

**Epidemiology of Preventable Risk Factors for Non-communicable Diseases  
among Adult Population in Tigray, Northern Ethiopia**

by

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I declare that **Epidemiology of Preventable Risk Factors for Non-communicable Diseases among Adult Population in Tigray, Northern Ethiopia** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.



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## **Dedication**

Dedicated to the humble activists and health professionals-  
who relentlessly work to reduce the human sufferings and deaths from non-  
communicable diseases.

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# **Epidemiology of Preventable Risk Factors for Non-communicable Diseases among Adult Population in Tigray, Northern Ethiopia**

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## **ABSTRACT**

The purpose of this study was to assess the epidemiology of preventable risk factors for NCDs among the adult population in Tigray, Northern Ethiopia. A quantitative descriptive cross-sectional design was employed to describe the distribution of behavioural and biological risk factors for NCDs, assess the status of knowledge, perceptions, attitude and behaviour of the study participants for NCDs and their risk factors, and a matched case-control study to identify the determinants of hypertension. The data was collected using a structured questionnaire for the interview, physical measurements including weight and height scales, non-elastic measuring tape for waist and hip circumferences, Omron digital BP apparatus for blood pressure and heart rate; Accutrend Plus for measuring fasting blood glucose, cholesterol and triglycerides. For the descriptive cross-sectional study a total of 2347 participants were included, and for the matched case control study a total of 117 cases and 235 controls participated. Behavioural and biological risk factors were assessed. Only 0.8% of the study participants used optimal fruit serving per day. The prevalence of low level physical activity (<600 MET-minutes/week) was 44.8%. The magnitude of ever alcohol consumption was 66.8%. However, the magnitude of khat chewing and tobacco smoking among the study participants was not as high as the other risk factors i.e. 3.3% and 2.3% respectively. The magnitude of hypertension, central obesity, hyperglycaemia, hypercholesterolemia and hypertriglyceridemia was 9.9%, 22.2%, 3.5%, 30.3% and 32.2% respectively. Factors associated with the risks aforementioned were gender, age, place of residence, education, knowledge status on NCDs, mental

stress and others. The status of knowledge on CVDs, breast and cervical cancers, diabetes and their potential risk factors was low and not comprehensive. Misconceptions on NCDs and body size and shape were pervasive. Risky behaviours underlying NCDs were rampant in the study population. Factors related to poor knowledge on NCDs were gender, age, place of residence, education and misconceptions on NCDs. The determinants of hypertension were physical inactivity, duration of alcohol intake, central obesity and mental stress. Awareness raising interventions on NCDs and their risk factors; improving socio-economic status and accessibility to health care settings have to be in place to curb these formidable problems.

Key words: Attitude, behaviour, behavioural risk factors, biological risk factors, cancer, CVDs, diabetes, hypertension, knowledge, mental stress, misconceptions, NCDs, perception on body size and shape, risk factors

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## CHAPTER 1

### Orientation to the study

#### 1.1 INTRODUCTION

Non-communicable diseases (NCDs) are the leading cause of mortality in the world and are a growing burden; however, they often remain invisible (World Health Organization (WHO) 2010:1). There are many risk factors that are contributing to the increasing burden of NCDs. The risk factors are majorly modifiable ones and to mention some are use of tobacco and alcohol, unhealthy diet, insufficient physical activity, overweight or obesity and elevated blood pressure, blood sugar and cholesterol (WHO 2013:2). A total of 57 million deaths occurred in the world during 2008, and of these, 36 million (63%) were due to NCDs, largely cardiovascular diseases, diabetes, cancer and chronic respiratory diseases (Alwan, David, Leanne, Edouard, Colin, Gretchen & Douglas 2010:4). Nearly 80% of these NCD-related deaths (29 million) occurred in low- and middle-income countries (WHO 2008:11). In the African Region, there are still more deaths from infectious diseases than NCDs. However, current projections indicate that by 2020 the largest increase in NCD deaths will occur in Africa, and this will exceed the combined deaths from communicable and nutritional diseases, maternal and perinatal deaths (WHO 2013:2). Communicable and nutritional diseases, maternal and perinatal problems are predicted as the most common causes of death by 2030 (WHO 2013:3).

Global and regional estimates of disease burden may not reflect the health problems faced by the world's poorest people. However, the probability of a woman between 15 and 60 years of age dying of an NCD is 12% in sub-Saharan Africa, and 5% in developed high-income countries (Shah, Reddy, Varghese & Ramadoss 2005:1746). And in men of the same age group, the risk of dying of NCDs is 15% (Shah *et al* 2005:1746). The world's poor face a double jeopardy: exposure to the risk of communicable disease and NCDs (Shah *et al* 2005:1747). The devastating effect of some NCDs' risk factors based on global reports show that each year, deaths caused by overweight or obesity, hypertension, and related health hazards are increasing (WHO 2012:7). The increasing trend of NCDs' risk factors was different among the different population groups (Mufunda, Chatora, Ndambakuwa, Nyarango, Kosia,

Chifamba, Filipe, Usman & Sparks 2011:893). Studies in some African countries showed the prevalence of stroke ranged from 0.07 to 0.3%, diabetes mellitus from 0 to 16%, hypertension from 6 to 48%, obesity from 0.4 to 43% and smoking from 0.4 to 71%. Hypertension was noted to be similar in both sexes, whereas women were more frequently obese and men were more likely to be smokers (Dalal, Beunza, Volmink, Adebamowo, Bajunirwe, Njelekela, Mozaffarian, Fawzi, Willett, Adami & Holmes 2011:892).

NCDs risk factors for Ethiopia in 2011 were 2.4% daily smoking, 17.9% inadequate physical inactivity, 35.2% elevated blood pressure, 7.1% overweight and 1.1% obesity (WHO 2011:73). Similar results have also been reported by the Federal Ministry of Health, (FMoH) (FMoH & WHO 2008:14). However, the reason for the consistent high hypertension compared to other risk factors is not clear, a view echoed in a number of the Federal Ministry of Health documents (FMoH & WHO 2008:15; FMoH 2009:19). To date, some prevalence studies conducted in Ethiopia only concentrated in the capital of the country, Addis Ababa (Fikru 2008:27; ACIPH 2010:12). To date, there are no published studies on the epidemiology of preventable risk factors of NCDs in Tigray region, Ethiopia. This study therefore examined the epidemiology of the preventable risk factors of NCDs in general and determinants of hypertension in particular in Tigray, Northern Ethiopia. Tigray was selected because its socio-demographic composition is different from that of large metropolitan areas, like Addis Ababa. Furthermore there is no evidence in the Tigray region pertaining to knowledge, perceptions, attitude and behaviour of NCDs and their risk factors. Hence, there is a need for this study to explore these issues in the Tigray region of Ethiopia.

## **1.2 BACKGROUND**

Chronic diseases are diseases of long duration with slow progression. Of the nine million premature deaths from chronic disease in 2008, 90% occurred in low- and middle-income countries (WHO 2012:2). Although there is variation with age and gender, most of the common chronic diseases and the resulting mortality are caused by dietary, lifestyle and metabolic risk factors (Danaei, Ding, Mozaffarian, Taylor & Rehm 2009:15). Behaviour changes like quitting smoking, adopting a healthy diet, and increasing physical activity reduce morbidity rates of NCDs (Braveman, Paula, Cubbin, Egerter, Williams & Pamuk 2010:188). Socioeconomic status, education level and race or ethnicity is important factors that are noted to influence NCDs and their care (Braveman *et al* 2010:189).

NCDs cause more than half of deaths of adults aged 15–59 years in the developed world, and are becoming a significant burden in sub-Saharan Africa (Lopez, Mathers, Ezzati, Jamison & Murray 2006:1751; Baingana & Bos 2006a:21). Cardiovascular disease (CVD), cancer and injuries rank as the top three conditions (Anderson & Chu 2007:210). Of critical importance to future social inequalities in chronic disease risk will be the speed with which social patterning of risk factors spreads from the more affluent to poorer people (Zaman & Brunner 2008:406). In West Africa, marketing of imported wheat and rice has supplanted the consumption of local less-refined cereals, and the pastoral Masai in Tanzania have experienced rapid changes in eating habits associated with rises in cholesterol (Steyn & Damasceno 2006:247). Inadequate physical exercise and smoking contribute to CVD in sub-Saharan Africa and are gender related, as some are prevalent in women (hypertension and central obesity) and others in men (alcohol consumption and cigarette smoking) (Rhonda, Titilayo, Juliet, Kelly, Arnold, Charles & Gbenga 2009:8).

To date, there is no well-organized national vital registration system in Ethiopia. From the limited and inconsistent health facility data, hypertension has been cited as the leading cause of death (FMoH & WHO 2007:18). The incidence of diabetes is rising in Ethiopia. CVD, diabetes mellitus and cancers are amongst the major contributors of mortality as reported by the preliminary assessment of the Federal Ministry of Health of

Ethiopia and WHO (FMoH & WHO 2007:13). Hypertension and related diseases ranked the 7<sup>th</sup> leading cause of all deaths and the 6<sup>th</sup> cause of death in females (FMoH 2009:19). Hypertension, overweight, obesity, misuse of alcohol, cigarette smoking and khat chewing were found to be high in both urban and rural areas (Fikru 2008:27). A study among a specific population segments, including bank workers and high school teachers in Addis Ababa showed that diabetes, hypercholesterolemia and mental distress were high among the study participants (Addis Continental Institute of Public Health (ACIPH) 2010:12). Information is limited on the epidemiology of the risk factors of NCDs. This warrants the conduct of further studies to unravel the magnitude of the behavioural and biological risk factors and other underlying risk factors of NCDs in a different population, like that of Tigray region of Ethiopia. Furthermore, the underlying factors for some of the major risk factors, like hypertension need to be investigated.

### **1.3 STATEMENT OF THE PROBLEM**

NCDs threaten progress towards the achievement of the United Nations (UN) Millennium Development Goals (MDGs). Poverty is closely linked with NCDs. The rapid rise in NCDs is predicted to impede poverty reduction initiatives in low-income countries, because of the household costs associated with health care. Greater risk of exposure to tobacco and unhealthy food and limited access to health services has fuelled the magnitude of sickness and death among the socially disadvantaged people (WHO 2013:10). Chronic diseases, majorly NCDs are also a major factor in the continuous growth of medical care spending (Roehrig, Miller, Lake & Bryant 2009:361). In the United States of America (USA), the spending growth is driven in part by the greater prevalence of chronic illnesses and the longer life expectancy of the population. Improvement in treatments has significantly extended the life spans of patients with NCDs. This resulted in additional costs over long period of time (Sondik, Huang, Klein & Satcher 2010:276).

In addition to direct costs in health care, chronic diseases are a significant burden to the overall country's economy. This is through limitations in daily activities, loss in productivity and loss of days of work (Sondik *et al* 2010:278). Medical condition

including obesity also contributes to this. This is because it constitutes a major risk factor for developing chronic illnesses, such as diabetes, stroke, cardiovascular disease and cancers. It also results in significant health care spending and indirect costs, such as transportation costs (Texas Comptroller of Public Accounts 2011:34)

With varying magnitude by age and gender, most of these NCDs are caused by dietary, lifestyle and metabolic risk factors resulting mortality (Danaei *et al* 2009:18). These risk factors can be prevented by behavioural changes such as quitting smoking, adopting a healthy diet and increasing physical activity. Social determinants, including socioeconomic status, education level, and race or ethnicity, are also a major cause for the NCDs. The social determinants are also responsible for disparities observed in the care of patients with chronic diseases (Braveman *et al* 2010:190). Lack of access and delay in receiving care result in worse outcomes for patients from minorities and disadvantaged populations (Mead, Cartwright-Smith, Jones, Ramos & Siegel 2008:86). These barriers to medical care complicate patients monitoring and continuity in treatment. Minorities and low-income populations are also less likely to access and receive preventive services necessary to detect conditions at an early stage (Sondik *et al* 2010:280).

A growing body of evidence supports that prevention is effective in reducing the effect of chronic conditions. Early detection results in less severe outcomes. Clinical preventive services include screening for the existence of the disease or predisposition to its development, counseling and immunizations against infectious agents. Despite their effectiveness, the utilization of preventive services is typically lower than for regular medical services. In contrast to their apparent cost in time and money, the benefits of preventive services are not directly perceived by patient. This is because their effects are on the long term or might be greater for society as a whole than at the individual level (Kenkel 2000:1690). Therefore, public health programmes are important in educating the public, and promoting healthy lifestyles and awareness about chronic diseases (Halverson, Mays & Scutchfield 1996:296). Public health programmes are effective in reducing mortalities associated with cardiovascular disease, diabetes and

cancer. The outcome of the programmes is somewhat heterogeneous depending on the type of NCDs and prevention approaches (Mays & Smith 2011:1590; Cutler 2008:13).

In low-resource settings, health-care costs for cardiovascular diseases, cancers, diabetes or chronic lung diseases can quickly drain household resources, driving families into poverty. The exorbitant costs of NCDs, including often lengthy and expensive treatment and loss of breadwinners, are forcing millions of people into poverty annually, and stifling development (WHO 2013:13). Thus, NCDs in low- and middle-income countries can no longer be ignored or seen as a distraction from the business of prevention and control of infectious diseases (Ebrahim & Smeeth 2005:494; Horton 2007:1881). The case has been highlighted in recent reports describing the global burden in terms of mortality- and disability-adjusted life years (Leeder 2004:2636; Strong, Mathers, Leeder & Beaglehole 2005:1580; Adeyi, Smith & Robles 2007:1795). Until recently, communicable diseases remained virtually the sole priority for global health policy. However, they do not constitute the major contributor to the burden of disease in terms of disability-adjusted life years or mortality in any region of the world apart from sub-Saharan Africa (Ollila. 2005:3 & Gaziano, Reddy, Paccaud, Horton & Chaturvedi 2006:649). People living in low- and middle-income countries, including Ethiopia are more likely to die prematurely from NCDs than those in high-income countries and almost 30-40 % of all NCD related-deaths occur among people under the age of 60 in low and middle-income countries (Population reference Bureau 2012:2).

NCDs are responsible for more than half of deaths in adults aged 15–59 in all regions except South Asia and sub-Saharan Africa, where infectious disease conditions, including HIV/AIDS result in one-third and two-thirds of deaths respectively (Lopez, Mathers, Ezzati, Jamison & Murray 2006:1753). However, the NCDs are also becoming a significant burden in sub-Saharan Africa (Baingana & Bos 2006:22). The Global Burden of Disease Study, conducted in 2001, showed that 20% of deaths in sub-Saharan Africa were caused by NCDs (Lopez 2006:1754). It has also been documented that CVD, cancer and injuries rank consistently as the top three conditions in the countries of this region (Anderson & Chu 2007:210).

Of critical importance to future social inequalities in chronic disease risk will be the speed with which social patterning of risk factors spread from the more affluent to poorer people (Zaman & Brunner 2008:406). In west Africa, marketing of imported wheat and rice has supplanted the consumption of local less-refined cereals (millet and sorghum) and even the pastoral Masai in Tanzania have experienced rapid changes in eating habits associated with rises in blood cholesterol (Steyn & Damasceno 2006:248).

Additional factors are that beyond biological risk factors of lipid and blood pressure profiles, are the varied patterns of health behaviours noted to be related to NCDs. For example, smoking patterns are markedly different between countries, and therefore, their population-attributable risk towards NCDs and mortality is not the same throughout the low- and middle-income countries (Ezzati & Lopez 2004:391).

The strong social patterning of many NCDs forces us to consider approaches to their prevention well beyond the simple risk factor profile of an individual. For example, from a merely economic perspective, belonging to a lower socioeconomic status confers protection from obesity up to a level of \$2500 per capita per year when inequities in obesity start to appear. If obesity is approached as a social networking issue, an interesting pattern also appears that shows clustering of individuals with obesity – and increased risks for the development of such condition in individuals closer to obese ones (Christakis & Fowler 2007:375).

The alarming rate of growth in the burden of both death and disability from non-communicable diseases in Africa is ever more recognized, with chronic diseases becoming more prevalent, linked to demographic, behavioural and social changes and urbanisation (African Union, AU 2013:2). A literature review conducted for sub-Saharan African countries revealed that the epidemic of CVD in sub-Saharan Africa is driven by multiple factors working collectively. Lifestyle factors such as diet, exercise and smoking contribute to the increasing rates of CVD in sub-Saharan Africa. Some lifestyle factors are considered gendered in that some are salient for women and others for men. For instance, obesity is a predominant risk factor for women compared to men, but smoking still remains mostly a risk factor for men. Additionally, structural and system level issues

such as lack of infrastructure for healthcare, urbanization, poverty and lack of government programmes also drive this epidemic and hampers proper prevention, surveillance and treatment efforts (Rhonda *et al* 2009:9).

In conclusion, the common preventable risk factors, such as tobacco use, alcohol misuse and inactivity that underlie most chronic diseases are perceived as the leading causes of death and disability burden in all countries, regardless of their economic development status (WHO 2005:13). The leading risk factor globally is raised blood pressure, followed by tobacco use, raised total cholesterol, and low fruit and vegetable consumption. These risk factors together, account for approximately 80% of deaths from heart disease and stroke, diabetes and cancer (WHO 2010:1). Limited studies were conducted on risk factors of NCDs in Tigray, northern Ethiopia. Hence, this study was conducted to address the following:

- Inadequate information on the prevalence and distribution of risk factors of NCDs; and
- Lack of information on knowledge, attitudes and behaviours on preventable risk factors and perception towards body size and shape of the community.

Generation of evidences in these areas will have remarkable contribution in designing appropriate intervention to all segments of the population in preventing and controlling NCDs and its impacts.

Misganaw, Haile Mariam, Ali and Araya (2014:5) conducted a systematic review of peer-reviewed and grey literature between 1960 and 2011 on major NCDs in Ethiopia. Half of these reviewed studies were from Addis Ababa. It was documented that the prevalence of CVD from two hospital based studies was 7.2% and 24%; a hospital-based study reviewed showed cancer prevalence to be 0.3% and two hospital-based studies reviewed revealed diabetes prevalence of 0.5% and 1.2%. Most of the studies reviewed the impact of these diseases on mortality: cardiovascular disease accounts for 24% of deaths in Addis Ababa, cancer causes 10% of deaths in the urban settings and 2% deaths in rural setting, and diabetes causes 5%, and chronic obstructive pulmonary

disease causes 3% of deaths. Most of the studies reviewed also showed the impact of these diseases on hospital admissions: cardiovascular disease accounts for 3%-12.6% and found to have increased between 1970s and 2000s; cancer accounts for 1.1%-2.8%, diabetes accounts for 0.5%-1.2%, and chronic obstructive diseases account for 2.7%-4.3% of morbidity. In addition to the aforementioned situations on the impact of NCDs in Ethiopia, morbidity from hypertension, stroke, diabetes, renal diseases, cancer and chronic respiratory diseases are increasing from time to time. It is also witnessed that hospital admissions due to these conditions is increasing tremendously. If not tackled timely through appropriate interventions, the NCDs will continue claiming the lives of many adults in the productive age group. Consequently, it also hampers the socio-economic development of the country due to death of economically productive people. It will have also another serious economic impact as resources should be allocated and invested to care for cases with the NCDs.

A study conducted in Addis Ababa and Butajira, Ethiopia by Fikru (2009:29) showed that hypertension is more prevalent than other biological risk factors, like obesity and overweight. A report by WHO (2011:73) showed raised blood pressure is more common compared to other risk factors, such as misuse of alcohol. However, there is lack of evidence on why hypertension or elevated blood pressure is high. Therefore, the reasons for the elevated blood pressure need to be investigated. Obtaining evidence on this will facilitate to institute interventional measures to avert the preventable risk factors of NCDs in Tigray and Ethiopia as a whole.

## **1.4 THE THEORETICAL FRAMEWORK**

### **1.4.1 Epidemiological Transition**

The epidemiological transition describes changing patterns of population age distributions, mortality, fertility, life expectancy, and causes of death (Omran 1971:510). There are two major components of the transition: The first is changes in population trajectories and composition, especially in the age distribution from younger to older, and secondly changes in patterns of mortality, including increasing life expectancy and reordering of the relative importance of different causes of death. Conceptually, the theory of epidemiological transition focuses on the complex change in patterns of health

and disease and on the interactions between these patterns and their demographic, economic and sociologic determinants and consequences. However, others challenge this theory by stating that the theory is most relevant as a way of looking at and understanding the relation among disease, mortality patterns, and population dynamics rather than as a definitive explanation or prediction (Robert 2009:6).

In his theory, Omran formulated three epidemiological transitions: The first transition phase, called the “Age of Pestilence and Famine,” is characterized by high and fluctuating mortality rates, variable life expectancy with low average life span, and periods of population growth that are not sustained. “Age of Receding Pandemics” is marked by declining mortality rates that become steeper as epidemics occur less frequently, an increase in average life expectancy from about 30 years to about 50 years of age, and more sustained population growth that eventually becomes exponential. The third transition phase is called the “Age of Degenerative and Man-Made Diseases.” In this phase, it is theorized that infectious disease pandemics are replaced as major causes of death by degenerative diseases, and infectious agents as the major contributor to morbidity and mortality are overtaken by anthropogenic causes (Omran 1971:518).

It is evidenced that the epidemiological transition theory appears to have some confirmation in recent trends that were characterized by increased life expectancy and a shift in the population age distribution to older ages, as well as the concomitant increase in the number of people living with chronic degenerative disease. These changes have a profound impact on public health planning, health care resources and workforce development, and a range of social, political, and financial policies. Although such changes consistent with the theory have been evident, there are some issues that remain controversial (Robert 2009:6). Caldwell (2001:159) argues that the original theory “fails to grasp the global nature and historical sequence of the mortality transition as it spread.” Criticisms of the original theory reflect continuing development in theories of health and disease, disagreement about the role of advances in medicine relative to public health interventions, and debate about the relative importance of various contributors to the unquestioned changes in mortality and disease patterns, especially

with regard to nutrition, poverty, and income inequalities. The theory of epidemiological transition has been useful in laying out an overarching perspective on changing demographic patterns. The various criticisms of the theory suggest that it is most relevant as a way of looking at and understanding the relation among disease, mortality patterns, and population rather than as a definitive explanation or prediction. Among the major critiques of the theory is that the overemphasis on mortality rather than disease causality and morbidity misses critical pieces of complex phenomena. The focus on mortality and life expectancy gives insufficient attention to disability and quality of life (Robert 2009:7).

One of the causes for considerable alarm is the projected rise in both proportional and absolute CVD mortality rates in the developing countries over the next 25 years (Omran 1971:522; Pearson, Jamison & Tergo-Gauderies 1993:579). The reasons for this anticipated acceleration of the epidemic are many. In the second half of the twentieth century, most developing countries experienced a major surge in life expectancy (World Bank 1993:30). For example, the life expectancy in India rose from 41.2 years in 1951–1961 to 61.4 years in 1991–1996. This was principally due to a decline in deaths occurring in infancy, childhood, and adolescence and was related to more effective public health responses to perinatal, infectious, and nutritional deficiency disorders and to improved economic indicators, such as per-capita income and social indicators, such as female literacy in some areas. Although this is a cause for celebration (and much remains to be done in these areas), the demographic shifts have augmented the ranks of middle-aged and older adults. The increasing longevity provides longer periods of exposure to the risk factors of CVD, resulting in a greater probability of clinically manifesting or occurring CVD events (Reddy 1993:102). The concomitant decline of infectious and nutritional disorders (competing causes of death) further enhances the proportional burden due to CVD and other chronic lifestyle-related diseases. This shift, representing a decline in deaths from infectious diseases to an increase in those due to chronic diseases, is often referred to as the modern epidemiological transition (Omran 1971:527; Pearson *et al* 1993:581).

The ratio of deaths due to pre-transitional diseases (related to infections and malnutrition) to those caused by post-transitional diseases (e.g., CVD and cancer) varies among regions and between countries, depending on factors such as the level of economic development and literacy as well as availability and access to health care. The direction of change toward a rising relative contribution of post-transitional diseases

is, however, common to and consistent among the developing countries (Pearson *et al* 1993:582). The experience of urban China, in which the proportion of CVD deaths rose from 12.1% in 1957 to 35.8% in 1990, is illustrative of this phenomenon (Yao, Wu & Wu 1993:114).

#### **1.4.2 Demographic Transition**

Demographic transition, the shift towards low mortality and fertility rates occurs when there is a process of overall modernization resulting from industrialization, urbanization, education, empowerment of women, and substantial overall socio-economic development. Such a shift would lead initially to a drop in mortality through progress in hygiene and medicine and, subsequently, to a decline in fertility occasioned by economic growth. Giving mortality decline as a pre-condition for fertility decline forms the cornerstone of the theory. In this regard, the classical wisdom often describes infant mortality as a decisive factor influencing parents to reduce their fertility. The relationship of socio-economic development and fertility decline has also been the focus of many discussions. Although the theory has experienced a great deal of critical analysis, it has remained a useful framework for discussing the dynamics of fertility and mortality change in the world (Economic Commission for Africa 2002:18)

Africa has experienced a mortality decline sustained for more than half a century, which accompanied socioeconomic development, advances in medical care, improvements in hygiene and reduction of infant mortality. However, fertility has not decreased significantly in most African countries. The high rate of population growth observed in Africa is, therefore, the result of a continuing decline in mortality and relatively high fertility. In the absence of a significant decline in fertility, Africa is the last region of the world to have embarked on demographic transition. Although the theory of demographic transition has experienced a great deal of critical analysis, it remains a useful framework for discussing the dynamics of fertility and mortality changes (Economic Commission for Africa 2002:21).

### **1.4.3 Lifestyle Changes**

Lifestyle has long been associated with the development of many chronic diseases. WHO has recognized diabetes, cardiovascular disease and stroke, cancer and chronic lung diseases as major non-communicable diseases (NCDs). These major NCDs share common lifestyle related risk factors like physical inactivity, unhealthy diet, tobacco use and harmful use of alcohol. Globally, the current scenario of NCDs is the major cause of morbidity and mortality (Kaushik, R & Khanna, P. 2012:7). Although economic development has raised living standards, it has brought with it more sedentary but stress filled lifestyles, smoking and high fat and salt consumption. These significant life style changes coupled with population ageing have led to an increase in NCDs such as diabetes and cancers. The relevance of focusing on lifestyle factors to reduce the burden of NCDs including cardiovascular diseases, diabetes and cancers came to the attention of health care planners since the beginning of 1990s (Ahmad, FY, Amal, NM, Gaurpreet, K, Mohd, AO, Vos, T, Rao, VPC, and Begg, S. 2004:32-40). The increasing use of tobacco in a number of developing countries will also translate into higher mortality rates of CVD, lung cancer, and other tobacco-related diseases (Peto 1996:1683; Peto, Lopez, Boreham & Thun 1996:15).

### **1.4.4 Nutrition Transition**

As recently reviewed by Drewnowski and Popkin (1997:34), the global availability of cheap vegetable oils and fats has resulted in greatly increased fat consumption among low-income countries. The transition now occurs at lower levels of the gross national product than previously and is further accelerated by rapid urbanization. In China, for example, the proportion of upper-income persons who were consuming a relatively high-fat diet (>30% of daily energy intake) rose from 22.8% to 66.6% between 1989 and 1993. The lower- and middle-income classes also showed a rise (from 19% to 36.4% in the former and from 19.1% to 51.0% in the latter) (Peto 1996:1684). The Asian countries, with a diet that is traditionally high in carbohydrates and low in fat, have shown an overall decline in the proportion of energy from complex carbohydrates along with the increase in the proportion of fat. The globalization of food production and marketing is also contributing to the increasing consumption of energy-dense foods poor in dietary fibre and rich in micronutrients (Lang 1997:178).

### **1.4.5 Tobacco Trends**

The rising tobacco consumption patterns in most developing countries contrast sharply with the overall decline in the industrial nations. Recent projections from the World Health Organization suggest that, by the year 2020, tobacco will become the largest single cause of death, accounting for 12.3% of global deaths (WHO 1996:65). India, China, and countries in the Middle Eastern Crescent will by then have tobacco contributing to >12% of all deaths. In India alone, the tobacco attributable toll will rise from 1.4% in 1990 to 13.3% in 2020. A large component of this will be in the form of cardiovascular deaths. Tobacco is the leading avoidable cause of death worldwide, and its rising consumption in the developing countries warrants early and effective public health responses.

### **1.4.6 Khat chewing**

For over 1400 years, the chewing of fresh leaves of *Catha edulis* Forssk., variously referred to as Khat, chat, Abyssinian tea, etc. as a stimulant or euphoriant has been practiced in the Middle East, Somalia, Ethiopia and extending down to as far as the Cape of South Africa (Dhadphale, Mengech & Chege 1981:132). Up until a few decades ago, khat chewing was mainly restricted to older men or members of Muslim communities who used it in lieu of alcohol on religious grounds and, therefore, the habit did not pose serious public health or socio-economic problems (Halbach 1980:318). In recent years, however, its use has spread across many faiths, ethnic groups, age, sex, etc (Getahun & Krikorian 1973:364). Khat (*Catha edulis*) is a shrub or tree whose leaves have been chewed for centuries by people who live in the Eastern part of Africa and the Arabian Peninsula. It has recently turned up in North America and Europe, particularly among emigrants and refugees from countries such as Somalia, Ethiopia and Yemen. Khat contains a number of chemicals, among which are two controlled substances, cathinone (Schedule I) and cathine (Schedule IV). Both chemicals are stimulant drugs with effects similar to amphetamine. Chewing the leaves makes people feel more alert and talkative, and suppresses appetite. Chewing Khat leaves releases cathinone, a stimulant that produces the feeling of euphoria. When cathinone is broken down in the body, it produces chemicals including cathine and norephedrine, which have a similar

structure to amphetamine and adrenaline (epinephrine). Regular Khat use is associated with a rise in arterial blood pressure and pulse rate, corresponding with levels of cathinone in the plasma. Moreover, regular Khat chewers have gingivitis and loose teeth, but there appears to be no convincing unusual incidence of oral cancer. Among Khat users in Yemen there is, however, a higher incidence of oesophageal cancer compared with gastric cancer. Long term use or abuse can cause insomnia, anorexia, gastric disorders, depression, liver damage and cardiac complications, including myocardial infarction. Manic and delusional behaviour, violence, suicidal depression, hallucinations, paranoia and Khat-induced psychosis have also been reported. On the basis of the scientific data it seems clear that Khat use has negative consequences on the economic development of a country and on the health of societies (Getahun & Krikorian 1973:374; Balint 2009:608).

## **1.5 THE WHO STEPS APPROACH**

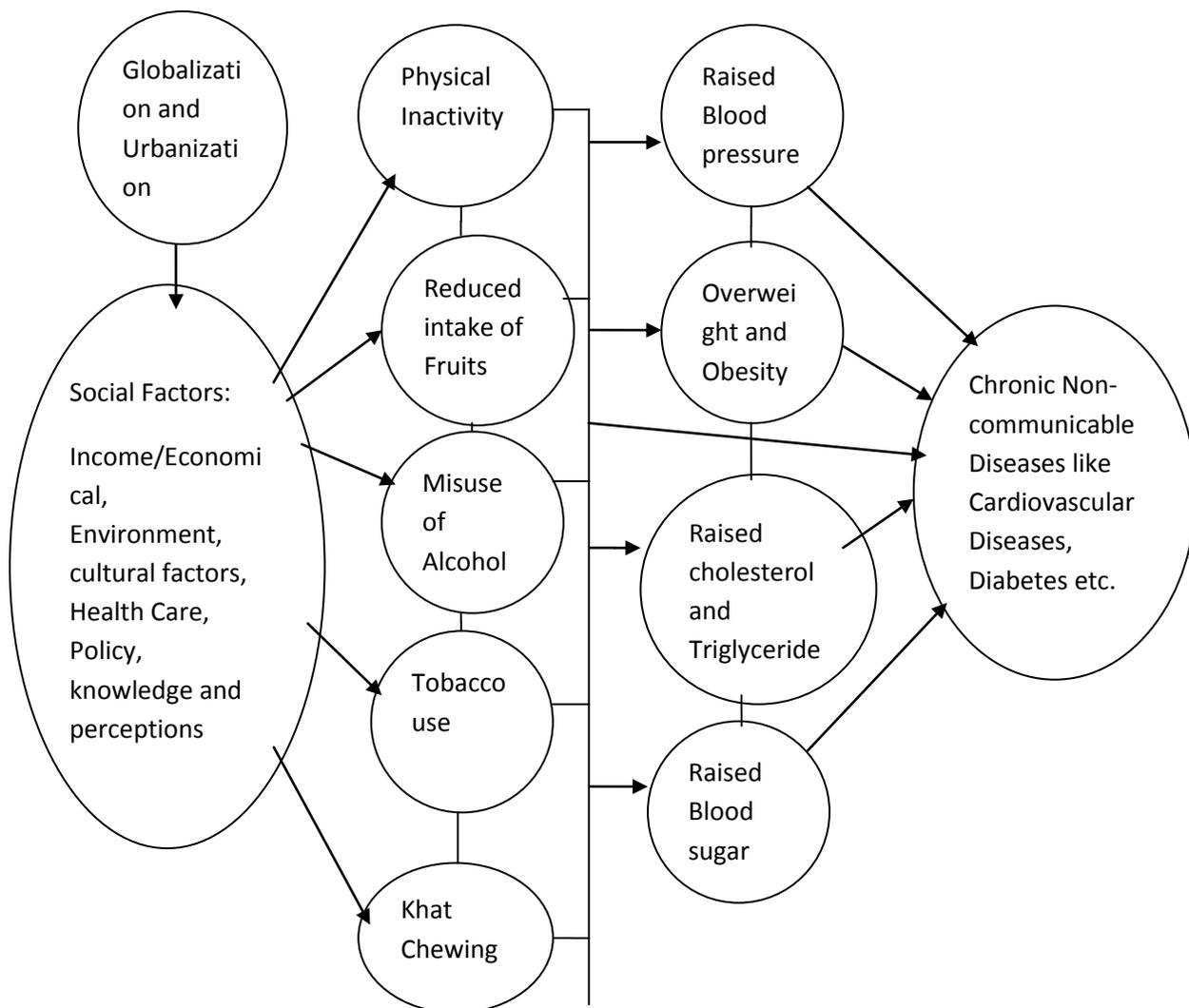
The basis of NCD prevention is the identification of the major common risk factors and their prevention and control. WHO recommends that, where resources are available, data on diseases (for example, heart disease, stroke, cancer) be included in the surveillance process. Such information is also important in assisting health services plan and determine public health priorities. From a primary prevention perspective, surveillance of the major risk factors known to predict disease is an appropriate starting point (Labarthe 1999:75). A well-functioning NCD surveillance system is an integral part of public health. As part of the wider health information system, surveillance provides information for better decision-making in countries. The use of the information determines the data collected and the speed necessary for the information flow within the system. The WHO STEPS document by Bonita, Beaglehole and Kjellström (2001:1022) argues for NCDs surveillance as an essential national public health function. The goal of the WHO global NCDs surveillance strategy is to provide standard methods and tools to enable countries to build and strengthen their capacity to conduct surveillance. The underlying framework is an integrated, systematic approach aimed at sustainable national collection of data on NCDs and their risk factors. This process enables countries to use the collected data for decision-making. The STEPs approach

is based on the concept that surveillance systems require standardized data collection to ensure comparability over time and across locations. It is also sufficiently flexible to be appropriate in a variety of country situations and settings. The STEPwise approach, therefore, allows for the development of an increasingly comprehensive surveillance system, depending on local needs and resources. While the STEPS approach can be similarly applied to disease-specific mortality and morbidity, the focus of the first STEPS document (Bonita *et al* 2001:1023) is its implementation for key NCDs risk factors. This is in recognition of the fact that ongoing surveillance of even major diseases such as heart attack and stroke are complex, costly, and difficult to achieve on an ongoing basis. Similarly, while national registration of deaths is undertaken routinely in many countries, this is not the case in many developing countries. Although there are several non-modifiable risk factors, emphasis of surveillance of factors associated with NCDs is given to those amenable to intervention (Stamler, Stamler, Neaton, Wentworth, Daviglius, Garside, Dyer, Liu & Greenland 1999:2015; Engström, Jerntorp & Pessah-Rasmussen 2001:1101). Surveillance of the eight selected risk factors which reflect a large part of future NCDs burden can provide a measure of the success of interventions. For example, inappropriate diet and physical inactivity – resulting in high body mass index, raised blood pressure and unfavourable blood lipids – together with tobacco use, explain at least 75% of cardiovascular disease (Magnus & Beaglehole 2001:2659).

Various literatures showed that the burden of NCDs preventable risk factors is increasing in low and middle income countries. The WHO has therefore devised a tool to strengthen the surveillance system of NCDs and the related risk factors in these countries. The tool can also be used as a survey questionnaire by adopting it to the country's situation (WHO 2005:23). STEPS is a sequential process, starting with gathering information on key risk factors by the use of questionnaires (Step 1), then moving to simple physical measurements (Step 2), and only then recommending the collection of blood samples for biochemical assessment (Step 3). Each STEPS has all three components namely core, expanded and optional. The core component cannot be left out. This approach is flexible based on the country's situation (WHO 2008:50).

In conclusion, the fact that studies conducted in Ethiopia to date are very few and majorly concentrating in the capital city Addis Ababa and its surrounding made the availability of the information on NCDs and their risk factors extremely limited. Thus it is believed that this study explores the epidemiology of preventable risk factors of NCDs, knowledge, perceptions, attitudes and behaviours on risk factors and determinants of hypertension among the adults in Tigray. This will ultimately help policy makers to focus on NCDs and design strategic plan to address the prevention of these diseases.

**Underlying factors    Primary risk factors    Intermediate risk factors    Outcome**



**Figure 1.1 a conceptual framework of NCDs and the risk factors**

**Table 1.1 Risk factors common to major NCDs (WHO 2001:10)**

Risk factors	Conditions			
	CVD*	Diabetes	Cancer	Respiratory conditions**
Smoking	✓	✓	✓	✓
Alcohol	✓	✓		
Nutrition	✓	✓	✓	✓
Physical inactivity	✓	✓	✓	✓
Obesity	✓	✓	✓	✓
Raised blood pressure	✓	✓		
Blood glucose	✓	✓	✓	
Blood lipids	✓	✓	✓	

\* Heart disease, stroke, hypertension. \*\*Chronic-obstructive pulmonary disease and asthma

## **1.6 SIGNIFICANCE OF THE STUDY**

To date, studies conducted in Ethiopia are very few and the majority are based in the capital city, Addis Ababa. The availability of the information on NCDs risk factors is extremely limited. Thus it is believed that this study will provide an insight into the magnitude and determinants of hypertension and knowledge, perceptions, attitudes and behaviours on risk factors of other NCDs in the study setting. This will ultimately help policy makers design a strategic plan to address the risk factors.

## **1.7 DEFINITIONS OF KEY CONCEPTS**

### **1.7.1 Chronic disease**

A chronic disease is one which is not immediately fatal but is present for months or years. Chronic diseases such as cardiovascular diseases, cancer, chronic respiratory diseases and diabetes are the leading causes of mortality globally (WHO 2011:75). This invisible epidemic is a neglected cause of poverty. Contrary to common perception, 80% of chronic disease deaths occur in low and middle-income countries (WHO 2011:75). Almost 50% of the adult disease burden and 30% of deaths in low- and middle-income countries is attributable to chronic diseases compared to 15% of the deaths in high-income countries (Lopez, Mathers, Ezzati, Jamison & Murray 2006b:1752).

### **1.7.2 Hypertension**

Hypertension is elevated systolic and diastolic blood pressure  $\geq 140/90$  mmHg. It has been referred to as a "silent killer" (van der Sande, Milligan, Nyan, Rowley, Banya, Ceesay, Dolmans, Thien, McAdam & Walraven 2000:493; Van der Sande, Walraven, Milligan, Banya, Ceesay, Nyan & McAdam 2001:426; Sande MA van der 2003:34) as it often has no early detectable symptoms; however, it is a major cause of serious and disabling health conditions, including heart disease, stroke and renal disease (Duda, Kim, Darko, Adanu, Seffah, Anarfi & Hill 2007:118 ; Hoel 1997:119). It has been identified as a major risk factor for CVD and mortality in sub-Saharan Africa (Addo, Amoah & Koram 2006:897). In relation to mortality hypertension, HIV, tuberculosis and malaria significantly contribute to this in the sub-Sahara Africa region (Addo, Smeeth & Leon 2007:1015; Agyemang 2006:528; Agyemang & Owusu-Dabo 2008:22).

### **1.7.3 Risk factors of non-communicable diseases**

The common risk factors of NCDs are regarded as behavioural and biological. Both are preventable. The behavioural risk factors are tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol. These behaviours lead to four key metabolic or biological changes: raised blood pressure, overweight or obesity, high blood glucose levels and high levels of fat in the blood. The biological risk factors are also referred to as 'intermediate risk factors' that increase the risk of NCDs. The common NCDs (CVDs, Diabetes and cancer) share the behavioural risk factors (WHO 2011:76).

### **1.7.4 STEPS Approach**

The WHO devised a tool to strengthen the surveillance system of non-communicable disease and their risk factors (WHO STEPS 2005:22). The goal of the WHO global NCDs surveillance strategy is to provide standard tools to enable countries to build and strengthen their capacity to conduct surveillance. The approach is based on the concept that surveillance systems require standardized data collection to ensure comparability over time and across locations. It is a flexible approach noted to be applicable in various country situations and settings as well as applicable to disease-specific mortality and morbidity (Bonita 2001:1025).

### **1.7.5 Behavioural risk factors**

These are major (preventable) factors identified by the WHO and are tobacco use, harmful alcohol consumption, unhealthy diet (low fruit and vegetable consumption) and physical inactivity (WHO 2005:23).

### **1.7.6 Biological risk factors**

These are factors identified by the WHO and include overweight and obesity, and elevated blood pressure, blood glucose and blood lipids (WHO 2005:25).

### **1.7.7 Cardiovascular Diseases**

These are diseases of the heart and blood vessels and include coronary heart disease, cerebrovascular disease, raised blood pressure, peripheral artery disease, rheumatic heart disease, congenital heart disease and heart failure (WHO 2011:73).

### **1.7.8 Chronic non-communicable diseases**

These are diseases of long duration and generally with slow progression. The term is usually applied when the course of the disease lasts for more than three months and when the aetiology is not an infectious agent (WHO 2011:73). In this particular research, shared risk factors for the NCDs namely CVDs, Diabetes and Cancer are emphasised on.

### **1.7.9 Kish Method**

A technique of random selection of an adult from a household after listing and ranking all eligible individuals by age and sex (WHO 2005:90).

### **1.7.10 Risk factors**

These are behaviours which increase the likelihood of developing NCDs (WHO 2005:17).

### **1.7.11 Cardiovascular diseases**

These are a group of disorders of the heart and blood vessels and they include: coronary heart disease – disease of the blood vessels supplying the heart muscle; cerebrovascular disease – disease of the blood vessels supplying the brain (WHO 2015:1).

