some similar studies in Vietnam, Kenya and Ethiopia (51, 59, 74). The proportion of overweight women was significantly higher than that of overweight men (67.3% Vs 32.7%). This is consistent with the study findings in Nigeria and Ethiopia (54, 72). The prevalence of central obesity (21.29%) was all among women; i.e. none men had central obesity. This implies that women are at more risk of obesity than that of men.

The study revealed that sex, age, educational status, marital status, work status and income were positive predictors of risk factors of CNCDs. This is consistent with the study findings in Kenya where sex, age, educational status and work status were found to be positive predictors of risk factors of CNCDs. (51) Educational status showed statistically significant association with physical inactivity and current smoking. This is also in agreement with the study findings in Kenya and Ethiopia. (51, 57) The implication of these findings could be when people become educated; they might have better access for health information about the health effects of smoking and physical inactivity from different sources like media, news papers and scientific articles. So, educating the people could help them to protect themselves from being exposed to smoking and physical inactivity. Work status also showed a significant association with low servings of fruits and vegetables. The implication of this finding could be when people have works with better income; they might have better opportunity to purchase and consume fruits and vegetables. Hence, this might help them to eat a recommended amount of fruits and vegetables.

Age was a positive predictor of hypertension. This is in agreement with the study findings in Ethiopia. (77) This could show that when people's age increase, the risk of being hypertensive increase accordingly but it needs further investigation. Besides, alcohol consumption and physical inactivity showed a significant association with hypertension. This is consistent with the study findings in Central Development Region of Nepal. (76) This might imply that alcohol drinkers and physically inactive people are at more risk of developing the hypertension.

CHAPTER 8: CONCLUSION

The study disclosed that the prevalence of alcohol consumption was the highest followed by the prevalence of low servings of fruits and/or vegetables; as compared to other risk factors. Sex, educational status, marital status, work status and income were positive predictors of behavioral risk factors of CNCDs. Sex, age, work status, alcohol drinking, low servings of fruits and/or vegetables and physical inactivity were positive predictors of biological risk factors of CNCDs.

Besides, sex was significantly associated with alcohol drinking, khat chewing and overweight. Work status also showed significant associations with low servings of fruits and/or vegetables, physical inactivity and hypertension. Educational status, on the other hand, was seen to have significant associations with current smoking and physical inactivity.

CHAPTER 9: RECOMMENDATION

The study revealed that about 50.5% of the study population had at least one or more of the key risk factors. Therefore, Mizan Aman town health office should plan and implement health education programs on prevention and control of CNCDs. The office should also promote health education activities on risk factors of CNCDs in schools.

On top of this, Bench Maji zone health department and Mizan Aman town health office should design a local media plan to aware the public about CNCDs and their risk factors. Federal Ministry of Health (FMOH) and SNNPRS health bureau in collaboration with other stakeholders should encourage further studies on the risk factors of CNCDs. They should, also, strengthen and support CNCDs prevention and control programs. Any interested researcher should conduct further study on the biochemical measurements to have a better picture of the prevalence of the risk factors of CNCDs. It is highly recommended that government should set up a community-based CNCDs risk factors surveillance system in the future.

REFERENCES

1. Daar AS, Singer PA, Persad DL, Pramming SK, Matthews DR, Beaglehole R et al. Grand challenges in chronic non-communicable diseases. Nature; 2007 Nov 22;450(7169):494-6
2. WHO. Preventing chronic diseases a vital investment. Geneva; 2005.
3. WHO. Global Health Estimates: deaths by cause, age, sex and country; 2000-2012.
4. Dalal S, Beunza JJ, Volmink J, Adebamowo C, Bajunirwe F, et al. Non-communicable diseases in sub-Saharan Africa: what we know now. International Journal of Epidemiology 40: 885–901. 2011, Apr 28.
5. De-Graft, Aikins A, Unwin N, Agyemang C, Allotey P, Campbell C, et al. Tackling Africa's chronic disease burden from the local to the global. Global Health; 2010, 6: 5.
6. Maher D, Smeeth L, Sekajugo J. Health transition in Africa: practical policy proposals for primary care. Bull World Health Organ 88: 943–948. Epub 2010 Nov 12
7. World Health Organization. Non-communicable diseases country profiles. Geneva: WHO; 2011. p207.
8. Misganaw A, Mariam DH, Araya T. The double mortality burden among adults in Addis Ababa, Ethiopia, 2006-2009. Prev Chronic Dis; 2012; 9:110142. DOI: http://dx.doi.org/10.5888/pcd9.110142
9. WHO. The WHO STEPwise approach to chronic disease risk factor surveillance. Geneva; 2005:1–15.
10. WHO. Reducing risks, promoting healthy life. Geneva, Switzerland; 2002
11. WHO. Action Plan for global strategy for the prevention and control of Non-communicable diseases. Geneva; 2008-2013:3.77
12. Kebede D, Alem A, Mitikie G, Enquselassie F, Berhane F, Abebe Y, et al. Khat and alcohol use and risky sex behavior among in-school and out-of-school youth in Ethiopia. BMC Public Health; 2005: 5:109-114.
13. WHO. Noncommunicable Diseases Country Profiles. Geneva; 2011;5–73.