### **1.7.12 Diabetes**

This is a condition in which the pancreas no longer produces enough insulin or cells stop responding to the insulin that is produced, so that glucose in the blood cannot be absorbed into the cells of the body (WHO 2006:21).

### **1.7.13 Cancer**

It is a generic term for a large group of diseases that can affect any part of the body. Other terms used are malignant tumours and neoplasms. One defining feature of cancer is the rapid creation of abnormal cells that grow beyond their usual boundaries, and which can then invade adjoining parts of the body and spread to other organs, the latter process is referred to as metastasizing. Metastases are the major cause of death from cancer (WHO 2015:1).

### **1.7.14 Epidemiology**

It is the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to control of health problems. "Study" includes surveillance, observation, hypothesis testing, analytic research, and experiments. "Distribution" refers to analysis by time, place, and classes of persons affected. "Determinants" are all the physical, biological, social, cultural, and behavioural factors that influence health. "Health-related states and events" include diseases, causes of death, behaviours such as use of tobacco, reactions to preventive regimens, and provision and use of health services. "Specified populations" are those with identifiable characteristics such as precisely defined numbers. "Application to control..." makes explicit the aims of epidemiology—to promote, protect, and restore health (John 2001:62).

## **1.8 RESEARCH HYPOTHESIS**

While conducting this research, the hypotheses for this particular research were set as follows.

- The magnitude of the behavioural and biological risk factors among the study population is high.

- There are gradients in the magnitude of the risk factors among the study population based on their socio-demographic characteristics including age, residence, gender and others.
- There is relationship between the preventable risk factors and socio-demographic and other underlying conditions
- There are differences in knowledge, perception attitude and behaviour on NCDs and their risk factors among the study population, and
- There are differences in the preventable risk factors and socio-demographic characteristics among study participants with hypertension and without.

## **1.9 RESEARCH PURPOSE AND OBJECTIVES**

This study encompasses the following purpose and objectives.

### **1.9.1 Research Purpose**

The purpose of this study is to assess the epidemiology of preventable risk factors for NCDs among the adult population in Tigray, Northern Ethiopia to enable policy makers to develop evidence-based NCDs prevention policies and public health interventions to ultimately reduce morbidity, mortality and disability to the health problem.

### **1.9.2 Research Objectives**

- To identify the prevalence of preventable risk factors of NCDs using stepwise approach;
- To describe the knowledge, attitudes and behaviours of preventable risk factors of NCDs in the adult population of the study setting;
- To examine the determinants of hypertension among the adult population; and
- To develop a risk factor identification model for NCDs

## **1.10 CONCLUSION**

Based on the information available in different studies and documents, the magnitude of morbidity and death due to the NCDs is on increasing trend. The projection in developing countries including Ethiopia shows NCDs are becoming major public health concerns. The NCDs are mainly due to the behavioural (use of tobacco and alcohol, unhealthy diet, insufficient physical activity) and biological (overweight or obesity and elevated blood pressure, blood sugar and cholesterol) risk factors. Most of these are shared risk factors of the major NCDs as indicated in Figure 1.1 and Table 1.1 above). The risk factors were also found to exist with varying degree based on the evidence generated to date from population in different settings. This chapter encompassed the background on the Epidemiology of preventable risk factors of NCDs among adult population in Tigray, Northern Ethiopia. The chapter also introduced statement of the problem, the theoretical framework, the WHO STEPS approach, definitions of key concepts, significance of the study, research hypothesis and research purpose and objectives. The literature review, which is based on the conceptual framework and purpose and objectives for this study, will be discussed in Chapter 2.

## **CHAPTER 2**

### **Literature review**

#### **2.1 INTRODUCTION**

There are various definitions for a literature review as indicated by many researchers and institutions. A literature review is both a summary and explanation of the complete and current state of knowledge on a specific topic (University of Guelph 2013:1). The University of Wisconsin (2013:1) defined literature review as a critical analysis of a segment of a published body of knowledge through summary, classification, and comparison of prior research studies, review of literature and theoretical articles. Similarly, a literature review is an objective, thorough summary and critical analysis of the relevant available research and non-research literature on the topic being studied (Hart 1998:28). Its goal is to bring the reader up-to-date with current literature on a topic and form the basis for another goal, such as the justification for future research in the area. A good literature review gathers information about a particular subject from many sources. Golde (2007:347), Green (2009:18), and Lovitts (2007:1) described literature review particularly in doctoral dissertation as a means of acquiring a deep comprehension of the critical competencies and foundation of one discipline for a doctoral candidate. Combs, Bustamante and Onwuegbuzie (2010:170) described it also as a more integrated and iterative process. Hofstee (2006:93) indicated a good literature review is a comprehensive, critical, factual overview of what has been done before and is contextualised.

The University of Guelph (2013:2) outlined the overall purposes of a literature review as follows:

- It gives readers easy access to research on a particular topic by selecting high quality articles or studies that are relevant, meaningful, important and valid and summarising them into one complete report.
- It provides an excellent starting point for researchers beginning to do research in a new area by forcing them to summarise, evaluate and compare original research in that specific area.

- It ensures that researchers do not duplicate work that has already been done.
- It can provide clues as to where future research is heading or recommend areas on which to focus.
- It highlights key findings.
- It identifies inconsistencies, gaps, flaws and contradictions in literature.
- It provides a constructive analysis of the methodologies and approaches of other researchers.

In addition to this, Boote and Beile (2005:7) identified other purposes including:

- To rationalize the significance of the problem;
- To enhance understanding of the subject under review;
- To present an understanding of the structure of the subject;
- To relate ideas and theories to applications; and
- To provide a framework for relating new findings to previous findings in the discussion section of a thesis.

It has also been well emphasized by Patricia, Frances and Michael (2008:40) a literature review is central to the research process and can help refine a research question through determining inconsistencies in the body of knowledge. Similarly, it can help inspire new research innovations and ideas while creating greater understanding of a topic. It can enable a novice researcher to gain insight into suitable designs for a future study, as well as providing information on data collection and analysis tools.

This chapter presents the review literature based on the purpose of the study and the specific objectives set.

## **2.2 NON-COMMUNICABLE DISEASES AND PREVENTABLE RISK FACTORS**

NCDs are the leading causes of death globally. They are strongly influenced by four main behavioural risk factors: tobacco use, insufficient physical activity, harmful use of alcohol, and unhealthy diet, which can lead to elevated blood pressure, raised blood glucose and cholesterol levels, and excess body weight (WHO 2010:1). However, these risks vary with age and gender. Most of the common chronic diseases are caused by dietary, lifestyle and metabolic risk factors that are also responsible for the resulting mortality (Danaei, Ding, Mozaffarian, Taylor, Rehm, Murray & Ezzati 2009:13).

Therefore these conditions could be prevented by behavioural changes, such as quitting smoking, adopting a healthy diet, and increasing physical activity.

Social determinants such as socioeconomic status, education level, and race or ethnicity, are important risk factors of NCDs influencing a person's accessibility to care (Braveman, Paula, Cubbin, Egerter, Williams & Pamuk 2010:191). Lack of access and delay in receiving care can lead to worse outcomes for patients from minority and underserved populations (Mead, Cartwright-Smith, Jones, Ramos & Siegel 2008:1071). Examples of such outcomes include acute or chronic complications secondary to the NCDs, permanent disability and premature death. Barriers such as lack of access to medical care complicate patients' monitoring and continuity of treatment. Particularly minorities and low-income populations are less likely to access preventive services necessary for early detection of conditions (Sondik, Huang, Klein & Satcher 2010:276).

The NCDs have different effects on the distributions among the different segments of the population with range of socioeconomic status. Shah and Mathur's (2010:638) identified a higher prevalence of coronary heart disease in Indian urban populations followed by a clear declining gradient from semi-urban to rural populations. There was gradient in the distribution of risk factors for NCDs by income status in Bangladesh. Accordingly, diabetes, hypertension, low physical activity and obesity were more prevalent in rich people but tobacco use, binge drinking, low fruit and vegetables intake were more prevalent among the poor. People in the higher socioeconomic group bore most of the brunt in terms of experiencing three or more concurrent risk factors (Bangladesh Ministry of Health 2010:21).

Risk factors for NCDs could concurrently be experienced by a person. In Bangladesh, there was hardly anyone without a risk factor for NCDs. About 98.7% have at least one risk factor, 77.4% had two or more risk factors and 28.3% had 3 or more risk factors for NCDs (Bangladesh Ministry of Health 2010:24). Similarly, Brazil experienced increasing magnitude of risk factors including physical inactivity (73.2%), followed by excess weight (48.1%). It is also noted that women were less active and thinner than men. More than half of the sample showed two or three risk factors (53.4%). The combination

of physical inactivity and excess weight was observed in 34.7% of the sample, while 10.8% presented physical inactivity, excess weight, and hypertension concurrently (Capilheira, Santos, Azevedo & Reichert 2008:2770). The magnitude of risk factors for NCDs is also rising in Jordan. Nearly one-third of participants smoked cigarettes, 18% were diagnosed with high blood pressure, and 10% reported frequent mental distress. The magnitude of the risk factors varied with the utilization of health service. Compared with survey participants who did not participate in the medical evaluation, those who participated were more likely to self-report high blood pressure, high blood cholesterol, and diabetes and report lower levels of health-related quality of life. Among participants of the medical evaluation, an estimated 11% reported they had been diagnosed with diabetes by a health professional, and 19% were diagnosed with diabetes according to laboratory testing. Approximately one-third of participants of the medical evaluation were either overweight (30%) or obese (36%). In the fully adjusted model, obese participants of the medical evaluation were nearly 3 times as likely to have high blood pressure and more than 2 times as likely to have high blood cholesterol as normal weight participants (Al-Nsour, Zindah, Belbeisi, Hadaddin, Brown & Walke 2012:3).

Nigeria is one of the countries with increasing overall prevalence of NCDs i.e. 32.8%. The specific prevalence of diseases and conditions was 25%, 14.4%, 12.7%, 20.1% and 10% for obesity, hypertension, diabetes mellitus, musculoskeletal disorders and respiratory disorders, respectively. There is variation in the magnitude of the NCDs in males and females and it was 20.7% vs 29.5%; 12.6% vs 12.2%; 9.7% vs 16.0%; 14.0% vs 26.5% and 8.6% vs 7.6% for obesity, hypertension, diabetes mellitus, musculoskeletal disorders and respiratory disorders, respectively. Risk factors with increased odds of NCDs were age, area of residence, work-related stress, triglyceride levels and positive family history of NCDs. Physical inactivity, high total cholesterol level, high general adiposity, high central adiposity and poor dietary habits were equally significantly associated with the prevalence of NCDs (Ekpenyong 2012:260). Thailand is also facing an increasing pattern. More than 1 in 5 individuals (20.4%) of the sample study participants reported that they were unhealthy (10.4% diagnosed with hypertension, 9.8% with diabetes, and 0.9% with cancer). For history of illness in the

family, the most common diseases were diabetes (42%), high blood pressure (16.5 %) and cancer (14.8%), and 66.9% reported stress within the last 6 months (Supanee, Kesinee, Supot, Wiporn, Patravoot, Surapon, Prasert & Malcolm 2011:1754).

## **2.2.1 Behavioural risk factors of NCDs**

### **2.2.1.1 Magnitude of the behavioural risk factors**

A large proportion of NCDs are preventable through the reduction of their four main behavioural risk factors namely tobacco use, physical inactivity, harmful use of alcohol and unhealthy diet per the evidence generated in Peru (Jaime, Robert & Smeeth 2011:792). Negin, Cumming, Stewart Ramirez, Abimbola and Sachs (2011:643) revealed increasing trend of cigarette smoking in three African countries (Tanzania, Malawi and Rwanda). The smoking rates among older men and women were higher than among adults under 50. Alcohol consumption among women aged 50 years and older (45.0%) was more common ( $P = 0.005$ ) than among women under the age of 50 (27.6%). However, the distribution of other behavioural risk factors like low intake of fruits and vegetables and physical inactivity was not addressed in Negin *et al's* (2011:644) study.

The behavioural risk factors were rising among people working in the industrial setting in India. Mehan, Srivastava and Pandya (2006:169) revealed that the magnitude of tobacco use, physical inactivity and alcohol drinking was 31.4%, 17.3% and 5% of the study participants, respectively. Universal prevalence of < 500 grams daily intakes of vegetables and fruits was also observed. Prabhakaran Shah, Chaturvedi, Ramakrishnan, Manhapra and Reddy (2005:62) disclosed similar pattern in another industrial setting. Accordingly, current cigarette smoking among male employees aged 20-59 years was 36% (34%-38% with 95% CI). The prevalence in a different industrial setting among male study participants was current smoking [40.7% (95% CI: 36.4-45.3)], current alcohol consumption [31% (95% CI: 27.2 – 35.1)], sedentary activity [41.2% (95% CI: 37.0 – 45.5)] and high fat intake [93.7% (95% CI: 90.2 - 95.5)] (Jamatia, Anand, Kapoor & Pandey 2009:206). Sugathan, Soman and Sankaranarayanan (2008:558) showed that the two major risk factors observed among

male study participants were smoking and alcohol consumption. About two fifths (40%) of these study participants were current smokers as well as current users of alcohol (41%). The median age at initiation was 21 years for both smoking habits and alcohol consumption. Nearly a quarter of the target population was inactive (23% males and 22% females), and this assertion was based on work and leisure time activities. However, both studies were only showing the distribution in a specific population i.e. in industrial setting.

NCDs risk factors were also found to be higher among other specific population groups in India. The high prevalence of the behavioural risk factors was also witnessed among study participants in a Mishing tribe in India (Misra, Mini & Thankappan 2014:374). Prevalence of any form of tobacco use was 84.3% (95% CI: 80.0-87.8). Current smoking was reported by 35.8% (95% CI: 30.8-41.1) and current smokeless tobacco use by 78.9% (95% CI: 74.2- 82.9). Current alcohol use prevalence was 66.9 % (95% CI: 61.6-71.7). Less than five servings of fruit and vegetable consumption were reported by 44.9% (95% CI: 39.6-50.2). Vigorous physical activity ( $\geq 3000$  Metabolic Equivalent (MET) minutes /week) was reported by 86.4% (95% CI: 82.3-89.7) and moderate physical activity by 13.6% (95% CI: 10.2-17.6) leaving none in the sedentary group. When the situation in prevalence of NCDs risk factors and level of physical activity were analyzed in in specific groups, such as physicians alcohol and tobacco use was found in 6% and 1% of the study participants, respectively, and the physical activity mean score was  $1227.2 \pm 76$  Metabolic Equivalent (MET) min/wk. Twenty percent of physicians were found to have low physical activity level (Hiral, Vaishali, Prem, Vijayakumar, Prabha Adikari & UnniKrishnan 2012:10). Smoking prevalence was found to be 18.4%, out of which more than three-fourths of the adults smoked more than one packet of cigarettes per day. Almost one-third of known hypertensive patients were not on any treatment regimen. A total of 40.3% did not participate in any kind of physical activity; 43% consumed only one serving of green vegetables a day while 58% of the patients included fruits as a part of their diet only once or twice a week (Nath, Garg , Deb , Ray & Kaur 2009:17). The urban settings were revealed to have higher magnitude of behavioural risk factors than rural areas.

The behavioural risk factors were observed to be increasing in women population of China. Li, Limin, Jiang, Mei and Linhong (2013:653) identified that women population in China had insufficient intake of fruit and vegetables, 51.7%; physical inactivity, 18.3%; current smoking, 2.4%; and harmful use of alcohol, 1.3%. The mean number of risk factors per woman was 1.61; 48.0% of the women had at least two risk factors. Women who were older, poorer, from rural areas or from eastern or central China had more risk factors, but only being more than 35 years old, poorly educated and a resident of eastern or central China independently increased the likelihood of having multiple risk factors.

Similar to other settings, Iran has faced an increasing magnitude in the behavioural risk factors. The prevalence of daily current cigarette smoking was 17.9%, and 5% of the target population consumed at least five combined servings of fruit and vegetables per day. The median daily time spent undertaking transport-related physical activity (43.8 minutes) was significantly higher than the median time spent on work-related physical activity (27.5 minutes) or recreational physical activity (28.6 minutes) (Alikhani , Delavari, Alaedini, Kelishadi, Rohbani & Safaei 2009:361). Tawa, Frantz and Waggie (2011:154) found that physical inactivity was the most common among 7.5% of the participants who had at least one of the investigated risk factors of NCDs. The magnitude of these risk factors is also rising in Zanzibar. It has been observed that overall prevalence of raised combined risk factors for NCDs (three or more of the risk factors of smoking, insufficient intake of fruits and vegetables, sedentary lifestyle, overweight or obesity and raised BP) to be 24.2% with slightly higher in urban than in rural areas (Ministry of Health Zanzibar 2012:13). Nepal was also observed to have the similar condition as evidenced by (Oli, Vaidya, Thapa 2013:4). The behavioural risk factors explored were physical inactivity, low fruit and vegetable consumption, and tobacco and alcohol use. Oli *et al* (2013:4) noted that the major behavioural risk factors of non-communicable diseases were very common as at least a quarter of the study population had the same. Based on one of the pocket surveys in southwest Ethiopia, the risk factors for NCDs are increasing. It was learned that the prevalence of smoking was 9.3%, alcohol consumption 7.3%, consumption of fruits and vegetables below

adequate level 27.0%, low level physical activity (16.9%) and Khat chewing (38.6%) (Alemseged, Haileamlak, Tegegn, Tessema, Woldemichael, Asefa, Mamo, Tamiru & Abebe. 2012:23).

### **2.2.1.2 Gradients in the distribution of behavioural risk factors**

Apart from high magnitude, there are disparities or differences in the prevalence of behavioural risk factors among population segments, an assertion supported by a range of studies. Nawi, Hoang, Sanjay, Abdur, Tran, Uraiwan, Ali, Syed and Kusol (2006:309) revealed that smoking prevalence among men was 53.9% in both rural and urban populations, and it was reported to be almost non-existent among women in Indonesia. The disparity in magnitude of the risk factors has also been witnessed by a similar study conducted in Ethiopia by (Fikru 2008:27). It was revealed by Fikru's (2008:27) study that physical inactivity was more concentrated in urban populations and while the rural-urban gap was narrower in the context of the distribution of cigarette smoking and binge drinking of alcohol. Intake of fruits and vegetables was not consistent with optimal cardiovascular health in both rural and urban populations, but comparatively better in rural areas. Fikru (2008:27) also documented that Khat chewing was much more prevalent in some rural areas of Ethiopia where 75 % of males and 41 % of females reported chewing at the time of the study. However, only about 2 % of females in major urban centres reported chewing Khat (Fikru 2008:27). The variability in the magnitude of the risk factors such as cigarette smoking and alcohol use and misuse among male and female study participants was evidenced by a study conducted in Vietnam (Luc, Thuy, Leigh, Nhan, Michael, Robert & Terence 2009:3; Bangladesh Ministry of Health 2010:18).

According to the 2011 Ethiopian demographic and health survey (EDHS) report compiled by the Central Statistical Agency Ethiopia and ICF International in 2012, 7% of men age 15-49 use tobacco products of some kind; 6 % reported that they smoke cigarettes with the highest prevalence among men between the ages of 40-49 years (11-13 %). The prevalence for Tigray is 1.5% for cigarette smoking and 0.1% for other tobacco products. Forty-five percent of women and 53% of men reported drinking

alcohol at some point in their lives. For both women and men this proportion increases with age, and it is higher for urban than rural residents. With regard to regions, the percentage of respondents who ever drank alcohol ranged from 2% in women and 5% in men in Somali, a predominantly Muslim region in Ethiopia that prohibits alcohol for religious reasons, to 86% in women and 91% in men in Tigray, a predominately Christian region of Ethiopia. Alcohol consumption is highest among both women and men who are wealthy and possess higher education qualifications. However, there is no clear association between alcohol consumption, education and wealth in general (Central Statistical Agency [Ethiopia] and ICF International 2012:51).

Gradient in the prevalence of behavioural risk factors was observed in India. Nearly 57% male, 70% Hindu, 20% illiterate and 35% unemployed, noted that 22.9% of this population used smoked and smokeless tobacco, 75.2% were current tobacco users, 21% were current drinkers, 38.5% had sedentary lifestyles, 27.1% were heavily active, 46.2% ate vegetables regularly, 40.8% ate fruits regularly, and nearly 50% added extra salt to their food most of the time (Basu, Biswas & Chatterjee 2013:20). Supanee *et al* (2011:1754) revealed similar gradient for behavioural risk factors in Thailand that 82.3% of males smoked cigarettes but only 1.9% of females did. However, the frequency and amount of smoking were not specified by the study. The respective figures for alcohol use by males and females were 68.4% and 26.6%. The majority (61.2%) of the study participants had low physical activity (sitting or standing with little movement). Bhagyalaxmi, Atul and Shikha (2013:81) indicated high prevalence of smoking (22.8%) and the use of smokeless tobacco (43.4%) were observed among rural men compared to urban men (smoking was 12.8% and smokeless tobacco consumption was 23.1%). There was a significant difference in the average consumption of fruits and vegetables between urban area ( $2.18 \pm 1.59$  servings) and rural area ( $1.78 \pm 1.48$  servings).

Misra *et al* (2014:374) showed that tobacco use, alcohol use and vigorous physical activity were significantly higher among males compared to females. A cross-sectional study that investigated the socio demographic patterning of non-communicable disease risk factors in rural India revealed disparities in the prevalence of behavioural risk factors of NCDs among members of community groups. For example, 37% (95% CI:

30% - 44%) of men smoked tobacco in the lowest socioeconomic group compared with 15% (95% CI: 12% - 17%) in the highest socioeconomic group. In women study participants, 35% (95% CI: 30% - 40%) of those in the highest socioeconomic group were obese compared with 13% (95% CI: 7% - 19%) in the lowest socioeconomic group. The age standardised prevalence of some risk factors was 40% (95% CI: 37% - 42%) for tobacco use in men, 4% (95% CI: 3% - 6%) for tobacco use in women; low fruit and vegetable intake was 69% (95% CI: 66% - 71%) for men, 75% (95% CI: 71% - 78%) for women (Kinra, Bowen, Lyngdoh, Prabhakaran, Reddy, Ramakrishnan, Gupta, Bharathi, Vaz, Smith, Ben-Shlomo & Ebrahim 2011:3). Negin, Cumming, Stewart Ramirez, Abimbola and Sachs (2011:643) identified in Malawi, Rwanda and Tanzania that smoking rates among older men and women were higher than among adults under the age of 50. While only 2.3% of women less than 50 years of age were current smokers, 21% of older women were current smokers ( $P < 0.0001$ ). Among men, 19% of men under 50 smoked and 36.6% of older men smoked ( $P = 0.001$ ). Alcohol consumption among older women aged 50 and older (45%) was more common ( $P = 0.005$ ) than among women under the age of 50 (27.6%). When a set of five risk factors were examined, it was noted that more men aged 50 years and older (49.5%) had two or more risk factors than men under 50 (25.5%) ( $P < 0.0001$ ). Similarly, 52% of women aged 50 years and older had two or more risk factors, versus 24.1% of women under 50 ( $P < 0.0001$ ).

The gradient in behavioural risk factors of NCDs has also been witnessed by Luc *et al* (2009:3), and they reported the prevalence of behavioural risk factors for men and women. Taking into account cultural influences, the prevalence of smoking and alcohol consumption were much higher in men than women. Additionally, 80.8% (730 of 910) of men and 50.6% (526 of 1066) of women reported being exposed daily to tobacco smoke either from themselves or someone else. The average time spent doing moderate and/or vigorous physical activities was 20.47 (95%CI: 15.96–24.98) hours per week for men and 16.27 (95%CI: 13.73–18.80) hours per week for women. The average time spent in sedentary activity was 3.83 (95%CI: 3.26–4.40) hours per day for men and 3.37 (95%CI: 2.81–3.92) hours per day for women.

The stepwise survey conducted in Bangladesh in 2010 uncovered smoking to be 26.2% (54.8% in men and 1.3% in women). On average, people started smoking at 18.4 years of age; however around 34.6% respondents initiated smoking at or before the age of 15 years. The overall consumption of smokeless tobacco was 31.7%. Its use in women (33.6%) was more than in men (29.4%). Consumption was higher in older than the younger age groups, and this trend was more prominent in women. Smokeless tobacco use was slightly higher in rural area (35.1%) compared to urban areas (30.8%). Tobacco in combination of smoking and smokeless or in isolation was being used by half of the adult population (51%), men being the most users (70%) compared to women (34.4%). Moreover, 42% non-smokers were exposed to second hand smoke at home (36%) or workplace (21%). The survey population ate fruit on an average 1.8 days a week. Vegetables consumption was around 6.1 days a week (men 5.7 days, and women 6.4 days). Considering this as minimum recommended amount, 95.7% did not consume adequate fruit or vegetables on an average day. Pertaining to physical activity level, 27% of the study participants fell into low physical activity category (<600), 20.2% fell into moderate physical activity category (600 -- 3000) and 52.8% fell into high physical activity category (>3000). Women participants were generally less active. Work contributed more than half of the total activity (56%), around 31% was contributed by transport related activity and around 13% were contributed by the leisure time physical activity. One third (33%) of them usually do not engage in even moderate activity and 62% people usually did not engage in any vigorous physical activities. High physical activity was more in rural men than their urban counterparts. Ninety-four percent of the study participants were lifetime abstainer of alcohol. Only 0.9% respondent consumed alcohol, even a single sip, in past 30 days. However, overall 66.7% of the current alcohol consumers were binge drinkers and almost all of them were men. (A standard drink is any drink containing 10 grams of alcohol; i.e., 285 ml of beer, 30 ml of spirit, 60 ml of appetive, 120 ml of wine or other equivalent alcoholic drinks). On average the current drinkers went binge in 4.2 occasions in past 30 days (Bangladesh Ministry of Health 2010:18).

## **2.2.2 Biological/Physiological risk factors of NCDs**

### **2.2.2.1 Magnitude of biological risk factors**

As reported by Mehan *et al* (2006:169), 65.9% and 65.5% prevalence of high blood pressure and high BMI respectively was observed among study participants. Central obesity was also present in 72.7% of the study participants (high waist hip ratio) and 32.3% (high waist circumference) respectively. A total of 34.1% of the study participants were identified as being “at risk” (>3 risk factors) with prevalence of hypercholesterolemia, hypertension and diabetes of 40.5, 38.2 and 19.1%, respectively. However, this only reflects the situation in a specified population group. Another finding among employees aged 20-59 years of a large industry near Delhi, India showed that the prevalence of the biological risk factors (95% CI) was: hypertension 30% (95% CI: 28-32%), diabetes 15% (95% CI:14-17%) which is higher than the finding in the aforementioned studies, high serum total cholesterol/HDL ratio (> or = 4.5) 62% (95% CI: 60-64%). Forty-seven percent of the respondents had at least two of these risk factors. Another 44% (95% CI: 42-46%) had pre-hypertension and 37% (95% CI: 35-39%) had evidence of either impaired fasting glucose or impaired glucose tolerance. Thirty-five per cent (95% CI: 33-37%) of the individuals were overweight (BMI > or = 25 kg/m<sup>2</sup>) while 43% (95% CI: 40%-45%) had central obesity (waist circumference >90 cm). The metabolic syndrome was present in 28-35% of the individuals depending on the diagnostic criteria used. The prevalence of several risk factors and the metabolic syndrome was high with increasing age, BMI and waist circumference. A third of those who had hypertension (31.5%) and diabetes (31%) were aware of their status. Among those aware, adequate control of blood pressure and blood glucose was present in only 38% of those with hypertension and 31% of those with diabetes, respectively (Prabhakaran Shah, Chaturvedi, Ramakrishnan, Manhapra & Reddy 2005:62).

High prevalence of cardiovascular risk factors was also evidenced by Chris Hani Baragwanath Hospital in Soweto, South Africa (Karen, Wilkinson, Hansen, Ntyintyane, Tibazarwa, Becker & Stewart 2008:918). And 897 (56%) patients were diagnosed to have hypertension, (190 [44%] of whom were also obese). Only 209 (13%) patients had no identifiable risk factors, whereas 933 (59%) had several risk factors. Similar report

was also reported by a study in Kenya that hypertension and overweight or obesity accounted for 24% and 11% of the sample respectively. Study participants who possessed a single risk factor profile were 42% and those who had multiple risk factors were approximately 17% (Tawa, Frantz & Waggie 2011:154).

The prevalence of the biological risk factors was also high among specific group of population. Jamatia *et al* (2009:206) conducted a study among factory workers found the prevalence (95% CI) of the risk factors as: overweight was [26.9% (95% CI: 23.2 – 30.9%)] and hypertension was [21.0% (95% CI: 17.62 - 24.6%)]. However, this had a different feature and was relatively lower among others as evidenced by (Hiral *et al* 2012:10). Hypertension and diabetes mellitus were found in 2% of the physicians who participated in the study. Sixty-nine percent of physicians were found to be in overweight category. Total cholesterol and triglyceride levels were high in 3% and 9% of physicians, respectively. A study conducted in Mishing tribe in India indicated that abdominal obesity (waist circumference (WC)  $\geq$  90 cm in men and  $\geq$  80 cm in women) was found in 11.4% (95% CI: 8.4-15.3). Overweight (body mass index of  $\geq$  25) was found among 15.7% (95% CI: 12.1-19.9) of the respondents. Hypertension was found in 25.6% (95% CI: 21.2-30.5). Among them 24.7% were aware, 16.5% were on treatment and 2.4% achieved adequate control (Misra *et al* 2014:374).

Li, Limin, Jiang, Mei and Linhong (2013:653) revealed that in China among the female population and found overweight and obesity, 32.3%; raised blood pressure, 29.7%; raised total serum cholesterol, 18.1% and raised blood glucose, 7.0%. The mean number of risk factors per woman was 1.61; 48.0% of the women had at least two risk factors. A cross-sectional study was conducted from September 2008 to January 2009 at Gilgel Gibe Field Research Center of Jimma University, southwest Ethiopia. It was learned that among the biological risk factors was 9.3% for hypertension, 2.6% for overweight and 33.3% central obesity. The prevalence of metabolic disorders is 10.7% for high total cholesterol and 7.7% for raised triglyceride. Overall, 80.0% of the population had at least one of the risk factors (Alemseged *et al* 2012:24).

### **2.2.2.2 Gradients in the distribution of biological risk factors**

With regard to the magnitude and distribution of the biological risk factors, there are disparities among the different population segments. In Indonesia it was revealed that a higher proportion of the urban population and the richest quintile of the rural population had high blood pressure and were classified as being overweight or obese when compared with the poorest quintile of the rural population. Those classified as being in the richest quintile who lived in the rural area were 1.5 times more likely to have raised blood pressure and 8 times more likely to be overweight than those classified as being in the poorest quintile and living in the rural area. Clustering of the risk factors was higher among those classified as being in the richest quintile of those living in the rural area compared with those classified as being in the poorest quintile (Nawi *et al* 2006:309). And the risks of clustering were just 20–30% lower compared with the urban population (Nawi *et al* 2006:309). The disparity in magnitude of the risk factors has also been witnessed by a similar study done in Addis Ababa, Ethiopia by (Fikru 2008:27). Elevated blood pressure, obesity, and physical inactivity were more concentrated in urban populations; however, men in rural areas have a markedly higher prevalence of hypertension than women, while the level is similar between men and women in urban areas.

Jaime, Robert and Smeeth (2011:792) in the provinces of Ayacucho and Lima, Peru revealed that for most risk factors, the migrant group had intermediate levels of risk between those observed for the rural and urban groups. Prevalence for rural, migrant and urban groups was 3%, 20% and 33%, respectively, for obesity, and 0.8%, 3% and 6% for type-2 diabetes. This gradient of risk was not observed uniformly across all risk factors. Blood pressure did not show a clear gradient of difference between groups. The urban group had higher systolic blood pressure but similar diastolic blood pressure than rural group. Hypertension was more prevalent among the urban (29%) than both the rural and migrant groups (11% and 16%, respectively). No differences were observed in triglycerides between the groups. The variability in the magnitude of the risk factors like hypertension, overweight or obesity and raised blood glucose, among male and female participants was evidenced by a study in Vietnam (Luc *et al* 2009:4). Similarly

disparities in distribution among males and females have been observed in national NCDs risk factors survey in Bangladesh (Bangladesh Ministry of Health 2010:21). There was marked difference in overweight or obesity among the two groups. The magnitude of obesity was also different among urban and rural population. A survey conducted in all provinces of Iran (Alikhani *et al* 2009:362) showed that overweight or obesity and waist circumference were greater among women than men. The prevalence of hypertension was 23.8%, with a higher prevalence among women than men. In addition, 6% of the target population had a high fasting blood glucose ( $\geq 126$  mg/dl), and 45.1% had a total cholesterol level of at least 200 mg/dl. Sugathan *et al* (2008:558) showed that obesity was found to be more among females (33%) than males (17%).

Mufunda , Mebrahtu , Usman, Nyarango, Kosia, Ghebrat, Ogbamariam, Masjuan and Gebremichael (2006:62) in Eritrea revealed that the prevalence of hypertension was 15.9% in the general population, with 16.4% in urban and 14.5% in rural areas, 17% of whom were males while 15% were females. This has also been revealed by (Luc *et al* (2009:3) and 8.8% of men and 12.6% of women were overweight (body mass index (BMI)  $\geq 25$  kg/m<sup>2</sup>) and 2.3% of men and 1.5% of women were obese (BMI  $\geq 30$  kg/m<sup>2</sup>). The prevalence of hypertension (systolic BP  $\geq 140$  mmHg and/or diastolic blood pressure)  $\geq 90$  mmHg, or taking medication for hypertension) was 27.3% for men and 16.2% for women. There were 1.0% of men and 1.1% of women with raised (blood glucose (BG) (defined as capillary whole BG of at least 6.1 mmol/L). The national step-wise survey in Zanzibar (Ministry of Health Zanzibar 2012:16) showed that the overall prevalence of hypertension was 33%. Prevalence of obesity measured as BMI  $> 30$  kg/m<sup>2</sup>/was found to be 14.3% whereas if determined by waist-hip ratio (WHR) it was found to be 33% among men and 72.6% among women. Prevalence of obesity was significantly higher in urban than in rural areas, where as prevalence of hypertension was the same across all strata. In addition to this, prevalence of diabetes mellitus was 3.7% in the surveyed population, and impaired fasting glucose (IFG) was found to be at 2.8 %. Raised levels of cholesterol and triglyceride, which also raises the total risk of NCDs, were found at respectively 24.4% and 5.7%, respectively. With few exceptions, women in the 45-64 years age group had worst risk indicators in all categories.

In Gujarat, India, the prevalence of overweight and obesity was observed to be high among urban men and women in all age-groups compared to rural men and women. Prevalence of overweight and obesity increased with age in both the areas. Twenty-nine percent of the urban residents and 15.4% of the rural residents were found to have raised blood pressure, and the difference was found to be statistically significant ( $P < 0.01$ ) (Bhagyalaxmi *et al* 2013:82). Other evidences in India by Kinra *et al* (2010:4) uncovered that obesity (19% (95%CI:17 - 21%) men, 28% (95%CI:24 - 31%) women); dyslipidaemia (33% (95%CI:31 - 36%) men, 35% (95%CI:31 - 38%) women); hypertension (20% (95%CI:18 - 22%) men, 22% (95%CI:19 - 25%) women); diabetes (6% (95%CI:5 - 7%) men, 5% (95%CI:4 - 7%) women) and underweight (21% (95%CI:19 - 23%) men, 18% (95%CI:15% - 21%) women). Risk factors were generally more prevalent in southern Indians compared with northern Indians. For example, the prevalence of dyslipidaemia was 21% (95%CI: 17% - 33%) in northern Indian men compared to 33% (95%CI: 29% - 38%) in southern Indian men, while the prevalence of obesity was 13% (9% - 17%) in northern Indian women compared with 24% (95%CI: 19% - 30%) in southern Indian women.

The Bangladesh Ministry of Health (2010:22) showed the distribution of biological risk factors as follows: One-third (32.9%) of the population never measured their blood pressure. The self-reported (documented) hypertension was 12.5% (men 10.9% and women 13.9%). The prevalence of hypertension was related to age. Overall 14.8% of the survey population was hypertensive (blood pressure  $\geq 140/90$  mmHg) excluding medication; when history of anti-hypertensive drugs was considered, this figure rose to 17.9% suggesting an existence of a huge number of undiagnosed cases in the population who were potentially at increased risk of ill consequences. The prevalence of hypertension is higher in urban area (19.9%) than in rural area (15.9%). Among those previously reported to have hypertension, 30% were found to be normotensive at measurement and 18% were normotensive on medication, 31% were hypertensive with medication and 21% were hypertensive and they did not take any medication. Around 83% of participants never measured their blood glucose. About 3.9% of the people were

previously diagnosed to have diabetes (men 4.3% and women 3.6%). Among them, 21% were receiving insulin and 61% oral anti diabetic drugs. The same survey also showed body mass index (weight in kg divided by height in metre squared) one-fourth (25%) of the population were underweight ( $BMI < 18.5 \text{ kg/m}^2$ ), 57% were normal weight and 18% were overweight ( $BMI \geq 25.0 \text{ kg/m}^2$ ). Proportion of overweight in women (21.6%) exceeded the proportion of those in men (13%). Waist circumference is a measure of central obesity. Eight percent of men and 33.7% of women (21.7% sexes combined) had increased waist circumference ( $>94 \text{ cm}$  in men and  $\geq 80 \text{ cm}$  in women). Higher prevalence of both central and general obesity in women may predispose them to an increased risk of NCDs.

It is also well evidenced in a study conducted in urban Delhi and its rural environments that a higher prevalence of coronary heart disease (CHD) in the urban sample was associated with higher levels of body mass index, blood pressure, fasting blood lipids (total cholesterol, ratio of cholesterol to HDL cholesterol, triglycerides), and diabetes (Reddy 1993:104). This is also similarly supported by evidence generated in South Africa among health care workers (HCWs) which showed that 73% of the HCWs were overweight or obese, and half of them had never tried to lose weight. Females and older HCWs were more obese than male HCWs and younger counterparts. There was no difference in BMI distribution between medical and nonmedical staff. About one-third of HCW reported that they suffered from obesity-related non-communicable diseases (hypertension 20%, diabetes 10%) and stress (32.5%) (Skaal & Pengpid 2011:565).

According to the Central Statistical Agency [Ethiopia] and ICF International (2012:180) the nutritional status of the study participants was described as follows. The mean BMI for Ethiopian women age 15-49 is  $20 \text{ kg/m}^2$ . There are no major differences in mean BMI by women's age, urban or rural residence, region, or education level. The mean BMI increases slightly with wealth, from  $20 \text{ kg/m}^2$  for women in the lowest wealth quintile to  $22 \text{ kg/m}^2$  in the highest quintile. Sixty-seven percent of Ethiopian women have a normal BMI (between  $18.5$  and  $24.9 \text{ kg/m}^2$ ), while 27% of women are thin or undernourished (BMI less than  $18.5 \text{ kg/m}^2$ ) and only 6 % are overweight or obese (BMI

25 kg/m<sup>2</sup> or above). Five percent are overweight (BMI 25-29 kg/m<sup>2</sup>), and just 1 % are obese (BMI 30 kg/m<sup>2</sup> or above). Younger women are less likely than older women to be overweight or obese. For example, 2% of women age 15-19 years are overweight or obese compared with 9% of women age 40-49 years. This difference in BMI among the two groups of women could be due to physiological changes including increasing fat accumulation with advancing age. The differences in the BMI between the two groups could also be due to higher wealth status and more sedentary life style among the older women. Urban women are more likely to be overweight or obese (15%) than rural women (3%). One woman of every five residing in Addis Ababa and Dire Dawa regions of Ethiopia are overweight or obese (20% and 19%, respectively), compared with 3 % of women in Benishangul-Gumuz and Tigray regions. This could be due differences in lifestyle (sedentary life and feeding practices) and socioeconomic (income/wealth, educational status, etc.) variations among women in these regions. It was witnessed that being overweight or obese is positively correlated with educational attainment; the proportion of overweight or obese women increases steadily from 4% among those with no education to 17% among those with more than secondary schooling. Similarly, the proportion of overweight or obese women increases as wealth increases, from 2% in the lowest wealth quintile to 16% in the highest quintile. The mean BMI for Ethiopian men age 15-49 is 19 kg/m<sup>2</sup>. There is little difference in the mean BMI by background characteristics. Sixty percent of Ethiopian men age 15-49 years have a normal BMI (between 18.5-24.9 kg/m<sup>2</sup>), whereas 37% are thin or undernourished (BMI less than 18.5 kg/m<sup>2</sup>), and 2 % are overweight or obese (BMI 25 kg/m<sup>2</sup> or above). Young men, age 15-19 years, are more likely to be thin (66%) than their older counterparts. Rural men are slightly more likely to be thin (39 percent) than urban men (32%). Among Ethiopian regions, those residing in the Somali region are most likely to be thin (62%), and those living in Addis Ababa are least likely (22%). The differences in BMI among the these men population groups could be due to variations in life style (feeding practices, physical activity level) , socioeconomic status (wealth/income, educational status) and some physiological attributes. Accordingly, men who attended only primary school are more likely than those with higher educational levels and those with no

education to have a BMI of less than 18.5 kg/m<sup>2</sup>. Forty-four percent of men in the lowest wealth quintile are thin, compared with 29% in the highest wealth quintile.

### **2.2.3 Predictors of NCDs and their risk factors**

Hypertension and physical inactivity were the most common multiple risk factors possessed by 7.5% of the participants who had at least one of the investigated risk factors for NCDs. Socio-demographic characteristics including male gender, increasing age, being a student and low socio-economic status were found to be positive predictors of NCDs (Tawa, Frantz & Waggie 2011:154). Sugathan *et al* (2008:558) showed that low socio-economic background as a high predictor (high risk group) for the habit of smoking, alcohol consumption, stress and unhealthy diet. Another study by Steven, Ben and Webster (2010:300) revealed that men residing in an urban area were positively associated with smoking (odds ratio, OR: 3.54; 95% CI: 2.4–5.1), high body mass index (OR: 7.32; 95% CI: 4.0–13.6), blood pressure (OR: 1.92; 95% CI: 1.4–2.7) and low physical activity (OR: 3.26; 95% CI: 2.5–4.3). Among women, urban-dwelling was positively associated with low physical activity (OR: 4.13; 95% CI: 3.0–5.7) and high body mass index (OR: 6.48; 95% CI: 4.6–9.2). In both sexes, urban residency was positively associated with the mean number of servings of fruit and vegetables consumed per day ( $P < 0.05$ ).

In Eritrea, Mufunda *et al* (2006:62) unravelled that BMI was positively associated with systolic blood pressure (SBP), diastolic and mean arterial pressure. Although the prevalence of obesity (3.3%) was higher in females, the effect of BMI on blood pressure (BP) was higher in males than in females (regression coefficient 0.64 and 0.38, respectively,  $P < 0.05$ ), especially in those >45 years old. BMI did not have a significant effect on BP in lean people ( $BMI < 19 \text{ kg/m}^2$ ) and in those with high BMI, but was positively correlated to SBP in those with normal BMI ( $P = 0.02$ ). BMI and age appear to play a synergistic role in creating a strong association with BP. The study conducted in India among the labour population (Mahmood, Srivastava, Shrotriya, Shaifali and Mishra (2011:45) showed that the prevalence of hypertension was significantly higher among individuals aged 40 years old and above, with high body mass index and

increased waist-to-hip ratio, ( $P < 0.05$ ). There is an increase in cases of hypertension amongst labour population of District Bareilly in India. Weight reduction may lead to a decrease in blood pressure of an individual. Smoking and low fruit and vegetable consumption were significantly higher among lower socioeconomic groups. The highest wealth-related absolute inequality was seen in smoking among men of low-income country group (slope index of inequality 23.0 percentage points; 95% CI 19.6, 26.4). The slope index of inequality for low fruit and vegetable consumption across the entire distribution of education was around 8 percentage points in both sexes and both country income groups. Physical inactivity was less prevalent in populations of low socioeconomic status, especially in low-income countries (relative index of inequality: (men) 0.46, 95% CI 0.33, 0.64; (women) 0.52, 95% CI 0.42, 0.65). Mixed patterns were found in the distribution of heavy drinking i.e. in all the socioeconomic statuses unlike other behavioural risk factors (Hosseinpoor, Bergen, Kunst, Harper, Guthold, Rekve, Naidoo & Somnath 2012:4).

The mean number of NCDs risk factors was found to increase among South Africans aged 50 years and older. It was indicated that the mean number of NCDs risk factors among all participants was 3 (95% CI: 2.81-3.10). Multivariate linear regression analysis revealed that being female, being in the age group of 60-69 years, and being from the coloured and Black African race were associated with a higher number of NCDs risk factors. Marital status, educational level, wealth, and residence were not significantly associated with the number of NCDs risk factors experienced (Phaswana-Mafuya, Peltzer, Chirinda, Musekiwa & Zamakayise 2013:5). Similar evidences generated in India indicated that the prevalence of type 2 diabetes mellitus (DM) was 5.8% and on univariate analysis age, occupation, socio-economic status, BMI, physical activity and family history were significant predictors for DM. In multivariate analysis age, BMI, family history of diabetes and occupation were significant for type 2 DM. The 'diabetes risk score' generated by the study using age, BMI and family history of DM, had specificity, sensitivity and accuracy of 54%, 77% and 76.2%, respectively. The area under curve for scoring system was 0.784 ( $P < 0.05$ ) (Majgi, Soudarssanane, Roy & Das 2012:4).

In Iran the risk factors of Diabetes Mellitus was identified and urban residents had significantly higher odds of diabetes than their rural counterparts (OR=1.196, 95% CI: 1.217- 1.265), a positive association between diabetes and hypertensive participants was observed (OR=1.307,95% CI:1.209-1.403), cholesterol was found as a significant factor for diabetes (OR=1.347,95% CI:1.268 - 1.424), waist circumference (WC) as the measure of obesity had a significant relationship with diabetes (OR=1.011, 95% CI: 1.009 - 1.013), having family history of diabetes had a profound influence on diabetes (OR=1.840, 95 %CI: 1.719- 1.970), the odds ratio of vegetable intake for diabetes was reported (OR= .998, 95 %CI: .983- 1.0129). Finally, there was an association between physical activity and diabetes. By using low as the reference group, diabetes odds ratios were 0.949 (95% CI: .884-1.020) and 0.859 (95 % CI: .807-.9158) for the moderate and vigorous levels, respectively (Yarandi, Mehdi Rahgozar, Jalil, Ali, Fereshteh & Enayatollah 2014:1519). It was learned that age, sex, employment, education seen to be associated significantly ( $P<0.05$ , 95% CI) with physical activity. Education had significant association with many behavioural risk factors ( $P<0.01$ ). Healthy lifestyle and increase in level of education is the need of modern time (Basu *et al* 2013:21).

#### **2.2.4 Knowledge, Attitudes and Behaviours toward Chronic Non-Communicable Diseases and their risk factors**

Knowledge, attitudes and behaviours statuses were assessed in Institute of Medical Sciences in India. It was mainly focusing on modifiable risk factors of CASHD. The risk factors specifically included smoking, hypertension, elevated cholesterol levels, diabetes mellitus and obesity. Identifying 3 or less risk factors was regarded as a poor knowledge level, whereas identifying 4 or more risk factors was regarded as a good knowledge level. Accordingly, 41% of the sample surveyed had a good level of knowledge. Sixty eight percent, 72%, 73% and 57% of the population identified smoking, obesity, hypertension, and high cholesterol correctly, respectively. Thirty percent identified diabetes mellitus as a modifiable risk factor of CASHD. In multiple logistic regression analysis independent demographic predictors of a good knowledge level with a statistically significant ( $P< 0.05$ ) adjusted odds ratio (AOR) were routine exercise of moderate intensity, AOR 8.41 (compared to infrequent or no exercise), no history of smoking, AOR 8.25, and former smokers, AOR 48.28 (compared to current

smokers). Although statistically insignificant, a trend towards a good knowledge level was associated with higher levels of education (Saeed, Gupta, Dhawan, Streja, John, Ku, Bhoi & Verma 2009:4).

In Saudi Arabia it was showed that 28.9% of the King Faisal University students do not practice any type of physical exercise. About 19% of the students were current smokers. A high proportion of university students were consuming fast foods, saturated fats, and soft drinks. Overweight (24.5%), obesity (11.9%), severe obesity (10.7%) as measured by BMI, as well as unacceptable WHR (10.7%) as an indicator of obesity was evident. Family history of obesity and unacceptable WHR were found to be statistically associated with increased obesity. Therefore, intervention programmes to raise the health awareness of adolescents about CHD risk factors and encourage them to adopt a healthy dietary behaviour, promote physical exercise and smoking cessation should be initiated (Amr, Attia, Abdulaziz, Nabil & Ahmed 2007:1833).

In Seychelles it was revealed that the age-standardized prevalence of hypertension (screening blood pressure [BP]  $\geq 160/95$  mm Hg or taking antihypertensive medication) was 36% in men and 25% in women aged 25 to 64 years. Among hypertensive persons, 50% were aware of the condition, 34% were treated, and 10% had controlled BP (i.e. BP  $< 160/95$  mm Hg). Most persons, be non-hypertensive, unaware-hypertensive or aware-hypertensive, had good basic knowledge related to the determinants and consequences of hypertension. These possibly have an effect of a nation-wide cardiovascular disease prevention programme over the last years. However, favourable outcome expectation, positive attitudes, and appropriate practices for hypertension and relevant healthy lifestyles were found in smaller proportions of participants, with little difference between aware hypertensive, unaware hypertensive, and non-hypertensive. Furthermore, hypertensive persons with other concurrent cardiovascular risk factors affecting the overall heart risk knew well the detrimental effects of these other factors but reported making little actual change to control them (particularly regarding overweight and sedentary habits (Aubert, Bovet, Gervasoni, Rwebogora, Waeber & Paccaud 1988:1140).

A study conducted among African American aged 18-26 years showed that some aspects of heart-disease were well-known among young adult African Americans (Donna & Kathleen 2011:5). Knowledge of certain other important risk factors (menopause) and preventive behaviours (eating fewer animal products), however, was more variable and inconsistent among the respondents. Differences in knowledge of individual variables was greater by education level than by gender overall. Predictors of a summary CVD knowledge score included higher education, female gender, and high self-efficacy (adjusted  $R^2 = 0.158$ ,  $p < .001$ ). Predictors of self-efficacy in changing CVD risk were higher education and perceived low risk of CVD (adjusted  $R^2 = 0.064$ ,  $p < .001$ ), but these characteristics explained only 6% of the variance.

In Tanzania it was learned that more than half of the study population (66.80%) had knowledge on hypertension but only 19.75% had knowledge on risk factors of hypertension (Mlunde 2011:60). The common risk factors known were consumption of fatty food and stress. People who reported to be doing physical exercises were 52.35%, smoking 9.54% and drinking alcohol 29.56%. Similarly, a study conducted in India by Jamatia *et al* (2009:206) among factory workers showed that most of the employees knew smoking as a risk factor for hypertension (55.2%), heart attack (61.1%) and cancer (78.7%); alcohol as a risk factor for hypertension (72.1%), heart attack (73.9%), cancer (54.9%); physical inactivity as a risk factor for hypertension (82.6%), heart attack (78.5%), diabetes (60.4%); and high fat diet as a risk factor for hypertension (67.2%), heart attack (64.8%) and that these risk factors lead to different non-communicable diseases. The prevalence (95% CI) of the risk factors is as follows: male current smoker [40.7% (95% CI:36.4-45.3)], current alcohol consumption [31.0 % (95% CI: 27.2 – 35.1)], sedentary activity [41.2% (95% CI: 37.0 – 45.5)], high fat intake [93.7% (95% CI: 90.2 - 95.5)], over weight [26.9% (95% CI, 23.2 – 30.9)]; and hypertension [21.0% (95% CI, 17.62 - 24.6)].

On the other hand, in China it was indicated that among females aged 18 year and older found that more than half (51.7%) of the women reported consuming less than 400 g of fruit and vegetables per day. The prevalence of other risk factors, in

descending order, were as follows: overweight and obesity, 32.3%; raised blood pressure, 29.7%; physical inactivity, 18.3%; raised total serum cholesterol, 18.1%; raised blood glucose, 7.0%; current smoking, 2.4%; and harmful use of alcohol, 1.3%. All risk factors except for physical inactivity showed a similar association with age, marital status and education: all of them increased significantly with age showed the highest prevalence among women who were separated, divorced or widowed, and declined with higher educational level. Although no trend for physical inactivity by age and education was observed, women between the ages of 45 and 54 years and those who had finished primary school, or who had attended junior high school without completing, showed the highest levels of physical activity (P for difference in means < 0.01). A negative association was observed between annual per capita household income and fruit and vegetable consumption on the one hand, and raised blood pressure on the other. No other factor showed an association with income. Women who lived in a rural area consumed fewer fruits and vegetables than women from an urban area (54.9% versus 47.4%, respectively) and they also had higher mean blood pressure than those from urban areas (31.4% versus 27.5%, respectively). On the other hand, the prevalence of raised blood glucose was higher among women from urban areas than among those from rural areas (8.0% versus 6.3%, respectively). The prevalence of some of the risk factors of NCDs varied with geographical location. For example, higher prevalence of overweight and obesity, raised blood glucose and raised total serum cholesterol were found in women from eastern China than in those from central and western China (Li, Limin, Jiang, Mei & Linhong 2013:655).

More than 4/5<sup>th</sup> (81.3%) of the general population knew that NCDs cannot be transmitted, but 9.4% of the population believed that NCDs can be transmitted from person to person and 9.3% did not have any idea. The vast majority of the study population (91.6%) agreed that NCDs are common among Mongolians, but a substantial percentage of them (65.7%), and almost seven out of every ten rural individuals (75.1%) thought that NCDs are less dangerous compared to infectious diseases (Mongolia Ministry of Health 2011:24).

The majority (90.1%) of the participants agreed that Mongolians drink large amounts of alcohol during one drinking period indicating binge drinking. Celebrations (91.3%) and drinking with friends (78.2%) were the most common reasons for drinking alcohol in large amounts, particularly for the urban people. Drinking alcohol in order to forget problems faced in life was also common, for 13.9% in the age group of 15-24 year olds and for 10.3% in the age group of 35-44 year olds. About 2/3<sup>rd</sup> or 66.2% of alcohol consumers knew that they needed to reduce the amount of alcohol they drink. Most study participants knew that smoking is harmful to their health, but 7.7% of them thought that it is harmful only if they smoke more than one packet in a day and 8.5% of them that only everyday smoking is harmful to health. Almost the whole population (99.4%) understood that smoking in the presence of others is harmful to others; however, 17.9% said that the smoking of others at their homes does not bother them and 37.1% of them that it bothers them but they still allow them to smoke (Mongolia Ministry of Health 2011:34).

With regard to fruit and vegetables consumption, Mongolians lacked attitudes toward the daily consumption of fruits and vegetables with only about 25% of the population considering it to be very important. Men saw less importance for the everyday consumption of vegetables and fruits, both in rural and in urban populations. As reasons for the low fruit and vegetable consumption, a high cost was cited by the majority of the normal consumers (69.2%) of the population studied. The safety of fruits and vegetables imported from other countries was reported by 32.3% of study participants, and 26% of the population, mainly rural, do not consume them because of limited access and availability. Concerning salt consumption, the majority of the population (92.1%) thought that the daily amount of salt consumed mostly comes from directly adding it into tea and food. Only 4.4% knew that salt can be consumed indirectly (discretionary) through eating salt containing manufactured foods like bread, ham, cookies and others (Mongolia Ministry of Health 2011:49).

As far as physical exercise is concerned in Mongolia, every fourth person (25.9%) did not understand how often they need to exercise to stay healthy; this was particularly true for young people. When asked why people did not exercise frequently, 29.8% of

them did not allocate time for it, 28.1% of the population did not know how to be physically active and 24.3% didn't like exercising. Body weight measurement practices were assessed and 57% had measured their weight in the 6 month time preceding the study. Only one-third (34.5%) of the population stated that it is "very important" to control their weight and this was true for 42.8% of women, which was 16.8% higher than among men. The survey also looked into the population's attitudes toward the health impacts of risky behaviours. Of all respondents, 72.2% believed that drinking alcohol every day is "very harmful" for human health, which is followed by tobacco use (38.4%). Men were twice more likely to think of smoking as slightly harmful indicating a lack of awareness. A little less than 20% of the population considered it "very harmful" to be physically inactive, to be overweight and to consume foods high in salt. Men considered twice as less the health risk of being overweight and were four times less conscious of the risk of eating foods high in salt. About 18% of the respondents thought that there is not any harmful effect on health if consuming too little amounts of fruits and vegetables, or it is only slightly harmful (49.8%), this attitude was particularly true for men. Nearly 48% were unaware of the term 'hypertension' or had only heard of the term before, indicating an insufficient level of knowledge. Men had less knowledge compared to women. More than 3/4<sup>th</sup>, 75.7% of people over 35 years of age considered the need to regularly check blood pressure as important for all people, but 44.9% of them thought this is "not important for them personally", 28.8% did not know that they need to measure it, and 17.1% stated not to have time to measure it. Over a fifth of the people surveyed (23.5%) didn't know that high salt containing foods affect the blood pressure. This is especially true for men (28.9%), whose knowledge is insufficient compared to women (18%). There was a preference to use drugs to reduce the blood pressure (96.8%) and only a quarter of the people (25.6%) considered to influence the blood pressure by reducing body weight, every fifth person (20.3%) by changing the eating behaviour and every tenth person (13.7%) by being physically active (Mongolia Ministry of Health 2011:49) .

In Mongolia more than half of the population did not know or had limited knowledge about CVDs and stroke (53% and 55.95%) and men were twice as likely to have less knowledge. However, the majority of the population (about 80%) thought cardiovascular

diseases are becoming common in their country. More than a fifth (21.4%) of the 15-24 year olds and 17% of the 25-34 year olds didn't have any idea in this regard. One out of ten persons (10.5%) of the Mongolian population didn't know or didn't understand the possibility to prevent CVDs. Limited knowledge among the 15-24 year olds, compared to other age groups, was twice as high. There was low knowledge among 15-34 year olds that smoking, physical inactivity, being overweight and old age increase the risk for CVDs. Nearly 2/3<sup>rd</sup> (65.3%) of the population had insufficient knowledge about diabetes. Almost half of the respondents (48.2%) were unaware that diabetes can develop even when a person feels normal, and 33.7% thought diabetes could not be prevented, indicating a lack of knowledge regarding the prevention and control of diabetes. Men tended to be less aware of diabetes prevention and control measures (Mongolia Ministry of Health 2011:49).

#### **2.2.4.1 Knowledge and Practices on Breast Cancer and Screening**

Awareness of breast cancer was assessed among specified nurses in India (Fotedar, Seam, Gupta, Vats & Verma 2013:119). The average knowledge of risk factors about breast cancer of the entire study population is 49%. About 10.5% of nurses had poor knowledge, 25.2% of the nurses had good knowledge, 45% had very good knowledge and 16.3% of the nurses had excellent knowledge about risk factors of breast cancer and early detection methods. The knowledge level was significantly higher among Bachelor degree holder nurses than those diploma graduates. Fifty-four percent of the participants in this study reportedly practice breast self-examination (BSE) at least once every year. Less than one-third reported that they had clinical breast examination (CBE) within the past one year. Seven percent ever had mammogram before this study. This has also been evidenced among admitted women in Pakistan and 161(84%) patients had heard of breast cancer, 35% were aware of one or two major risk factors while 65 % knew at least one major sign or symptom of breast cancer. Eighty-five percent of respondents believed that early detection of cancer improved survival. Of the 101 participants > 40 years of age, 36.9 % practiced BSE, 6.9 % CBE and only 4.9 % had had a mammogram at some point in their life. Most patients did not practice breast cancer screening because they had either never heard of the screening tests or did not

feel the need to perform them (Maqsood, Zeeshan, Rehman, Aslam, Zafar, Syed, Qadeer, Ajmal & Imam 2009:419).

In Mongolia, one in four women didn't have any knowledge about breast cancer and only 7.6% expressed they know a lot about it. The extent of knowledge increased with age, going along with an increased risk for breast cancer. Among women, 50.9% were never worried that breast cancer will affect her or her family and 45% expressed that they only sometimes think about it (Mongolia Ministry of Health 2011:71).

#### **2.2.4.2 Cervical Cancer Knowledge, Attitude, Practices and related conditions**

In Nepal it was learned that factors associated with late diagnosis for cervical cancer were advancing age, being illiterate and being rural inhabitants. Medical shops (33.6%) and private hospitals (31%) were major first contact points of patients with health care providers (HCP). There was no cervical/per-speculum examination (78.2%) and symptoms misinterpretation (90%) of patients occurred in initial consultation with HCP. Four in every five cases (80.9%) of cervical cancer had late diagnosis. Literate women (adjusted OR=0.121, CI: 0.030-0.482) and women having abnormal vaginal bleeding as an early symptom (adjusted OR=0.160, CI: 0.035-0.741) were less likely to suffer late diagnosis. Women who shared their symptoms late (adjusted OR=4.272, 95% CI: 1.110-16.440) and did so with people other than their husband (adjusted OR=12.701, 95% CI: 1.132-142.55) were more likely for late diagnosis (Gyenwali, Pariyar & Onta 2013:4375). In Estonia was assessed that the main reasons for non-participation in the national screening programme were a recent visit to a gynaecologist (42.3%), fear to have a Pap-smear (14.3%), long appointment queues (12.9%) and unsuitable reception hours (11.8%). Fear to have a Pap-smear was higher among women aged 30 and 35 years than those 50 and 55 years (RR 1.46; 95% CI: 0.82-2.59) and women with one or no deliveries (RR 1.56, 95% CI: 0.94-2.58). The awareness of cervical cancer risk factors is poor and it does not depend on socio-demographic factors. Awareness of screening was higher among Estonians than Russians (RR 1.64, 95% CI: 1.46-1.86). Most women prefer to receive information about screening from personally mailed information letters (74.8%) (Kivistik, Lang, Baili, Anttila & Veerus 2011:3). In Mongolia again, more than a half (57.6%) of the women 30 years of age or older didn't know about cervical cancer or had just heard the term before. One in five women (21.4%)

didn't know how often it is recommended for women to have a Pap smear test, and 71.6% were guessing that it is recommended to be conducted yearly. Furthermore, 2/3rd of the women (63.1%) expressed that they did not know that they need to have a Pap smear test, 14.5% said that they do not have the time and 13.2% didn't know where to go to have it taken (Mongolia Ministry of Health 2011:74).

The report of the Central Statistical Agency [Ethiopia] and ICF International (2012:59) indicated that women age 25-49, 29% first had sexual intercourse before age 15, 62 % before age 18, and by age 25 the majority of Ethiopian women (88 %) had had sexual intercourse. The median age at first sexual intercourse for women age 25-49 years is 16.6 years, which is very close to the median age at first marriage of 16.5 years. The median age at first sex for women in Tigray is 16.1 years. This suggests that Ethiopian women generally begin sexual intercourse at the time of their first marriage. The median age at first sexual intercourse has increased over the past two decades, from 15.6 years for women currently age 45-49 to 18.8 years for women currently age 20-24. It was also shown that 1 %, each, of Ethiopian women and men reported having had an STI in the past 12 months. Three percent of women and 2 % of men reported having had an abnormal genital discharge, and 1% each of women and men reported having had a genital sore or ulcer in the 12 months preceding the survey. The proportion of genital discharge or ulcer or STI for women in Tigray is 4%.

### **2.2.5 Perception of body size and shape**

In accurate perception of body size and shape is pervasive among some population group in South Africa and the United States of America (USA). In South Africa health professionals were found to have an inaccurate perception of their own weight (Skaal & Pengpid 2011:565). In college-age African-American males it found that 50.4% were overweight or obese (OW/O). Of the OW/O males, 59.7% inaccurately classified their own weight status as normal and chose ideal weights  $F(2,59)=3.8$ ,  $P<0.04$ ) and healthy weights ( $F(2,59)=8.0$ ,  $P<0.001$ ) that were heavier than males with accurate weight perceptions. Specifically, OW/O males desired larger upper torsos ( $\chi^2=7.2$ ,  $df=1$ ,  $P<0.01$ ) and larger body parts (i.e., arms, legs, chest area;  $F(2,59)=11.0$ ,  $P<0.0001$ ).

Inaccurate, overweight males were less likely to agree that losing weight supported healthiness ( $\chi^2=26.5$ ,  $df=4$ ,  $P<0.001$ ) or that losing weight would make them more attractive ( $\chi^2=14.4$ ,  $df=4$ ,  $P<0.01$ ) (Gross 2005:1612).

The misperception has also been found to be in the US in Texas that less than half of the study participants perceived themselves correctly regardless of actual weight and ethnicity ( $P<0.001$ ). Nearly three-fourths of African American (AA) (73.9%) and less than half of Hispanic or Latina (HL) (42.9%) women who were normal weight desired to be obese, and only 39.4% of AA and HL women desired to be normal weight. Women varied on measures of physical activity (PA) ( $P<0.05$ ). Regression analyses showed objectively measured PA was significantly associated with BMI and ethnicity ( $P<0.01$ ) (Mama, Quill, Maria, Reese-Smith, Jorge & Lee 2011:284). There is also further evidence among housewives that body image dissatisfaction was found significantly correlated with BMI ( $r=0.487$ ,  $P<0.05$ ) (Tan Zhao 2010:38) .

### **2.2.6 Mental Stress and related conditions**

Sugathan *et al* (2008:558) learned that more than one-fifth of them (23%) reported stress according to a study conducted in Kerala, India. Similarly, the prevalence of self-reported symptoms of anxiety or depression was 6.8% when using a relatively high cut-off point for positive symptoms to screen for mental illness. This was significantly higher than the prevalence of those already diagnosed with a mental disease (any diagnosis) which stood at 1.6% (Ministry of Health Zanzibar 2011:17).

## **2.3 HYPERTESION AND ITS DETERMINANTS**

Hypertension, once rare in West Africa, is emerging as a serious endemic threat and has been referred to as a "silent killer" as it often has no early detectable symptoms (Sande, Milligan, Nyan, Rowley, Banya & Ceesay 2000:492; Sande, van der, Milligan, Walraven, Dolmans, Newport, Nyan, Banya, Thien, Ward & McAdam 2001:736; Sande & van der 2003:34). However, it is a major cause of serious and disabling health conditions, including heart disease, stroke and renal disease (Hoel & Howard 1997:118; Duda, Darko, Adanu, Seffah, Anarfi, Gautam & Hill 2007:118). Hypertension has been

identified as a major risk factor for CVD, which has emerged as an important medical and public health issue in Sub-Saharan Africa (SSA) despite the ravage being perpetuated by HIV, tuberculosis, and malaria (Addo, Amoah & Koram, 2006:897; Agyemang 2006:529; Agyemang, Bruijnzeels & Owusu-Dabo 2006:69; Addo, Smeeth & Leon 2007:1015; Agyemang & Owusu-Dabo 2008:22). Studies from various countries in SSA also identify hypertension as a disease burden that requires concerted preventive and control efforts. Hypertension is defined in existing studies using either WHO criteria of blood pressure (BP)  $\geq 160/95$  mmHg or the JNC (Joint National Committee on Prevention, Evaluation, and Treatment report) criteria of blood pressure  $\geq 140/90$  mmHg or self-reported antihypertensive medication (Addo *et al* 2007:1016).

Prevalence for hypertension varies across and within regions in SSA. An analysis of all national data in Zimbabwe in the 1990s found that between 1990 and 1997, the national crude prevalence of hypertension increased from 1% to 4% (Mufunda, Chatora, Ndambakuwa, Nyarango, Kosia, Chifamba, Filipe, Usman & Sparks 2011:888). Adedoyin, Mbada, Balogun, Martins, Adebayo, Akintomide and Akinwusi (2008:685) found that in a semi-urban community sample, 36.6% had a BP of greater than or equal to 140/90 mmHg. A study in the Niger Delta region found the prevalence of hypertension to be 16% and 12% for males and females, respectively (Ofuya 2007:948). A study in an urban area of Nigeria in the 1990s found that among more than 10,000 adults, the crude prevalence of hypertension (blood pressure  $> 160/95$  mm Hg) was 12.4 % with an age-adjusted rate of 7.4% (Lawoyin 2002:209). In a prospective study conducted in rural Nigeria, the prevalence of hypertension was determined to be 7% (Kaufma 1999:648).

The impact of migration from rural to urban areas was demonstrated in a longitudinal study in Kenya, in which moving from a rural to urban setting produced significant increases in BP within a short time (Poulter, Khaw & Hopwood 1985:5376). Growing migration from rural areas to urban areas also suggests worsening prevalence of hypertension as migrants adopt lifestyle changes in physical activity, dietary habits, and stress level. Regardless of gender or type of community, advancing age is associated with an increased prevalence of hypertension Addo *et al* (2007:1016); Zaman and

Brunner (2008:406) and this implies greater burden of hypertension as population aging occurs in SSA. The study conducted in Eritrea showed that the prevalence of hypertension was 15.9% in the general population, with 16.4% in urban and 14.5% in rural areas, 17% of whom were males while 15% were females. BMI was positively associated with systolic (SBP), diastolic and mean arterial pressure. Although the prevalence of obesity (3.3%) was higher in females, the effect of BMI on BP was higher in males than in females (regression coefficient 0.64 and 0.38, respectively,  $P < \text{or} = 0.05$ ), especially in those  $>45$  years. BMI did not have a significant effect on BP in lean people ( $\text{BMI} < 19$ ) and in those with high BMI, but was positively correlated to SBP in those with normal BMI ( $P < \text{or} = 0.02$ ) (Mufunda *et al* 2006:62). The age-adjusted prevalence (95% confidence interval) of high blood pressure, defined as systolic blood pressure (SBP)  $\geq 140$  mmHg (millimetres of mercury) or diastolic blood pressure (DBP)  $\geq 90$  mmHg or reported use of anti-hypertensive medication, was 31.5% (95% CI: 29.0, 33.9) among males and 28.9% (95% CI: 26.8, 30.9) among females (Tesfaye, Byass & Wall 2009:3).

In Nigeria it was revealed that 60 (49.6%) of the study participants was hypertensive diabetics (hypertensive cases eventually developing diabetes) while 52 or 43% was diabetic hypertensive (diabetic cases eventually developing hypertension). The rest had simultaneous diagnosis of diabetes and hypertension. The diabetic hypertensive participants significantly had higher BMI ( $P = 0.04$ ) while the hypertensive diabetics group had higher hip/waist ratio ( $p = 0.01$ ). The diabetic hypertensive group had higher waist circumference statistically significant only in women ( $p = 0.04$ ). Also significantly more people (21 or 42%;  $p = 0.04$ ) in the diabetic hypertensive group used table salt often. A logistic regression performed showed that only use of table salt was independently associated with a diagnosis of diabetes or hypertension (Balogun 2011:91). A case control study to assess the role of risk factors for essential hypertension in India showed that various risk factors including smoking, its frequency and duration, alcoholic status, increased leisure time, physical inactivity, restless sleep, increased BMI, increased mental stress, mixed diet (animal and plant products) and salt intake. Smoking of more than 10 cigarettes or bidi had 3.23 times the risk of developing

hypertension than smoking up to 10 cigarettes or bidi (Sunil , Sagare, Rajderkar & Girigosavi 2011:11).

## **2.4 DIABETES MELLITUS**

Diabetes, an important non-communicable disease, is undoubtedly a rising problem globally. Sub-Saharan Africa is not immune to the process and is experiencing a triple and, in many instances, a quadruple burden of disease as the traditional infectious diseases such as malaria and tuberculosis have been joined by non-communicable diseases in addition to HIV. In certain countries, high levels of trauma and violence contribute further to the burden of disease (Mbanya, Ramiaya, Jamison, Feachem, Makgoba, Bos, Baingana, Hofman & Rogo 2006:325). All this occurs in a region in which over 40% of the population live on <US\$1/day, (World Bank 2007:7) and in which the epidemiological transition is occurring rapidly, often accompanied by tremendous social and political upheaval. Sub-Saharan Africa, however, is not homogeneous and countries are clearly at different stages of this transition.

Against this backdrop, the current review focuses on the scope of diabetes in the region, the different forms of diabetes and macrovascular complications encountered, and finally, the challenges and barriers to the provision of optimal healthcare for diabetes. The review concentrates on these topics as they relate to the indigenous African population, overwhelmingly the majority of the population throughout sub-Saharan Africa. It is perhaps pertinent to note that a number of authors have proposed that diabetes be used as a tracer for the other burgeoning chronic diseases, because it is well-defined, fairly easy to diagnose and prevalent (Mbanya *et al* 2006:325).

Diabetes was regarded as a rare disease in SSA prior to the 1990s (Nolte & Bain 2006:1009). Since the 1990s, demographic and epidemiological transitions, including urbanization, have rendered diabetes as one of the NCDs burdens in SSA. Currently, there are 10.4 million individuals with diabetes in SSA, representing 4.2% of the global population with diabetes (International Diabetes Federation, 2006:3). By 2025, it is estimated that this figure will increase by 80% to reach 18.7 million in this region, with a higher prevalence in the urban areas (International Diabetes Federation 2006:3; Kengne, Albert, Amoah & Mbanya 2005:3597). Studies indicate that an aging

population, coupled with rapid urbanization, is expected to lead to the increasing prevalence of diabetes in SSA (Kengne *et al* 2005:3597). As in other parts of the world, Type 2 diabetes is more prevalent than type 1 diabetes in SSA (Beran & Yudkin 2006:1692). We focus on type 2 diabetes. Studies presented define diabetes either by physician diagnosis, in-situ capillary whole blood glycaemia test, or in some cases by urinalysis or self-report. Studies listed were conducted after the WHO diabetes criteria were implemented in 1980 (modified in 1985) (WHO 1999:1763).

According to International Diabetes Federation (IDF), the current estimated prevalence rate of type 2 diabetes in Africa is about 2.8%. Malawi and Ethiopia have rates under 2%, whereas Ghana, Sudan and South Africa have prevalence rates over 3% (Gill , 2009). Regarding urban areas, the crude prevalence of type 2 diabetes ranges from 1.3% in Sudan to 6.3% in Cameroon (Mbanya, Ngogang, Salah, Minkoulou & Balkau 1997:826; Elbagir, Eltom, Elmahadi, Kadam & Berne 1998:166; Nasheetta, Krisela, Carl, Estelle, Bavanisha & Naomi 2012:604). Consistent rural-urban disparities in the prevalence of type 2 diabetes have been noted in SSA with urban areas recording higher rates (Motala, Omar & Pirie 2003:80; Mbanya *et al* 2006:325; Gill, Mbanya, Ramaiya & Tesfaye 2009:3). The crude prevalence rate of type 2 diabetes in rural communities has been found as low as <1% in rural Cameroon in 1997, 4.0% in rural Guinea in 2007 to 4.8% in rural South Africa (Mbanya, Ngogang, Salah, Minkoulou & Balkau 1997:826).

In Sudan, Elbagir, Eltom, Elmahadi, Kadam and Berne (1998:166) revealed no rural-urban differences. The biochemical risk factors investigated in India showed mean levels of fasting blood glucose, cholesterol, TGL and low HDL were the highest in the urban area, though there was not much difference in the rural and peri-urban areas. There was also an increasing trend of all the parameters as age increased in both men and women. 11.4% of men in urban areas had fasting blood glucose above the cut off levels and 44.3% of urban men and women had high cholesterol levels (Nongkynrih 2008:167). Similarly a survey conducted in china revealed that fasting plasma glucose (FPG) was positively correlated with BMI, Waist circumference (WC), systolic blood pressure (SBP), diastolic blood pressure (DBP), triglyceride (TG), and total cholesterol

(TC), and was negatively correlated with high density lipoprotein-cholesterol (HDL-C) (all  $p < 0.05$ ). BMI was more strongly correlated with Impaired Fasting Glucose (IFG) than with WC. The correlation coefficient of FPG was remarkably higher with TG (0.244) than with TC (0.134) and HDL-C (-0.192). TG was an important predictor of IFG, with odds ratios of 1.76 (95%CI: 1.31-2.36) for the study participants with borderline high TG level ( $1.70 \text{ mmol/l} \leq \text{TG} < 2.26 \text{ mmol/l}$ ) and 3.13 (95% CI: 2.50-3.91) for those with higher TG level ( $\text{TG} \geq 2.26 \text{ mmol/l}$ ), when comparing to study participants with  $\text{TG} < 1.70 \text{ mmol/l}$ . There was a significant dose-response relationship between the number of abnormal variables and increased risk of IFG (Qian, Lin, Zhang, Bai, Chen, Zhang, Luo & Shen 2010:3).

## **2.5 CONCLUSION**

To summarise, different literature have been consulted to learn the findings on preventable risk factors. It has been documented that the prevalence of the behavioural and biological risk factors are high among the different study population. In fact, there are variations in the magnitude of the risk factor from one study population to another by gender, study setting, age and socio-economic status.

The magnitude of the knowledge, perceptions, attitudes and behaviour also differ from one population to another. Determinants of hypertension have also been identified. Apart from these findings, the different study designs used have also been explored. The methods and study designs to address the study objectives and hypothesis established will be outlined in the methodology section, Chapter 3.

## **CHAPTER 3**

### **Research methodology**

#### **3.1 INTRODUCTION**

Research methodology is a way to systematically solve the research problem (Rajasekar, Philominathan & Chinnathambi 2013:5). It may be understood as a science of studying how research is done scientifically. In it we study the various steps that are generally adopted by a researcher in studying his or her research problem along with the logic behind them. When one talks of research methodology concerning a research problem or study, the following points are mentioned by Kothari (2005:10):

- Why a research study has been undertaken,
- How the research problem has been defined,
- In what way and why the hypothesis has been formulated,
- What data have been collected and what particular method has been adopted, and
- Why particular technique of analysing data has been used.

This chapter elucidates the study design and methods to be used for this study. The chapter encompasses setting, population, sampling procedure, data collection procedure, data collection instruments, variables, quality control measures, validity and reliability data management and analysis and ethical considerations.

#### **3.2 STUDY SETTING AND POPULATION**

The research setting can be seen as the physical, social, and cultural site in which the researcher conducts the study (Bhattacharya 2008:788). In order to meet the research objective of this particular study, rural and urban populations were considered. The rural setting was the Health and Demographic Surveillance System (HDSS) sites, which is owned by the Mekelle University in Tigray Region and used as a research centre of the University. The HDSS site is located in the Kilte Awlaelo district. The HDSS site has 10 Kebeles (the lowest political administrative unit in Ethiopia). The urban population was taken from the regional capital of Tigray, Mekelle. Including the adult populations from both urban and rural areas in this study enabled the researcher to determine the distribution of the risk factors of NCDs and the determinants of hypertension in particular in both settings.

### **3.2.1 Mekelle City**

Mekelle is a city in the northern part of Ethiopia. It is located in the Enderta district which is located in the southern zone of the region. Mekelle is the capital of the Tigray regional state. It is located some 783 kilometers north of the capital, Addis Ababa, at latitude and longitude 13°29'N 39°28'E / 13.483°N 39.467°E / 13.483; 39.467 with an elevation of 2084 to 2200 meters above sea level. The ambient temperature is 16° to 30° Celsius year round. The city has an estimated area of 24.44 square kilometers (Mekelle City 2011:1).

#### **3.2.1.1 Population Characteristics and Political Administration of Mekelle City**

Based on the projections from the Central Statistical Agency in 2007, Mekelle has an estimated total population of 273,459, of whom 132,868 were males and 140,591 were females. Mekelle has a population density of 11,189 people per square kilometer. The 1994 census reported that this city had a total population of 96,938 people of whom 45,729 were males and 51,209 were females (Central Statistical Agency Ethiopia 2012:7). There was one city administration, 7 sub-city administrations or “Kifle ketema” and 104 “Ketenas” (Mekelle City 2011:2). The total number of households in the city was 60,206. Christianity accounts for 93% of the population whereas Islam and other religions comprise the remaining 7% (Central Statistical Agency Ethiopia 2012:7). The languages spoken in the city are Tigrigna, Amharic and English. The predominant ethnic group in the area is Tigrie.

Mekelle has been among the fastest growing cities of Ethiopia. It is one of Ethiopia's principal economic and educational centres. A new international standard airport, Alula Aba Nega Airport, has been opened very recently, as well as the northern Ethiopia's principal cement production facility. There are diverse economic activities such as cement making, timber, mining, light manufacturing, agro-processing, wholesale and retail trade. In May 2000, Mekelle University was created by the merger of Mekelle Business College and Mekelle University College (Cannon 2009:20).

### **3.2.1.2 Health Services of Mekelle City**

Like other major urban centres in Ethiopia, the health service coverage in terms of physical accessibility is 100%. There are seven hospitals (three public, three private, and one non-governmental). There are nine health centers, forty-eight private clinics and ten non-governmental organizations clinics (Mekelle City Health Bureau 2011:3).

### **3.2.2 Kilte Awlaelo**

The district is located in the eastern zone of Tigray, 45 km away from Mekelle in the North direction. It is bordered by the following districts: in the north Saese Tsaeda Amba, in the south Enderta, in the east Atsibi Wemberta and in the west Degua Tembien Woreda. The district has a total area of 101,758 hectares. There are 18 Kebeles in the district. The district also has an altitude ranging 1900-2300 metres above sea level. The annual rain fall ranges 350-450 mm. The climatic condition is mainly temperate and with a mean annual temperature of 17.25 degrees Celsius. The capital of the district is Wukro Town (Kilte Awlaelo District Health Office 2012:2).

#### **3.2.2.1 Population and Economy of Kilte Awlaelo District**

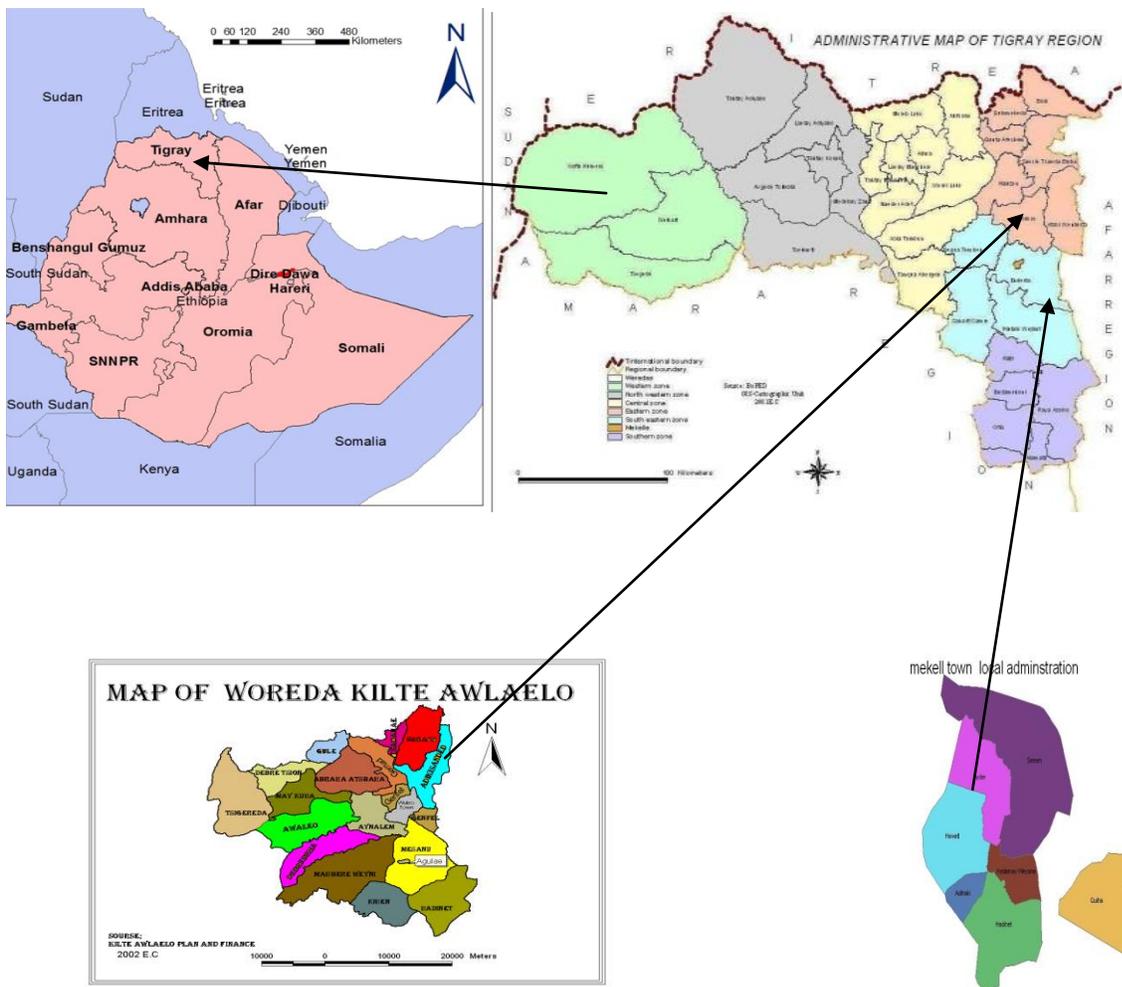
Based on the projection from the Central Statistical Agency in 2007, Kilte Awlaelo has an estimated total population of 111,593 people, of whom 54,423 were males and 57,170 were females. The district has a population density of 54.2 people per square kilometer (Central Statistical Agency Ethiopia 2012:8). The major source of income is from agriculture. Horticulture is currently increasing as a source of income for a small segment of the population (Kilte Awlaelo District Health Office 2012:1).