14. Jha P, Peto R, Zatonski W et al. Social inequalities in male mortality, and in male mortality from smoking: indirect estimation from national death rates in England and Wales, Poland, and North America. Lancet; 2006, 368:367–70.
15. WHO. Building blocks for tobacco control: a handbook. Geneva; 2003-2004.
16. Misganaw A, Mariam D, Ahmed Ali, Tekebash A : Epidemiology of Major Non-communicable Diseases in Ethiopia: A Systematic Review, Journal of health population nutrition; 2014 Mar;32(1):1-13
17. Casswell S. You RQ HT. Alcohol's harm to others: reduced wellbeing and health status for those with heavy drinkers in their lives. Addiction; 2011,July.
18. WHO. Global status report on alcohol and health. 2014;1–85. Available from: http://www.who.int/substance_abuse/publications/global_alcohol_report/msb_gsr_2014_1.pdf?ua=1, accessed 01 july 2015
19. IVuori Oja P, Borms J E. Physical inactivity as a disease risk and health benefits of increased physical activity.Perspectives-The multidisciplinary series of physical education and sport science. Heal enhancing Phys Act; 2004: 29–73.
20. Al Bfem. Comparative quantification of health risks: global and regional burden of disease attributable to selected major risk factors. Geneva: WHO; 2004:729–881.
21. WHO: Global recommendations on physical activity for health: Geneva; 2010
22. Al-Hebshi N, Skaug N. Khat (Catha edulis) - an updated reviews. Addiction Biol, 2005; 10:299-307.
23. Kalix P. Pharmacological properties of the stimulant Khat research. Clinical Pharmacology Ther, 1990; 48:397-416.
24. Valterio C & Kalix P. The effect of the alkaloid cathinone on motor activity of mice. Arch. Int. Pharmacodynamics; 1982; 255:196-203.
25. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, A-RH et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012;380(9859):2224−2260
26. Giday A, Tadesse B. Prevalence and determinants of hypertension in rural and urban areas of southern Ethiopia. Ethiop Med Journal; 2011: 49:139-47.
27. WHO: Reducing risks, promoting healthy life. Geneva; 2002

28. WHO. Global health risks: mortality and burden of disease attributable to selected major risks. Geneva; 2009.
29. WHO. Preventing and managing the global epidemic of obesity. Geneva; 2000
30. Alamian A PG. Clustering of chronic disease behavioral risk factors in Canadian children and adolescents. Prev Med; 2009: 48(5):493–9.
31. Meng L, Maskarinec G, Lee J KL. Lifestyle factors and chronic diseases: application of a composite risk index. Prev Med; 1999: 29(4):296–304.
32. Danaei G, Vander Hoorn S, Lopez AD, Murray CJ EM. Causes of cancer in the world: comparative risk assessment of nine behavioural and environmental risk factors. Lancet. 2005;366(9499):1784–93.
33. Macro CSA (CSA) [Ethiopia] and O. Ethiopian Demographic and Health Survey 2005. Addis Ababa, Ethiopia and Calverton, Maryland, USA: CSA and ORC Macro. 2011.
34. Commission FD of EPC. Summary and Statistical report of the population and housing census. CSA. 2007.
35. Jamison D BJ and MA. Priorities in Developing Countries. Washington Oxford University Press and The World Bank; 2006.
36. Unwin N, Setel P, Rashid S. Non communicable disease in sub-Saharan Africa: where do they feature in the health research agenda? Bull World Heal; 2001.
37. Shah B GV. Risk factors for non-communicable disease in urban Haryana: a study using the STEPS approach. Indian Hear J; 2008:60(1):9–18.
38. Unit HD, Country C, Unit M, America L. The growing burden of non communicable diseases in the eastern carebian. 2010;1–5.
39. Prevett M. Chronic non-communicable diseases in Ethiopia. A hidden burden: Ethiop J Health Science; 2008: 22(2):1 -2.
40. Cortez AL. The international development strategy beyond 2015: Considering demographic dynamics. Economic& Social Affairs; 2012; 122(1):7-16.7
41. Miranda JJ, Kinra S, Casas JP, Davey Smith G, Ebrahim S. Non-communicable diseases in low- and middle-income countries: context, determinants and health policy. Trop. Med. Int. Health; 2008: 13:1225–1234
42. Stuckler D, Basu S, McKee M. Drivers of inequality in Millennium Development Goal progress: a statistical analysis. PLoSMed; 2010: 7:e1000241.

43. BeLue R, Okoror TA, Iwelunmor J, Taylor KD, Degboe AN. An overview of cardiovascular risk factor burden in sub-Saharan African countries: a socio-cultural perspective. Global Health; 2009: 5:10. Doi:10.1186/1744–8603-5-10.

44. Godfrey KM, Barker DJ. Fetal nutrition and adult disease. Am. J. Clin. Nutr; 2000: 71: 1344S–52S

45. World Health Organization: Global status report on non-communicable diseases, Geneva, 2010

46. Central Statistical Agency (CSA) [Ethiopia] and ORC Macro. Ethiopia Demographic and Health Survey 2005. Addis Ababa, Ethiopia and Calverton, Maryland, USA: CSA and ORC Macro, 2006.

47. FDRE; Population Census Commission. Summary and Statistical report of the 2007 population and housing census. Addis Ababa. CSA; 2008 Dec.

48. Seblewengel Lemma. Assessment of Risk Factors for Selected Chronic Diseases among Higher Education Students in Addis Ababa. 2007, July :6.

49. WHO. Tobacco control: prevalence of tobacco use: Global Health Observatory (GHO) data; 2013. WWW.who.int/gho/tobacco/use/en/

50. Belue R, Okoror TA, Iwelunmor J, Taylor KD, Degboe AN, Agyemang C, et al. An overview of cardiovascular risk factor burden in sub-Saharan African countries : a socio-cultural perspective; 2008: 12:2005–8.

51. Tawa N, Frantz J,WaggieF. Risk factors for chronic non communicable diseases in Mombasa , Kenya : Epidemiological study using WHOstepwise approach. 2011;19(3):2005-8.

52. Olivia N1, Juliet N S, Simon K, Peter W , Nicholas T, Bitekyerezo M, etal. Risk factors for non-communicable diseases in rural Uganda: a pilot surveillance project among diabetes patients at a referral hospital clinic. Pan Afr Med J; 2011: 8688:1–11.

53. S VZ, Lj VDM, Sa DA. A risk-factor profile for chronic lifestyle diseases in three rural Free State towns. 2010;52(1):72–6.

54. Sani UM, Wahab KW, Yusuf BO, Gbadamosi M, Johnson O V. Modifiable cardiovascular risk factors among apparently healthy adult Nigerian population - a cross sectional study. 2010;20–3.