#### **3.2.2.2 Health services of Kilte Awlaelo District**

The district has a single general hospital, five health centres and 16 health posts. The hospital is primarily providing curative services as opposed to prevention programmes. The health centres are providing both curative and preventive health services. The health posts are also providing preventive and promotional health services most of which are at the household level (Kilte Awlaelo District Health Office 2012:2).

### 3.2.2.3 Kilte Awlaelo HDSS Site

The HDSS site includes 10 Kebeles drawn from the three Districts. Eight of the 10 HDSS Kebeles are from the Kilte Awlaelo district. The remaining two sites are from Atsbi Wonberta District. The population size of the HDSS is 68,495, with 51.4% female and 48.6% male composition. The HDSS sites are Abreha Atsbaha, Agazi, Adi Mesanu, Adeki Sandid, Aynalem, Gemad, Gule, May Kuiha, Mahibere Woyni and Negash. The major source of income is agricultural products, including farming and cattle rearing. Each HDSS Kebele has one health post (Mekelle University 2011:2).



**Figure 3.1 Maps of Ethiopia, Tigray Region, Mekelle city Administration (Mekelle City 2011:3) and Kilte Awlaelo District (Mekelle University 2011:3)**

### **3.3 RESEARCH DESIGN**

This section describes the research designs and the rationale for using the designs in this particular research.

#### **3.3.1 Definition of Research Design**

The research design is the conceptual structure within which research is conducted. It constitutes the blueprint for the collection, measurement and analysis of data. As such, the design includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data (Kothari 2004:31).

#### **3.3.2 Rationale for choosing the Research Design**

A particular research design is selected for this study because it provides direction for the various research operations, thereby making research as efficient as possible by yielding maximal information with minimal expenditure of effort, time and money. Just as for a better, more economical and the attractive construction of a house, one needs a blueprint (or what is commonly called the map of the house) well-thought out and prepared by an expert architect. Similarly we need a research design or a plan in advance of data collection and analysis for our research project. Research design stands for advance planning of the methods to be adopted for collecting the relevant data and the techniques to be used in their analysis, keeping in view the objective of the research and the availability of staff, time and money. Research design, in fact, has a great bearing on the reliability of the results arrived at and as such constitutes the firm foundation of the entire edifice of the research work (Kothari 2004:32). Berger and Wong (2009:13) also described the research design as how data are to be collected to test whether the posited relations among variables hold or not. It is a plan for collecting and utilizing data so that information is generated to test hypotheses. A good or poor research design may be characterized by the amount of information it generates and its power for testing the hypotheses. Specifically, the research design determines conditions under which the study is to be carried out. Conditions refer to selection of the combination of levels of all the independent variables, including how the units of analysis are allocated to each of the conditions and how many replications are planned. The choice of the design is based on a hypothetical relation between independent (predictor, explanatory) variables and dependent (response) variables posited in Stage

1 where it is also assumed that variation in the independent variables leads to changes in the dependent variable (effect).

To identify the magnitude of NCDs risk factors and to assess the knowledge, perceptions, attitudes and behaviour of the study participants, a descriptive cross-sectional study design (to identify the prevalence of conditions and the associations between factors) (Wolfgang & Pigeot 2007:158) was employed. To identify the risk factors of hypertension, a matched case-control study design is used. The matched case control study enabled the researcher to observe the population efficiently by using a control series in place of complete assessment of the denominators of the disease frequencies (Rothman, Greenland & Lash 2008:112).

### **3.3.3 Quantitative method and paradigm**

Aliaga and Gunderson (2002:1) defined quantitative method as the means of explaining phenomena by collecting numerical data that are analysed using mathematically based methods. According to Creswell (2003:20), the researcher primarily uses a post-positivist approach to develop knowledge when quantitative research is selected (i.e., cause-and-effect thinking, use of measurement and observations, and test of theories), employs strategies of inquiry such as experiments and surveys, and collects data on predetermined instruments that yield valid and reliable statistical data.

According to Babbie (2010:23), the goal of a researcher in quantitative research is to determine the relationship between one thing (an independent variable) and another (a dependent or outcome variable) in a population. Quantitative research designs are either descriptive (study participants usually measured once) or experimental (study participants measured before and after a treatment). A descriptive study establishes only associations between variables. Experiments establish causality. Quantitative research deals in numbers, logic and the objective and unchanging static data and detailed convergent reasoning rather than divergent reasoning.

Babbie (2010:25) also described the main characteristics of quantitative data as follows:

- The data are usually gathered using well-structured research instruments.
- The results are based on large sample sizes that are representative of the population.

- The research study can usually be replicated or repeated, given its high reliability.
- The researcher has a clearly defined research question to which objective answers are sought.
- All aspects of the study are carefully designed before data are collected.
- Data are in the form of numbers and statistics.
- The project can be used to generalize concepts more widely, predict future results, and/or investigate causal relationships.
- The researcher uses tools such as questionnaires or equipment to collect numerical data.

Quantitative designs rely on a positivist paradigm. Positivism which emphasizes an objectivist approach to studying social phenomena gives importance to research methods focusing on quantitative analysis, surveys, experiments etc. (Nigel, Daniel & Debbi 2008:281). In this study, the assumption is that there are preventable risk factors of NCDs and there are community knowledge, perceptions, attitudes and behaviours related to the risk factors.

### **3.4 RESEARCH METHODS**

The research methods refer to those methods/techniques that are used for conduction of research (Kothari 2004:7).

#### **3.4.1 Phases of the Research**

Polit and Beck (2004:730), describe 5 phases to the research process: the conceptual phase, the design and planning phase, the empirical phase, the analytic phase, and the dissemination phase as detailed in Table 3.1 below.

**Table 3.1 Phases of the research**

Phase	Application
1. The Conceptual Phase	<p>This is the initial phase of research and involves the intellectual process of developing a research idea into a realistic and appropriate research design. The following activities were carried out:</p> <ul style="list-style-type: none"><li>• Critiquing the literature on the topic of interest, continually refining and narrowing down the topic until a succinct research problem and purpose have been determined.</li><li>• Evaluating the existing research on the topic of interest, including the strengths and limitations.</li><li>• Gaining comprehensive knowledge of NCDs preventable risk factors.</li><li>• Consulting experts on NCDs.</li></ul>
2. The Design and Planning Phase	<p>Selecting a research design, developing study procedures, determining the sampling and data collection plan. The following activities were done:</p> <ul style="list-style-type: none"><li>• The study design identified,</li><li>• The sampling plan and sample size prepared</li><li>• Data collection instrument prepared</li><li>• The study instrument is translated</li><li>• Data collection procedures outlined</li><li>• Quality control measures prepared</li><li>• Training of data collectors planned</li><li>• Budgeting to undertake the data collection and related activities was sought.</li></ul>

<p>3. The Empirical Phase</p>	<p>This is a step for collecting data and preparing data for analysis. The following were conducted:</p> <ul style="list-style-type: none"> <li>• Training of data collectors and supervisors</li> <li>• Pretesting to validate the instrument</li> <li>• Interviewing the study participants</li> <li>• Obtaining physical measurements including weight, height, BP, waist and hip circumferences</li> <li>• Providing fasting instructions for those who take part in the biochemical test</li> <li>• Testing for fasting blood sugar, cholesterol and triglycerides</li> </ul>
<p>4. Analytic Phase</p>	<p>This phase comprises of analyzing the data and interpreting the results. The following details were done:</p> <ul style="list-style-type: none"> <li>• Preparing of template data entry</li> <li>• Cleaning and entry of data</li> <li>• Analyzing the data and interpretation</li> <li>• Writing the results</li> </ul>
<p>5. Dissemination Phase</p>	<p>This phase focuses on communicating results to appropriate audience. The following have been done:</p> <ul style="list-style-type: none"> <li>• Preparing of full research report</li> <li>• Identifying channel of disseminating reports</li> <li>• Planning for the dissemination of results.</li> </ul>

### **3.4.2 Population**

A research population is generally a large collection of individuals or objects that is the main focus of a scientific query. It is also known as a well-defined collection of individuals or objects known to have similar characteristics. All individuals or objects within a certain population usually have a common, binding characteristic or trait (Friedman, Furberg & DeMets 2010:361; Chernick 2003:22).

#### **3.4.2.1 Source Population**

##### **3.4.2.1.1 Definition of source population**

The source population is list or frame of group from which a study population is selected (John 2001:137).

##### **3.4.2.1.2 Source population for this study**

For the specific objectives 1, 2 and 4, the source population was the same. Both urban and rural dwellers aged 25-64 years, including both males and females, comprised the source population (World Health Organization 2005:68). The study participants from the rural population were all residents in Kilde Awlaelo HDSS and the urban population was all residents in the selected kebeles of Mekelle city administration. For the specific objective 3, the source population consisted of all hypertensive cases (whose systolic blood pressure was  $\geq 140$  mmHg and/or diastolic blood pressure  $\geq 90$  mmHg or those who were taking antihypertensive drugs during the study period) aged 25-64 years in the study settings. Controls were those residents in the study area aged 25-64 years and whose systolic blood pressure was  $< 140$  mmHg and/or diastolic blood pressure  $< 90$  mmHg during the study period and those who did not have history of hypertension before the study period.

#### **3.4.2.2 Study population**

##### **3.4.2.2.1 Definition of study population**

This refers to individuals or groups selected to participate in the investigation or study (John 2001:137). It is also defined as all of the people who enter a study, regardless of

whether they are treated, exposed to intervention, develop the disease, or drop out after the study has begun (Bryan 2009:21).

#### **3.4.2.2.2 Study population for this study**

For the specific objectives 1, 2 and 4, the study population was all residents of Kille Awlaelo HDSS and Mekelle city administration selected and included in the descriptive cross-sectional study. For the specific objective 3, the study population was all selected cases and controls based on the requirements mentioned in section 3.4.2.1.2.

#### **3.4.3 Inclusion and Exclusion criteria**

The following criteria were carefully employed to include eligible study participants and exclude others to ensure the internal validity of the study.

- The age group included in this study is 25-64 years.
- For the specific objectives 1 and 2, people with mental and physical disabilities, people who were debilitated and bed ridden as well as pregnant mothers were excluded.
- For the specific objective 3, only cases and controls fulfilling the requirements were considered.

#### **3.4.4 Sample Size**

##### **3.4.4.1 Definition of Sample Size**

The size of a sample needed in a survey depends on many things: the type and number of indicators to be estimated; the sampling plan to be used; and the way in which the estimation is made (Klaus, Pham & Pham 2012:43). Often it is too expensive or impossible to collect information on an entire population. For appropriately chosen samples, accurate statistical estimates of population parameters are possible (Chernick 2003:31). The population may be seen as immensity as well as a dynamic, and a study is always based on a sample of it. The sample affords the opportunity to examine factors to be described. Statistics provide the procedures to draw conclusions and make inferences of the population based on the study sample (Petter, Haakon & Bjørn 2007:103). In conclusion, it is important to have a sufficient sample size to be

representative of the population and to achieve high levels of power for testing the null hypothesis (Stephen 2012:98).

#### **3.4.4.2 Sample Size for this Study**

For the specific objectives 1, 2 and 4, the single population proportion formula for cross-sectional studies of Stephen (2001:281) was used for the stepwise approach (WHO stepwise 2005:89). To adjust for the design effect of the sample design, simply multiply the sample size by the design effect. In order to have an adequate level of precision for each age-sex estimate, the sample size must be multiplied by the number of age-sex groups for which estimates were reported. To adjust for anticipated non-response divide by the anticipated response. Hence, Z-score=1.96; Proportion=30.2 % Tesfaye, Byass and Wall (2009:5); marginal error=0.05; Design effect=1.5; age-sex estimate=4 groups and non-response rate=20%. Thus a total of 2,430 comprised of a probabilistic sample of 1,701 from Mekelle and 729 from Kilde Awlaelo HDSS site were included.

For the specific objective 3, an unmatched case control formula was used because the matching variables are few in number and this formula is more conservative than the formula for matched case control (Nigel, Daniel & Debbi 2008:282). Hence, the desired sample size was calculated using the standard sample size formula for unmatched case control studies. Using 95% confidence level, 80% power, case to control ratio 1:2, expected frequency of hypertension among the control was 30.2% (Tefaye *et al* 2009:5) and considered Odds ratio closest to 1 is 2. Accordingly, 117 cases and 235 controls for a total of 339 study participants were included.

#### **3.4.5 Sampling**

Sampling is used to ensure that individuals included in the study represent the population from which the sample is drawn. This is ensured by using an appropriate sampling method. There are many methods for sampling (Richard & Ross 2004:26). Bias will result in a systematic deviation from the truth and produces an incorrect conclusion, either about existence or strength of association. The first possibility for selection bias comes from the selection of study participants (Alan, Silman & Gary 2002:57). Sampling may be defined as the selection of some part of an aggregate or totality on the basis of which a judgment or inference about the aggregate or totality is

made. In other words, it is the process of obtaining information about an entire population by examining only a part of it (Kothari 2004:152).

### **3.4.5.1 Sampling Procedure**

#### **3.4.5.1.1 For objectives 1 and 2 (Descriptive cross-sectional study)**

For Kilde Awlaelo HDSS site, eight Kebeles (the smallest political administrative unit in Ethiopia) were randomly identified and included. From each Kebele, twenty-five percent of the villages (Clusters) were selected using simple random sampling technique. All the households in the selected blocks were visited until the sample size was satisfied for each cluster. One eligible individual was selected from each household using kish method (It is a random selection of eligible study participants at the household level). For the Mekelle city, all the seven sub-city administrations of Mekelle were included. All 'Ketenas' (Ketena is the smallest administrative unit in Mekelle city) were listed from each sub-city (administrative structure next to the city administration and containing the 'Ketenas') . Ten percent of the 'Ketenas' were selected from each sub-city using simple random sampling technique. Twenty-five percent of the blocks (these are clusters of households found in each 'Ketena') were selected using simple random sampling technique from each 'Ketena'. All the households in the selected blocks were visited until the sample size was satisfied for each cluster. One eligible individual was selected from each household using the kish method. These procedures were applied for the interview and physical measurements in both settings. To address the biochemical measurements (STEPS 3) stated in objective 1, 20% of the study participants who participated in the interview and physical measurements were selected using systematic random sampling technique.

#### **3.4.5.1.2 For the objective 3 (Matched case-control study)**

For the matched case control study, hypertensive cases were selected using simple random selection technique from the already identified cases referred to in objective 1. Controls were correspondingly selected using simple random selection technique from residents in the same study settings (persons who were found to be non-hypertensive

both by history and physical measurement). Two controls were selected for each case after matching by age (within two years interval) and gender.

### **3.5 DATA COLLECTION PROCEDURE**

#### **3.5.1 Data collection**

There are alternative approaches to obtaining data to meet research objectives. These include interviewing, global ratings, observation, and biological measures. Each of them has its own strengths and limitations (Geoffrey, David & David 2005:36).

#### **3.5.2 Development and structure of the research instrument**

The principal investigator of this research, in consultation with his supervisors, developed the questionnaires for data collection. The following guided the researcher in the development of the instrument.

- The research problem, purpose and objectives of the study,
- WHO stepwise instrument,
- The literature review on behavioural and biological risk factors of NCDs, knowledge, perceptions, attitudes and behaviors pertaining to the risk factors of NCDs and determinants of hypertension.

The research instrument has the following components to address the set objectives.

##### **3.5.2.1 For objective 1 (STEPS survey)**

The instrument used for data collection on non-communicable diseases preventable risk factors was based on the STEP-wise approach for surveillance of risk factors for chronic diseases (STEPS) developed by the WHO. STEPS is the WHO-recommended surveillance tool for chronic disease risk factors and chronic disease-specific morbidity and mortality. It is intended to serve as an entry point for low and middle-income countries for surveillance of chronic diseases and their risk factors. It is also designed to help countries build and strengthen their capacity to conduct surveillance. The STEPS instrument and the corresponding question-by-question guide are available online (WHO 2005:61). STEPS is a sequential process involving the collection of data on selected risks factors with a questionnaire, basic physical measurements, and collection of blood samples for biochemical analysis. The STEPS approach has three levels and within each level, risk factor assessment is divided into

core, expanded and optional modules. This part of the questionnaire consists of 111 questions for step 1, 15 questions for step 2, and 11 for step 3.

### **STEP 1- Questionnaire-based assessment**

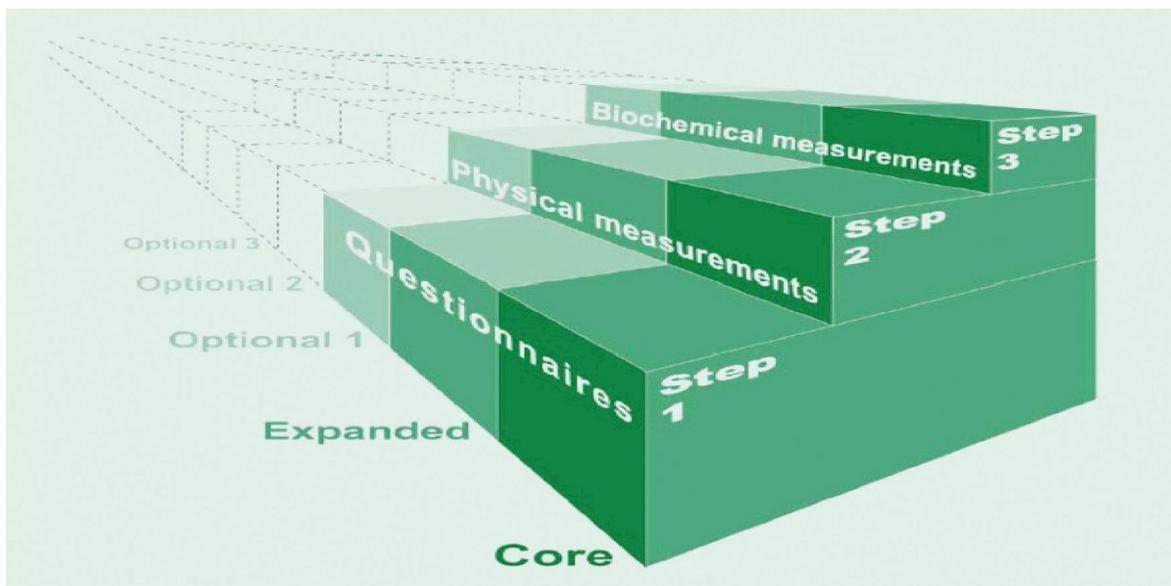
Step 1 covers variables on socioeconomic status, tobacco and alcohol use, as well as measures of nutritional status and physical inactivity. Khat chewing and mental stress are also included as expanded component variables. This STEPS serves two purposes: consideration of the local context and comprehensiveness of the questionnaire to address the set objectives.

### **STEP 2- Simple physical measurements**

It is a follow-up to step 1 with the inclusion of simple physical measurements, such as height, weight, waist circumference, and blood pressure. Heart rate and hip circumference are considered as optional components.

### **STEP 3- Biochemical Measurements**

Step 3 which is a follow-up to STEPS 1 and 2 involves biochemical measurements. For this purpose, the dry method using Accutrend Plus device was used to assess fasting blood glucose, fasting cholesterol and triglycerides in 20% of the study population included in STEPS 1 and 2.



**Figure 3.2 STEPS Conceptual Framework (WHO 2005:36).**

**Table 3.2 Different components of STEPS survey (WHO 2005:37)**

<b>Core</b>	<b>Expanded</b>	<b>Optional</b>
<b>STEP I – Interview</b>		
<b>Basic demographic information</b>	<b>Expanded demographic information</b>	<b>Injury and violence</b>
Age		Ethnicity
Mental health		
Sex		Highest level of education
Oral health		
Years of schooling	Employment	
Tobacco use	History of tobacco use	
Alcohol consumption	Smokeless tobacco use	
Types of physical activity	Binge drinking	
Sedentary behaviour	History of raised blood pressure	
Fruit and vegetable consumption		
Consumption	History of diabetes	
	Household income	
	Oil and fat consumption	
<b>STEP II – Physical Measurements</b>		
Weight, height, waist Circumference		
	Hip-circumference	
Skin-fold thickness, Blood pressure		Heart rate
Assessment of physical Fitness		
<b>STEP III – Biochemical Measurements</b>		
Fasting blood sugar		Fasting HDL-cholesterol and

	triglycerides
Oral glucose tolerance test	
Total cholesterol	
Urinalysis	

### **3.5.2.2 For objective 2 (Knowledge, perceptions, attitudes, and behaviours concerning NCDs)**

In this section, variables assessing the knowledge of the study participants about non-communicable diseases and their risk factors were included. Seventy-seven questions were developed to measure knowledge, perceptions, attitudes and behaviours concerning non-communicable diseases, including cardiovascular diseases, cancer, diabetes and the risk factors such as alcohol consumption, tobacco use, fruit and vegetable intake, salt intake, intake of beef, physical activity and sedentary lifestyle. Knowledge, attitudes and practices pertaining to breast and cervical cancers were also addressed using 33 questions. Perception of body size and shape was also another dimension assessed among the study participants using 15 questions.

#### **3.5.2.2.1 Operational definitions**

1. Knowledgeable on NCDs and the risk factors- A person or study participant who was able to identify or mention that NCDs are diseases not transmissible between people and who were able to mention the behavioural and biological risk factors responsible for the major NCDs.

2. Not knowledgeable on NCDs and the risk factors - A person or study participant who was unable to mention that NCDs are diseases not transmissible between people and who was not able to mention the at least half of the behavioural risk factors (tobacco use, misuse of alcohol, inadequate physical exercise and inadequate intake of fruits and vegetables) and biological (raised blood pressure, overweight or obesity, raised blood glucose and raised blood cholesterol) responsible for the major NCDs to occur.

3. Positive attitude – A person whose mean score for attitudinal questions is equal or greater than the group mean.

4. Negative attitude – A person whose mean score for attitudinal questions is below the group mean.

### **3.5.2.3 For objective 3 (Risk factors for Hypertension)**

A questionnaire was also developed to examine the risk factors for hypertension after consulting the literature on NCDs' risk factors. Accordingly, 23 questions were prepared to cover the socio-demographic characteristics. Risk factors assessment comprised of 71 questions (using interview and physical measurements).

### **3.5.3 Data Collectors**

The data collectors were health professionals including clinicians, nurses and laboratory technologists. Training covered three days was given to equip them with basic knowledge and skills of data collection and related procedures. The trainees were made familiar with the instruments for data collection. A practical session on physical and biochemical measurements was conducted until the data collectors' skill was found to be satisfactory. Only those who demonstrated adequate competency were engaged in the main data collection process.

### **3.5.4 Data Collection Process**

To address objective 1, WHO stepwise tool was used. For objectives 2 and 3, a questionnaire was designed. The data collection instruments are questionnaires and physical and biochemical measurements. The questionnaire for objective 1 was modified with expanded and optional questions to suit local needs. Optional or new questions were added to the instrument because they were deemed locally important (e.g., Khat chewing). All the modifications were done in accordance with the STEPS manual (WHO STEPS 2005:39). Physical measurements include weight (in bare feet without heavy clothing using Seca 767 digital scales), height (in bare feet without headwear using digital scales), waist circumference (at the narrowest point between the lower costal border and the iliac crest with a constant tension tape), hip circumference (at the greatest posterior protuberance of the buttocks with a constant tension tape),

and blood pressure (at the midpoint of the left arm after participants rested for at least five minutes using an Omron T9P digital automatic blood pressure monitor). Two blood pressure readings were taken on all participants. A third reading was taken if there is a difference of more than 25 mmHg for systolic blood pressure or 15 mmHg for diastolic blood pressure between the first two readings. The mean of all measures was used to declare the presence or absence of hypertension. Biochemical measurements including fasting total cholesterol, blood glucose and triglycerides with an Accutrend Plus. The study participants fasted for at least eight hours before their samples were taken. For objective 2, knowledge status, attitudes, perceptions and behavioural questions were administered. For the matched case control, a questionnaire was administered to address the role of the various risk factors of hypertension. Adults 25-64 years of age were study participants. Adults with known mental and physical disabilities, debilitated and bed ridden individuals and pregnant women were excluded.

For objective 2, the questionnaire was designed to assess the knowledge status, attitudes, perceptions and behaviour of the study participants regarding the NCDs risk factors. For the matched case control study, the questionnaire was developed in a way that it could address the study objective; i.e., the role of the various risk factors/determinants as cause of hypertension.

### **3.6 VALIDITY AND RELIABILITY**

Two fundamental components of accuracy, both inversely related to the error of an observation, are validity and reliability. In the setting of tests and measures, validity relates to how well the instrument measures what it purports to measure and reliability relates to how consistently the instrument measures whatever it is that it measures. Together, validity and reliability reflect the ability of the instrument to provide an accurate quantitative estimate of the characteristic of interest to the researcher (Stephen 2012:203).

#### **3.6.1 Validity**

The validity of a measurement refers to how closely the measured data represent the true data (Bryan 2009:35). According to Geoffrey, David and David (2005:21), there are four variants of validity. These are: **Content validity** (the extent to which a particular

method of measurement includes all the dimensions of the construct one intends to measure), **Construct validity** (the extent that the measurement is related in a coherent way to other measures that are believed to be part of the same phenomenon; it also relates to interpreting the basis of the causal relationship, and it refers to the congruence between the study's results and the theoretical underpinnings guiding the research), **Criterion validity** (the extent to which the measurements predict a directly observable phenomenon) and **Statistical validity** (also referred to as statistical conclusion validity refers to aspects of quantitative evaluation that affects the accuracy of the conclusions drawn from the results of a study). In this research, content validity was applied to assess the different dimensions i.e. the magnitude, knowledge, perceptions, attitudes and behaviours of risk factors for NCDs. The determinants of hypertension were also assessed by including most known conditions underlying hypertension.

### **3.6.2 Reliability**

This refers to the extent to which repeated measurements of a stable phenomenon by different people and instruments at different times and places get similar results (Fletcher & Fletcher 2005:23). In short, it refers to the ability of a test to provide consistent results (Bryan K. 2009:35). There are different types of validity as described by Stephen (2012:204). Among these are **Test-retest reliability**, the most commonly recognized form of reliability. It is evaluated by administering the same item, scale, or instrument to a sample of individuals twice over a relatively short period (the period depending on the intrinsic stability of the variable under study) and comparing the results using Pearson's Product Moment Correlation for interval data or Spearman's Rank Order Correlation for ordinal data. Typically, test-retest correlation coefficients ranging 0.70–0.80 generally are considered to be satisfactory to good (though criteria for acceptability vary according to discipline), **Inter-observer (Inter-rater) reliability** reflects the agreement between or among two or more assessors who independently rate the same item, scale, or instrument administered within a sample of individuals at a single point in time. Cohen's Kappa (k) is a commonly used statistic for estimating agreement between two raters for binary data. This may also be used for ordinal data such as those obtained via Likert-type scales. If the raters are in complete agreement,

then  $k = 1$ . If there is no agreement beyond that which would be expected by chance, then  $k = 0$  (values  $<0$  signify that agreement is even less than that which would be attributable to chance). Although there is no universal consensus, in the range of values indicating better than chance agreement, statistics 0.01–0.20 have been interpreted as “slight agreement,” 0.21–0.40 as “fair agreement,” 0.40–0.60 as “moderate agreement,” 0.61–0.80 as “substantial agreement,” and 0.81 as “almost perfect agreement. **Internal consistency** is an approach to reliability assessment that estimates the homogeneity of items in a scale that is intended to measure the same construct. The essential idea is that the various items on a scale all should correlate highly and positively; that is, when one item is answered in a particular way, other related items ought to be answered similarly. This approach is preferable to test-retest methods for instruments that are highly sensitive to change and which, when evaluated as repeated measures, can falsely create the impression of relatively low reliability. As a rule of thumb, coefficients between 0.70 and 0.80 indicate adequate reliability and 0.90 or greater indicates high reliability. If the two “half” measures are highly correlated, this provides evidence that they are measuring the same attribute. Two common methods for performing this analysis are to choose the first N items and the last N items, or to choose odd numbered items and even numbered items and determine the correlation between the two groups). For this particular research, the internal consistency for variables on knowledge, perceptions attitude and stress related questionnaire scores were individually assessed and the internal consistencies were found to range between 0.73 and 0.81 from the pretest study. Hence, all variables were included in the final questionnaire without any addition or deletion. The language consistency between the backward and forward versions of the translation was evaluated and found to be excellently done.

### **3.7 QUALITY CONTROL MEASURES**

The following quality control measures were employed in this study:

- Training of data collectors
- Pretest of the study instrument
- Close supervision during data collection and
- Conducting relevant statistical analysis as indicated in section 3.8.1 below

## **3.8 DATA PROCESSING AND ANALYSIS**

### **3.8.1 Definitions of Data processing and analysis**

According to Kothari (2004:122), processing of data implies editing, coding, classification and tabulation of collected data so that they are amenable to analysis. The term “analysis” refers to the computation of certain measures along with searching for patterns of relationship that exist among data-groups. EPI-data statistical software was used in this study for entry and cleaning of data, which were then exported to SPSS version 20 for data management and analysis. Descriptive statistical analyses including frequency distribution, measures of central tendency and dispersion (Klaus, Pham & Pham 2012:103; Singh 2006:272) were computed. Results were presented using tables and figures. Bivariate and multivariate analyses were employed to identify the independent predictors of the outcome variables (Rao, Miller & Rao 2007:187). These analytical steps were also done to outline the independent predictors of the NCDs risk factors. To assess the presence of association between dependent and independent variables, OR with 95% confidence interval was computed. The predictors of some components metabolic syndrome including raised blood pressure, raised blood sugar, raised cholesterol was computed using a receiver operating characteristics curve (ROC). This is a graphic technique for visualizing; organizing and selecting classifiers based on their performance and were developed for this study. ROC graphs have long been used in signal detection theory to depict the tradeoff between hit rates and false alarm rates of classifiers (Swets 1988:1289). Curves with areas under curve (AUC) and 95% CIs were generated for predictors including body mass index (BMI), waist circumference (WC), hip circumference (HC) and waist-to-hip ratio (WHR), as predictors of the metabolic syndrome.

## **3.9 ETHICAL CONSIDERATIONS**

Ethics is the branch of philosophy that deals with distinctions between right and wrong—with the moral consequences of human actions (John 2001:63). Ethical principles govern the conduct of epidemiology, as they do all human activities. The ethical issues that arise in epidemiological practice and research include informed consent, confidentiality, respect for human rights, and scientific integrity.

Epidemiologists and others have developed guidelines for the ethical conduct of epidemiological studies (Bankowski, Bryant & Last 1991:139; Fayerweather, Higginson & Beauchamp 1991:18).

High standards of research are not merely met with professional diligence; rather, whenever innovative scientific interventions are undertaken on human beings, in addition to the high professional diligence, ethics has to be a paramount issue to be emphasized (WHO 2001:19).

Geoffrey, David and David (2005:23) underscored three underlying ethical principles:

1. Beneficence requires that good should result, harm should be avoided (non-maleficence), and/or benefits of participating in a study should justify the expected risk or harm;
2. Respect for rights includes the free choice of the individual (autonomy) to become a study subject or to withdraw at any point from a study. Protection for those individuals with diminished autonomy should be assured; and
3. Justice, which requires an equal distribution of burden and benefit among individuals. The principal investigator of this study is a public health expert and epidemiologist. He is highly passionate about the quality of the data generated. He adhered to the principles of scientific integrity and honesty. These are principles that all scientific researchers should observe individually and toward the outside world. The researcher has neither direct financial gain from this study nor any prospects for any incentives. By adhering to the scientific method, researchers can, in due course, obtain valid and reliable findings that may advance scientific knowledge. Virtually all studies with human participants involve some degree of risk that may range from minor discomfort to severe effects on participants' physical or emotional well-being (Geoffrey, David & David 2005:30). The risks anticipated in this study were heavy bleeding, pain and infection at the site of needle prick. None of these risks occurred during or after the sample collection to any of the study participant. The benefits to the study participants were advices were given to each participant on how to prevent the risk factors of NCDs regardless of their risk factor status. Participants with risk factors including

heavy alcohol drinking, tobacco use, high blood sugar, and elevated cholesterol and triglycerides levels were advised to visit a health institution for further diagnosis and treatment. A referral slip was also given to these participants. The other benefit is evidence generated from this particular research so that appropriate interventions could be in place.

The proposal of this study was submitted to the University of South Africa, Department of Health Studies. The Ethical Review Board of the university reviewed the proposal and issued ethical clearance. A formal letter was written to the different administrative bodies and organizations to obtain permission to conduct the research in the two settings. A study such as this that includes the collection of biomedical data also needs ethical clearance by the National Research and Ethics Review Committee at the Ministry of Science and Technology of Ethiopia. Therefore, the proposal was submitted to the Ethiopian national research and ethics committee. The proposal was evaluated and cleared by this committee. Local institutions including the Tigray region health bureau, Mekelle University and other local administrative bodies including the Mekelle City, sub cities and kebeles included from Kilde Awlalo HDSS were consequently contacted to obtain permission to conduct this research in the setting.

The data collectors introduced themselves and the purpose of the study to the members of the households and to individuals from the households from whom data were to be collected. The interviews with the selected individuals continued after an explanation of the study was provided and their written permission was obtained. Confidentiality of the information given by the study participants was respected. Privacy of the study participants was maintained by interviewing the participants alone and taking the physical measurements in a private room. In addition to these means of protection, unit identifiers were used to maintain anonymity of respondents' information. For the biochemical measurements, blood samples were taken in nearby health centers or in a clinic to minimize any risk of infection or related complications to finger pricking. The samples were collected by experienced laboratory technologists. Psychological support including explaining the procedure of the blood sample collection and the fact that the procedure has only very minimal risk was mentioned prior to the finger pricking for all

who underwent this step. Before pricking each participant's finger, every participant was asked for any history of bleeding disorders and history of anticoagulants intake. The sample was taken from the tip of ring finger on the left hand. Before taking the blood sample, the site was thoroughly cleansed with cotton swabs with alcohol to minimize any risk of infection. After pricking, the first drop of blood was cleaned away with cotton swabs to avoid false reading. After taking 0.5 microliter of blood, cotton swabs were applied with little pressure to avoid bleeding. The participants were closely observed by the laboratory technologists for 15 minutes for cessation of bleeding. After samples were taken and analyzed using the Accutrend plus device, participants screened to have high blood sugar, cholesterol and triglycerides levels were advised to visit a health institution for further diagnosis and treatment. At the end of the interview, physical and biomedical measurements, every participant was acknowledged for taking his/her time and participated in the study.

### **3.10 CONCLUSION**

This chapter describes the research design and methodology that guided the conduct of the study to meet the study objectives. The next chapter will present data analysis and the research findings.

## **CHAPTER 4**

### **Results and discussions**

#### **4.1 INTRODUCTION**

In the preceding chapters, the background and scope of the problem, literature on NCDs and related issues, the objective of this study, and methods to carry out the study have been widely addressed. In this chapter, the findings of the study are presented as they addressed the objectives of the study. Tables and figures are used to display the findings. The findings are also interpreted and discussed based on the output of the analysis conducted. The study population enrolled was adults whose age was 25-64 years for both cross-sectional and case control study designs. Inclusion and exclusion criteria were also set and applied when identifying the study participants. Particularly in the case control study, the controls were carefully ascertained that they were not hypertensive. Matching by age and gender was also done during the conduct of the case control study. As already mentioned in the methodology section (Chapter 3), the data were collected using interview, physical measurements, and biochemical measurements.

This study was conducted to address the following objectives:

- To identify the prevalence of preventable risk factors of NCDs using stepwise approach;
- To describe the knowledge, attitudes and behaviours of preventable risk factors of NCDs in the adult population of the study setting;
- To examine the determinants of hypertension among the adult population; and
- To develop a risk factor identification model for NCDs

The following sections are included in the result section:

1. The descriptive cross sectional survey result includes
  - Socio-demographic characteristics of the study participants
  - Distribution of the behavioural risk factors of NCDs
  - Distribution of biological risk factors of NCDs

- Distribution of perception of body size and shape in relation to NCDs risk factors
  - Distribution of stress related factors in relation NCDs
  - Predictors of behavioural, biological risk factors of NCDs
  - Distribution of general knowledge, attitude and behaviours on NCDs and their risk factors
  - Distribution of knowledge attitude and behaviours on cardiovascular diseases (CVDs) including hypertension and their risk factors
  - Distribution of knowledge, attitude and behaviours on type II diabetes and the risk factors related
  - Distribution of knowledge, perceptions, attitudes and behaviours on breast and cervical cancers and related risk factors
  - Predictors of knowledge and screening practices of NCDs, CVDs (hypertension), type II diabetes, weight measurement, breast and cervical cancers
2. The case control study on determinants of hypertension includes:
- Socio-demographic characteristics
  - Socio-demographic determinants of hypertension
  - Behavioural determinants of hypertension
  - Physical measurement determinants of hypertension
  - Perception and mental stress related determinants of hypertension
  - Independent predictors or determinants of hypertension

## **4.2 RESULTS AND DISCUSSIONS FOR THE DESCRIPTIVE CROSS-SECTIONAL STUDY**

### **4.2.1 Socio-demographic characteristics of the study participants**

Of the total sample size computed for this study which was 2,430, the total number of study participants was 2,347 with the participation rate of 96.6%. Of all participants, 1638 (68.9%) were from Mekelle city and the remaining 729 (31.1%) were from Kilde Awlaelo HDSS site. One thousand nine hundred and thirty-four (82.4%) of the participants were between the age group of 25-34 years with the median of 31 years.

Most 1434 (61.1%) of the study participants were women. Among ethnic groups, the Tigre accounted for 2214 (97%) followed by Amhara 62 (2.7%). Regarding the marital status, 1193 (51.6%) were married or cohabiting followed by never married and separated or divorced 632 (27.3%) and 384 (16.6%) respectively. With regard to education status, study participants whose educational level was less than first cycle and first and second cycle comprised 710 (30.3%) and 686 (29.3%) respectively. The mean number of years spent in formal schooling was  $9.5 \pm 4.1$  years. Income wise, the monthly income of the study participants was assessed and 263 (28.7%) were in the first quartile category or earned less than 500 Ethiopian Birr. This was followed by the third quartile (1000-1999 Ethiopian Birr), fourth quartile ( $\geq 2000$  Ethiopian Birr), and second quartile (500-999 Ethiopian Birr) accounted for 259 (28.3%), 259 (28.3%) and 135 (14.7%) respectively. Most 478 (20.6%) of the study participants were self-employed, followed by government employee, 336 (14.5%). Orthodox religion followers accounted for 2177 (93.3%). The number of eligible adults in the 1891(87.1%) households visited was 1-2 (Table 4.1).

**Table 4.1 Socio-demographic characteristics of the study participants in Kilte Awlaelo HDSS site and Mekele City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

Characteristics	Study settings		Total
	Kilte Awlaelo	Mekelle city	
<b>Gender (N=2,347)</b>			
Men	184(20.2%)	729(79.8%)	913(38.9%)
Women	545(38%)	889 (62%)	1434(61.1%)
<b>Age Group (N=2,347)</b>			
25-44	548(28.3%)	1386 (71.7%)	1934(82.4%)
45-64	181(43.8%)	232(56.2%)	413(17.6%)
Median=31 year and (Range =39 year)			
<b>Ethnicity (N=2,282)</b>			
Tigre	697(31.5%)	1517(68.5%)	2214(97%)
Amhara	10(16.1%)	52(83.9%)	62(2.7%)
Others	4(66.7%)	2(33.3%)	6(0.3%)
<b>Marital status (N=2,311)</b>			
Never married	91(14.4%)	541(85.5%)	632 (27.3%)
Married/Cohabiting	408(34.2%)	785(65.8%)	1193 (51.6%)
Separated/Divorced	169(44%)	215(56%)	384(16.6%)
Widowed	49(48%)	53(52%)	102(4.4%)

<b>Education (N=2,341)</b>			
Less than first cycle	408(57.5%)	302(42.5%)	710(30.3%)
First and second cycle	181(26.4%)	505(73.6%)	686(29.3%)
High school	60(16.5%)	303(83.5%)	363(15.5%)
Preparatory	20(15.4%)	110(84.6%)	130(5.6%)
College and University	60(13.3%)	392(86.7%)	452(19.3%)
Mean years on formal education=9.5±4.1 years			
<b>Monthly Income (N=916)</b>			
First quartile (<500 Birr)	115(43.7%)	148(56.3%)	263(28.7%)
Second quartile (500-999 Eth Birr)	60(44.4%)	75(55.6%)	135(14.7%)
Third quartile (1000-1999 Eth Birr)	79(30.5%)	180(69.5%)	259(28.3%)
Fourth quartile (>=2000 Eth Birr)	24(9.3%)	235(90.7%)	259(28.3%)
<b>Occupation (N=2,316)</b>			
Gov't employee	106(31.5%)	230(68.5%)	336(14.5%)
Non-gov't employee	10(7.2%)	129(92.8%)	139(6%)
Self-employed	158(18.8%)	681(81.2%)	839(36.2%)
Student	6(5.9%)	95(94.1%)	101(4.4%)
House-wife	123(25.7%)	355(74.3%)	478(20.6%)
retired	10(37%)	17(63%)	27(1.2%)
farmer	293(95.4%)	14(4.6%)	307(13.3%)
Unemployed	15(16.9%)	74(83.1%)	89(3.8%)
<b>Religion (N=2,334)</b>			
Orthodox	702(32.2%)	1475(67.8%)	2177(93.3%)
Muslim	14(12.2%)	101(87.8%)	115(4.9%)
Others	10(23.8%)	32(76.2%)	42(1.8%)
<b>Number of eligible adults in the household(N=2170)</b>			
1-2	583(30.8%)	1308(69.2%)	1891(87.1%)
3-4	67(33%)	136(67%)	203(9.4%)
>=5	32(42.1%)	44(57.9%)	76(3.5%)

## 4.2.2 Behavioural risk factors

### 4.2.2.1 Tobacco use

As depicted in Table 4.2, the prevalence of current tobacco smoking among the study population was 2.3% (with 95% Confidence Interval (CI) 1.8-3). This is by far lower than findings in similar studies in India among industry employees by Mehan, Srivastava and Pandya (2011:169) and Prabhakaran *et al* (2005:62). The difference could be due to the variation in the population studied per se. The finding is also lower than that of the similar studies conducted in Iran by Alikhani *et al* (2009:361), in Ethiopia by Alemseged *et al* (2012:23) and higher than the result of the survey by Central Statistical Agency [Ethiopia] and ICF International (2012:51) which was 1.5% for Tigray province. This could also be due to the difference in the exposure to tobacco use and cultural variations between these populations as well. The current rate of tobacco smoking was 2.4% (95% CI 1.8-3.2) among 25-44 and 1.6% (95% CI: 0.7-3.3) in 45-64 years of age.

This is in contrast to the findings of the survey conducted in the three African countries of Tanzania, Malawi and Rwanda (Negin *et al* 2011:643). The difference could be due to the rise in the number of current tobacco users among the younger population in Tigray. The prevalence in men, aged 25-44 years was 5.6% (95% CI: 4.1-7.4) and it slightly decreased to 3.4% (95% CI: 1.3-7.4) in men 45-64 years of age. However, in women, the prevalence of current tobacco smoking was 0.3% (95% CI: 0.1-0.8) in 25-44 years of age and increased to 0.8% (95% CI: 0.1-2.5) in 45-64 years of age. Gender wise, the prevalence of current tobacco use (at the time of the study) was higher in men than women study participants, 5.3% (95% CI: 4.0-6.9) versus 0.4% (95% CI: 0.2-0.9). This result is consistent with the studies in Vietnam by Luc *et al* (2009:3), (Bangladesh Ministry of Health 2010:18) and Ethiopia, Central Statistical Agency [Ethiopia] and ICF International (2012:51). The gradient in smoking prevalence among men and women could be due to the fact that culturally, tobacco smoking in women is unacceptable by the community. Underreporting of tobacco smoking in women could not be ruled out.

In terms of daily tobacco smoking, 33 or 63% (95% CI: 49.6-75) of all current smokers (at the time of the study) were daily smokers. The age group 25-44 years practiced more daily tobacco smoking 70.2% (95% CI: 56.1-81.9) than the age group 45-64 years 14.3% (95% CI: 0.7-53). In men, the prevalence of daily smoking in the age group 25-44 was 72.1%(95% CI: 57.4-83.9)% which was higher than the prevalence in the age group 45-64 years; e.g., 20% (95% CI: 1-71.6). In women, the prevalence of daily tobacco smoking in the age group 25-44 years was 50% (95% CI: 9.4-90.6) which was higher than in the age group 45-64 years 0 (95% CI: 0-77.6)%. Gender wise, the prevalence of daily smoking was higher among men than their women counterparts, which was 66.7% (95% CI: 52.5-78.9) versus 3.3% (95% CI: 6.0-73.8). This is again similar to the findings of the study in Vietnam by Luc *et al* (2009:3).

The mean age for initiation of tobacco smoking was 19.3 (95% CI: 17.8-20.8) years, which is higher than findings reported by Bangladesh Ministry of Health (2010:18), and lower than that of a study done by Sugathan (2008:558). This could be due to exposure to tobacco in the early ages among the study population and differences in tobacco control measures among these settings. In men, the mean age of initiation of smoking

was 19.5 (95% CI: 18-21) years among the 25-44 years old and this was lower than in the age group 45-64 years i.e. 23 (95%CI, 17-29) years . In women, the mean age of initiation of tobacco smoking was 25 (95%CI: 16.6-33.4) years among the current smokers. Gender wise, men initiated smoking earlier than the women participants; e.g.,19.8 (95%CI: 18.3-21.3) years versus 25 (95% CI: 16.6-33.4) years. This is similar to the survey results reported by Bangladesh Ministry of Health (2010:18). The mean duration of tobacco smoking in both sexes was 14.7 (95%CI: 10.9-18.5) years. This is lower than that reported by Bangladesh Ministry of Health (2010:18), which could be explained by the differences in behaviour of cigarette smoking among the two populations. The mean duration of tobacco smoking in the age group 25-44 years was 12.1(95% CI: 8.1-16.1) years and that of 45-64 years, 36.5 (95% CI: 23.1-49.9) years.

With regard to the ever smoking in the past, the prevalence was 1.6% (95% CI: 1.1-2.1) in the study participants. The prevalence of past ever smoking in 25-44 and 45-64 years of age was 1.8% (95% CI: 1.2-2.4) and 0.7% (95% CI: 0.2-2.0), respectively. In men, the prevalence of past ever tobacco smoking in the age groups 25-44 and 45-64 years was 3.9% (95% CI: 2.7- 5.5) and 2% (95% CI: 0.5-5.5) respectively. In women, the prevalence was 0.3% (95% CI: 0.1-0.8) in the age group 25-44 years, however, there was no experience of ever smoking in the past in the age group 45-64 years old. Gender wise, the prevalence in men was higher than that of women, 3.6% (95% CI: 2.6-5.0) versus 0.3% (95% CI: 0.1-0.7), respectively. In terms of gender variation, this is consistent with the results of the studies by Bangladesh Ministry of Health (2010:18) and Ethiopia, Central Statistical Agency [Ethiopia] and ICF International (2012:51).

The prevalence of current smokeless tobacco use among the study participants was 0.2% (95% CI: 0.1-0.4). This is much lower than the findings of the study conducted in India by (Misra 2014:374) and that of the Bangladesh Ministry of Health (2010:18). This could also be explained by the cultural differences among the study population in terms of consuming smokeless tobacco. There was no marked difference observed in the prevalence of smokeless tobacco by age and gender. The smokeless tobacco users consumed 2 times per day on average and all of them used snuff by mouth. The prevalence of ever use of smokeless tobacco in the past was 0.6% (95% CI: 0.3-0.9).

The ever use smokeless tobacco prevalence among the 25-44 years of age was higher than that of 45-64 years; e.g., 0.7% (95% CI: 0.4-1.1), 0.3% (95% CI: 0.01-1.2), respectively. Gender wise, the prevalence of ever use of smokeless tobacco in men and women was 1.2% (95% CI: 0.6-2.1) and 0.2% (95% CI: 0.1-0.6), respectively.

Second hand smoking at home was also assessed and the prevalence of second hand smoking at home was 6.8% (95% CI: 5.8-8.0) with slightly higher magnitude in 25-44 than 45-64 years of age; e.g., 7.1% (95% CI: 6.0-8.4) versus 5.6% (95% CI: 3.5-8.5). Gender wise, the prevalence of second hand smoking at home in men was 8.5% (95% CI: 6.7-10.5) and women 5.8% (95% CI: 4.7-7.2). The mean number of days for being exposed to second hand smoking at home was 2.9 days in a week. The overall second hand smoking prevalence in enclosed areas, including workplace or office or other places was 10.6% (95% CI: 9.3-12.0). This was higher among the 25-44 than that of 45-64 years of age; e.g., 11.5% (95% CI: 10.1-13.1) versus 6.1% (95% CI: 4.0-8.9), respectively. Gender wise, the prevalence of second hand smoking in enclosed areas, including workplace or office or other places in men was 16.2% (95% CI: 13.8-18.9) and women 7.1% (95% CI: 5.7,8.6). The mean number of days for being exposed to second hand smoking in enclosed areas, including workplace or other places was 3.9 days in a week. The magnitude of second hand cigarettes smoking in this study (both at home and workplace) are much lower than that reported by Bangladesh Ministry of Health (2010:18). This could be due to the higher prevalence of cigarette smoking in Bangladesh than Tigray.

In general, tobacco (in the form of smoke and smokeless) is used by the study participants but with lower magnitude. The younger, urban resident and male study participants had higher magnitude of tobacco use compared to their counterparts. Tobacco smoking mostly started at younger age. The duration of smoking among who had initiated smoking was also longer. Second hand tobacco smoking is higher in magnitude both in residential areas and work places.

**Table 4.2 Distribution of Tobacco use among the study participants in Kiltte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

Characteristics	Age Group	Men		Women		Both Sexes	
		No	Proportion (95% CI)	No	Proportion (95% CI)	No	Proportion (95% CI)
Current Tobacco smoking	25-44	766	43, 5.6 (4.1,7.4)	1168	4, 0.3 (0.1,0.8)	1934	47, 2.4(1.8,3.2)
	45-64	147	5,3.4 (1.3, 7.4)	266	2, 0.8 (0.1,2.5)	413	7, 1.6(0.7,3.3)
	25-64	913	48, 5.3(4.0,6.9)	1434	6, 0.4(0.2,0.9)	2347	54, 2.3(1.8,3.0)
Daily Tobacco smoking	25-44	43	31, 72.1(57.4,83.9)	4	2, 50(9.4,90.6)	47	33, 70.2(56.1,81.9)
	45-64	5	1, 20(1,71.6)	2	0, 0(0,77.6)	7	1, 14.3(0.7,53)
	25-64	48	32, 66.7(52.5,78.9)	6	23, 3.3(6.0,73.8)	54	34, 63(49.6,75)
Age of initiation tobacco smoking (Standard Deviation(SD)= 4.3 yrs)	25-44	30	Mean95%CI 19.5(18,21)	1	Mean95%CI 25(16.6,33.4)	31	Mean95%CI 18.9(17.4,20.4)
	45-64	2	23 (17,29)	0	0	2	23(17,29)
	25-64	32	19.8(18.3,21.3)	1	25(16.6,33.4)	33	19.3(17.8,20.8)
Duration of smoking in years (SD=9.7 yrs)	25-44	22	Mean 95% CI 12.6(8.6,16.7)	1	Mean 95% CI 1(-18,20)	23	Mean 95% CI 12.1(8.1,16.1)
	45-64	2	36.5(23.1,49.9)	0	0	2	36.5(23.1,49.9)
	25-64	24	14.6(10.7,18.5)	1	1(-18,20)	25	14.7(10.9,18.5)
Ever smoking in the past daily	25-44	765	30 3.9(2.7,5.5)	1168	4 0.3(0.1,0.8)	1933	34 1.8(1.2,2.4)
	45-64	147	3 2(0.5,5.5)	266	0 0(0.0,1.1)	413	3 0.7(0.2,2.0)
	25-64	912	33 3.6(2.6,5.0)	1434	4 0.3(0.1,0.7)	2346	37 1.6(1.1,2.1)
Smokeless Tobacco currently	25-44	762	1 0.1(0.01,0.7)	1168	2 0.2(0.03,0.6)	1930	3 0.2(0.04,0.4)
	45-64	147	1 0.7(0.03,3.3)	266	0 0(0.0,1.1)	413	1 0.2(0.01,1.2)
	25-64	909	2 0.2(0.01,0.7)	1434	2 0.1(0.02,0.5)	2343	4 0.2(0.1,0.4)
Smokeless Tobacco daily	25-44	3	0 (0.0,63.2)	2	0(0.0, 77.6%)	5	2, 40(7.4,81.8)
	45-64	0	0	0	0	0	0
	25-64	3	0(0.0,63.2)	2	0(0.0, 77.6%)	5	2, 40(7.4,81.8)
Number of times snuff(mouth) SD=0.1	25-44	0	Mean 0	2	Mean 2(1.9,2.1)	2	2(1.9,2.1)
	45-64	0	0	0	0	0	0
	25-64	0	0	2	2(100%)	2	2(1.9,2.1)
Ever use of smokeless tobacco in the past	25-44	757	10, 1.3(0.7,2.3)	1151	3, 0.3(0.1,0.7)	1908	13, 0.7(0.4,1.1)
	45-64	145	1, 0.7(0.03,3.4)	262	0(0.0,1.1)	407	1, 0.3(0.01,1.2)
	25-64	902	11, 1.2(0.6,2.1)	1413	3,0.2(0.1,0.6)	2315	14,0.6(0.3,0.9)
Secondhand smoke at home Mean =2.9 days	25-44	680	61, 9(7.0,11.3)	1051	62, 5.9(4.6,7.5)	1731	123, 7.1(6.0,8.4)
	45-64	124	7, 5.7(2.5,10.9)	235	13, 5.5(3.1,9.0)	359	20, 5.6(3.5,8.5)
	25-64	804	68, 8.5(6.7,10.5)	1286	75, 5.8(4.7,7.2)	2090	143, 6.8(5.8,8.0)
Secondhand smoke in work place Mean =3.9 days	25-44	676	115, 17(14.3,20)	1040	77, 7.4(5.9,9.1)	1716	198,11.5(10.1,13.1)
	45-64	126	15, 11.9(7.1,18.5)	236	13, 5.5(3.1,9.0)	362	22, 6.1(4.0,8.9)
	25-64	802	130,16.2(13.8,18.9)	1276	90, 7.1(5.7,8.6)	2078	220, 10.6(9.3,12.0)

#### 4.2.2.2 Alcohol Consumption

The distribution of alcohol consumption was assessed among the study participants as indicated in Table 4.3. The prevalence of ever consumption of all type of alcoholic drinks, including the local ones namely 'Araque', 'Tej', 'Tella' and others such as beer, wine, spirits and to name but a few was 66.8% (95% CI, 64.9,68.8). This is much higher than that of the studies conducted in India by Mehan *et al* (2011:169) and in Gilgel Gibe, Ethiopia by Alemseged *et al* (2012:23), and lower than that conducted in India by Misra (2014:374). These differences could be due to cultural variation among the different populations mentioned. The distribution by age showed that older people tended to outnumber the younger ones; i.e., the prevalence in the age group 25-44 and 45-64 years was 65.3% (95% CI: 63.2-67.4) and 69.5% (95% CI: 64.9-73.8), respectively. This is consistent with the study conducted in Tanzania, Malawi and Rwanda (Negin *et al* 2011:643). Distribution by gender showed that the prevalence in men and women participants was 70.1% (95% CI: 67-73) and 63.5% (95% CI, 61-66), respectively. This is lower than the findings for Tigray in 2011 of a study conducted by the Ethiopia Central Statistical Agency [Ethiopia] and ICF International (2012:51), which could be explained by difference in the study population. Simply, the majority of the study participants in the current study are predominantly from urban. As to the alcohol drinking experience in the 12 months preceding the study in all ever drinkers, the overall prevalence was 92% (95% CI: 90.5-93.2). The prevalence by age group showed it was 92.7% (95% CI: 91.2-94.1) and 88.5% (95% C: 84.4-91.8) in 25-44 and 45-64 years, respectively. Gender wise, the prevalence in men and women was 93.1% (95% CI: 90.9-94.9) and 91.1% (95% CI: 89.2-92.95), respectively. This is by far higher than the findings of the STEPS surveys conducted by Ministry of Health, Zanzibar (2012:13) and Bangladesh Ministry of Health (2010:21). This could be due to cultural differences in general and religion differences in particular in consuming alcohol. In terms of frequency of alcohol consumption in the 12 months preceding the study, 2.2% (95% CI: 1.5-3.1) consumed daily; 2.3% (95% CI: 1.6-3.2) consumed 5-6 days per week; 14.3% (95% CI: 12.5-16.2)% 1-4 days per week; 54.1% (95% CI: 51.6-56.7) consumed 1-3 days in a month; 25.4% (95% CI: 23.2-27.7) consumed less than once per month. The prevalence increases with decreasing frequency, which is similar to that reported by Bangladesh

Ministry of Health (2010:21). The male study participants reported to consume alcohol more frequently than the female counterparts. Participants in the age group 45-64 years old reported to consume alcohol more frequently than the 25-44 years old counterparts.

With regard to the experience of alcohol consumption in the 30 days preceding the study, the overall prevalence was 87.7% (95% CI: 85.8-89.4%). There were slight differences in the prevalence by age and gender. By age group, the prevalence was 87.4% (95% CI: 85.3-89.3) in 25-44 years and 89.1% (95% CI: 84.6-92.6) in 45-64 years. Gender wise, surprisingly, the prevalence in women was slightly higher than that of men; 88% (95% CI: 85.5-90.1) versus 87.3% (95% CI: 84.3-90). This is inconsistent with the studies conducted in Thailand by Supanee (2011:1754) and by Luc *et al* (2009:4). This could be attributed to cultural differences. The mean number of occasions at least one alcoholic drink was consumed in 30 days preceding the study was 3.9 (95% CI: 3.6-4.2), which was lower than that reported by Bangladesh Ministry of Health (2010:21), which could be by cultural and behavioural differences in drinking alcohol. The mean number of occasions alcohol was consumed in 30 days preceding the study was slightly higher in 45-64 years old than the age group 25-44 i.e. 4.4 (95% CI: 3.7-5.1) versus 3.8 (95% CI: 3.5- 4.1). The mean number of occasions was also higher in men participants than women, 5.2 (95% CI: 4.7- 5.7) versus 2.9 (95% CI: 2.5- 3.3).

The average number of standard alcohol consumed during one drinking occasion in 30 days preceding the study was 4.0 (95% CI: 3.7 4.3). This is again higher than that reported by Bangladesh Ministry of Health (2010:18) and Ministry of Health, Zanzibar (2012:13), which could be due to cultural and behavioural differences. The number of standard alcohol consumed was higher in the age group 25-44 years than the 45-64 years, 4.4 (95% CI: 4.1- 4.7) versus 2.4 (95% CI: 1.7- 3.1). There was no difference in the average number of standard alcohol drinking among the men and women participants; e.g. . 3.8 (95% CI: 3.3-4.3) versus 3.9 (95% CI: 3.5-4.3). The largest number of all types of standard alcoholic drinks the participants had on a single occasion in 30 days preceding to the study was 5.4 (5.1, 5.7). This was higher in the age group 25-44 years than 45-64 years; e.g., 5.6(95% CI: 5.2-6.0) versus 4.4 (95% CI,

3.6-5.2). Gender wise, the highest consumption of all standard drinks on a single occasion was among the men than women counterparts; e.g., 7.3 (95% CI: 6.8-7.8) versus 3.9 (95% CI:3.5-4.3), which is consistent with findings documented by Bangladesh Ministry of Health (2010:18) and Ministry of Health, Zanzibar (2012:13) in terms of gender difference.

Overall, the study participants experienced binge drinking (five or more standard drinks for men and four or more standard drinks for women on a single occasion) 4.3 (95% CI: 3.8-4.8) times in 30 days preceding the study. This is also consistent with the findings reported by Bangladesh Ministry of Health (2010:18) but higher than that reported by Ministry of Health, Zanzibar (2012:13), due to cultural differences in consuming alcohol between the populations in Tigray and Zanzibar. By age group, binge drinking was higher in 45-64 than 25-44 years; e.g., 5.3 (95% CI: 4.1- 6.5) versus 4.1(95% CI: 3.5-4.7) times. Gender wise, the number of times binge drinking experienced was higher among men than women participants, 5.2 (95% CI: 4.5-5.9) versus 3.6 (2.9-4.3).

Alcohol consumption with meal and its frequency in 30 days preceding study was assessed. Most or 87.9% (95% CI: 86-89.7) of the study participants reported they usually consume with meals. Nearly 6.8% (95% CI: 5.5-8.3) of the participants consumed alcohol with meals and 4.5% (95% CI: 3.5-5.8) consumed alcohol rarely with meals. The prevalence of the participants who never consumed alcohol with meals was very low; e.g., 0.7% (95% CI: 0.4-1.3). Women and age group 25-44 years, participants tended to consume alcohol more frequently with meals than their men and the age group 45-64 years counterparts. The prevalence of alcohol consumption was generally high among the study participants. It was higher among male and rural residents than their counter parts.

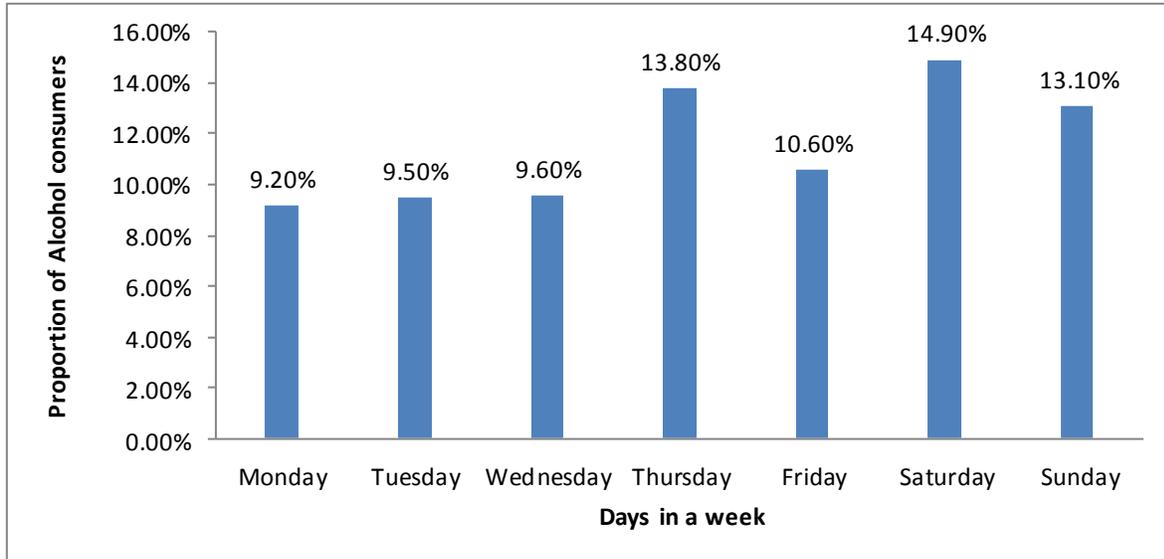
**Table 4.3 Distribution of Alcohol consumption among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013- January, 2014 (N=2,347)**

Characteristics	Age group	Men		Women		Both sexes	
		Number	Proportion (95% CI)	Number	Proportion (95% CI)	Number	Proportion 95% CI
Ever drink							

alcohol	25-44 45-64 25-64	766 146 912	68.7(65.3,71.9) 77.4(70.1,83.6) 70.1(67,73)	1164 267 1431	63.3(60.5,66.1) 64.4(58.5,70) 63.5(61,66)	1933 410 2343	65.3(63.2,67.4) 69.5(64.9,73.8) 66.8(64.9,68.8)
Drink alcohol in the past 12 months	25-44 45-64 25-64	525 113 638	94.1(91.8,95.9) 88.5(81.6,93.5) 93.1(90.9,94.9)	730 173 903	91.8(89.6,93.6) 88.4(83,92.6) 91.1(89.2,92.9)	1255 286 1541	92.7(91.2,94.1) 88.5(84.4,91.8) 92(90.5,93.2)
Daily alcohol consumption	25-44 45-64 25-64	495 100 595	3(1.8,4.8) 7(3.1,13.4) 3.7(2.4,5.5)	669 149 818	1.5(0.8,2.6) 0(0,2) 1.2(0.6,2.2)	1164 249 1443	2.1(1.4,3.1) 2.8(1.2,5.5) 2.2(1.5,3.1)
Alcohol consumption 5-6 days a week	25-44 45-64 25-64	495 100 595	0.8(0.3,1.9) 17(10.6,25.3) 3.5(2.3,5.3)	669 149 818	0.1(0.0,0.7) 7.4(3.9,12.5) 1.5(0.8,2.5)	1164 249 1443	0.4(0.2,0.9) 11.2(7.8,15.6) 2.3(1.6,3.2)
Alcohol consumption 1-4 days a week	25-44 45-64 25-64	495 100 595	22.6(19.1,26.5) 27(19,36.3) 23.0(19.8,26.5)	669 149 818	8.5(6.6,10.8) 6.7(3.5,11.6) 8.2(6.5,10.2)	1164 249 1443	14.5(12.6,16.6) 14.9(10.8,19.7) 14.3(12.5,16.2)
Alcohol consumption 1-3 days a month	25-44 45-64 25-64	495 100 595	50.5(46.1,54.9) 46(36.4,55.8) 49.7(45.7,53.8)	669 149 818	59.3(55.6,63) 59.1(51,66.8) 59.3(55.9,62.6)	1164 249 1443	55.6(52.7,58.4) 89.9(84.3,94) 54.1(51.6,56.7)
Alcohol consumption Less than once a month	25-44 45-64 25-64	495 100 595	21.2(17.8,25) 16(9.8,24.2) 20.3(17.3,23.7)	669 149 818	29.1(25.8,32.7) 33.6(26.3,41.4) 30(26.9,33.2)	1164 249 1443	25.8(23.3,28.4) 26.5(21.3,32.3) 25.4(23.2,27.7)
Alcohol consumption in the last 30 days	25-44 45-64 25-64	451 92 543	87.6(84.3,90.4) 85.9(77.6,91.9) 87.3(84.3,90)	610 146 756	87.2(84.4,89.7) 91.1(85.6,95) 88(85.5,90.1)	1061 238 1299	87.4(85.3,89.3) 89.1(84.6,92.6) 87.7(85.8,89.4)
Number of occasions in the past 30 days SD=5.4	25-44 45-64 25-64	428 87 515	4.8(4.3, 5.3) 7.4(6.3, 8.5) 5.2(4.7, 5.7)	594 139 733	3.0(2.6, 3.4) 2.6(1.7, 3.5) 2.9(2.5, 3.3)	1022 226 1248	3.8(3.5, 4.1) 4.4(3.7, 5.1) 3.9(3.6, 4.2)
Average No of standard Alcohol consumed /occasion in the past 30 days	25-44 45-64 25-64	428 85 513	3.9(3.4, 4.4) 3.1(2.0-4.2) 3.8(3.3, 4.3)	576 128 704	4.4(4.0, 4.8) 1.7(0.8, 2.6) 3.9(3.5, 4.3)	1004 213 1217	4.4(4.1, 4.7) 2.4(1.7, 3.1) 4.0(3.7, 4.3)
Largest No of all types of standard alcoholic drinks/occasion	25-44 45-64 25-64	371 76 447	7.6(7.1, 8.1) 6.1(4.9, 7.3) 7.3(6.8, 7.8)	488 114 602	4.0(3.5, 4.5) 3.2(2.2, 4.2) 3.9(3.5, 4.3)	859 190 1,049	5.6(5.2, 6.0) 4.4(3.6, 5.2) 5.4(5.1, 5.7)

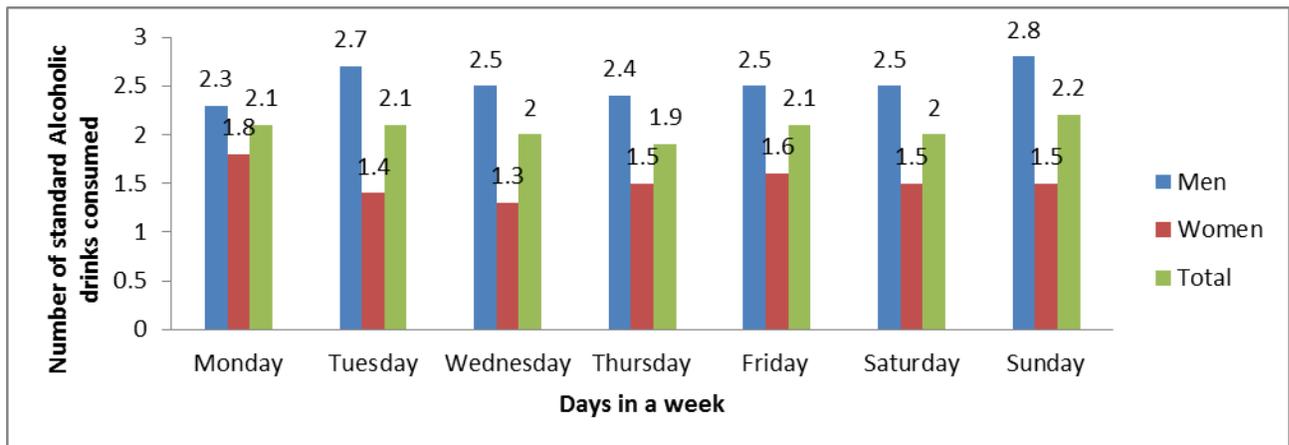
How many times >=5 for men and >=4 for women	25-44	174	4.8(4.0, 5.6)	190	3.5(2.7, 4.3)	364	4.1(3.5, 4.7)
	45-64	38	7.0(5.3, 8.7)	40	3.6(1.9, 5.3)	78	5.3(4.1, 6.5)
	25-64	212	5.2(4.5, 5.9)	230	3.6(2.9, 4.3)	442	4.3(3.8, 4.8)
Alcohol drunk with meals-often	25-44	428	86.9(83.5,89.9)	586	91.6(89.2,93.7)	1014	89.6(87.7,91.4)
	45-64	86	80.2(70.8,87.6)	136	80.1(72.8,86.2)	222	80.2(74.6,85)
	25-64	514	85.8(82.6,88.6)	722	89.5(87.1,91.6)	1236	87.9(86,89.7)
Alcohol drunk with meals sometimes	25-44	428	6.3(4.3,8.9)	586	5.5(3.8,7.5)	1014	5.8(4.5,7.4)
	45-64	86	9.3(4.4,16.9)	136	12.5(7.7,18.9)	222	11.3(7.6,15.9)
	25-64	514	6.8(4.9,9.2)	722	6.8(5.1,8.8)	1236	6.8(5.5,8.3)
Alcohol drunk with meals Rarely	25-44	428	5.4(3.5,7.8)	586	2.7(1.6,4.3)	1014	3.8(2.8,5.2)
	45-64	86	8.1(3.6,15.4)	136	7.4(3.8,12.7)	222	7.7(4.7,11.7)
	25-64	514	5.8(4.0,8.1)	722	3.6(2.4,5.2)	1236	4.5(3.5,5.8)
Alcohol drunk with meals-Never	25-44	428	1.4(0.6,2.9)	586	0.2(0.0,0.8)	1014	0.7(0.3,1.4)
	45-64	86	2.3(0.4,7.5)	136	0(0,2.2)	222	0.9(0.2,2.9)
	25-64	514	1.6(0.7,2.9)	722	0.1(0.0,0.7)	1236	0.7(0.4,1.3)

Figure 4.1 below indicated the proportion of study participants who consumed all types of alcohol on each day of the preceding week to the study period. Accordingly, the highest proportion (14.9%) of the study participants consumed alcohol on Saturday. This was followed by Thursday and Sunday 13.8 and 13.1% respectively.



**Figure 4.1 Proportion of alcohol users among the study participants in the preceding week to the study period in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

As depicted in Figure 4.2, in all days of the week men participants reported to consume more standard alcoholic drinks compared to the women counterparts. Sunday was the day on which the study participants consumed more standard alcoholic drinks compared to other days of the week.



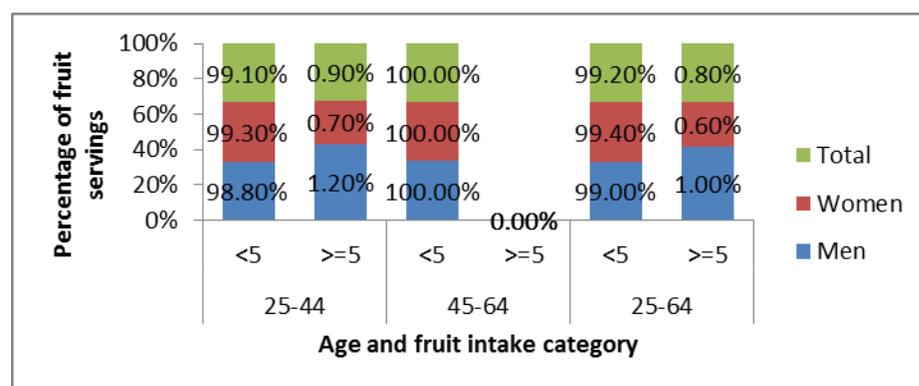
**Figure 4.2 Number of standard alcoholic drinks consumed in the week preceding the study by the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

#### **4.2.2.3 Fruits, vegetables and oil intake**

The intake of fruits and vegetables among the study participants was assessed as indicated in Table 4.4 below. The number of days the participants usually eat fruit in a typical week was reported to be 1.7 (95% CI: 0.7-2.7). This is almost consistent with findings reported by Bangladesh Ministry of Health (2010:21). There is no marked difference in fruit consumption by gender and age. The number of serving of fruit the participants ate on one of those days in a week was 1.3 (95% CI: 1.0-1.6). This is slightly lower than reported by Bangladesh Ministry of Health (2010:21) and Ministry of Health, Zanzibar (2012:13). This could also be explained by cultural differences. There is no difference by age and gender in the number of fruit serving. The proportion of the study participants who received less than five servings of fruit per day was 99.2 (95% CI: 98.7-99.6). Only 0.8% of the study participants used more than five servings of fruits per day (Figure 4.3). This is lower than the findings of the studies conducted in Jimma, Ethiopia by Alemseged *et al* (2008:23) and Bangladesh Ministry of Health (2010:23). Generally the number fruit serving among the study population was suboptimal. The number of days the participants ate vegetables in a typical week was reported to be 1.9 (95% CI: 1.5-2.3). This is slightly lower than that reported by Bangladesh Ministry of Health (2010:23). This is due to differences in vegetables consumption culture. There is no gender and age difference in the number of days for the vegetables intake. The number of serving of vegetables the participants ate on one of those days in a week was 1.6 (95% CI: 1.4-1.8). There was no difference in the number of servings by age and gender. The average number of meals consumed per week not prepared at home was 2.2 (95% CI: 1.9, 2.5) among all participants. By age, the age group 25-44 reported to consume more meals not prepared at home than those between 45-64 years, 2.4 (95% CI: 2.1-2.7) versus 1.4 (95% CI: 0.6-2.2). By gender, men reported to consume more meals not prepared at home than women, 2.7(95% CI: 2.3-3.1) versus 1.5(95% CI: 1.0-2.0).

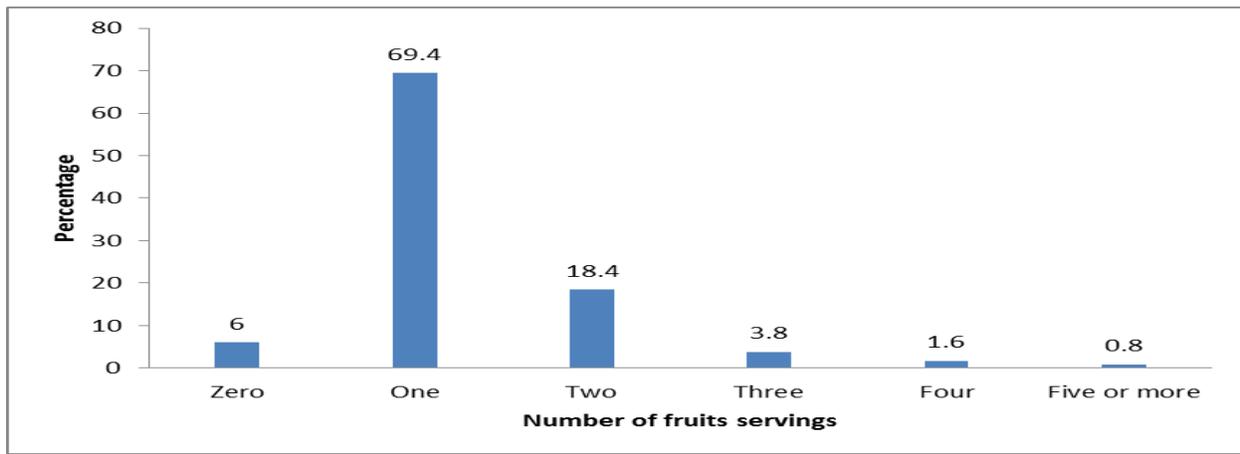
**Table 4.4 Distribution of fruits and vegetables intake among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

	Characteristics	Men		Women		Both sexes	
		No	Proportion (95% CI)	No	Proportion (95% CI)	No	Proportion 95% CI
How many days do you eat fruit in a week? SD= 20.2	25-44	590	1.7(0.1, 3.3)	784	1.7(0.3, 3.1)	1374	1.7(0.6, 2.8)
	45-64	85	1.5(-2.8, 5.8)	119	1.6(-2.0, 5.2)	204	1.5(-1.3,4.3)
	25-64	675	1.7(0.2, 3.2)	903	1.7(0.4, 3.0)	1578	1.7(0.7,2.7)
How many serving of fruit on one of those days? SD=6.7	25-44	574	1.4(0.9, 1.9)	798	1.3(0.8, 1.8)	1372	1.3(0.9, 1.7)
	45-64	85	1.3(-0.1, 2.7)	125	1.2(0.0, 2.4)	210	1.3(0.4, 2.2)
	25-64	659	1.4(0.9, 1.9)	923	1.3(0.9, 1.7)	1582	1.3(1.0, 1.6)
How many days do you eat vegetables in a week? SD=10.2	25-44	688	2.0(1.2, 2.8)	1069	1.9(1.3, 2.5)	175733	1.9 (1.4, 2.4)
	45-64	125	1.8(0.0, 3.6)	206	1.7(0.3, 3.1)	1	1.8(0.7, 2.9)
	25-64	813	2.0(1.3, 2.7)	1275	1.9(1.3, 2.5)	2088	1.9 (1.5, 2.3)
How many serving of vegetables per daySD=4.5	25-44	656	1.5(1.2,1.8)	1054	1.6(1.3,1.9)	1710	1.5(1.3,1.7)
	45-64	122	1.5(0.7,2.3)	200	1.6(1.0 ,2.2)	322	1.6(1.1,2.1)
	25-64	778	1.5(1.2,1.8)	1254	1.6(1.4,1.8)	2032	1.6(1.4,1.8)
<5 servings of fruits	25-44	608	98.8(97.7,99.5)	825	99.3(98.5,99.7)	1433	99.1(98.5,99.5)
	45-64	91	)	137	)	228	100(98.7,0.0)
	25-64	699	100(96.8,0.0)	962	100(97.8,0.0)	1661	99.2(98.7,99.6)
Meals taken not prepared at home per week	25-44	451	2.8 (2.4, 3.2)	306	1.5(1.0, 2.0)	757	2.4(2.1, 2.7)
	45-64	61	1.6(0.5,2.7)	67	1.2(0.1, 2.3)	128	1.4 (0.6,2.2)
	25-64	512	2.7(2.3,3.1)	373	1.5(1.0, 2.0)	885	2.2(1.9, 2.5)



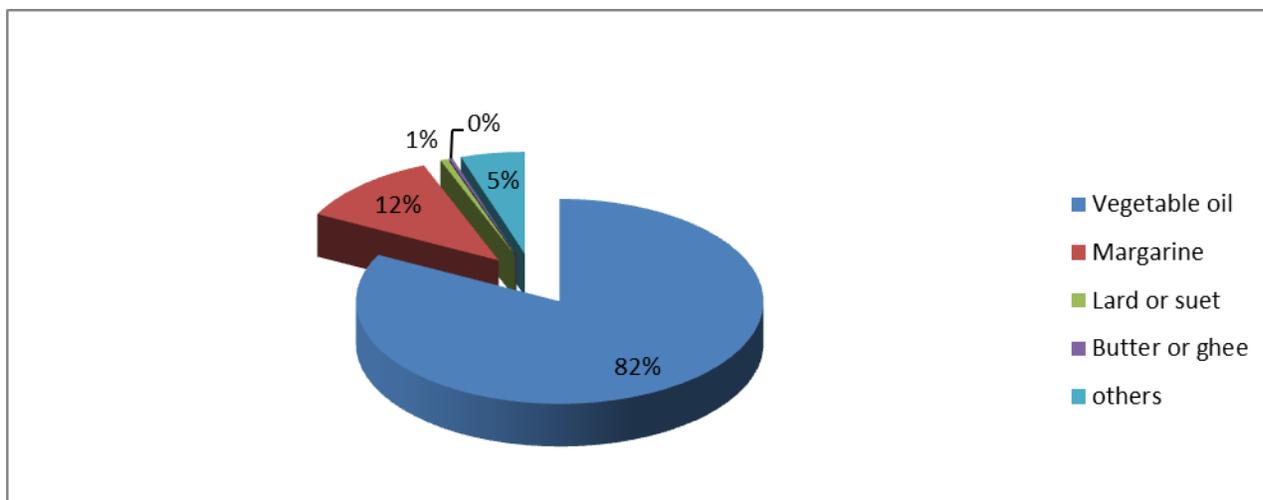
**Figure 4.3 Fruit intake by the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

Pertaining to the number of servings of fruits per day, 69.4% of the study participants had at least one serving of fruit. Of all the study participants, only 6% of the study participants did not have any servings and only 0.8% had five or more servings of fruit per day (Figure 4.4). Although the magnitude varies, the pattern is similar to the findings reported by Bangladesh Ministry of Health 2010:21.



**Figure 4.4 Number of fruit servings on typical day among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

The most commonly used oil or fat for the preparation of meals as reported by most (82%) of the study participants was vegetable oil. The second commonly used oil or fat for meal preparation was margarine in 12% of the study participants (Figure 4.5). This is much lower than the findings in India, Jamatia *et al* (2009:206). The difference could be due to culture variation of food preferences and food availability. In fact, the fact that most study participants used vegetable oil is an encouraging result.



**Figure 4.5 Type of oil or fat used in the preparation of meal by the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014.**

#### 4.2.2.4 Physical Activity

In this section, a range of physical activities including work, travel and recreational related activities and the intensity of these physical activities experienced by the study participants were assessed as clearly shown in the Table 4.5.

With regard to the experience of work related vigorous physical activity, of the 2,343 participants only 14.2% (95% CI: 12.8-15.7) were engaged in work-related vigorous activity of at least 10 minutes per day. This is lower than that of Ministry of Health, Zanzibar (2012:14), which could be explained by work related behaviours and experiences between the two population groups. By age group, there was no marked difference in work-related vigorous physical activity between the age groups 25-44 and 45-64 years. Gender wise, the prevalence of work related vigorous intensity physical activity in men was 23.5% (95% CI: 20.8-26.3) and 8.3% (95% CI: 7.0-9.8) in women. There was significant difference by gender. This finding is consistent with that of the studies conducted in India by Steven *et al* (2010:300), Bangladesh Ministry of Health (2010:23) and Ministry of Health, Zanzibar (2012:14). Nearly one-third, 31.3% (95% CI: 29.3-33.2%) of the study participants involved in work-related moderate intensity physical activity. This is higher than that reported by Bangladesh Ministry of Health (2010:23). This could be due to differences in the population enrolled to the study. With increasing age, the moderate intensity physical activity decreased; i.e., from 32.5%

(95% CI: 30.4-34.6%) in 25-44 years to 25.7 (95% CI: 21.7-30.1%) in 45-64 years. Gender wise, the moderate intensity physical activity is slightly higher among the men than women participants, 33.4% (95% CI: 30.4-36.5%). This is consistent with Ministry of Health, Zanzibar (2012:14). The mean number of days per week participants engaged in work-related vigorous intensity physical activity was 5.0 (95% CI: 4.9-5.1) days. The mean number of days for engaging in such vigorous activity was larger among the age group 25-44 than those 45-64 years old, 5.1 (95% CI: 5.0-5.2) days versus 4.6 (95% CI, 4.4-4.8) days. The mean number of days spent for work-related vigorous activity by men and women participants was 5.2 (95% CI, 5.1-5.3) and 4.6 (95% CI: 4.4-4.8), respectively. As to the number of days for moderate physical activity per week, the mean number of days the participants engaged was 4.7 (95% CI: 4.6-4.8). The mean number of days for work-related moderate physical activity among the age groups 25-44 and 45-64 years was 4.8 (95% CI: 4.7-4.9) and 4.4 (95% CI: 4.2-4.6) per week, respectively. By gender the work-related moderate intensity physical activity was 5.1 (95% CI: 5-5.2) among men and 4.5 (95% CI: 4.4-4.6) per week among women participants. Men had more engagement in work-related moderate physical activity than women, which is consistent with the findings in Jimma town, Ethiopia by Alemseged *et al* (2012:23).