55. Tesfaye F. Epidemiology of Cardiovascular Disease Risk Factors in Ethiopia : The rural-urban gradient. 2008.

56. Alemseged F, Haileamlak A, Tegegn A, Tessema F, Woldemichael K, et al. Risk factors for chronic non-communicable diseases at gilgel gibe field research center, Southwest Ethiopia: Population based study. Ethiop J Heal scinces; 2012: 22:22.
57. Kebede Y. Cigarette smoking and Khat chewing among college students in North West Ethiopia. 2001. 6–15. *Ethiop. J. Health Dev.* 2002;16(1):9-17
58. WHO: The Global Information System on Alcohol and Health, Management of substance abuse, facts and figures: WHO; 2015
59. Pham LH, Au TB, Blizzard L, Truong NB, Schmidt MD, Granger RH, et al. Prevalence of risk factors for non-communicable diseases in the Mekong Delta , Vietnam : results from a STEPS survey. 2009;8:1–8.
60. Bhardwaj SD, Shewte MK, Bhatkule PR, Khadse JR. Prevalence of risk factors for non-communicable disease in a rural area of nagpur district , maharashtra – A WHO STEP wise approach . 2012;3(1):1413–8.
61. Tesfaye F, Byass P, Berhane Y, Bonita R. Association of smoking and khat (catha edulis forsk) use with high blood pressure among adults in Addis Ababa. public Heal Res Pract policy; 2008: 5(3):5.
62. FAO J, Workshop WHO. Fruit and Vegetables. 2004, Sep:1–3.
63. Al-nsour M, Zindah M, Belbeisi A, Hadaddin R. Prevalence of Selected Chronic, Noncommunicable Disease Risk Factors in Jordan : Results of the 2007 Jordan Behavioral Risk Factor Surveillance Survey. 2012;9(1):1–9.
64. Padrão P, Laszczynska O, Silva-Matos C, Damasceno A, Lunet N. Low fruit and vegetable consumption in Mozambique: results from a WHO STEPwise approach to chronic disease risk factor surveillance.Br J Nutr 107: 428-435, 2012
65. Alfa M, Marina N, Rose M, Zablon M, Kazuya K, Mari M, etal. Physical activity and cardiovascular disease risk factors among young and middle- aged men in urban Mwanza, Tanzania. Pan Afr Med J; 2012;8688:1–9.
66. Mateen FJ, Cascino GD. Khat chewing: a smokeless gun? Mayo Clin Proc. 2010 Nov; 85(11):971–973.Erratum in: *Mayo Clin Proc*. 2011 Feb; 86(2):168.
67. Basunaid S, Van Dongen M, Cleophas TJ. Khat abuse in Yemen: a population-based survey. Clin Res Regul Affairs; 2008; 25:87–92.

68. Danaei G. National, regional, and global trends in systolic blood pressure since 1980: systematic analysis of health examination surveys and epidemiological studies with 786 country-years and 5·4 million participants. The Lancet; 2011; 377(9765):568–577.

69. Press D. Risk factor investigation for cardiovascular health through WHO STEPS approach in Ardabil , Iran. Vasc Health Risk Manag; 2011: 417–9.

70. Tesfaye F, Nawi NG, Minh H Van, Byass P, Berhane Y, Bonita R, et al. Association between body mass index and blood pressure across three populations in Africa and Asia. 2007;28-37.

71. S Stewart R, DA Enquob, G Nyadzi, D Mjungu, F Magombo, M Ramirez, etal. Prevalence and correlates of hypertension: a cross-sectional study among rural populations in Sub-Saharan Africa: Journal of Human Hypertension; 2010 : 24, 786 – 795

72. WHO: NCDs risk factors. obesity. Global Health Observatory (GHO) data: WHO; 2015. www.who.int/gho/ncd/risk_factors/obesity_text/en/

73. The Economist Intelligence Unit: Sub-Saharan health care. The user experience, a focus on Non Communicable diseases: 2014, P10.

74. Muluneh AT, Haileamlak A, Tessema F, Woldemichael K, Asefa M, Mamo Y, et al. Population based survey of chronic non- communicable diseases at Gilgel Gibe Field Research Center , Southwest Ethiopia. Ethiop J Heal Science; 2012;22:8–12.

75. Tekalign D. et al. Khat chewing and mental distress: A community based study in Jimma city, south western Ethiopia. *Ethiop J Health Sci. Vol.21, March 2011*

76. Chataut J, Adhikari RK, Sinha NP; Prevalence and risk factors for hypertension in Adults living in Central Development Region of Nepal. *Kathmandu univ med J 2011:33(1)13-8*

77. Awoke et al.: Prevalence and associated factors of hypertension among adults in Gondar, Northwest Ethiopia: a community based cross-sectional study. BMC Cardiovascular Disorders 2012 12:113.

Annexes

Annex A: Consent form

Dear Participant,

You have been randomly selected to be part of this survey and that is why we would like to interview you. This survey is currently taking place in all kebeles' of Mizan-Aman town. The aim of the survey is to assess the prevalence and associated determinants of modifiable risk factors of CNCDs among adults aged 25-64 years living in Mizan-Aman town.

Confidentiality - The information you provide is totally confidential and will not be disclosed to anyone. It will only be used for research purposes. Your name, address, and other personal information will be removed from the instrument, and only a code will be used to connect your name and your answers without identifying you. You may be contacted by the survey team again only if it is necessary to complete the information on the survey.

Voluntary participation- Your participation is voluntary and you can withdraw from the survey after having agreed to participate. You are free to refuse to answer any question that is asked in the questionnaire. If you have any questions about this survey you may ask me or contact Mr Teklemariam Ergat; the principal investigator.

Consent to participate - Signing this consent indicates that you understand what will be expected of you and are willing to participate in this survey.

Signature *(If agree to participate)*

I hereby provide my ***INFORMED CONSENT*** to take part in the Study.

Name ____________________________ sign: ___________

GOOD LUCK!