Most or 86.5% (95% CI: 85.1-87.9) of the study participants practiced walking or bicycle riding as usual physical activity. This is higher than that reported by Bangladesh Ministry of Health (2010:23) and Alemseged *et al* (2008:23) which could be explained by better walking or bicycle riding experiences in Tigray. There was no significant difference in walking or bicycle riding among the age group 25-44 and 45-64 years old, 86.7% (95% CI: 85.2-88.2) versus 85.6% (95% CI: 82.0-88.8). Gender wise, the walking or bicycle related physical activity was higher among men than women participants, 91.3% (95% CI: 89.3-93) versus 83.5% (95% CI: 81.5-85.4). The mean number of days the study participants engaged in walking/bicycle activity per week was 4.3 per week. The engagement in walking or bicycle activity per week among the 25-44 and 45-64 years of age was 4.3 and 4.2 days per week, respectively. In men and women, the engagement in walking or bicycle activity was 4.7 days (95% CI: 4.6-4.8) and 4.0 days (95% CI: 3.9-

4.1), respectively. This is consistent with the findings of the study done in Vietnam by Luc *et al* (2009:3).

The mean number of days per week the participants engaged in vigorous recreational activity was 4.6 (95% CI: 4.5-4.7). There was no difference in the number of days for vigorous recreational activity among the age group 25-44 and 45-64 years, 4.6 days (95% CI: 4.5-4.7) and 4.7 days (95% CI: 4.3-5.1). Gender wise, the vigorous recreational activity was practiced for 4.6 days per week on average in both men and women. This is consistent with the findings of the studies in Jimma, Ethiopia by Alemseged *et al* (2012:23), in Vietnam by Luc *et al* (2009:3) and in India by Misra (2014:374).

The prevalence of recreational vigorous intensity physical activity was small, 7.8% (95% CI: 6.7-8.9). By age group, this activity was slightly higher in the 25-44 than 45-64 years, 8.1% (95% CI: 7-9.4) versus 6.1% (95% CI: 4.1-8.7). In terms of gender, the prevalence in men was slightly lower than that of women, 14.9% (95% CI: 12.7-17.4) and 17.4% (95% CI: 13.2-22.3). The prevalence of recreational moderate intensity physical activity was 15.9% (95% CI: 14.5-17.5). Among the different ages, the prevalence was 16.8% (95% CI: 15.2-18.5) in 25-44 years of age and 12% (95% CI: 9.1-15.4). Gender wise, this was 24.8% (95% CI: 22.1-27.7) in men and 11% (95% CI: 9.5-12.7) in women. This clearly shows that the magnitude was higher in men than women and is similar to the findings of the study reported by Bangladesh Ministry of Health (2010:24) and Ministry of Health, Zanzibar (2012:14). The mean number of days per week for moderate recreational activity engagement by the study participants was 4.3 (95% CI: 4.2-4.4). There was no significant difference in the number of days among the age group 25-44 and 45-64 years; i.e., 4.2 days (95% CI: 4.1-4.3) and 4.4 days (95% CI: 4.1-4.7). In men and women the mean number of days per week for moderate recreational activity engagement was 4.5 days (95% CI: 4.4-4.6) and 3.9 days (95% CI: 3.7-4.1). This is also consistent with the findings of the studies conducted in Jimma, Ethiopia by Alemseged *et al* (2012:24), in Vietnam by Luc *et al* (2009:3) and in India by Misra (2014:374).

The physical activity level was computed for metabolic equivalent using the time spent for work, transportation and recreation related physical activities. The prevalence of low level physical activity or <600 MET-minutes per week, moderate (600-3000 MET-minutes per week) and high level ( $\geq$ 3000 MET-minutes per week) was 44.8% (95% CI: 42.6,46.9), 36.6% (95% CI: 34.5,38.7) and 18.6% (95% CI: 17,20.4), respectively. This is different from the findings of the study reported by Bangladesh Ministry of Health (2010:23). This could be due to differences in physical activity related behaviour between the two populations. The low and moderate physical activities were increasing with increasing age. This could be due decreasing mobility and work related physical activities as the age advances. In contrast the high level activity was decreasing with increasing age. Gender wise, the low level physical activity was higher in women than men. There was no significant difference in gender for the moderate level physical activity. Men experienced higher level physical activity than women.

**Table 4.5 Magnitude and types of physical activities experienced by the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

Characteristics	Age group	Men		Women		Both sexes	
		No	Proportion (95% CI)	No	Proportion (95% CI)	No	Proportion 95% CI
Engage in vigorous work intensity activity	25-44	765	182,23.8(20.9,26.9)	1165	95,8.2(6.7,9.8)	1930	277,14.4(12.8,16)
	45-64	147	32,21.8(15.7,29)	266	24,9(6,12.9)	413	56,13.6(10.5,17.12)
	25-64	912	214,23.5(20.8,26.3)	1431	119, 8.3(7,9.8)	2343	333,14.2(12.8,15.7)
Engage in moderate work intensity activity	25-44	761	267,35.1(31.8,38.5)	1166	359,30.8(28.2,33.5)	1927	626,32.5(30.4,34.6)
	45-64	146	36,24.7(18.2,32.1)	266	70,26.3(21.3,31.9)	412	106,25.7(21.7,30.1)
	25-64	907	303,33.4(30.4,36.5)	1432	429,30(27.6,32.4)	2339	732,31.3(29.4,33.2)
Engage in Walking/bicycle physical activity	25-44	763	697,91.3(89.2,93.2)	1166	976,83.7(81.5,85.7)	1929	1673, 86.7(85.2,88.2)
	45-64	145	132,91(85.5,94.9)	266	220,82.7(77.8,86.9)	411	352,85.6(82,88.8)
	25-64	908	829,91.3(89.3,93)	1432	1196,83.5(81.5,85.4)	2340	2025,86.5(85.1,87.9)
Engage in vigorous activity recreational	25-44	765	119,15.6(13.1,18.3)	1166	38,3.3(2.3,4.4)	1931	157, 8.1(7,9.4)
	45-64	146	17,11.6(7.2,17.6)	66	8,12.1(5.8,21.7)	411	25,6.1(4.1,8.7)
	25-64	911	136, 14.9(12.7,17.4)	265	46,17.4(13.2,22.3)	2342	182,7.8(6.7,8.9)
Recreational Moderate physical activity	25-44	763	199,26.1(23.1,19.3)	1162	124,10.7(9,12.6)	1925	323,16.8(15.2,18.5)
	45-64	145	26,17.9(12.3,24.8)	265	33,12.5(8.9,16.9)	410	49,12(9.1,15.4)
	25-64	908	225, 24.8(22.1,27.7)	1427	157, 11(9.5,12.7)	2335	372,15.9(14.5,17.5)
Number of days for vigorous work activity/week	25-44	952	5.3(5.2,5.4)	433	4.8(4.6,5)	1385	5.1(5,5.2)
	45-64	164	5(4.7,5.3)	99	4.1(3.7,4.5)	263	4.6(4.4,4.8)
	25-64	1116	5.2(5.1,5.3)	532	4.6(4.4,4.8)	1648	5.0(4.9,5.1)
Number of days for moderate	25-44	1373	5.1(5,5.2)	1629	4.6(4.5,4.7)	3002	4.8(4.7,4.9)
	45-64	165	4.7(4.4,5)	296	4.2(4,4.4)	461	4.4(4.2,4.6)

work activity/week	25-64	1538	5.1(5,5.2)	1925	4.5(4.4,4.6)	3463	4.7(4.6,4.8)
Number of days	25-44	3171	4.7(4.6,4.8)	3834	4.0(3.9,4.1)	7005	4.3(4.3,4.3)
Walking/bicycle activity/week	45-64	591	4.6(4.4,4.8)	834	3.9(3.8,4)	1425	4.2(4.1,4.3)
	25-64	3762	4.7(4.6,4.8)	4668	4.0(3.9,4.1)	8430	4.3(4.3,4.3)
Number of days	25-44	545	4.6(4.4,4.8)	171	4.5(4.2,4.8)	716	4.6(4.5,4.7)
vigorous recreational activity/week	45-64	73	4.6(4.1,5.1)	40	5(4.4,5.6)	113	4.7(4.3,5.1)
	25-64	618	4.6(4.4,4.8)	211	4.6(4.3,4.9)	829	4.6(4.5,4.7)
Number of days	25-44	888	4.5(4.4,4.6)	477	3.9(3.7,4.1)	1365	4.2(4.1,4.3)
moderate recreational activity/week	45-64	123	4.7(4.3,5.1)	92	4(3.6,4.4)	215	4.4(4.1,4.7)
	25-64	1011	4.5(4.4,4.6)	569	3.9(3.7,4.1)	1580	4.3(4.2,4.4)
Low level physical activity	25-44	249	35.4(31.9,39.0)	502	52.3(49.1, 55.4)	751	45.1(42.8,47.5)
	45-64	37	28.5(21.2,36.7)	112	47.3(45,58.2)	149	42.9(37.8,48.2)
	25-64	286	34.3(31.1, 37.6)	614	52.2(49.3,55)	900	44.8(42.6,46.9)
Moderate level physical activity	25-44	261	37.1(33.6,40.7)	351	36.6(33.6, 39.7)	612	36.8(34.5,39.1)
	45-64	50	38.5(30.4,47.0)	74	34.1(28,40.6)	124	35.7(30.8,40.9)
	25-64	311	37.3(34.1,40.6)	425	36.1(33.4,38.9)	736	36.6(34.5,38.7)
High level physical activity	25-44	194	27.6(24.4,31)	107	11.1(9.3,13.3)	301	18.1(16.3,20)
	45-64	43	33.1(25.4,41.5)	31	14.3(10.1,19.4)	74	21.3(17.3,25.9)
	25-64	237	28.4(25.4,31.6)	138	11.7(10,13.7)	375	18.6(17,20.4)

\*Vigorous: A person achieving a minimum of at least 3 000 MET-minutes per week

Moderate: A person not meeting the criteria for the "high" category, but achieving a minimum of at least 600 MET-minutes per week

Low: A person not meeting any of the above mentioned criteria falls in this category (<600 MET-minutes per week)

#### 4.2.2.5 Time spent in vigorous, moderate and sedentary activities

The durations of time (in minutes) spent per week in vigorous, moderate and sedentary activities were assessed among the study participants as shown in Table 4.6. The mean, median and interquartile range (IQR) time spent in work related vigorous activity on an average day was 470.1, 480 and 360-600 minutes, respectively. This is higher than that reported by Bangladesh Ministry of Health (2010:24). The difference could be due to variation in the nature of work-related activity to be engaged in. There was reduction in the mean and IQR of time spent in work-related vigorous physical activity with increasing age among the study participants. This is because many people do not engage in work-related vigorous physical activity as their age advances. Gender wise, men and women spent mean, median and IQR of 516, 540 and 480-600 and 385.1, 390 and 240-480 minutes respectively in work-related vigorous physical activity; i.e., men spent more time than women. This is consistent with Luc *et al* (2009:3). The mean, median and IQR time spent on an average day in work-related moderate activity was 467.6, 480 and 240-600 minutes respectively.

For the transport-related physical activity, the mean, median and IQR of time spent by the study participants on average day were 79.5, 30 and 25-80 minutes, respectively. This is higher than that of Bangladesh Ministry of Health (2010:24). The difference could be due to better walking and bicycling behaviours of the people in Tigray to travel from one place to another.

The mean, median and IQR of time spent on recreational related vigorous physical activity among the study participants were 66.6, 60 and 50-90 minutes. This is higher than that reported by Bangladesh Ministry of Health (2010:24). The difference could be due to the difference in terms of knowledge and behaviours between the two populations. The mean and IQR of time spent in recreational related vigorous activity was decreasing from 25-44 to 45-64 years of age. The mean, median and IQR of time spent on recreational related moderate physical activity among the study participants on an average day were 86.8, 60 and 30-120 minutes. Gender wise, in men and women the mean, median and IQR of time spent on recreational related moderate physical activity among the study participants on an average day were 76.5, 60, 30-120 and 102.6 120 and 40-120 minutes respectively. This is also consistent with that of Luc *et al* (2009:3).

The time spent on sedentary sitting on an average day among the study participants was 127.6, 60 and 30-150 in minutes. This is higher than that of the findings in Jimma by Alemseged *et al* (2012:24) but lower than that of Vietnam by Luc *et al* (2009:3). By gender, the mean, median and IQR time spent on the sedentary sitting for men and women were 89.8, 60 and 60-120 and 151.2, 90 and 30-180 minutes respectively. This shows women tended to be more sedentary than men. This is not consistent with the findings in Vietnam by Luc *et al* (2009:3). This could be due to differences behaviour of work related engagements between the above population groups.

**Table 4.6 Time (in minutes) spent in vigorous, moderate and sedentary activity on an average day by the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

Characteristics	Age group	Men				Women				Both Sexes			
		No	Mean	Median	IQR	No	Mean	Median	IQR	No	Mean	Median	IQR
Work related vigorous activity	25-44	93260	518.1	540	480, 600	36260	398.5	480	270, 480	129520	477.9		
	45-64	16650	504.5	480	285, 690	8025	334.4	360	180, 480	24675	432.9	480	360, 600
	25-64	109,910	516	540	480, 600	44,285	385.1	390	240, 480	154195	470.1	480	240, 480
Work related moderate activity	25-44	119100	452.9	480	300, 600	177540	498.7	330	180, 480	296640	479.2		
	45-64	14400	411.4	480	180, 600	27480	392.6	390	240, 540	41880	398.9	480	240, 600
	25-64	133500	448	480	300, 600	205020	481.3	360	180, 480	338520	467.6	420	240, 600
Transport related activity	25-44												
	45-64	46693	68.7	40	30, 71.3	67962	71.7	30	20, 60	114655	70.4	30	25, 60
	25-64	14720	116.8	60	30, 120	27195	127.1	30	21.3, 90	41915	123.3	40	30, 90
Recreational related vigorous activity	25-44												
	45-64	7402	66.1	60	60, 90	2520	76.4	60	60, 97.5	9922	68.4	60	60, 90
	25-64	800	53.3	60	30, 60	475	59.4	45	18.5, 105	1275	55.4	60	30, 60
Recreational related moderate activity	25-44	8202	64.6	60	45, 82.5	2995	73.1	60	52.5, 97.5	11197	66.6	60	50, 90
	25-44	5000	76.1	60	30, 120	13164	107	120	60, 120	28164	88.0		
	45-64	2050	78.8	60	30, 120	1821	79.2	60	20, 120	3871	79.0	60	30, 120
Duration of sedentary sitting	25-64	17050	76.5	60	30, 120	14985	102.6	120	40, 120	32035	86.8	60	30, 120
	25-44	61597	89.7	90	60, 120	153879	144.9	90	30, 180	215476	123.2		
	45-64	11350	90.8	60	20, 120	41944	180	90	30, 240	53294	148.9	60	30, 150
Duration of sedentary sitting	25-64	72947	89.8	60	60, 120	195823	151.2	90	30, 180	268770	127.6	60	30, 180
												60	30, 150

#### 4.2.2.6 Khat chewing

Khat chewing was another behavioural risk factor for NCDs customized and included as expanded component of the local situation in this study. Accordingly, the distribution of Khat chewing has been indicated in Table 4.7. The overall prevalence of Khat chewing among the study participants was 3.3% (95% CI: 2.4-4.1%). This was much lower than that of Alemseged *et al* (2012:24) which could be explained by the differences in the Khat chewing practices due to high number of Muslims in Jimma than Tigray. The prevalence of Khat chewing in the age groups 25-44 and 45-64 years was 3.8% (95% CI: 3.0-4.7%) and 1% (95% CI: 0.3-2.3%), respectively. As to the distribution of Khat chewing by gender, in men and women it was 7.1% (95% CI: 5.5-8.9%) and 0.9 (95% CI: 0.5-1.5), respectively. The gender variation in chewing Khat is in agreement with that that of the study in Addis Ababa and Butajira in Ethiopia by Fikru (2009:28).

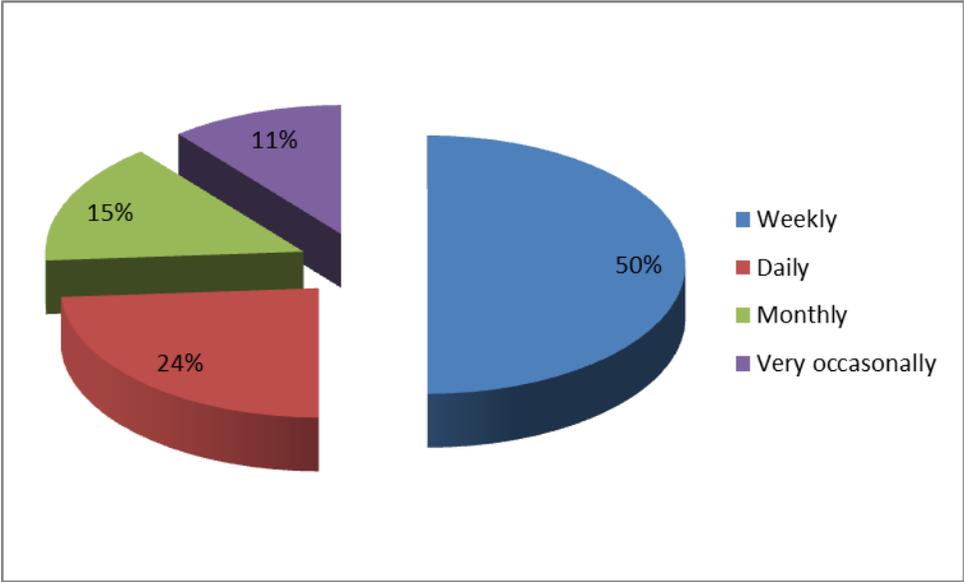
Of all the ever Khat chewers, 60.8 (95% CI: 49.4-71.4) chewed Khat in the 12 months preceding the study. Khat chewing in the 12 months preceding the study among the age group 25-44 years and 45-64 years was 62% (95% CI: 50.3-72.7)% and 33.3% (95% CI: 1.7-86.8). Gender wise, the prevalence in men and women was 66.7% (95% CI: 54.4-77.5) and 27.3% (95% CI: 7.5-57.8). Khat chewing in 30 days preceding the study was 73.9% (95% CI: 59.9-85.0). In the age groups 25-44 years and 45-64 years, the prevalence was 75% (95% CI: 60.7-86.1) and 50% (95% CI: 2.5-97.5) respectively. Gender wise, it was 78% (95% CI: 63.5-88.7) in men and 40% (95% CI: 7.3-81.8) in women. From this, Khat chewing was more prevalent in the age group 25-44 years old and men participants.

**Table 4.7 Khat chewing by the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

Characteristics	Age group	Men		Women		Both Sexes	
		No	Proportion (95%CI)	No	Proportion (95% CI)	No	Proportion (95% CI)
Ever Khat chewing	25-44	762	8(6.2,10.1)	1164	1(0.6,1.7)	1926	3.8(3.0,4.7)
	45-64	145	2.1(0.5,5.5)	264	0.4(0.0,1.9)	409	1(0.3,2.3)
	25-64	907	7.1(5.5,8.9)	1428	0.9(0.5,1.5)	2335	3.3(2.6,4.1)
Khat chewing in the past 12 months	25-44	61	67.2(54.7,78.1)	10	30(8.3,62)	71	62(50.3,72.7)
	45-64	2	50(2.5,97.5)	1	0(0,95)	3	33.3(1.7,86.8)
	25-64	63	66.7(54.4,77.5)	11	27.3(7.5,57.8)	74	60.8(49.4,71.4)
Khat chewing in the past 30	25-44	40	31,77.5(62.7,88.4)	4	2,50(9.4,90.6)	44	33,75(60.7,86.1)
	45-64	1	1,100(5,0)	1	0,0(0,95)	2	1,50(2.5,97.5)

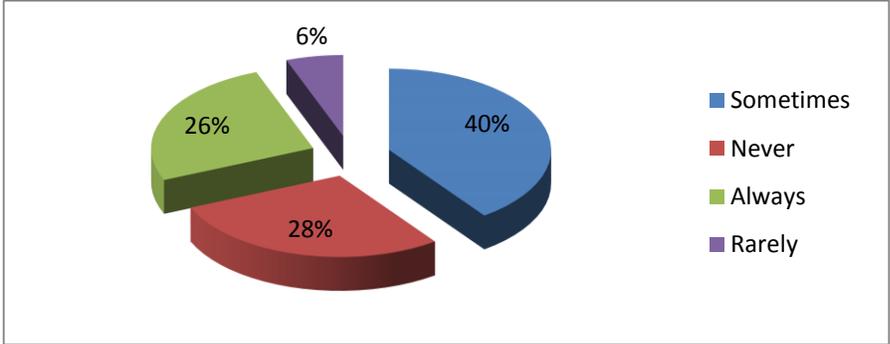
days	25-64	41	32,78(63.5,88.7)	5	2,40(7.3,81.8)	46	34,73.9(59.9,85)
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Concerning the frequency of Khat chewing, 23 (50%) of the study participants chewed Khat on weekly bases followed by 24% daily chewers (Figure4.6).



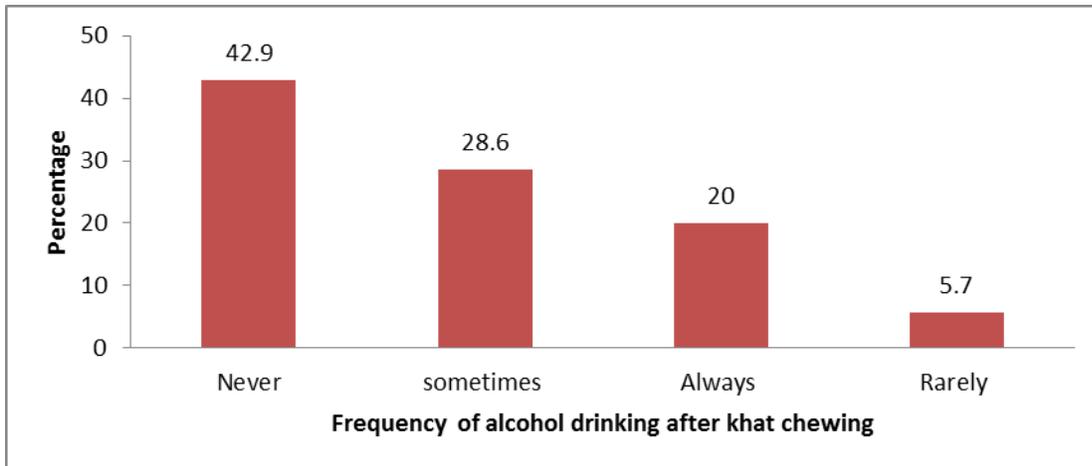
**Figure 4.6 Frequency of Khat chewing among the study participants in the 12 months preceding the study in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=46)**

Figure 4.7 below showed that among the Khat chewers in the 30 days preceding the study, 72% smoked cigarettes while chewing Khat with varying frequency. Four in ten (40%) chewers smoked cigarettes sometimes while chewing Khat. Twenty-six percent smoked cigarettes always while chewing Khat. Twenty-six percent smoked cigarettes always while chewing Khat.



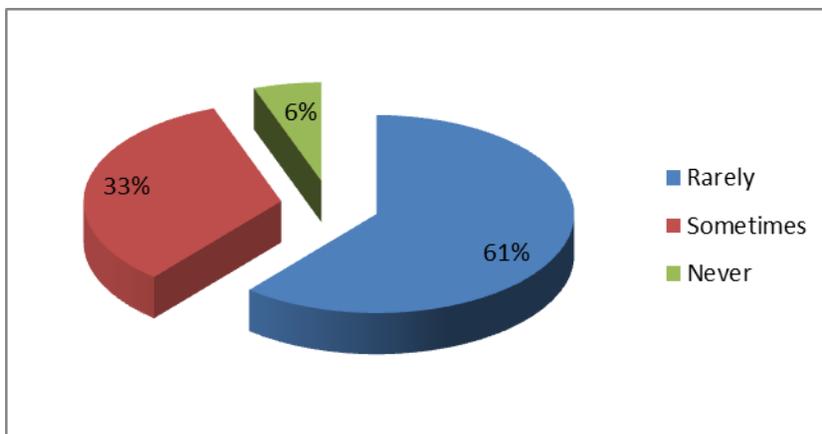
**Figure 4.7 Simultaneous use Khat and cigarette among the study participants in the 30 days preceding to the study in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=35).**

As clearly indicated in figure 4.8, 42.9% of the Khat chewers did not consume any alcohol after chewing Khat. The remaining 57.1% of the study participants drank alcohol following Khat chewing to break the effect of Khat in the 30 days preceding the study. One in five (20%) chewers drank alcohol always after chewing Khat.



**Figure 4.8 Frequency of alcohol drinking after Khat chewing among the study participants in the 30 days preceding to the study in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=34)**

Of the 18 Khat chewers, 17(94%) responded that they used shisha (a type of tobacco used by smoking) or other substances while chewing Khat (Figure 4.9).



**Figure 4.9 Frequency of Shisha and other substances use after Khat chewing among the study participants in the 30 days preceding to the study in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=34)**

**4.2.2.7 History of hypertension**

The history of hypertension was assessed and the findings have been illustrated in the Table 4.18. Only 46.5% (95% CI: 44.5-48.5) of the 2337 participants had never had their blood pressure measured by a health worker. This is lower than that reported by Bangladesh Ministry of Health (2010:21) which could indicate low health seeking behaviour among the study population of this study. Age wise, it was 46.1(95% CI: 43.9-48.3) in the age group 25-44 year and 48.4% (95% CI: 43.6-53.3) in 45-64 years. In men and women, 39.3% (95% CI: 36.2-42.5) and 51.1% (95% CI: 48.5-53.7), respectively had their blood pressure measured. The majority of the study participants did not have their blood pressure measured and that is slightly higher among the age group 45-64 years and women than their counterparts. It is higher in the older age group due to increasing morbidities in this age group that enable them to visit health institutions and consequently measured their blood pressure.

Of the study participants who had their blood pressure measured, 5% (95% CI: 3.8-6.4) were ever been told to have hypertension. This is by far lower than that reported by Bangladesh Ministry of Health (2010:21). The prevalence of hypertension based on the information from health workers in the age group 25-44 and 45-64 years, was 1.8% (95% CI: 1.1-2.9) and 19% (95% CI: 14-24.9) respectively. In men and women, the presence of hypertension by history was 4.5% (95% CI: 2.7-7.0) and 5.2% (95% CI: 3.8-7.0) respectively. This was significantly higher in the age group 45-64 years and was slightly higher in women than men participants, which is similar to the findings of Alemseged *et al* (2012:24) and the report of Bangladesh Ministry of Health (2010:21).

Of the study participants whose blood pressure was measured in the 12 months preceding the study, 56.8% (95% CI: 42-70.8) had hypertension. Out of these, the magnitude for the age group 25-44 and 45-64 years was 25% (95% CI: 8.5-49.9) and 75% (95% CI: 56.7-88.4) respectively. By gender, hypertension was apparent in 46.2% (95% CI: 21.3-72.6) and 61.3% (95% CI: 43.5-77.1) in men and women participants

respectively. The prevalence was higher in the age group 45-44 years than in younger individuals and in women more than men. .

Of the 42 study participants reported to have hypertension by history, 45.2% (95% CI: 30.8-60.4) received drugs in two weeks preceding the study; 97.6% (95% CI: 88.8-99.9) were advised to reduce salt intake and 66.7% (95% CI, 51.5-79.6) advised to lose weight; 73.2% (95% CI: 58.2-85) were advised to start or do more exercise. Of the study participants with hypertension, 55.6% (95% CI: 39.2-71) were advised to stop smoking. . Treatment with drugs for hypertension was higher in the findings reported by the Bangladesh Ministry of Health (2010:22), however, the advices given by health workers to the hypertensive cases to start life style measures such as reducing salt intake, weight reduction, start or do more exercise and stop tobacco smoking were higher in this study. These could be due to different treatment protocols for hypertension in the two settings. This study also revealed that the advice given by health workers to manage hypertension was not given to all hypertensive cases. Of these study participants with history of hypertension, 19% (95% CI: 9.3-33) visited a traditional healer for hypertension. Out of the study participants with history of hypertension, 14.6% (95% CI: 6.2-28) were taking herbal or traditional remedies at the time of the study. These are higher than the findings reported by Bangladesh Ministry of Health (2010:22), which could be attributed to the differences in health care seeking behaviours particularly from traditional healers between the two populations. According to these findings, the majority of participants did not get their blood pressure measured.

**Table 4.8 History of raised blood pressure among the study participants in Kilte Awlaleo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

Characteristics	Age group	Men		Women		Both Sexes	
		No	Proportion (95%CI)	No	Proportion (95% CI)	No	Proportion (95% CI)
Ever had BP measured by a health worker	25-44	764	292,38.2(34.8,41.7)	1162	596,51.3(48.4,54.2)	1926	888,46.1(43.9,48.3)
	45-64	66	147,44.9(37,53)	264	133,50.4(44.4,56.4)	411	280,48.4(43.6,53.3)
	25-64	358	439,39.3(36.2,42.5)	1426	729,51.1(48.5,53.7)	2337	1168,46.5(44.5,48.5)
Ever been told that you have hypertension	25-44	292	5,1.7(0.6,3.8)	593	11,1.9(1,3.2)	885	16,1.8(1.1,2.9)
	45-64	66	11,16.7(9.1,27.1)	134	27,20.1(14,27.6)	200	38,19(14,24.9)
	25-64	358	16,4.5(2.7,7)	727	38, 5.2(3.8,7)	1085	54,5(3.8,6.4)

Ever been told you have hypertension in the past 12 months	25-44	5	1,20(1,66.6)	11	3,27.3(7.5,57.8)	16	4,25(8.5,49.9)
	45-64	8	5,62.5(27.8,89.4)	20	16,80(58.5,93.3)	28	21,75(56.7,88.4)
	25-64	13	6,46.2(21.3,72.6)	31	19,61.3(43.5,77.1)	44	25,56.8(42,70.8)
Drugs taken in the past two weeks	25-44	4	2,50(9.4,90.6)	10	2,20(3.5,52)	14	4,28.6(9.8,55.5)
	45-64	9	5,55.6(24,84)	19	10,52.6(30.6,73.9)	28	15,53.6(35.2,71.2)
	25-64	13	7,53.8(27.4,78.7)	29	12,41.4(24.7,59.7)	42	19,45.2(30.8,60.4)
Advice to reduce salt intake	25-44	4	4,100(47.3,0)	9	9,100(71.7,0)	13	13,100(79.4,0)
	45-64	9	9,100(71.7,0)	20	19,95(77.7,99.8)	29	28,96.6(84.2,99.8)
	25-64	13	13,100(79.4,0)	29	28,96.6(84.2,99.8)	42	41,97.6(88.8,99.9)
Advice or treatment to lose weight	25-44	4	3,75(24.2,98.8)	9	4,44.4(16.1,76)	13	7,53.8(27.4,78.7)
	45-64	9	7,77.8(43.8,96.1)	20	14,70(47.7,86.8)	29	21,72.4(54.3,86.3)
	25-64	13	10,76.9(49.1,93.8)	29	18,62.1(43.7,78.2)	42	28,66.7(51.5,79.6)
Advice or treatment to stop smoking	25-44	4	3,75(24.2,98.8)	9	4,44.4(16.1,76)	13	7,53.8(27.4,78.7)
	45-64	7	4,57.1(21.6,87.7)	16	9,56.3(32,78.5)	23	13,56.5(36.1,75.4)
	25-64	11	7,63.6(33.6,87.2)	25	13,52(32.8,70.8)	36	20, 55.6(39.2,71)
Advice to start or do more exercise	25-44	4	4,100(47.3,0)	9	6,66.7(33.2,90.7)	13	10,76.9(49.1,93.8)
	45-64	9	6,66.7(33.2,90.7)	19	14,73.7(50.9,89.7)	28	20,71.4(52.9,85.8)
	25-64	13	10,76.9(49.1,93.8)	28	20,71.4(52.9,85.8)	41	30, 73.2(58.2,85)
Ever seen a traditional healer for raised BP	25-44	4	2,50(9.4,90.6)	9	0,0(0,28.3)	13	2,15.4(2.7,42.2)
	45-64	9	1,11.1(0.6,43.9)	20	5,25(9.8,47)	29	6,20.7(8.8,38.2)
	25-64	13	3,23.1(6.2,50.9)	29	5,17.2(6.6,34.2)	42	8,19(9.3,33)
Currently taking any herbal or traditional remedy	25-44	3	1,33.3(1.7,86.8)	9	0,0(0,28.3)	12	1,8.3(0.4,34.8)
	45-64	9	0,0(0,28.3)	20	5,25(9.8,47)	29	5,17.2(6.6,34.2)
	25-64	12	1,8.3(0.4,34.8)	29	5,17.2(6.6,34.2)	41	6, 14.6(6.2,28)

#### 4.2.2.9 History of raised blood glucose (diabetes)

The history of being diagnosed for diabetes and interventions made by the health workers among the study participants was assessed as depicted in the Table 4.9. Of the 2,336 participants who responded to history of diabetes, only 11.5% (95% CI: 10.3-12.9) had ever had their blood sugar level determined, to their awareness. This is lower than that reported by the Bangladesh Ministry of Health (2010:22) which could be attributed to the differences in health seeking behaviour and accessibility of health care services by the study participants. Blood sugar measurement was slightly higher in the age group 45-64 than 25-44 years and in women than men participants. Out of the 270 screened participants 5.6% (95% CI: 3.3-8.8) had a history of diabetes. This is higher than the prevalence reported by Bangladesh Ministry of Health (2010:22). This could be could be majorly attributed to differences in exposure to behavioural risk factors

between the two population. The history of diabetes was higher in the age group 45-64 years than 25-44, years and in men than women participants. In the 12 months preceding the study, 14 participants reported to have been screened for diabetes and 12 or 85.7% (95% CI: 60.3-97.5) were told they have diabetes. Among those diagnosed with diabetes in the 12 months preceding the study, diabetes was slightly higher in 45-64 years than those 25-44 years of age and in women than men. Of these 12 participants, only 64.3% (95% CI: 37.6-85.6) of the participants were taking insulin. This is higher than reports from Bangladesh Ministry of Health (2010:22) and Ministry of Health, Zanzibar (2012:16) which could be attributed to the differences in treatment protocol of diabetes among the three settings. About 61.5% (95% CI: 34.1-84.3) were taking other medications for diabetes, which is consistent with Bangladesh Ministry of Health (2010:22). Around 84.6% (95% CI: 57.8-97.3) were on special diabetic diets. In this study, 92.3% (95% CI: 67.5-99.6%) were advised to lose weight; 83.3% (95% CI: 40.9-99.2) were advised to stop cigarette smoking; and 84.6% (95% CI: 57.8-97.3) were advised to start or increase exercise. This is consistent with the finding of Ministry of Health, Zanzibar (2012:16). Nearly one-third, 30.8% (95% CI: 10.6-58.7%) visited traditional healers for their diabetes; and 23.1% (95% CI: 6.2-50.9%) were taking herbal and other traditional medications for their diabetes at the time of the study. This is by large higher than the findings reported by Bangladesh Ministry of Health (2010:23) and Ministry of Health, Zanzibar (2012:16) which could be due to the differences in the cultural influences in using herbal medication for diabetes and other health perceived health problems. Only small proportions of the participants underwent blood sugar measurement in their life time. Diabetes existed among the study population. The interventions and advices given by the health workers were not comprehensive enough. Nearly 1 in 3 diabetic patients visited traditional healers and 1 in 4 diabetic patients used herbal or traditional remedies to treat their diabetes.

**Table 4.9 History of Diabetes among the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,336)**

Characteristics	Age group	Men		Women		Both Sexes	
		No	Proportion (95%CI)	No	Proportion (95% CI)	No	Proportion (95% CI)
Ever had you Blood	25-44	762	74,9.7(7.8,12)	1163	134,11.5(9.8,13.5)	1925	208,10.8(9.5,12.3)

sugar measured	45-64 25-64	146 908	20,13.7(8.8,20) 95,10.4(8.5,12.5)	265 1428	41,15.5(11.5,20.2) 175,12.3(10.6,14)	411 2336	61,14.8(11.7,18.5) 270,11.5(10.3,12.9)
Ever been told that you have diabetes or raised blood sugar	25-44 45-64 25-64	75 20 95	0,0(0,3.9) 7,35(16.8,57.3) 7,7.4(3.3,14)	134 41 175	4,3(1,7) 4,10(3.2,21.9) 8,4.6(2.1,8.5)	209 61 270	4,1.9(0.6,4.6) 11,18(9.9,29.2) 15,5.6(3.3,8.8)
Ever been told that you have diabetes in the past 12 months	25-44 45-64 25-64	1 5 6	0,0(0,95) 5,100(54.9,0) 5,83.3(40.9,99.2)	3 5 8	3,100(36.8,0) 4,80(33.4,99) 7,87.5(52,99.4)	4 10 14	3,75(24.2,98.8) 9,90(59.7,99.5) 12, 85.7(60.3,97.5)
Currently receiving Insulin	25-44 45-64 25-64	- 7 7	0 - 5,71.4(33,94.9) 5,71.4(33,94.9)	3 4 7	1,33.3(1.7,86.8) 3,75(24.2,98.8) 4,57.1(21.6,87.7)	3 11 14	1,33.3(1.7,86.8) 8,72.7(42.2,92.6) 9,64.3(37.6,85.6)
Taken drugs in the past two weeks	25-44 45-64 25-64	- 7 7	0 - 5,71.4(33,94.9) 5,71.4(33,94.9)	3 3 6	1,33.3(1.7,86.8) 2,66.7(13.2,98.3) 3,50(14.7,85.3)	3 10 13	1,33.3(1.7,86.8) 7,70(38,91.7) 8,61.5(34.1,84.3)
Special prescribed diet	25-44 45-64 25-64	- 7 7	0 - 5,71.4(33,94.9) 5,71.4(33,94.9)	3 3 6	3,100(36.8,0) 3,100(36.8,0) 6,100(60.7,0)	3 10 13	3,100(36.8,0) 8,80(48.1,96.5) 11,84.6(57.8,97.3)
Advice or treatment to lose weight	25-44 45-64 25-64	- 7 7	0 - 6,85.7(47,99.3) 6,85.7(47,99.3)	3 3 6	3,100(36.8,0) 3,100(36.8,0) 6,100(60.7,0)	3 10 13	3,100(36.8,0) 9,90(59.7,99.5) 12,92.3(67.5,99.6)
Advice or treatment to stop smoking	25-44 45-64 25-64	- 6 6	0 - 2,33.3(6,73.8) 2,33.3(6,73.8)	3 3 6	3,100(36.8,0) 2,66.7(13.2,98.3) 5,83.3(40.9,99.2)	3 9 12	3,100(36.8,0) 4,44.4(16.1,76) 7,58.3(30.2,82.8)
Advice to start or do more exercise	25-44 45-64 25-64	- 7 7	0 - 5,71.4(33,94.9) 5,71.4(55,94.9)	3 3 6	3,100(36.8,0) 3,100(36.8,0) 6,100(60.7,0)	3 10 13	3,100(36.8,0) 8,80(48.1,96.5) 11,84.6(57.8,97.3)
Ever seen a traditional healer for diabetes	25-44 45-64 25-64	- 7 7	0 - 1,14.3(0.7,53) 1,14.3(0.7,53)	3 3 6	3,100(36.8,0) 0,0(0,63.2) 3,50(14.7,85.3)	3 10 13	3,100(36.8,0) 1,10(0.5,40.4) 4,30.8(10.6,58.7)
Currently taking any herbal/ traditional medication	25-44 45-64 25-64	- 7 7	0 - 1,14.3(0.7,53) 2,28.6(5.1,67)	3 3 6	1,33.3(1.7,86.8) 1,33.3(1.7,86.8) 2,33.3(6,73.8)	3 10 13	1,33.3(1.7,86.8) 2,20(3.5,52) 3,23.1(6.2,50.9)

#### 4.2.2.10 Mental stress

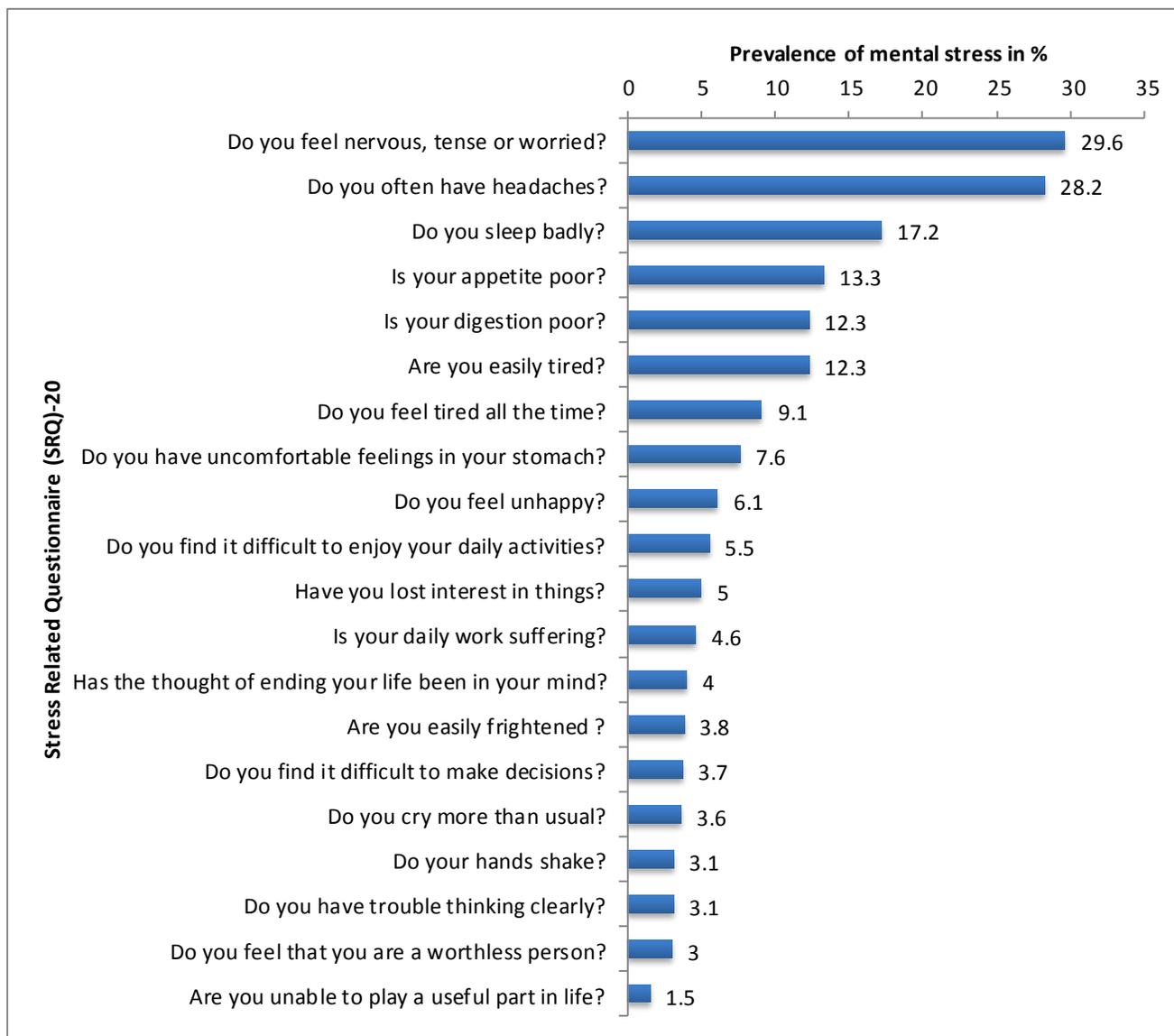
Mental stress was examined using self-reporting questionnaire (SRQ-20) comprising of 20 variables. Table 4.10 is showing the distribution of mental stress in the 2,339 study participants. Mild, moderate, moderately severe and very severe categories of mental stress were assessed by gender and age. Accordingly, the magnitude of mild, moderate, moderately severe and very severe mental stress was 2166 or 92.6% (95 %

CI: 91.5-93.6), 132 or 5.6% (95% CI: 4.6-6.6%), 38 or 1% (95% CI: 0.6- 1.4%) and 4 or 0.2% (95% CI: 0.1-0.4) respectively. This finding is higher than those of Sugathan *et al* (2008:558) and Ministry of Health, Zanzibar (2012:17) which could be attributed to the differences in socio-economic and behavioural determinants of health in the two populations. All the categories of mental stress are higher among the age group 25-44 years than 45-64 years participants. Women were more affected than men study participants.

**Table 4.10 Distribution of mental stress using SRQ-20 among the study participants in the 30 days preceding to the study in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,339)**

Characteristics	Age group	Men		Women		Both Sexes	
		No	Proportion (95%CI)	No	Proportion (95% CI)	No	Proportion (95% CI)
Mental stress score <5 (Mild)	25-44	732	84.2(81.7, 86.5)	1077	83.0(80.9,85.0)	1809	83.5(81.9, 85.0)
	45-64	137	15.8(13.5,18.3)	220	17.0(15.0,19.1)	357	16.5(15.0, 18.1)
	25-64	869	40.1(38.1,42.2)	1297	59.9(57.8, 61.9)	2166	92.6(91.5, 93.6)
Mental score 5-9 (Moderate)	25-44	26	76.5(60.2, 88.4)	67	68.4(58.7, 77)	93	70.5(62.3,77.8)
	45-64	8	23.5(11.6,39.8)	31	31.6(23.0, 41.3)	39	29.5(22.2,37.7)
	25-64	34	25.8(18.8, 33.7)	98	74.2(66.3,81.2)	132	5.6(4.8,6.6)
Mental Score 10-14 (Moderately severe)	25-44	5	71.4(33.0, 94.9)	17	54.8(37.3,71.5)	22	57.9(41.9, 72.7)
	45-64	2	28.6(5.1, 67)	14	45.2(28.5, 62.7)	16	42.1(27.3, 58.1)
	25-64	7	18.4(8.4,33.1)	31	81.6(66.9, 91.6)	38	1 (0.6, 1.4)
Mental score >=15 (Very severe)	25-44	1	100(5.0, 0.0))	3	100(36.8, 0.0)	4	100(47.3, 0.0)
	45-64	0	0	0	0	0	0
	25-64	1	25(1.3, 75.8)	3	75(24.2,98.8)	4	0.2(0.1,0.4)

Figure 4.10 has outlined the magnitude of mental stress. The three top mental stresses commonly observed in 2,339 study participants were feeling of nervousness, tense or worried; having headaches, and sleeping badly in 693 or 29.6%, 660 or 28.2% and 402 or 17.2% respectively. Unable to play a useful part in life was the least mental stress observed among the study participants, which accounted for 35 or 1.5%.



**Figure 4.10 Magnitude of mental stress using SRQ-20 among the study participants in the 30 days preceding to the study in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,339)**

#### **4.2.3 Biological risk factors**

##### **4.2.3.1 Findings of physical measurement**

The physical measurement was conducted to assess the Body Mass Index (BMI), blood pressure, waist circumference, heart rate, hip circumference and waist to hip ratio. The distribution of these is presented in the Table 4.11. The mean and SD of BMI was 21.5 kg/m<sup>2</sup> ±3.85kg/m<sup>2</sup>. This is higher than the mean BMI reported in Central Statistical Agency [Ethiopia] and ICF International (2012:180) (19kg/m<sup>2</sup> for men and 20kg/m<sup>2</sup> for

women). The difference could be due to the age differences in the two population groups and wider coverage of the Central Statistical Agency report. However, the mean BMI in this study was lower than that reported by Ministry of Health, Zanzibar (2012:16), which could be due to differences in life style such as physical exercise and type of diet consumed. The mean BMI in this study is consistent with that reported by Bangladesh Ministry of Health (2010:24). The mean BMI was slightly higher in the age group 45-64 than that of 25-44 years old, 22.3 versus 21.4 kg/m<sup>2</sup>. Gender wise, the mean BMI for women was slightly higher than in men, 21.7 versus 21.2 kg/m<sup>2</sup>. This is consistent with the study finding in Ethiopia by Fikru (2009:27).

The mean systolic blood pressure was 118.2(95% CI: 117.6 -118.8) mmHg. This is slightly lower than that reported by Bangladesh Ministry of Health (2010:24), which could be due to variations in life style among the two populations. The mean systolic blood pressure was higher in the age group 45-64 than 25-44 years e.g. 22.3(95% CI, 22.2-22.4)kg/m<sup>2</sup> versus 21.4(95% CI: 21.4-21.4) mm Hg. The mean systolic blood pressure was higher in men than women participants e.g. 121.8(95% CI: 120.9-122.7) versus 115.9(95% CI: 115.2-116.3) mmHg. This is consistent with finding in Ethiopiaby Fikru (2009:27).

The mean diastolic blood pressure was 77.6(95% CI: 77.5-77.7) mmHg among the study participants. This is slightly higher than that reported by Bangladesh Ministry of Health (2010:24). By age group the mean diastolic blood pressure in 45-64 years was higher than that of 25-44 years, i.e. 77(95% CI: 76.9-77.1) mmHg versus 80.8(95% CI: 80.7-80.9)mmHg. Diastolic blood pressure increased with advancing age. Gender wise, the mean in men was higher than that of women, i.e. 80(95% CI: 79.9-80.1) mmHg versus 76.8(95% CI: 76.7-76.9) mmHg. This is also consistent with the finding in Ethiopia reported by Fikru (2009:27).

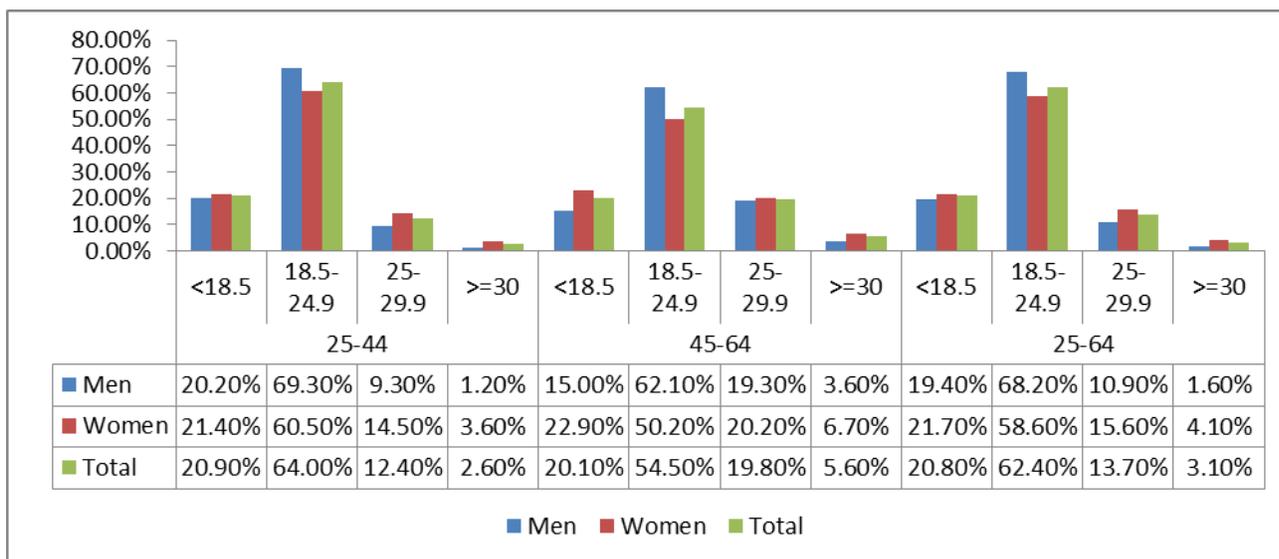
The mean heart rate among the study participants was 76(95% CI: 75.9-76) beats per minute. This is almost comparable with that reported by the Ministry of Health, Zanzibar (2012:16). This was higher in the age group 25-44 than 45-64 years. The heart rate was also higher in women than men.

The mean waist circumference among the study participants was 77.4cm (95 % CI: 77.3-77.5). This is lower than that reported by the Ministry of Health, Zanzibar (2011:16) due to difference in life style related conditions. It was higher in in the age group 45-64 than 25-44 years and in men than women. The mean waist to hip ratio was 0.84 in the study participants. It was higher in the age group 45-64 than 25-44 years, which is consistent with that reported by the Ministry of Health, Zanzibar (2012:16).

**Table 4.11 Distribution of mean BMI, blood pressure, heart rate, waist and hip circumferences among the study participants in the 30 days preceding to the study in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,339)**

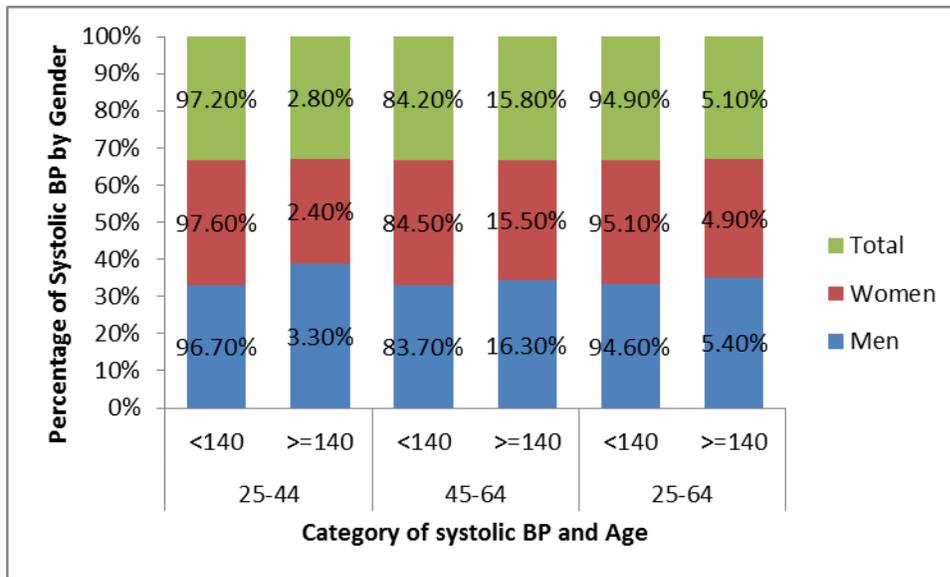
Characteristics	Age group	Men		Women		Both Sexes	
		No	Proportion (95%CI)	No	Proportion (95% CI)	No	Proportion (95% CI)
Body Mass Index (BMI) in kg/m <sup>2</sup> Mean ± SD	25-44	754	21.1(21,21.2)	1129	21.6(21.6,21.6)	1883	21.4(21.4,21.4)
	45-64	145	22.2(22.1,22.3)	254	22.3(22.2,22.4)	399	22.3(22.2,22.4)
	25-64	899	21.2(21.1,21.3)	1383	21.7(21.7,21.7)	2282	21.5(21.5,21.5)
		21.6 ±3.8					
Systolic BP Mean ± SD	25-44	761	120.8(119.8,121.8)	1154	115.3(114.5, 116.1)	1915	117.5(116.9,118.1)
	45-64	147	127(124.8, 129.2)	265	118.5(116.9, 120.1)	412	121.5 (120.2, 122.8)
	25-64	908	121.8(120.9, 122.7)	1419	115.9(115.2, 116.3)	2327	118.2(117.6, 118.8)
		117.9±13.6					
Diastolic BP Mean ± SD	25-44	761	78.6(78.5,78.7)	1154	75.9(75.8,76)	1914	77(76.9,77.1)
	45-64	147	80.9(80.7,81)	265	80.7(80.6,80.8)	412	80.8(80.7,80.9)
	25-64	908	80(79.9,80.1)	1419	76.8(76.7,76.9)	2326	77.6(77.5,77.7)
		77.4±10					
Heart rate Mean ± SD	25-44	758	74(73.9,74.1)	1149	77.7(77.6,77.8)	1908	76.2(76.1,76.3)
	45-64	146	72.6(72.4,72.8)	263	76.3(76.1,76.5)	409	75(74.9,75.1)
	25-64	904	73.8(73.7,73.9)	1412		2317	76(75.9,76)
		75.9±11.5			77.4(77.3,77.5)		
Waist circumference Mean ± SD	25-44	752	79.1(79.0-79.2)	1148	74.2(74.1,74.3)	1890	76.6(76.5,76.7)
	45-64	142	83.5(83.3,83.7)	259	80.4(80.3,80.5)	401	
	25-64		79.8(79.7,79.9)			2291	81.5(81.4,81.6)
		0.83±0.09	894		1397	75.9(75.8,76)	77.4(77.3,77.5)
Waist to Hip Ratio	25-44	742	0.85(0.8,0.9)	1117	0.81(0.8,0.8)	1849	0.83(0.8,0.8)
	45-64	138	0.92(0.9,0.9)	255		393	0.86(0.8,0.9)
	25-64	880			0.83(0,8,0.8)	2242	0.84(0.8,0.8)
			0.86(0.9,0.9)	1362	0.82(0.8,0.8)		

Figure 4.11 is showing the distribution of BMI by age and gender in 2,282 study participants. The prevalence of underweight, normal weight, overweight and obesity was 20.8%, 62.4%, 13.7% and 3.1% respectively. The prevalence of BMI 25kg/m<sup>2</sup> and above was 16.8%. This is lower than the findings of the studies India reported by Mehan *et al* (2011:169), Prabhakaran *et al* (2005:62) and Misra (2014:374) and the finding in Ethiopia by Alemseged *et al* (2012:24). This could be due to the difference in the life style related behaviours including physical exercise and type of dietary intake among these study populations. As indicated, more than 1 in 4 study participants was underweight or had chronic energy deficiency; however, this is lower than the finding in Ethiopia by Fikru (2009:33). This could be due to variation in food security and nutrition-literacy among the two populations. Women were more overweight and obese compared to men study participants, e.g. 19.7% versus 12.5%. This is in agreement with the findings in India as reported by Sugathan (2008:558). The prevalence of overweight and obesity in 45-64 years old was higher than that of 25-44 years old, 25.4% versus 15%. Obesity and overweight tends to increase with advancing age in men and women.



**Figure 4.11 Distribution of BMI by age and gender among the study participants in Kiltе Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013- January, 2014 (N=2,282)**

Of the 2327 study participants, systolic hypertension or systolic blood pressure of  $\geq 140$ mmHg was found in 5.1% of the study participants. This is lower than that of Ministry of Health, Zanzibar (2012:16), which could be due to variation in behavioural risk factors between the two populations. The systolic hypertension was found in 5.4% of men and 4.9% of women. Systolic hypertension in the age group 45-64 and 25-44 years was 15.8% and 2.8% respectively (Figure 4.12). As expected, there was an increase in systolic blood pressure with increasing age in this study.

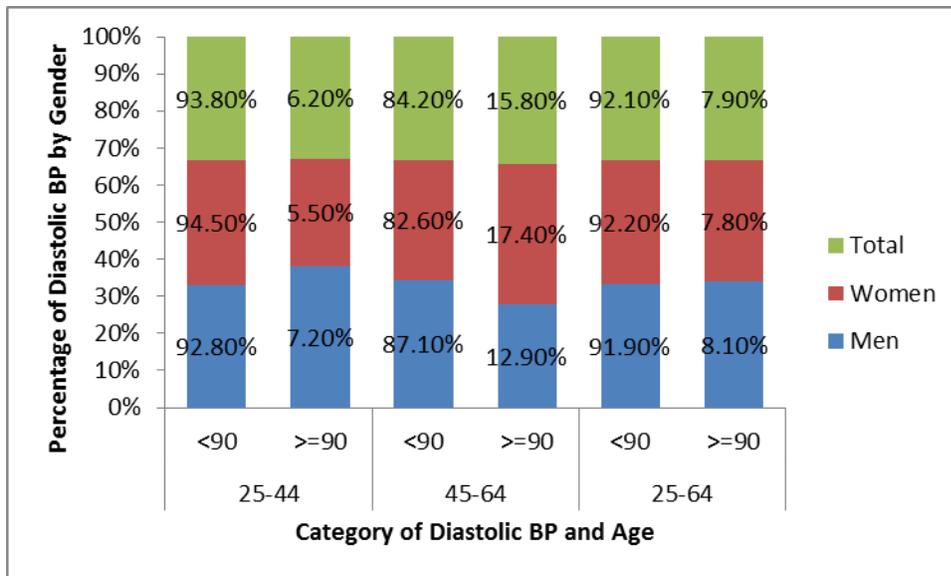


**Figure 4.12 Distribution of systolic blood pressure by age and gender among the study participants in Kilte Awlaleo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,327)**

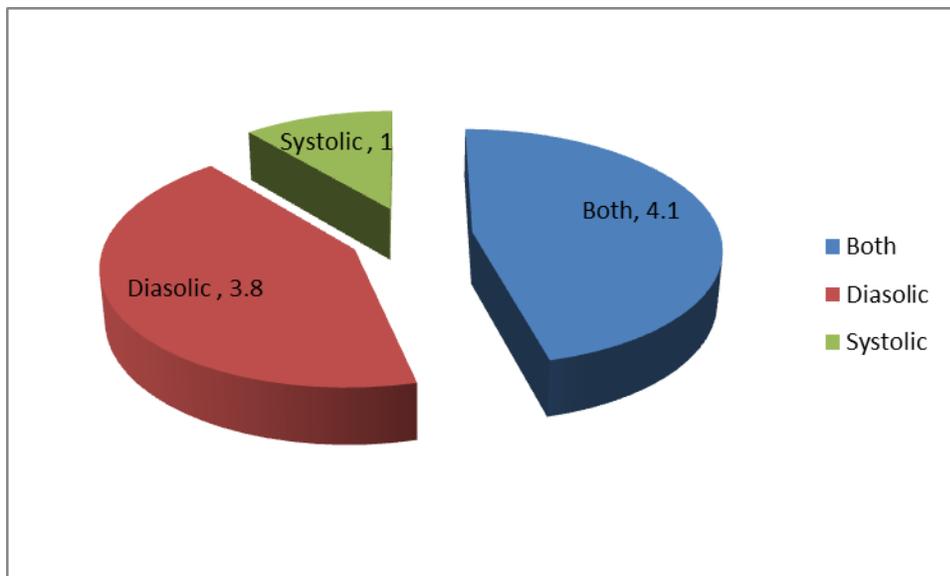
The distribution of diastolic blood pressure in 2,327 study participants is indicated in Figure 4.13. The prevalence of diastolic hypertension or diastolic blood pressure of  $\geq 90$ mmHg was 7.9%. It was slightly higher in men than women, 8.10% versus 7.8%. Age wise, the diastolic hypertension in the age group 25-44 years and 45-64 years was 6.2% and 15.8%, respectively. This is almost consistent with the study conducted in Eritrea by Mufunda *et al* (2006:62).

Ninety five (4.1%) of the participants had both systolic and diastolic hypertension. Twenty three (1%) had only systolic hypertension. The composition of the participants

with only diastolic hypertension was 89(3.8%). After combining the diastolic and systolic hypertension, the overall prevalence of hypertension by physical measurement was 207(8.9%) (Figure 4.14). This is lower than that reported in Eritrea by Mufunda *et al* (2006:62), Ministry of Health, Zanzibar (2012:16) and Bangladesh Ministry of Health (2010:24). The explanation for this could be the differences in behavioural risk factors for NCDs between these populations.

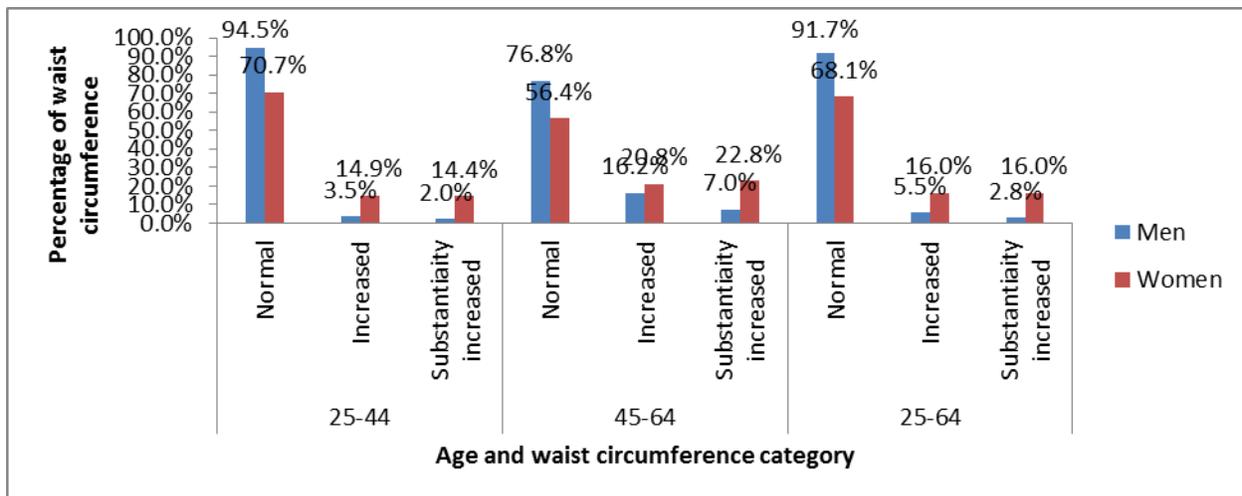


**Figure 4.13 Distribution of diastolic blood pressure by age and gender among the study participants in Kilte Awlaleo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,327)**



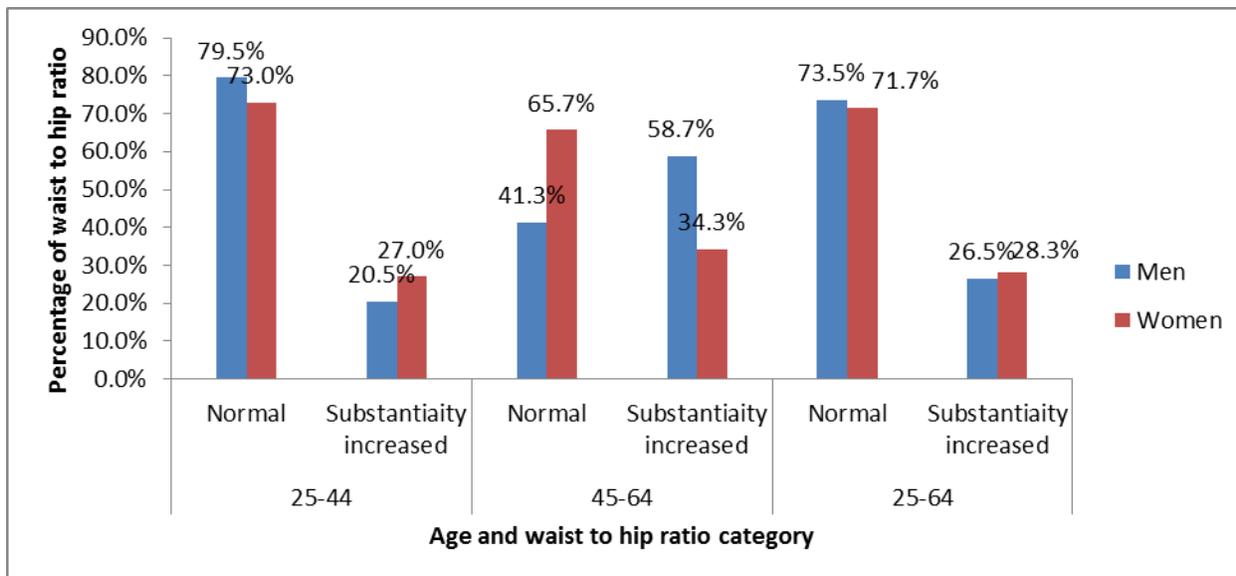
**Figure 4.14 Magnitude of systolic and diastolic hypertension among the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,327)**

Figure 4.15 depicts the waist circumference in 2,242 study participants by gender and age group. The classification of waist circumference in men (<94cm=Normal, 94-101.9cm=Increased and  $\geq 102$ cm=substantially increased) and in women (<80cm=Normal, 80-87.9cm=Increased and  $\geq 88$ cm=substantially increased) is different. The prevalence of increased and substantially increased waist circumference in men was 5.5% and 2.2% respectively. In women, the increased and substantially increased waist circumference was 16.0% and 16.0% respectively. The waist circumference in women was generally higher than that of men, which is consistent with that of the study in Iran by Alikhani *et al* (2009:362). The magnitude of increased and substantially increased waist circumference both in men and women was 22.2%. These findings are higher than that of the study in India by Misra (2014:374) and lower than that of the study in Ethiopia by Alemseged *et al* (2012:24), which could be attributed to the differences in life style including eating practices and physical inactivity.



**Figure 4.15 Distribution of waist circumference by age and gender among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,242)**

As it has been indicated in Figure 4.16 in 2,242 patients, the prevalence of substantially increased waist to hip ratio (WHR) in men and women was 26.5% and 28.3% respectively. The prevalence of substantially increased waist to hip ratio was higher in the age group 45-64 years than 25-44 years. The overall prevalence of increased and substantially increased WHR was 28.3%. This is higher than that of a study in Saudi Arabia by Amr *et al* (2007:1833) which could be attributed to age differences between the two populations; however, the prevalence of increased or substantially increased WHR in this study was lower than that reported by Ministry of Health, Zanzibar (2012:16), which could be explained by differences in lifestyle related behaviours including dietary intake and level of engagement in different physical exercise between the two populations.



**Figure 4.16 Distribution of waist to hip ratio by age and gender among the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,242)**

#### **4.2.3.2 Findings of biochemical measurements**

The biochemical measurement was carried out to assess level of the fasting blood sugar, cholesterol and triglycerides in 481 study participants. The mean values of the three items have been described after analyzing by age and gender as indicated in Table 4.12. The mean fasting blood sugar was 5mmol/L among the study participants with the median fasting blood sugar 4.8 mmol/L. This is slightly higher than that of Ministry of Health, Zanzibar (2012:16) which could be attributed to the differences in life style between the two populations. By age group, it was higher in the age group 45-64 years. There was no difference in the blood sugar level by gender.

The mean fasting total cholesterol level was 4.2mmol/L with the median 4.6mmol/L. This is lower than that of Ministry of Health, Zanzibar (2012:16) which could be attributed to the differences in life style between the two populations. The mean cholesterol level was higher in the age group 45-64 years and among women participants.

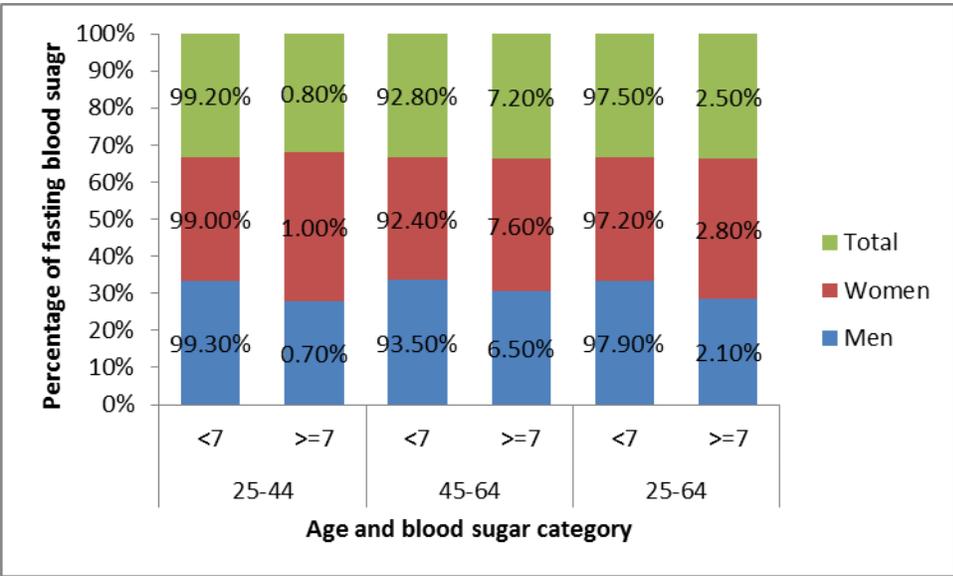
The mean fasting triglyceride was 2.1mmol/L and the median 1.6mmol/L. The mean is higher than that of Ministry of Health, Zanzibar (2012:16). Similar to the cholesterol

levels, the triglyceride levels were higher in the age group 45-64 year and among women.

**Table 4.12 Distribution of mean fasting blood sugar, cholesterol and triglycerides among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=481)**

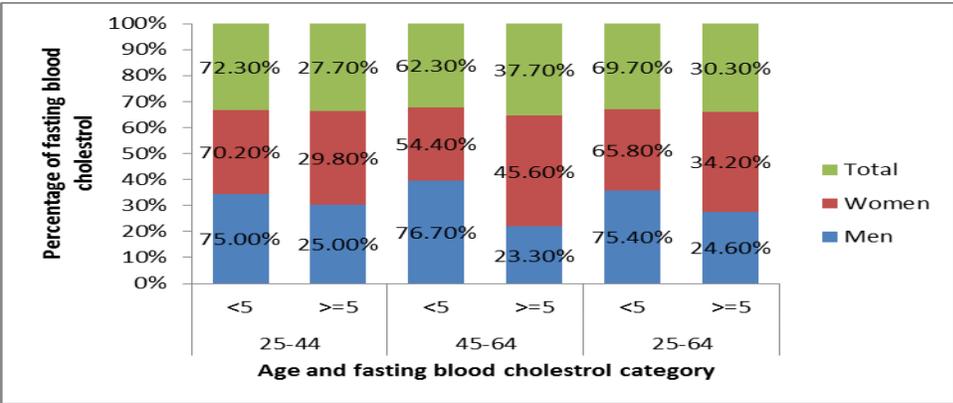
Characteristics	Age group	Men		Women		Both Sexes	
		No	Proportion (95%CI)	mean	Proportion (95% CI)	mean	Proportion (95% CI)
Fasting blood sugar level	25-44	148	4.9(4.8,5)	203	4.8(4.7,4.9)	351	4.8(4.7,4.9)
	45-64	46		79	5.6(5.5,5.7)	125	5.6(5.5,5.7)
	25-64	194	5.6(5.5,5.7)	282		476	5.0(4.9,5.1)
Median(Range)	4.8 (17.3)		5.0(4.9,5.1)				
Fasting total cholesterol level	25-44	153	4.0(3.9,4.1)	206	4.1(4,4.2)	359	4.1(4,4.2)
	45-64	43	4.2(4,4.4)	79	4.8(4.6,5)	122	4.6(4.5,4.7)
	25-64	196		285	4.3(4.2,4.4)	481	4.2(4.1,4.3)
Median(Range)	4.6(9.3)		4.1(4,4.2)				
Fasting triglyceride level	25-44	146	1.9(1.7,2.1)	202	2.2(2.1,2.3)	348	2.1(2,2.2)
	45-64	45	1.9(1.6,2.2)	81	2.3(2.1,2.5)	126	2.2(2,2.4)
	25-64	191		283	2.2(2.1,2.3)	474	2.1(2,2.2)
Median(Range)	1.6(7.7)		1.9(1.8,2)				

Figure 4.17 shows the fasting blood sugar level. Hyperglycemia is when blood sugar level is  $\geq 7$ mmol/Liter. The prevalence of hyperglycemia or diabetes by biochemical measurement was 2.5%. This is lower than the study conducted in Iran by Alikhani *et al* (2009:362). This could be due to variations in lifestyle among these populations. However, it is consistent with the outcomes of studies by Mufunda *et al* (2006:62), Ministry of Health, Zanzibar (2012:16) and Gill (2009:12). The magnitude of diabetes was higher in women than men and in the age group 45-64 years than 25-44 years.



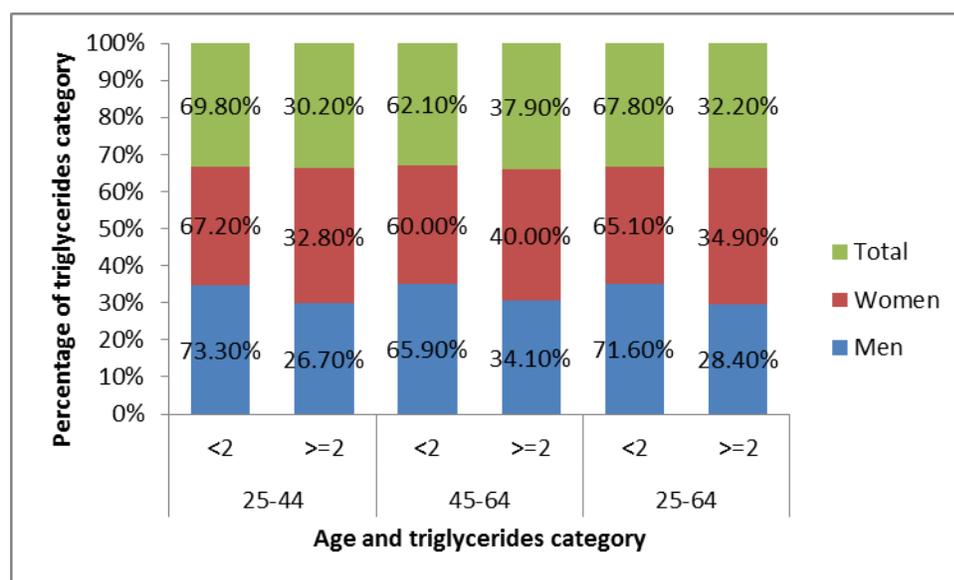
**Figure 4.17 Distribution of blood sugar by age and gender among the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=478)**

Figure 4.18 depicts the prevalence of fasting cholesterol in 478 study participants. Elevated cholesterol or hypercholesterolemia is when cholesterol level is  $\geq 5$  mmol/Liter. The prevalence of hypercholesterolemia was 30.3%. This is higher than that reported by Ministry of Health, Zanzibar (2012:16) and study findings in Ethiopia by Alemseged *et al* (2012:24). This could be due to variations in the exposure to behavioural risk factors for NCDs between the two populations. The hypercholesterolemia was higher in women than men and in the age group 45-64 years than 25-44 years.



**Figure 4.18 Distribution of blood cholesterol by age and gender among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=478)**

The level of fasting triglycerides was depicted in the Figure 4.19 in 478 study participants. Hypertriglyceridaemia is triglyceride level of  $\geq 2$ mmol per liter. The prevalence of hypertriglyceridemia was 32.2%. Similar to the magnitude of hypercholesterolemia, this is also higher than that reported by Ministry of Health, Zanzibar (2012:16) and the finding in Ethiopia by Alemseged *et al* (2012:24). This could be due to variations in the exposure to behavioural risk factors for NCDs between the two populations. The hypertriglyceridaemia was higher in women than men and in the age group 45-64 than 25-44 years.



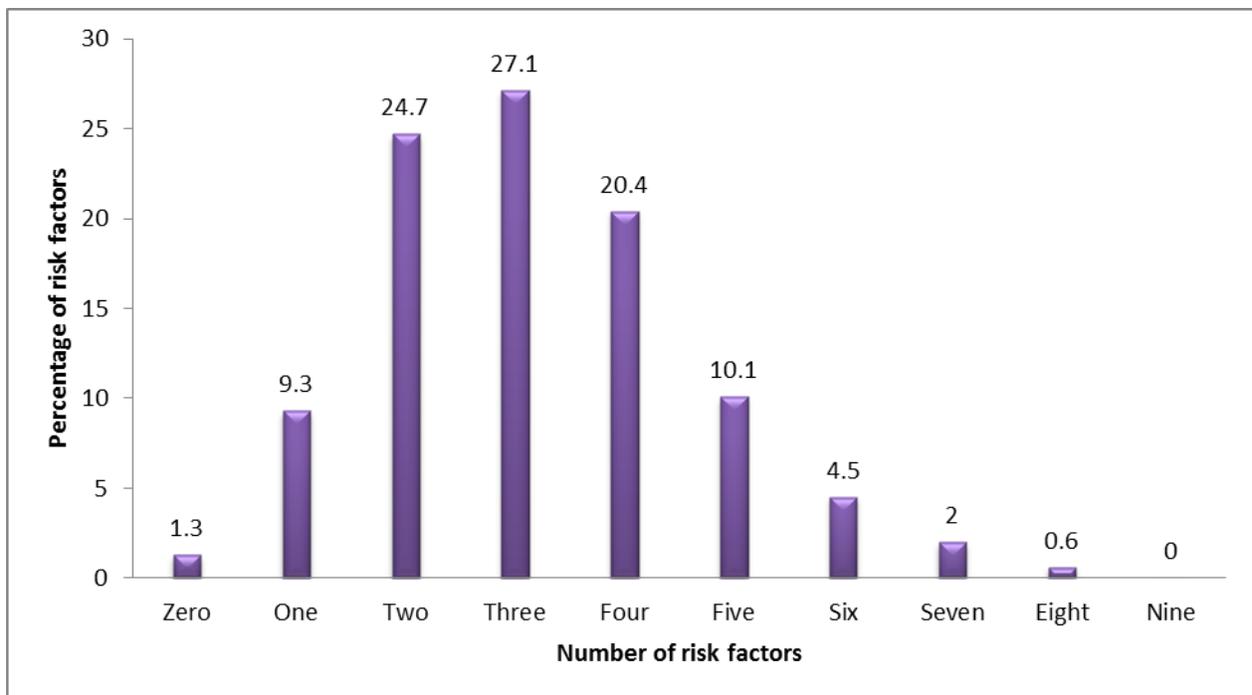
**Figure 4.19 Distribution of blood cholesterol by age and gender among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=478)**

#### 4.2.4 Summary of findings on distribution of risk factors of NCDs

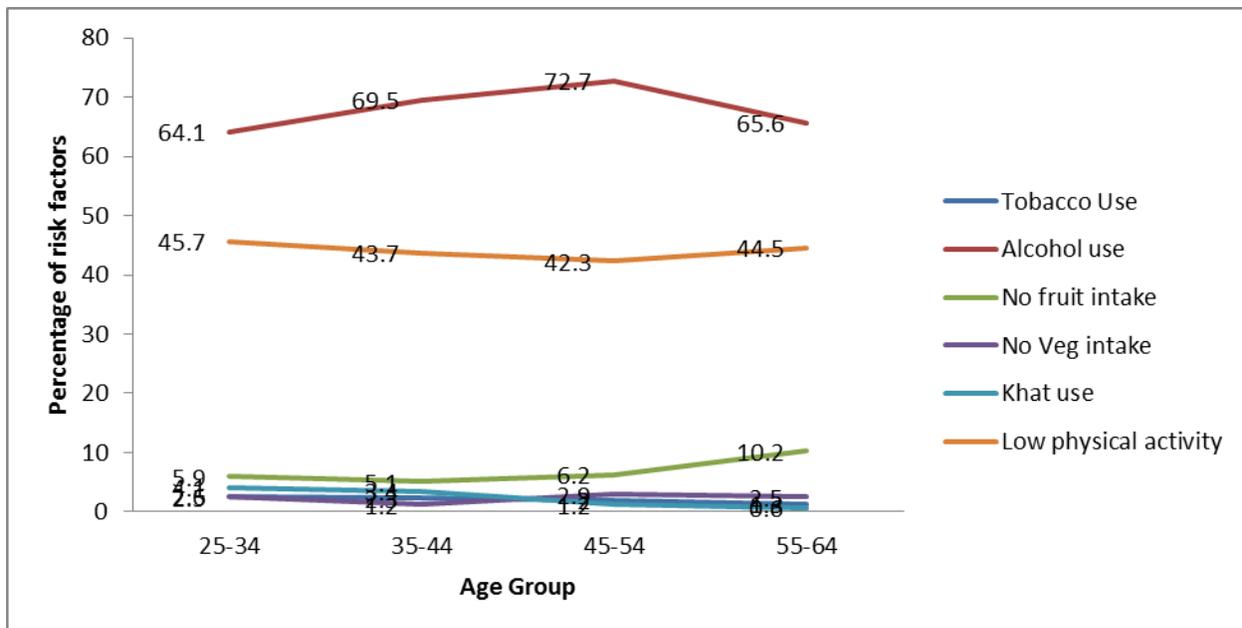
Surprisingly, only 31(1.3%) of all the study participants were without any of the risk factors. The remaining 98.7% had at least one of the risk factors assessed. More than 633(27%) of the study participants had three risk factors. Nearly 1 in 4 study participants 579(24.7%) had two risk factors and more than 1 in 5, 479(20.4%) had four risk factors (Figure 4.20). The prevalence of one or more risk factors is higher in this study than those of Alemseged *et al* (2012:24), Karen *et al* (2008:918) and Tawa *et al*

(2011:154) and lower than that of Li *et al* (2013:653). This could be due to the differences in sociocultural and life style behaviours including the behavioural risk factors for NCDs between the two populations.

Figure 4.21 depicts the trend of risk factors by age in 2,347 study participants. Alcohol use had an increasing trend with increasing age. Physical inactivity or low physical activity had a declining trend up until the age of 54. Fruit intake had somewhat increasing trend starting from 35 years onwards. Tobacco and Khat use had a declining trend with increasing age. This showed that the magnitude of tobacco and Khat use among the younger age was higher than the older age participants.