Annex B: Questionnaire **Ques code:_______**

Name of Kebele __________Name of the respondent _______________

House number ____________

Part 01: Socio-demographic characteristics of the participants

Serial number	Question	Response	Code
1	**Sex**	Male Female	C1
2	What is your **age**?	______ 777. Don't know	C2
3	What is the **highest level of education** you have completed?	1 No formal schooling 2 Primary education completed 3 Secondary education completed 4 College/university education completed	C3
4	What is your **religion**?	1.Orthodox 2. Protestant 3. Muslim 4. Others	C4
5	What is your **ethnic** background?	1 Bench 2 Kaffa 3 Amhara 4 Gurage 5 Others (specify) …………	C5
6	What is your **marital status**?	1 Never married 2 Married 3 Divorced 4 Widowed	C6

7	Which one of the following best describes your **main work** over the past 12 months?	1 Government employee 2 Non-government employee 3 Self-employed 4 Student 5 housewife 6 Homemaker 7 Retired 8 Unemployed	C7
8	Taking the **past year**, can you tell me what the **earnings** of the house hold have been?	1 Per week--------or	C8a
		2 Per month ……. or	C8b
		3 Per year ……… Go→T1	C8c
		88. Refused	

Part 02: **Behavioral measurements**

Now I am going to ask you some questions about various health behaviors. This includes things like smoking, drinking alcohol, eating fruits and vegetables and physical activity. Let's start with tobacco.			
2.1: Tobacco use			
Serial number	**Question**	**Response**	**Code**
9	Do you currently **smoke tobacco products**, such as cigarettes, pipes, etc?	1 Yes 2 No If No, go →T6	T1
10	How old were you when you **first started** smoking?	Age (years) __________ *If known, Go → T4a* Do not know 77	T2

11	Which one of the following **tobacco products** do you smoke?	Manufactured cigarettes ___	T3a
		Hand-rolled cigarettes_____	T3b
		Pipes full of tobacco______ others(specify)________________	T3c T3others
		Don't know 77	
12	In the past, did you **ever** smoke tobacco products?	1.Yes 2. No If No, go → T7	T4
13	How old were you when you **stopped past** smoking?	Age (years) ___________ *If known, go →T8a* Do not know 77______	T5
14	During the past 7 days, on how many days did someone **in your home** smoke when you were present?	Number of days _______ Don't know 77 ____	T6
15	During the past 7 days, on how many days did someone **smoked in closed areas** in your work place when you were present?	Number of days _____ Don't know or don't work I a closed area 77 ____	T7

2.2: Alcohol consumption

The next questions ask about the consumption of alcohol.

S .no	Question	Response	Code
16	Have you **ever** consumed alcoholic drinks such as beer, wine?	1.Yes 2.No If No, go → D1	A1
17	Do you **currently** consume alcoholic drinks?	1. yes 2. No If No, go → D1	A2

18	If ‘yes’ to question no.16, **how often** do you consume alcoholic drinks in a week?	Number of days ______	A3
19	Have you consumed alcoholic drink **within the past 30 days?**	1. yes 2. No If No, go → D1	A4
20	If ‘Yes’ to Question no.19, What was the average number of standard alcoholic drinks you had daily?	Number _____	A5
	For men: *Did you have five or more drinks on any day in last week?*	1. Yes 2. No	
	For women: *Did you have four or more drinks on any day in last week?*	1. Yes 2. No	
21	During the past 30 days, when you consumed an alcoholic drink, how often was it with meals? *Please do not count snacks*	1 Usually with meals 2 Sometimes with meals 3 Rarely with meals 4 Never with meals	A6

2.3 Diet

The next questions ask about the fruits and vegetables that you usually eat. I have a nutrition card here that shows you some examples of local fruits and vegetables. Each picture represents the size of a serving. As you answer these questions please think of a typical week in the last year

S.No	Question	Response	Code
22	In a typical week, on how many days do you **eat fruit**?	Number of days______ Don’t know 77 _____ IF Zero days, go → D3	D1

23	How many **servings** of fruit do you eat on **one** of those days?	Number of servings ___ Don't know 77 ___	D2
24	In a typical week, on how many days do you **eat vegetables**?	Number of days_____ Don't know 77 ____ IF Zero days, go → D5	D3
25	How many **servings** of vegetables do you eat on one of those days?	Number of servings____ Don't know77 __	D4
26	What type of **oil or fat is most often** used for meal preparation in your household?	1 Vegetable oil 2 Butter (animal) 3 Non used 4 Other Don't know77 __ If other, go to D5other	D5
		Other (Specify) ____________________	D5other
27	On average, how many **meals per week** do you eat that were not prepared at a home? By meal, I mean breakfast, lunch and dinner	Number _____ Don't know 77 __	D6

2.4 Physical activity

Next I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person.

Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, seeking

employment. In answering the following questions **'vigorous-intensity activities'** are activities that require hard physical effort and cause large increases in breathing or heart rate, **'moderate-intensity activities'** are activities that require moderate physical effort and cause small increases in breathing or heart rate.			
S. no	**Question**	**Response**	**Code**
28	Does your work involve **vigorous-intensity** activity that causes large increases in breathing or heart rate like (*carrying or lifting heavy loads, digging or construction work)* for at least 10 minutes continuously?	1 Yes 2 No If No, go → P4	P1
29	In a typical week, on how many days do you do vigorous-intensity activities as part of your work?	Number of days _____	P2
30	How much time do you spend doing vigorous-intensity activities at work on a typical day?	Hours : Minutes _____hrs : ____mins	P3
31	Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking *(or carrying light loads)* for at least 10 minutes continuously?	1 yes 2 No If No, go →P7	P4
32	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Number of days _____	P5
33	How much time do you spend doing moderate-intensity activities at work on a typical day?	Hours : Minutes _____hrs : ____mins	P6
Travel to & from places (usual travel to and from places)			
34	Do you walk or use a bicycle (pedal cycle) for at least 10 minutes continuously to get to & from places?	1.Yes 2. No If No → P10	P7
35	In a typical week on how many days do you walk or bicycle for at least 10 minutes	Number of days ------	P8

	continuously to get to and from places?		
36	How much time do you spend walking or bicycling for travel on a typical day?	Hours : Minutes _____ _________	P9
	Recreational activities		
37	Do you do any Vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like (*running, football*) for at least 10 minutes continuously?	1 Yes 2 No If No, go →P13	P10
38	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational activities?	Number of days ________________	P11
39	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hours : Minutes ______ : _____	P12
40	Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate such as brisk walking, (*cycling, swimming, and volleyball*) for at least 10 minutes continuously?	1 Yes 2 No If No, go →P16	P13
41	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational activities?	Number of days ______________	P14
42	How much time do you spend doing moderate intensity sports, fitness or recreational activities?	Hours : Minutes _____ : _______	P15
	Sedentary behavior		
43	How much time do you usually spend sitting or reclining on a typical day? (*Do not include time spent sleeping)*	Hours : Minutes _____hrs : ____mins	P16

2.4 Khat chewing			
44	Have you ever chew khat?	1. Yes 2. No If No →H1	K1
45	Do you currently chew khat?	1. Yes 2. No	K2
46	How often do you chew khat?	1. Daily 2. Usually 3. Sometimes 4. Rarely	K3
Part 03: Biological risk factors measurement **3.1 History of Raised Blood Pressure**			
47	Have you ever had your blood pressure measured by a doctor or other health worker?	1 yes 2 No If No, go →H6	H1
48	If you have been measured, did they tell you that you have raised blood pressure or hypertension?	1 yes 2 No If No, go → H6	H2
49	Have you been told in the past 12 months?	1 yes 2 No	H3
50	Are you currently receiving any treatments/medication for high blood pressure prescribed by a doctor or other health worker?	1 Yes 2 No	H4
3.2: Physical measurements			
51	Height	in Centimeter ________	M1

52	Weight *If too large for scale, code 666.6*	in Kilogram (Kg) ___________	M2
53	Waist circumference	in centimeter _________	M3
54	Hip circumference	in centimeter ……..	M4
3.3: **Blood Pressure**			
55	Reading 1	Systolic (mmHg) ……………	M5a
		Diastolic (mmHg) ……………..	M5b
	Reading 2	Systolic (mmHg) ……………	M6a
		Diastolic (mmHg) ……………..	M6b
	Reading 3	Systolic (mmHg) ……………	M7a
		Diastolic (mmHg) ……………..	M7b
	Pulse		

Participant feedback form

Dear Participant, __________________________

We thank you very much for participating in the study of risk factors for chronic diseases in Mizan-Aman town. This study was undertaken in order to gather information on the following risk factors for chronic diseases in Mizan-Aman: **tobacco use, alcohol consumption, low intake of fruit and vegetables, physical inactivity, Khat chewing, raised blood pressure, overweight and obesity**. We would like to provide you with an overview of your results from the physical measurements.

Blood pressure Systolic: _________ mmHg, Diastolic: _________ mmHg

Blood pressure classification

1. Normal (SBP< 120 and DBP< 80)
2. Pre-hypertension (SBP 120-139 and/or DBP 80-89)
3. Hypertension (SBP≥140 and/or DBP≥90)
4. Currently on medication

Height: ______________ cm,**Weight**:_____Kg
Body Mass Index (BMI): ________________________ kg/m2

BMI classification

A. Underweight (BMI< 18.5)

B. Normal weight (BMI 18.5-24.9)

C. Overweight (BMI 25-29.9)

D. Obese (BMI≥30)

NB.

- If you are classified as **pre-hypertensive and/or hypertensive**, or **overweight and/or obese** you have to visit/consult your doctor promptly

Annex C: የተሳትፎ ፈቃድ መስጫ ፎርም (የተተረጎመ)

ዉድ ተሳታፊ፤

በሚዛን አማን ከተማ አስተዳደር ከ25-64 እድሜ ክልል ዉስጥ ባሉ ነዋሪዎች ላይ ጥናታዊ መረጃ እያሰበሰብን እንገኛለን፡፡ እርስዎም በዘፈቀደ (randomly) የዚህ ጥናት ተሳታፊ ሆኖ ተመርጠዋል፡፡

በጥናቱ ሲሳተፉ የሚሰጡን መረጃ በሚስጢር የሚያዝና ለጥናቱ ብቻ የሚዉል ነዉ፡፡ ስምዎ፤ አድራሻዎ እና ሌሎች መረጃዎችን ከመጠይቁ አጥፍተን እርስዎን የሚንለየዉ በኮድ ብቻ ይሆናል፡፡ እርስዎን በድጋሚ ማግኘት ካስፈለገ ፤ በዚህ ኮድ መሰረት የመረጃ አሰባሰብ ቡድኖች በኋላ ያገኝዎታል፡፡

ተሳትፎዎ በእርስዎ ፈቃደኝነት ላይ የተመሰረተ ይሆናል፡፡ ያልተመቹዎትን ጥያቄ ያለመመለስ መብት አለዎት፡፡ ጥናቱን በተመለከተ ማንኛዉም ጥያቄ ካሎት ሊጠይቁን ይችላሉ፡፡

ስለዚህ በጥናቱ ለመሳተፍ ዝግጁ ከሆኑ በሚቀጥለዉ ክፍት ቦታ በመፈረም ፈቃደኛ መሆንዎን ያረጋግጡልን፡፡

በጥናቱ ለመሳተፍ ፈቃደኛ መሆኔን አረጋግጣለሁ፡፡

ስም ________________________ ፊርማ ________

አመሰግናለሁ!

Annex D: መጠይቅ *(ወደ አማርኛ የተተረጎመ)*

የቀበሌ ስም_______ የመላሽ ስም ___________________የቤት ቁጥር ________

የጠያቂ (interviewer) ስም ___________________ **ኮድ** _______

1. **ማህበራዊ እዉነታ መረጃ**		
ተ.ቁ	**ጥያቄዎች**	**ምላሾች**
1	ፆታ	1. ወንድ 2. ሴት
2	እድሜዎት ስንት ነዉ?	_______
3	የትምህርት ደረጃዎ (highest level of education completed) ምንድነዉ?	1. መደበኛ ትምህርት ያልተማሩ 2. የመጀመሪያ ደረጃ ትምህርት ያጠናቀቁ 3. ሁለተኛ ደረጃ ትምህርት ያጠናቀቁ 4. የኮሌጅ/የኒቨርሲቲ ትምህርት ያጠናቀቁ
4	ሀይማኖትዎ ምንድ ነዉ?	1. ኦርቶዶክስ 2. ፕሮቴስታንት 3. ሙስሊም 4. ሌላ ....
5	ብሄረሰብዎ ምንድነዉ?	1. ቤንች 2. ከፋ 3. አማራ 4. ጉራጌ 5. ሌላ ....
6	የጋብቻ ሁኔታዎ (marital status) ምንድነዉ?	1. ያላገቡ 2. ያገቡ 3. አግብቶ የፈቱ 4. ባል/ሚስት በሞት የተለየዉ
7	ዋና መተዳደሪያ ስራዎ (Main work) ምንድነዉ? (ላለፉት 12 ወራት)	1. የመንግስት ቅጥረኛ 2. የግል ድርጅት ቅጥረኛ 3. በግል ሰርቶ የሚኖር (self-employed) 4. ተማሪ 5. የቤት እመቤት 6. የቤት ሰራተኛ

		7. ጡረተኛ 8. ስራ አልባ (unemployed)
8	ያለፈዉን አመት በማስታወስ፤ የቤት ገቢዎን ሊነግሩኝ ይችላሉ?	በሳምንት ....ወይም
		በወር .... ወይም
		በአመት ....
2. የባህሪ ልኬቶች (Behavioural measurements)		
2.1 **የትምባሆ አጠቃቀም** (Tobacco Use)		
9	የትምባሆ ዉጤቶችን ያጤሳሉ? (**ለምሳሌ- ሲጋራ**…)	1. አዎ 2. አላጤስም *መልሱ አላጤስም ከሆነ ወደ ጥያቄ ቁ. 16 ይሂዱ*
10	ማጤስ ሲጀምሩ እድሜዎት ስንት ነበር ?	እድሜ ....
11	ከሚከተሉት የትምባሆ ዉጤቶች የትኛዉን ያጤሳሉ?	በፋብሪካ የተመረተ ሲጋራ ....
		በእጅ የተጠቀለለ ሲጋራ ....
		ጋያ ....
		ሌላ ....
12	ድሮ ሲጋራ ያጥሱ ነበር?	1. አዎ 2. አይደለም
13	ድሮ ማጤስ ሲያቆሙ እድሜዎት ስንት ነበር?	እድሜ .... አመት
14	ባለፉት 7 ቀናት ፤ እርስዎ ባሉበት በቤትዎ ዉስጥ ሌላ ሰዉ ምን ያህል ጊዜ ሲጋራ አጤሴ?	የቀን ብዛት ....
15	ባለፉት 7 ቀናት ፤ እርስዎ ባሉበት በስራ ቦታ ሌላ ሰዉ ምን ያህል ጊዜ ሲጋራ አጤሴ?	የቀን ብዛት ....
2.2 የአልኮል መጠጥ አጠቃቀም (Alcohol consumption)		
16	እንደ ቢራ፤ ዊይን፤ አረቄ፤ ጠላ የመሳሰሉ የአልኮል መጠጦችን ጠጥቶ	1. አዎ

	ያዉቃሉ?	2. አልጠጣም *መልሱ 2 ከሆኔ ወደ ጥያቄ ቁ 22 ይሂዱ*
17	ሰሞኑን የአልኮል መጠጥ ጠጥተዋል?	1. አዎ 2. አልተጠቀምኩም
18	የጥያቄ 17 መልስ **አዎ** ከሆነ፤ ባለፈዉ ሳምንት ለምን ያህል ቀን አልኮል መጠጥ ወሰዱ?	ቁጥር--------
19	**ባለፈዉ 30 ቀናት** ዉስጥ የአልኮል መጠጥ ተጠቅመዋል?	1. አዎ 2. አልተጠቀምኩም *መልሱ 2 ከሆነ ወደ ጥያቄ ቁ. 22 ይሂዱ*
20	የጥያቄ 19 መልስ **አዎ** ከሆነ፤ ባለፈዉ ሳምንት በአማካይ በቀን ስንት ነበር? **ለወንድ፡** 5 እና ከዚ በላይ ጠጥተሀ ነበር? **አዎ/አይደለም** **ለሴት፡ 4 እና ከዚያ በላይ ጠጥተሽ ነበር? አዎ/አይደለም**	በቀን በአማካይ.............
21	ባለፉት 30 ቀናት ዉስጥ የአልኮል መጠጥ ሲጠጡ፤ ከምግብ ጋር የነበረበት ድግግሞሽ እንዴት ነበር? *(መከሰስ አይቆጠረም)*	1. በአብዛኛዉ ከምግብ ጋር ነበር 2. አንዳንዴ ከምግብ ጋር ነበር 3. አልፎአልፎ ከምግብ ጋር ነበር 4. በፍፁም ከምግብ ጋር አልነበረም
2.3 የአመጋገብ ስርዓት (Diet)		
22	በሳምንት ለምን ያህል ቀን **ፍራፍሬ (fruit)** ይመገባሉ? (የበዓል፤ ሃይማኖታዊ.....ወዘተ ቀናትን አያካትትም)	የቀናት ቁጥር .... *ዜሮ ቀን ከሆነ ወደ ጥያቄ ቁ 24 ይሂዱ*
23	ከነዚህ ቀናት በአንዱ ቀን ምን ያህል ጊዜ (number of servings) ፍራፍሬ ይመገባሉ?	በቁጥር..........................
24	በሳምንት ለምን ያህል ቀን አትክልት (vegetables) ይመገባሉ? (የበዓል፤ ሃይማኖታዊ....ወዘተ ቀናትን አያካትትም)	የቀናት ቁጥር .... *ዜሮ ቀን ከሆነ ወደ ጥያቄ ቁ 28 ይሂዱ*
25	ከነዚህ ቀናት በአንዱ ቀን ምን ያህል ጊዜ (number of servings) አትክልት ይመገባሉ?	በቁጥር..........................

26	በቤትዎ ዉስጥ ለምግብ ዝግጅት ምን አይነት ዘይት ወይም ስብ (oil or fat) ይጠቀማሉ?	1. የአትክልት ዘይት 2. ቅቤ 3. ምንም አንጠቀምም 4. ሌላ......
27	ከቤት ዉጪ የተዘጋጁ ምግቦችን ፤ በሳምንት በአማካይ ምን ያህል ጊዜ ትመገባለህ? (ቁርስ፤ ምሳ እና እራት)	በቁጥር ....

2.4 የአካል እንቅስቃሴ (Physical activities)

- **ሃይለኛ እንቅስቃሴ** (Vigorous –intensity activity)፡ የአተነፋፈስ ስርዓትን ወይም የልብ ምትን በከፍተኛ ሁኔታ የሚጨምር **ከባድ የአካል እንቅስቃሴ** ነዉ፡፡ ለምሳሌ፡- መቆፈር፤ በፍጥነት መሮጥ፤ ከባድ ነገር መሸከም .. ወዘተ
- **መካከለኛ እንቅስቃሴ** (Moderate –intensity activity)፡ የአተነፋፈስ ስርዓትን ወይም የልብ ምትን በአነስተኛ ሁኔታ የሚጨምር ቀላል የአካል እንቅስቃሴ ነዉ፡፡ ለምሳሌ፡- ቀላል ነገር መሸከም

28	ሥራዎት ቢያንስ ለ10 ደቂቃ ከባድ የአካል እንቅስቃሴ (**Vigorous –intensity activity**) ይጠይቃል? ለምሳሌ፡- ማረስ፤ መቆፈር፤ ጠንካራ እንጨት በመጋዝ መቁረጥ.. ወዘተ	1. አዎ 2. አይደለም ***መልሱ 2 ከሆነ ወደ ጥያቄ ቁ 31 ይሂዱ***
29	በሳምንት ለምን ያህል ቀን ከባድ የአካል እንቅስቃሴ የሚጠይቅ ስራ ይሰራሉ?	የቀን ብዛት ....
30	በቀን ከባድ የአካል እንቀስቃሴ የሚጠይቅ ስራ ለምን ያህል ሰዓት ይሰራሉ? *(የተለያዩ በዓላት ቀናትን አያካትትም)*	ሰዓት ፡ ደቂቃ .... ፡ ....
31	ሥራዎት ቢያንስ ለ10 ደቂቃ **መካከለኛ የአካል እንቅስቃሴ** (**Moderate –intensity activity**) ይጠይቃል? ለምሳሌ፡- ዉሃ መቅዳት፤ ሲሚንቶ ማቡካት፤ ወተት ማለብ፤ ከብት መጠበቅ፤ አፈር በአካፋ ማንሳት፤ እህል መዝራት እና መሰብሰብ ወዘተ	1. አዎ 2. አይደለም ***መልሱ 2 ከሆነ ወደ ጥያቄ ቁ 34 ይሂዱ***
32	በሳምንት ለምን ያህል ቀን መካከለኛ የአካል እንቅስቃሴ የሚጠይቅ ስራ ይሰራሉ?	የቀን ብዛት ....
33	በቀን መካከለኛ እንቀስቃሴ የሚጠይቅ ስራ ለምን ያህል ሰዓት ይሰራሉ? *(የተለያዩ በዓላት ቀናትን አያካትትም)*	ሰዓት ፡ ደቂቃ .... ፡ ....

2.4.1 **ከቦታ ቦታ መንቀሳቀስ** (Travelling to & from places)		
34	በቀን ቢያንስ ለ10 ደቂቃ በእግር ወይም በፔዳል ሳይክል እንቅስቃሴ ያደርጋሉ?	1. አዎ 2. አላደርግም ***መልሱ 2 ከሆነ ወደ ጥያቄ ቁ 37 ይሂዱ***
35	በሳምንት ለስንት ቀን ቢያንስ በተከታታይ ለ10 ደቂቃ ያህል በእግር ወይም በፔዳል ሳይክል እንቅስቃሴ ያደርጋሉ?	የቀን ብዛት ....
36	በቀን ለምን ያህል ጊዜ በእግር ወይም በፔዳል ሳይክል ይ[1]ዛሉ?	ሰዓት ፡ ደቂቃ .... ፡ ....
2.4.2 **የመዝነኛ እንቅስቃሴዎች** (Recreational activities)		
37	ከባድ የአካል እንቅስቃሴ (Vigorous-intensity activities) የሚጠይቁ ስፖርቶችን ወይም የመዝነኛ እንቅስቃሴዎችን ቢያንስ ለ10 ደቂቃ አድርጎ ያዉቃሉ? *ለምሳሌ፡- የእግር ካስ፣ ቴኒስ፣ high-impact aerobics ... ወዘተ*	1. አዎ 2. አይደለም ***መልሱ 2 ከሆነ ወደ ጥያቄ ቁ 40 ይሂዱ***
38	በሳምንት ዉስጥ ለምን ያህል ቀናት ከባድ የአካል እንቅስቃሴ የሚጠይቁ ስፖርቶችን ወይም የመዝነኛ እንቅስቃሴዎችን ያከናዉናሉ?	የቀናት ብዛት ....
39	በቀን ለምን ያህል ሰዓት ከባድ የአካል እንቅስቃሴ የሚጠይቅ ስፖርት ወይም የአካል ብቃት እንቅስቃሴ ያደርጋሉ?	ሰዓት ፡ ደቂቃ .... ፡ ....
40	**መካከለኛ የአካል እንቅስቃሴ** (Moderate-intensity activities) የሚጠይቁ ስፖርቶችን ወይም የመዝነኛ እንቅስቃሴዎችን ቢያንስ ለ10 ደቂቃ አድርጎ ያዉቃሉ? *ለምሳሌ፡- የቅርጫት **ኳስ** ጨዋታ፣ ሳይክልንግ፣ የፈረስ ግልቢያ፣ ሶምሶማ ሩጫ፣ ዳንስ ... ወዘተ*	1. አዎ 2. አይደለም ***መልሱ 2 ከሆነ ወደ ጥያቄ ቁ 44 ይሂዱ***
41	በሳምንት (a typical week) ዉስጥ ለምን ያህል ቀናት መካከለኛ የአካል እንቅስቃሴ የሚጠይቁ ስፖርቶችን ወይም የመዝነኛ እንቅስቃሴዎችን ያከናዉናሉ? **ለ**ምሳሌ፡-	የቀናት ብዛት ....
42	በቀን (a typical day) ለምን ያህል ሰዓት መካከለኛ የአካል እንቅስቃሴ የሚጠይቅ ስፖርት ወይም የአካል ብቃት እንቅስቃሴ ያደርጋሉ?	ሰዓት ፡ ደቂቃ .... ፡ ....

43	በቀን በመቀመጥ (sitting) ወይም ጋደም ብሎ በመቀመጥ (reclining) ምን ያህል ጊዜ ያሳልፋሉ? *(መደበኛ የእንቅልፍ ጊዜ ኢያካትትም)*	ሰዓት ፡ ደቂቃ ……… ፡ ……..
	2.5 ጫት መቃም (Khat chewing)	
44	ጫት ቅሞ ያዉቃሉ?	1. አዎ 2. አልቅምም ***መልሱ 2 ከሆነ ወደ ጥያቄ ቁ 47 ይሂዱ***
45	ሰሞኑን (currently) ጫት ቅመዋል?	1. አዎ 2. አልቃምኩም
46	ጫት የሚቅሙበት ድግግሞሽ እንዴት ይገለፃል?	1. በየቀኑ 2. አብዛኛዉን ጊዜ 3. አንዳንዴ 4. አልፎአልፎ
	3. ስነ-ህይወታዊ ልኬቶች (Biological measurements) **3.1 የደም ግፊት ታሪክ (History of blood pressure)**	
47	የደም ግፊትዎን በሐኪም ወይም በጤና ባለሙያ ተለክተዉ ያዉቃሉ?	1. አዎ 2. ተለክቼ አላዉቅም ***መልሱ 2 ከሆነ ወደ ጥያቄ ቁ. 51 ይሂዱ***
48	የደም ግፊትዎን ተለክተዉ ከሆነ፤ ግፊትዎ እንደጨመረ ተነግረዉታል?	1. አዎ 2. አልጨመረም ***መልሱ 2 ከሆነ ወደ ጥያቄ ቁ. 51 ይሂዱ***
49	የደም ግፊትዎ ስለመጨመሩ (raised blood pressure) የተነገሪዎት ባለፉት 12 ወራት ዉስጥ ነዉ?	1. አዎ 2. አይደለም
50	ሰሞኑን (currently) በሐኪም ወይም በጤና ባለሙያ የታዘዘ የደም ግፊት ህክምና/መድሃኒት እየወሰዱ ነዉ?	1. አዎ 2. አይደለም

3.2 አካላዊ ልኬቶች (Physical measurements)		
51	ቁመት (height)	............................ሴ.ሜትር
52	ክብደት (weight) *(ከመመዘኛ ስኬል አቅም በላይ ከሆነ 666.6 ይፃፉ)*	..............................ኪ.ግ
53	የወገብ ዙሪያ (waist circumference)	.... ሴ.ሜትር
54	የዳሌ ዙሪያ(hip circumference)	.............................ሴ.ሜትር
	3.4 የደም ግፊት ልኬት (Blood pressure measurement)	
55	ንባብ 01	Systolic (mmHg) ....
		Diastolic (mmHg) ....
	ንባብ 02	Systolic (mmHg) ....
		Diastolic (mmHg) ....
	ንባብ 03	Systolic (mmHg) ....
		Diastolic (mmHg) ....
	ፐልስ	

ግብረ መልስ መስጫ ፎርም *(ለተሳታፊዎች የሚሰጥ)*

ዉድ ተሳታፊ፤

በዚህ ጥናት ስለተሳተፉ እጅግ የላቀ ምስጋና እያቀረብን፤ የደም ግፊት እና የክብደት ልኬት ዉጤትዎን እንደሚከተለዉ ሰጥተንዎታል፡፡ እርሰዎም ከዚህ ዉጤት በመነሳት ለጤናዎ አስፈላጊዉን እንክብካቤ እንድያደርጉ እና በአቅራቢያዎ ወዳለዉ የጤና ተkም በመሄድ በየጊዜዉ የጤና ባለሙያዎችን እንድያማክሩ እያልን መልካም ጊዜ እንመኝልዎታለን፡፡

የደም ግፊት ምድብ (BP classification)

ሀ. **ጤናማ** (Normal) (SBP< 120 and DBP< 80)

ለ. ቅድመ-ግፊት (pre-hypertension) (SBP 120-139 and/or DBP 80-89)

ሐ. **የደም ግፊት በሽታ** (hypertension) (SBP≥140 and/or DBP≥90)

መ. **በህክምና ላይ ያሉ** (Currently on medication)

ቁመት: __________________ ሴ.ሜ.**ክብደት:**______ኪ.ግ

የሰዉነት ግዝፈት መለኪያ (BMI): ___________________________ ኪ.ግ/ሜ^2

የሰዉነት ግዝፈት ምድብ

1. **ዝቅተኛ ክብደት** - Underweight (BMI< 18.5)
2. **ጤናማ ክብደት**- Normal weight (BMI 18.5-24.9)
3. **ከልክ ያለፈ ክብደት**- Overweight (BMI 25-29.9)
4. **ጤናማ ያልሆነ ዉፍረት**- Obese (BMI≥30)

ያስተዉሉ:

- የደም ግፊት ምድብዎ **ለ** ወይም **ሐ** ከሆነ፣ በፍጥነት የጤና ባለሙያ/ሐኪም ያማክሩ
- የሰዉነት ግዝፈት ምድብዎ **3** ወይም **4** ከሆነ፣ በፍጥነት የጤና ባለሙያ/ሐኪም ያማክሩ

Declaration

I, the undersigned, declare that this research thesis is my own original work and it has not been presented for a degree in this or any other universities; and all the sources of materials used for this thesis have been fully acknowledged and the comments given during final defense were fully accommodated.

Name of the student	Signature	Date
Teklemariam Ergat Yarinbab	__________________	________________

Approval of the internal examiner

This thesis proposal has been submitted with my approval as internal examiner.

Name	Signature	Date
Abdulhalik Workicho (Assistant professor)	_________	___/____/____

Approval of chair person

This thesis proposal has been submitted with my approval as chair person.

Name	Signature	Date
Tamirat Sheweno	_________	___/___/____