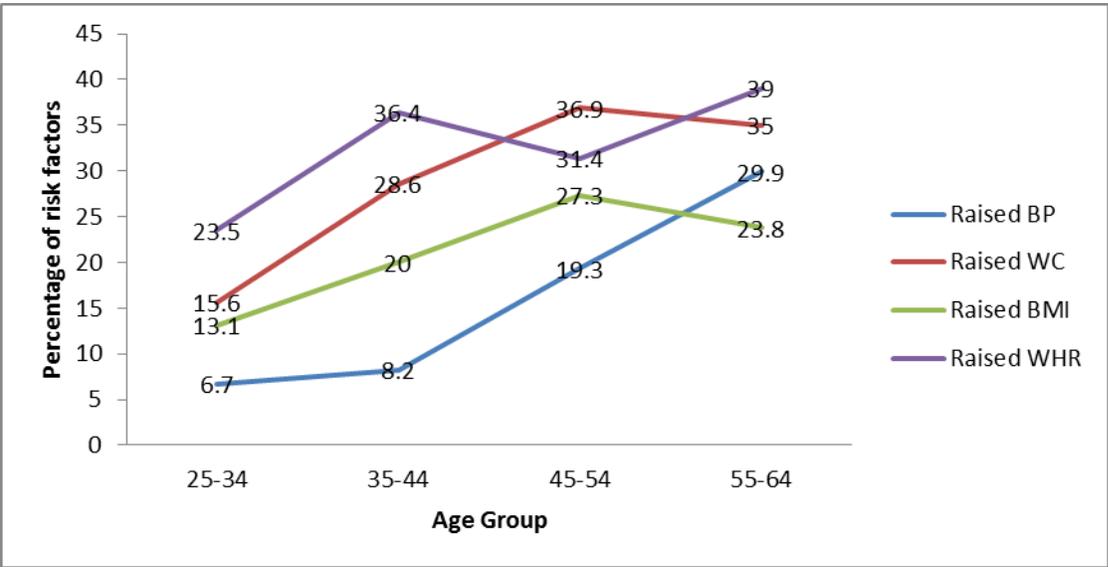


**Figure 4.20 Distribution of all types of risk factors among the study participants in Kilde Awlalo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013- January, 2014 (N=2,347)**



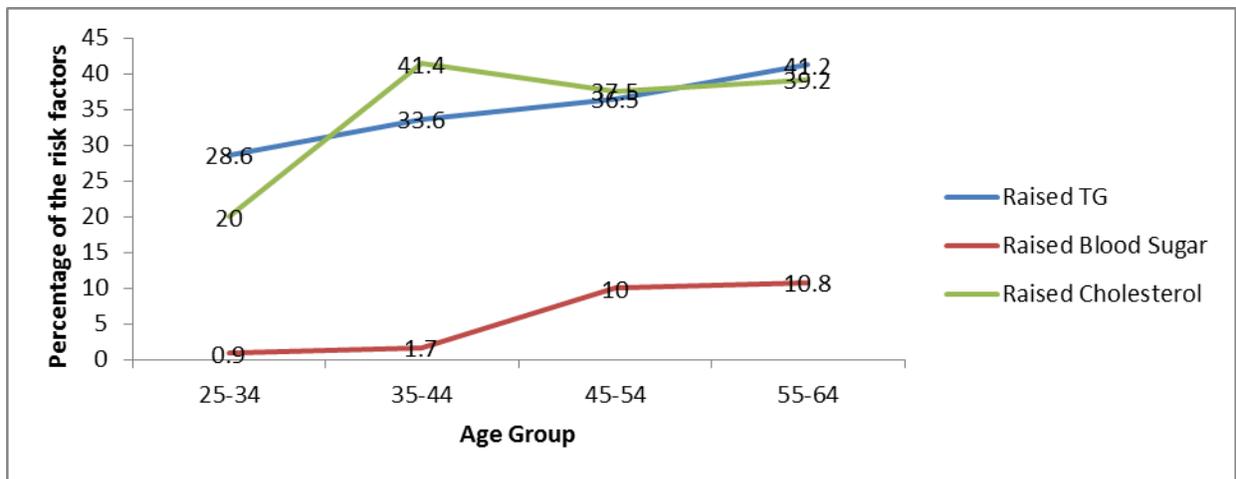
**Figure 4.21 Trends of behavioural risk factors by age among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

The trends of the physical measurements, including raised BP, waist circumference, waist to hip ratio and BMI have been evaluated. Although not linear, all these risk factors had increasing trends with advancing age (Figure 4.22). This is consistent with that of Alemseged *et al* (2012:24). The overall prevalence of hypertension (by history and physical measurement) was 9.9%, which is by far lower than that of Mufunda *et al* (2006:62) and Fikru (2009:27). This could be due the differences in the exposure to the behavioural and biological risk factors between the study populations.



**Figure 4.22 Trends of physical risk factors by age among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

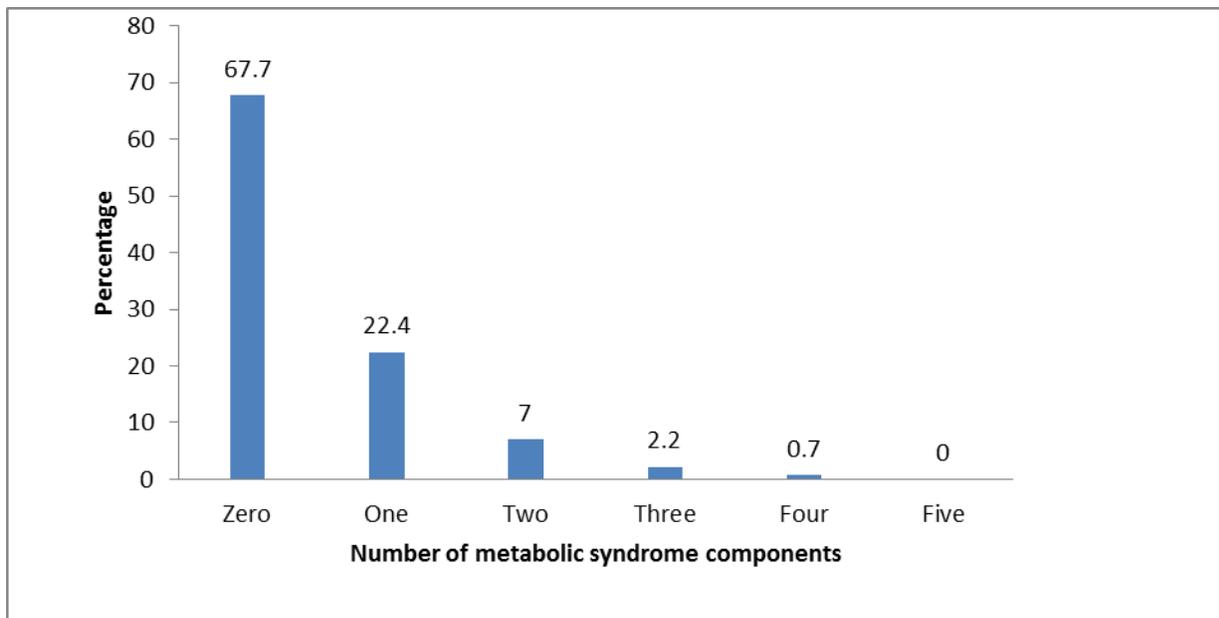
The trends of biochemical risk factors including elevated fasting blood sugar, fasting cholesterol and fasting triglycerides were assessed. With advancing age, elevated blood sugar, cholesterol and triglycerides showed an increasing trend (Figure 4.23). This is almost consistent with that of Alemseged *et al* (2012:24) and Ministry of Health, Zanzibar (2012:16). The overall prevalence of diabetes (by history and biochemical measurement) was 3.5%. This is consistent with that of Ministry of Health, Zanzibar (2012:16).



**Figure 4.23 Trends of biochemical risk factors by age among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

#### **4.2.4.1 Distribution of metabolic risk factors among the study participants**

Of the total 2,347 study participants, 1,589(67.7%) did not have any components of metabolic risk factors. More than 1 in 5 study participants 526(22.4%) had at least one component of the metabolic syndrome. The proportion of the study participants with at least three components of the metabolic risk factors (metabolic syndrome is central obesity plus two of these i.e. hypertension, hyperglycemia, hypercholesterolemia and hypertriglyceridemia) was 2.2% (Figure 4.24). This is essentially consistent with the findings of Alemseged *et al* (2012:24). However, this is lower than the findings of Prabhakaran *et al* (2005:62) due to differences in the exposure to behavioural risk factors for NCDs between the two populations.



**Figure 4.24 Magnitude of components of metabolic risk factors among the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

#### **4.2.5 Predictors of behavioural risk factors of NCDs**

##### **4.2.5.1 Predictors of Tobacco smoking**

The predictors of tobacco smoking were assessed using binary logistic regression analysis. Variables, which were found to have statistical significance through bivariate analysis and those having biological relationships with tobacco smoking, were entered into the final model of the binary regression. As depicted in Table 4.13, occupation, being self-employed had 76% reduced risk with AOR, 0.24(95%CI: 0.07-0.84) of tobacco smoking compared to unemployed participants. This is similar to that of Basu *et al* (2013:20). Men were 11.9 times more likely to smoke tobacco compared to women with AOR 11.9 (95% CI: 3.2-44.5). This is also consistent with the studies by Basu *et al* (2013:20) and Luc *et al* (2009:3). Never married participants had 90% reduced risk of tobacco smoking with AOR 0.09 (95%CI: 0.01-0.58) compared to widowed. Being married or cohabiting had 94% reduced risk of tobacco smoking with AOR 0.06(95%CI: 0.01-0.37) compared to the widowed. This could be due to stressful life situations among the widowed that might have predisposed them to smoke tobacco. Study participants who chewed Khat were 25.7 times more likely to smoke cigarettes than the non-chewers with AOR 25.7(95%CI: 12.5-52.9). The other variables, including participants' address, educational status, alcohol consumption, knowledge of heart

diseases, and feeling of nervousness and the presence of other mental stresses were not found to have statistically significant association with tobacco smoking.

**Table 4.13 Predictors of Tobacco smoking among the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

S. No	Characteristics	Tobacco smoking		Odds Ratio with 95% CI	
		Yes	No	Crude	Adjusted
1	Address (N=2,268) Kilde Awlaelo HDSS Mekelle city	3(0.4%) 51(3.2%)	726(99.6%) 1567(96.8%)	0.13(0.04-0.41) 1	0.21(.04-1.22) 1
2	Occupation (N=2,316) Gov't employee Non-gov't employee Self-employed Student Retired farmer Unemployed	8(2.4%) 9(6.5%) 22(2.6%) 7(6.9%) 1(3.7%) 1(0.3%) 5(5.6%)	328(97.6%) 130(93.5%) 817(97.4%) 94(93.1%) 26(96.3) 306(99.7%) 84(94.4%)	.41(.13-1.29) 1.16(0.38-3.59) 0.45(0.17-1.23) 1.25(0.38-4.1) .65(.07-5.78) .06(.01-0.48) 1	0.27(.06-1.12) 0.41(0.1-1.62) .24(0.07-0.84) .47(0.17-2.07) 1.1(0.1-12.35) .41(.030-5.59) 1
3	Educational status (N=2,241) Less than first cycle First and second cycle High school Preparatory school College and University	4(0.6%) 13(1.9%) 11(3.0%) 7(5.4%) 18(4.0%)	706(99.4%) 673(98.1%) 352(97.0%) 123(94.6%) 434(96.0%)	.14(0.05-0.41) .47(0.23-0.96) .75(.35-1.62) 1.37(0.56-3.36) 1	0.49(0.12-1.97) 0.93(0.34-2.5) 1.15(0.42-3.1) 1.12(0.32-3.91) 1
4	Gender (N=2,347) Men Women	48(5.3%) 6(0.4%)	865(94.7%) 1428(99.6%)	13.21(5.63-31) 1	11.9(3.2-44.5) 1
5	Marital status (N=2,311) Never married Currently married/cohabiting Separated/Divorced Widowed	32(5.1%) 14(1.2%) 6(1.6%) 2(2.0%)	600(94.9%) 1179(98.8%) 378(98.4%) 100(98.0%)	2.7(0.63-11.30) 0.59(.13-2.65) 0.79(.16-3.99) 1	.09(.01-0.58) .06(.01-0.37) .29(.05-1.85) 1
6	Alcohol consumption (N=2,347) Yes No	45(2.9%) 9(1.1%)	1507(97.1%) 786(98.9%)	2.6(1.3-5.4) 1	0.53(0.23-1.20) 1
7	Knowledge about heart disease (N=2,303) Not knowledgeable Knowledgeable	45(2.4%) 8(2.0%)	1867(97.6%) 383(98%)	1.2(.54-2.5) 1	1.67(0.66-4.23) 1
8	Chew Khat (N=2,335) Yes No	29(37.7%) 25(1.1%)	48(62.3%) 2233(98.9%)	2.47(1.15-5.32) 1	25.7(12.47-52.9) 1
9	Do you feel, nervous?				

	(N=2,339) Yes No	23(3.3%) 30(1.8%)	669(96.7%) 1617(98.2%)	1.85(1.1-3.2) 1	1.33(.68-2.61) 1
10	Mental stress (N=2,347) Yes No	37(2.7%) 16(1.7%)	1337(97.3%) 950(98.3%)	1.63(0.91-2.91) 1	0.97(0.40-2.35) 1

#### 4.2.5.2 Predictors of alcohol consumption

The following variables were found to be independent predictors of alcohol consumption as shown in Table 4.14. Participants from Kiltte Awlaleo HDSS were 1.5 times more likely to consume alcohol than those from Mekelle city with AOR 1.5(95%CI: 1.15-1.96). Government employees were 3 times more likely to consume alcohol than the unemployed, AOR, 3.0(95%CI: 1.77-5.14). Non-government employees were 2.05 times more likely to consume alcohol than unemployed with AOR 2.05(95%CI: 1.13-3.71). Self-employed participants were 2 times more likely to consume alcohol than unemployed with AOR 2.0(95%CI: 1.22-3.14). Similarly being housewife, retired or farmer by occupation were found to increase the risk of alcohol consumption compared to unemployed, AOR 1.84(95%CI: 1.12-3.02), 4.8(95%CI: 1.42-15.82) and 2.16(95%CI: 1.23-3.82) respectively. By educational status, being less than the first cycle (grades 1-4) was 1.65 times more likely to consume alcohol than those who completed college or university education, AOR 1.65(95%CI: 1.14-2.39). Those who completed first and second cycle (grades 5-8) education were 1.67 times more likely to consume alcohol than those who completed college or university education, AOR 1.67(95%CI: 1.20-2.32). Generally less educated participants were more likely to consume alcohol than those who were educated. Men were 1.61 times more likely to consume alcohol than women, AOR 1.61(95%CI: 1.28-2.02) which is consistent with the findings of Luc *et al* (2009:3), Kinra *et al* (2010:4) and Supanee *et al* (2011:1754). Being Muslim had 94% reduced risk of consuming alcohol compared to other religions like protestant and catholic, AOR, 0.06(95% CI: 0.02-0.16). Similar findings have been evidenced in the report of Central Statistical Agency [Ethiopia] and ICF International (2012:51). Study participants who always felt stressed were 2.25 times more likely to consume alcohol compared to those who never felt stressed, OR 2.25(95%CI: 1.04-4.85). Those who felt stressed sometimes were also 1.41 times more likely to consume alcohol than those who never feel stressed, AOR 1.41(95%CI: 1.13-1.77). This indicates that stressful

situations increase the tendency to consume alcohol. Not surprisingly, participants who reported that alcohol is harmful to health were 1.31 times more likely to drink alcohol than those who reported it is very harmful AOR 1.31(95%CI: 1.06-1.62). Khat chewers were 5.36 times more likely to consume alcohol than the non-chewers, AOR 5.36(95%CI: 2.38-12.1). Study participants who felt nervous were 1.33 times more likely to consume alcohol than those who did not experience nervousness with AOR 1.33(95%CI: 1.04-1.71). The remaining variables indicated in the Table were not found to be statistically significant.

**Table 4.14 Predictors of Alcohol consumption among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013- January, 2014**

S. No	Characteristics	Alcohol consumption		Odds Ratio with 95% CI	
		Yes	No	Crude	Adjusted
1	Age group (N=2,347)				
	25-44	1264(65.4%)	670(34.6%)	0.82(.65-1.03)	1.04(0.79-1.38)
	45-64	288(69.7%)	125(30.3%)	1	1
2	Address (N=2,347)				
	Kilte Awlaelo HDSS	545(74.8%)	184(25.2%)	1.8(1.5-2.2)	1.5(1.15-1.96)
	Mekelle city	1007(62.2%)	611(37.8%)	1	1
3	Occupation (N=2,316)				
	Gov't employee	236(70.2%)	100(29.8%)	2.5(1.6-4.1)	3.0(1.77-5.14)
	Non-gov't employee	93(66.9%)	46(33.1%)	2.16(1.25-3.73)	2.05(1.13-3.71)
	Self-employed	551(65.7%)	288(34.3%)	2.05(1.32-3.18)	2.0(1.22-3.14)
	Student	59(58.4%)	42(41.6%)	1.50(0.85-2.67)	1.4(0.74-2.60)
	House-wife	287(60.0%)	191(40.0%)	1.61(1.02-2.53)	1.84(1.12-3.02)
	Retired	21(77.8%)	6(22.2%)	3.74(1.38-10.16)	4.8(1.42-15.82)
	Farmer	241(78.5%)	66(21.5%)	3.91(2.38-6.42)	2.16(1.23-3.82)
	Unemployed	43(48.3%)	46(51.7%)	1	1
4	Educational status (N=2,341)				
	Less than first cycle	492(69.3%)	218(30.7%)	1.31(1.02-1.68)	1.65(1.14-2.39)
	First and second cycle	468(68.2%)	218(31.8%)	1.25(.97-1.60)	1.67(1.20-2.32)
	High school	226(62.3%)	137(37.7%)	0.96(0.72-1.27)	1.32(0.94-1.87)
	Preparatory school	77(59.2%)	53(40.8%)	.84(0.57-1.26)	.96(.61-1.50)
	College and University	286(63.3%)	166(36.7%)	1	1
5	Gender (N=2,347)				
	Men	640(70.1%)	273(29.9%)	1.34(1.12-1.60)	1.61(1.28-2.02)
	Women	912(63.6%)	522(36.4%)	1	1

6	Religion Orthodox Muslim Others	1507(69.2%) 15(13.0%) 23(54.8%)	670(30.8%) 100(87.0%) 19(45.2%)	1.858(1.01-3.44) 0.12(0.06-0.28) 1	1.77(0.89-3.48) 0.06(.02-0.16) 1
7	Do you sleep badly? (N=2,340) Yes No	287(71.4%) 1259(65.0%)	115(28.6%) 679(35.0%)	1.35(1.1-1.70) 1	1.04(.79-1.36) 1
8	Knowledge on NCDs (N=2,303) Not knowledgeable Knowledgeable	1296(65.2%) 239(72.2%)	692(34.8%) 92(27.8%)	0.72(0.56-0.93) 1	0.89(0.67-1.20)
9	How often do you feel stressed? (N=2,318)  Always often Sometimes/infrequently Never	44(81.5%) 51(59.3%) 732(71.1%) 704(61.3%)	10(18.5%) 35(40.7%) 298(28.9%) 444(38.7%)	2.78(1.38-5.57) 0.92(0.59-1.44) 1.55(1.30-1.85) 1	2.25(1.04-4.85) 0.83(.51-1.37) 1.41(1.13-1.77) 1
10	Drinking alcohol every day (N=2,279) Not Harmful Moderately harmful Harmful Very harmful	29(69.0%) 142(68.9%) 624(70.0%) 706(61.9%)	13(31.0%) 64(31.1%) 267(30.0%) 434(38.1%)	1.37(0.71-2.67) 1.36(0.99-1.88) 1.44(1.19-1.73) 1	1.16(.56-2.41) 1.06(0.75-1.51) 1.31(1.06-1.62) 1
11	Chew Khat (N=2,335) Yes No	61(79.2%) 1481(65.6%)	16(20.8%) 777(34.4%)	2.0(1.15-3.49) 1	5.36(2.38-12.1) 1
12	Do you feel, nervous? (N=2,339) Yes No	503(72.7%) 1043(63.3%)	189(27.3%) 604(36.7%)	1.54(1.27-1.87) 1	1.33(1.04-1.71) 1

#### 4.2.5.3 Predictors of fruit and beef intake

Table 4.15 demonstrates the predictors of fruit intake. Study participants whose monthly income was <500 Ethiopian Birr were 8.32 times more likely not to take fruits compared those whose income was  $\geq$ 2000 Ethiopian Birr, AOR 8.32(95%CI: 1.75-39.6). The participants whose income ranged from 500-999 Ethiopian Birr were 7.86 times more likely not to eat fruit than those whose income was  $\geq$ 2000 Ethiopian Birr, AOR, 7.86(95%CI: 1.5-41.95). Not eating fruit was also 8.18 times more likely among those whose income was 1000-1999 Ethiopian Birr than those whose income was  $\geq$ 2000 Ethiopian Birr, AOR 8.18(95%CI: 1.77-37.8). Generally those with small monthly income

were more likely not to eat fruit. Study participants who were moderately concerned about developing cardiovascular diseases had 81% reduced risk of not using fruit compared to those who were very concerned about developing cardiovascular diseases with AOR 0.19(95%CI: 0.04-0.87). The participants who reported improving diet can reduce chance of developing diabetes were more likely to eat fruit or had 27% reduced risk of not using fruits compared to those who did not report, AOR 0.73(95%CI: 0.52-0.92).

Factors associated with beef or raw meat consumption was indicated in Table 4.16. Men were 2.32 times more likely to consume beef or raw meat compared to women with AOR 2.32(95%CI: 1.64-3.28). Participants who reported that low fruit and vegetables intake is moderately harmful and harmful had protective effect to beef consumption compared to those who reported it is very harmful with AOR 0.45(95%CI: 0.24-0.84) and 0.55(95%CI: 0.36-0.84) respectively.

**Table 4.15 Predictors of fruit intake among the study participants in Kilte Awlaleo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Fruit intake		Odds Ratio with 95% CI	
		No	Yes	Crude	Adjusted
1	Age group (N=1661)				
	25-44	81(5.7%)	1352(94.3%)	0.72(0.44-1.17)	0.67(0.11-4.08)
	45-64	18(7.9%)	210(92.1%)	1	1
2	Address (N=1,661)	21(4.8%)	415(95.2%)	.76(0.47-1.21)	0.66(0.09-4.95)
	Kilte Awlaleo HDSS Mekelle city	78(6.4%)	1147(93.6%)	1	1
3	Monthly income in Eth. Birr (N=669)				
	<500 Birr	13(7.4%)	163(92.6%)	5.53(1.55-19.73)	8.32(1.75-39.6)
	500-999 Eth Birr	8(8.6%)	85(91.4%)	6.53(1.69-25.2)	7.86(1.5-41.95)
	1000-1999 Eth Birr	14(7.4%)	175(92.6%)	5.55(1.57-19.61)	8.18(1.77-37.8)
	>=2000 Eth Birr	3(1.4%)	208(98.6%)	1	1
4	Knowledge on CVDs (N=1634)				
	Not knowledgeable	80(6.0%)	1244(94.0%)	1.10(0.66-1.83)	0.67(0.1-4.75)
	Knowledgeable	17(5.5%)	293(94.5%)	1	1
5	Knowledge on Type II Diabetes (N=1611)				
	Not knowledgeable	31(6.5%)	447(93.5%)	1.21(0.79-1.83)	0.27(0.03-2.4)
	Knowledgeable	61(5.4%)	1072(94.6%)	1	1

6	Are you concerned about developing CVDs? (N=1626)				
	Not at all	19(4.1%)	442(95.9%)	0.45(0.25-0.81)	0.15(0.01-1.83)
	Yes, moderately	47(5.7%)	775(94.3%)	0.63(0.39-1.02)	0.19(0.04-0.87)
	Yes, very	30(8.7%)	313(91.3%)	1	1
7	Improving diet can reduce chance of getting diabetes (N=1496)				
	Yes	49(5.0%)	926(95.0%)	0.64(0.43-0.95)	0.73(0.52-0.92)
	No	41(7.9%)	480(92.1%)	1	1

**Table 4.16 Predictors of beef feeding/raw meat consumption among the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Eat raw meat/beef		Odds Ratio with 95% CI	
		Yes	No	Crude	Adjusted
1	Address (N=2,182)				
	Kilde Awlaelo HDSS	129(19.4%)	537(80.6%)	0.56(0.45-0.69)	0.86(0.57-1.31)
	Mekelle city	466(30.2%)	1077(69.8%)	1	1
2	Educational status (N=2,205)				
	Less than first cycle	114(17.5%)	537(82.5%)	0.35(0.27-0.47)	0.77(0.44-1.33)
	First and second cycle	189(29.0%)	462(71.0%)	0.68(0.53-0.88)	1.05(0.67-1.65)
	High school	97(28.0%)	250(72.0%)	0.64(0.48-0.87)	0.67(0.40-1.13)
	Preparatory school	30(25.0%)	90(75.0%)	0.55(0.35-0.87)	0.57(0.26-1.23)
	College and University	164(37.6%)	272(62.4%)	1	1
3	Gender (N=2,209)				
	Men	334(38.4%)	536(61.6%)	2.57(2.12-3.12)	2.32(1.64-3.28)
	Women	261(19.5%)	1078(80.5%)	1	1
4	Monthly income in Eth Birr(N=852)				
	<500 Birr	47(19.0%)	200(81.0%)	2.28(1.30-4.01)	0.70(0.42-1.16)
	500-999 Eth Birr	27(21.4%)	99(78.6%)	1.89(1.09-3.29)	0.76(0.43-1.34)
	1000-1999 Eth Birr	68(29.4%)	163(70.6%)	1.1(0.53-2.07)	0.94(0.62-1.44)
	>=2000 Eth Birr	86(34.7%)	162(65.3%)	1.85(1.0-3.43)	1
5	Knowledge on NCDs (N=2,190)				
	Not knowledgeable	528(28.2%)	1342(71.8%)	1.58(1.20-2.12)	0.63(0.35-1.12)
	Knowledgeable	64(19.9%)	257(80.1%)	1	1

6	Eating low amounts of fruits and vegetables is harmful for health (N=2,178) Not Harmful Moderately harmful Harmful Very harmful	57(18.4%) 66(22.1%) 275(26.3%) 194(37.2%)	253(81.6%) 233(77.9%) 772(73.7%) 328(62.8%)	0.38(0.27-0.53) 0.48(0.35-0.66) 0.60(0.48-0.75) 1	0.69(0.37-1.29) 0.45(0.24-0.84) 0.55(0.36-0.84)
7	Frequent feeding of fruits/vegetables negatively affect our body size & shape (N=2,189) Yes No I don't know	125(18.7%) 460(31.8%) 8(11.0%)	544(81.3%) 987(68.2%) 65(89.0%)	1.87(0.87-3.99) 3.79(1.80-7.96) 1	2.65(0.28-25.5) 3.44(0.36-33.1)
8	Frequent feeding of animal products raw meat/beef is beneficial for body size & shape. (N=2,185) Yes No I don't know	80(16.8%) 489(31.2%) 24(16.8%)	396(83.2%) 1077(68.8%) 119(83.2%)	1.02(0.61-1.65) 2.25(1.43-3.54) 1	0.53(0.19-1.51) 0.85(0.33-2.18) 1
9	Overweight/obesity is a sign of attractiveness (N=2,180) Yes No I don't know	36(19.1%) 544(28.3%) 8(11.9%)	152(80.9%) 1381(71.7%) 59(88.1%)	1.81(0.83-3.94) 2.03(1.10-3.90) 1	1.21(0.21-7.10) 0.86(0.16-4.61) 1

#### 4.2.5.4 Predictors of physical inactivity

Different aspects of physical activities including transport related, work related and recreation related physical activities and their predictors were assessed after combining all types of physical activities. Table 4.17 is showing low physical activity or inactivity level predictors. The study participants from Kilde Awlaelo HDSS site (which is predominantly a rural setting) had 24 % reduced risk of low physical activity level compared to those residing in Mekelle city with AOR 0.76 (95%CI: 0.57-1.01). This is consistent with the outcome of a study by Fikru (2009:35). Men had 58% reduced risk of low physical activity level compared to women with AOR 0.42 (95%CI: 0.33-0.53). This is consistent with Misra (2014:374), Steven *et al* (2010:300) and Fikru (2009:36). By occupation non-government employees were 2.22 times more likely to have low level physical activity compared to the unemployed ones with AOR 2.22 (95%CI: 1.14-4.32). This is in agreement with Basu *et al* (2013:20). Study participants who were not

knowledgeable about type II diabetes were 1.83 times more likely to have low level physical activity compared to those who were knowledgeable with AOR 1.83 (95%CI: 1.43-2.35). Study participants who knew nothing about stroke had 79% reduced risk of low physical activity compared to those who knew very well about stroke with AOR 0.21 (95%CI:0.08-0.56). Participants who reported that overweight or obesity is a sign of good health had 70% reduced risk of having low level physical activity compared to those who knew nothing with AOR 0.30 (95%CI: 0.14-0.67). Participants who reported that overweight or obesity is not a sign of good health had 71% reduced risk of having low level physical activity compared to those who knew nothing, AOR 0.29 (95%CI: 0.15-0.53). Participants who reported overweight or obesity could result in heart diseases were 1.31 times more likely to have low level physical activity than those who did not report, AOR 1.31 (95%CI: 1.01-1.71). Participants who reported overweight or obesity could result in cancer were 1.71 times more likely to engage in low level physical activity than those who did not report, with AOR 1.72 (95%CI: 1.33-2.22).

**Table 4.17 Predictors of physical activity level among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013- January, 2014**

S. No	Characteristics	Physical activity level		Odds Ratio with 95% CI	
		Low	Normal	Crude	Adjusted
1	Address (N=2,011) Kilte Awlaelo HDSS Mekelle city	234(35.9%) 666(49.0%)	418(64.1%) 693(51.0%)	1.72(1.42-2.08) 1	0.76(0.57-1.01) 1
2	Educational status (N=2,007) Less than first cycle First and second cycle High school Preparatory school College and University	353(59.2%) 329(56.2%) 173(56.4%) 50(44.6%) 206(50.6%)	243(40.8%) 256(43.8%) 134(43.6%) 62(55.4%) 201(49.4%)	0.71(0.55-0.91) 0.80(0.62-1.03) 0.79(0.59-1.07) 1.27(0.84-1.94) 1	0.82(0.55-1.20) 0.77(0.54-1.1) 0.80(0.55-1.16) 1.05(0.63-1.74) 1
3	Gender (N=2,011) Men Women	286(34.3%) 614(52.2%)	548(65.7%) 563(47.8%)	2.09(1.74-2.51) 1	0.42(0.33-0.53) 1
4	Occupation (N=1986) Gov't employee Non-gov't employee Self-employed Student House-wife	137(46.3%) 69(53.5%) 313(43.4%) 38(40.9%) 219(58.6%)	159(53.7%) 60(46.5%) 408(56.6%) 55(59.1%) 155(41.4%)	1.31(0.77-2.24) 1.75(0.96-3.17) 1.17(0.70-1.94) 1.05(0.55-1.99) 2.15(1.27-3.64)	1.14(0.62-2.12) 2.22(1.14-4.32) 1.25(0.71-2.20) 1.10(0.53-2.28) 1.52(0.84-2.76)

	retired farmer Unemployed	10(43.5%) 70(24.8%) 27(39.7%)	13(56.5%) 212(75.2%) 41(60.3%)	1.17(0.45-3.04) 0.50(0.29-0.87) 1	1.15(0.39-3.38) 0.61(0.31-1.19) 1
5	Knowledge on Type II Diabetes (N=1,961) Not knowledgeable Knowledgeable	668(47.8%) 219(38.9%)	730(52.2%) 344(61.1%)	0.69(0.57-0.85) 1	1.83(1.43-2.35) 1
6	Knowledge on Stroke(N=1,973) Nothing at all Only heard about the term A little about the disease Very familiar with it	412(37.9%) 398(53.5%) 52(45.6%) 21(75.0%)	675(62.1%) 346(46.5%) 62(54.4%) 7(25.0%)	0.20(0.09-0.48) 0.38(0.16-0.91) 0.28(0.11-0.71) 1	0.21(.08-0.56) 0.40(0.16-1.03) 0.43(0.16-1.16) 1
7	Overweight/obesity is a sign of good health (N=1991) Yes No I don't know	33(35.9%) 810(44.4%) 50(67.6%)	59(64.1%) 1015(55.6%) 24(32.4%)	0.27(0.14-0.51) 0.38(0.23-0.63) 1	0.30(0.14-0.67) 0.29(0.15-0.53) 1
8	Alcohol consumption (N=2011) No Yes	579(42.7%) 321(49.1%)	778(57.3%) 333(50.9%)	0.77(0.64-0.93) 1	1.0(0.81-1.25) 1
9	Overweight or obesity could result in Diabetes. (N=1,889) Yes No	650(48.6%) 210(38.1%)	688(51.4%) 341(61.9%)	1.28(1.13-1.44) 1	0.81(0.62-1.07) 1
10	Overweight or obesity could result in Hypertension.(N=1,909) Yes No	786(46.7%) 81(35.8%)	897(53.3%) 145(64.2%)	1.30(1.09-1.56) 1	1.27(0.90-1.81) 1
11	Overweight or obesity could result in Heart Diseases. (N=1,891) Yes No	669(49.5%) 193(35.7%)	682(50.5%) 347(64.3%)	1.39(1.22-1.57) 1	1.31(1.01-1.71) 1
12	Overweight or obesity could result in Cancer. (N=1879) Yes No	398(59.2%) 459(38.0%)	274(40.8%) 748(62.0%)	1.56(1.42-1.71) 1	1.72(1.33-2.22) 1

## 4.2.6 Predictors of raised physical measurement risk factors

### 4.2.6.1 Predictors of overweight and obesity

Overweight or obesity is having a Body Mass Index of  $\geq 25\text{kg/m}^2$  and its predictors are indicated in Table 4.18. Study participants from Kilde Awlalo HDSS site had 50% reduced risk of having overweight or obesity compared to those from Mekelle city, OR

0.50(95%CI: 0.32-0.78). This is consistent with that of Luc *et al* (2009:4). Participants in the age group 25-44 years had 61% reduced risk of overweight or obesity compared to participants in the age group 45-64 years old, with AOR 0.39(95%CI: 0.27-0.57). This is similar to the outcome of a study conducted in India by Bhagyalaxmi *et al* (2013:82). By occupation, being a housewife was 3.07 times more likely to be overweight or obese compared to the unemployed, with AOR 3.07(95%CI: 1.24-7.62). This may be due to sedentary life style among the housewives. Participants whose educational status was less than formal education had 42% reduced risk of being overweight or obese, with AOR 0.58(95%CI: 0.34-0.98). This is consistent with the finding by Central Statistical Agency [Ethiopia] and ICF International (2012:180). By gender, men had 53% reduced risk of being overweight or obese compared to women, with AOR 0.47(95%CI: 0.33-0.66). This is consistent with finding by Alikhani *et al* (2009:362). Participants who reported religious fasting would reduce risk of acquiring NCDs were 1.96 times more likely to be overweight or obese than those who did not report so, AOR 1.96(95%CI: 1.04-3.69).

**Table 4.18 Predictors of raised Body Mass Index among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Body Mass Index		Odds Ratio with 95% CI	
		>=25kg/m <sup>2</sup>	<25 kg/m <sup>2</sup>	Crude	Adjusted
1	Address (N=2,277) Kilte Awlaelo HDSS Mekelle city	50(7.3%)	639(92.7%)	0.29(0.22-0.40)	0.50(.32-0.78)
		334(21.0%)	1254(79.0%)	1	1
2	Age group 25-44 45-64	282(15.0%)	1596(85.0%)	0.51(0.40-0.67)	0.39(0.27-0.57)
		102(25.6%)	297(74.4%)	1	1
3	Occupation (N=2,246) Gov't employee Non-gov't employee Self-employed Student House-wife Retired Farmer Unemployed	61(18.7%)	265(81.3%)	2.00(0.95-4.20)	2.11(0.82-5.45)
		26(18.7%)	113(81.3%)	1.99(0.89-4.49)	2.11(0.76-5.85)
		138(17.0%)	675(83.0%)	1.77(0.87-3.62)	2.04(0.83-4.99)
		7(7.3%)	89(92.7%)	0.68(0.24-1.92)	0.87(0.26-2.96)
		123(26.5%)	341(73.5%)	3.13(1.52-6.42)	3.07(1.24-7.62)
		5(18.5%)	22(81.5%)	1.97(0.60-6.48)	1.71(0.43-6.88)
		8(2.7%)	286(97.3%)	0.24(0.09-0.65)	0.57(0.17-1.90)
		9(10.3%)	78(89.7%)	1	1

4	Educational status (N=2,272) Less than first cycle First and second cycle High school Preparatory school College and University	94(13.8%) 122(18.3%) 60(17.0%) 23(18.5%) 84(18.8%)	587(86.2%) 545(81.7%) 293(83.0%) 101(81.5%) 363(81.2%)	0.69(0.50-0.96) 0.97(0.71-1.32) 0.89(0.61-1.28) 0.98(0.59-1.64) 1	0.58(0.34-0.98) 0.90(0.58-1.41) 1.00(0.62-1.63) 0.87(0.42-1.80) 1
5	Gender (N=2,277) Men Women	113(12.6%) 271(19.7%)	785(87.4%) 1108(80.3%)	0.59(0.46-0.75) 1	0.47(0.33-0.66) 1
6	Work related vigorous physical activity (N=2,277) Yes No	357(18.3%) 27(8.2%)	1590(81.7%) 303(91.8%)	2.24(1.54-3.26) 1	1.47(0.79-2.74) 1
7	Travel related physical activity (N=2,277) Yes No	75(24.4%) 309(15.7%)	232(75.6%) 1661(84.3%)	1.56(1.25-1.94) 1	1.28(0.41-3.97) 1
8	Physical activity category (N=1,948) Low category activity Moderate category activity High category activity	159(18.2%) 103(14.6%) 40(10.9%)	716(81.8%) 603(85.4%) 327(89.1%)	1.82(1.25-2.63) 1.4(0.95-2.06) 1	0.76(0.43-1.34) 0.68(0.39-1.18) 1
9	Overweight/obesity is a sign of good health (N=2,258) Yes No I don't know	14(13.2%) 360(17.4%) 6(7.1%)	92(86.8%) 1708(82.6%) 78(92.9%)	1.98(0.73-5.39) 2.74(1.19-6.34) 1	2.25(0.56-9.07) 1.57(0.49-5.02) 1
10	Knowledge on Type II diabetes (N=2,220) knowledgeable not knowledgeable	123(19.2%) 245(15.5%)	516(80.8%) 1336(84.5%)	1.30(1.02-1.65) 1	0.89(0.65-1.21) 1
11	Do you think religious fasting will reduce risk of acquiring NCDs? (N=2,257) Yes No I don't know	201(18.8%) 158(16.0%) 20(10.1%)	869(81.2%) 831(84.0%) 178(89.9%)	2.06(1.26-3.35) 1.69(1.03-2.77) 1	1.96(1.04-3.69) 1.61(0.84-3.08) 1
12	Being overweight is harmful for health. (N=2237) Not harmful Moderately harmful Harmful Very harmful	97(13.2%) 23(13.1%) 149(20.1%) 110(18.8%)	637(86.8%) 153(86.9%) 594(79.9%) 474(81.2%)	0.66(0.49-0.88) 0.65(0.40-1.05) 1.08(0.82-1.42) 1	0.88(0.58-1.35) 0.55(0.28-1.06) 0.92(0.63-1.36) 1

#### 4.2.6.2 Predictors of central obesity (Increased waist circumference)

Table 4.19 depicts the predictors of increased waist circumference. Participants in the age group 25-44 years old had 63% reduced risk of increased waist circumference compared to those in the age group 45-64 years old, with AOR 0.37(95%CI: 0.23-0.60). This is consistent with that of Ministry of Health, Zanzibar (2012:16). Non-government employees were 6.3 times more likely to have increased waist circumference compared to the unemployed ones, with AOR 6.3(95%CI: 1.20-32.70). This could be due to the differences in socio-economic status and life style behaviours between the non-government employees and the unemployed population. Men had 69% reduced risk of increased waist circumference compared to their women counterparts, with AOR 0.31(95%CI: 0.19-0.52). This is consistent with the outcomes of studies by Alikhani *et al* (2009:362) and Sugathan (2008:558). Participants who did not engage in work related vigorous physical activities were 4.73 times more likely to have increased waist circumference compared to the participants who engaged in work related vigorous physical activity, with AOR 4.73(95%CI: 1.85-12.1). Study participants who reported that religious fasting benefits their health by reducing weight were 2.2 times more likely to have increased waist circumference compared to those who did not report, with AOR 2.20(95%CI: 1.46-3.32). Study participants who sometimes felt stressed were 1.59 times more likely to have increased waist circumference compared to those who never felt stressed, AOR 1.59(95%CI: 1.1-2.38). This is in agreement with the findings of Skaal and Pengpid (2011:565).

**Table 4.19 Predictors of increased waist circumference among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Waist circumference		Odds Ratio with 95% CI	
		Increased	Normal	Crude	Adjusted
1	Address (N=2,347)				
	Kilte Awlaelo HDSS	119(16.3%)	610(83.7%)	0.66(0.55-0.79)	0.99(0.58-1.70)
	Mekelle city	401(24.8%)	1217(75.2%)	1	1
2	Age group (N=2,347)				
	25-44	374(19.3%)	1560(80.7%)	0.55(0.47-0.64)	0.37(0.23-0.60)
	45-64	146(35.4%)	267(64.6%)	1	1

3	Occupation (N=2,316) Gov't employee Non-gov't employee Self-employed Student House-wife Retired Farmer Unemployed	62(18.5%) 24(17.3%) 180(21.5%) 10(9.9%) 190(39.7%) 8(29.6%) 24(7.8%) 14(15.7%)	274(81.5%) 115(82.7%) 659(78.5%) 91(90.1%) 288(60.3%) 19(70.4%) 283(92.2%) 75(84.3%)	1.21(0.643-2.28) 1.12(0.54-2.29) 1.46(0.81-2.65) 0.59(0.25-1.40) 3.53(1.94-6.44) 2.26(0.83-6.16) 0.45(0.22-0.92) 1	2.27(0.52-9.88) 6.3(1.20-32.70) 2.9(0.69-12.06) 5.04(0.82-30.8) 3.52(0.82-15.0) 1.99(0.30-13.2) 0.25(0.04-1.65) 1
5	Gender (N=2,347) Men Women	74(8.1%) 446(31.1%)	839(91.9%) 988(68.9%)	0.26(0.21-0.33) 1	0.31-0.19-0.52) 1
6	Work related vigorous physical activity (N=2,347) No Yes	490(24.4%) 30(8.9%)	1520(75.6%) 307(91.1%)	2.74(1.93-3.90) 1	4.73(1.85-12.1) 1
7	Do you think religious fasting will reduce risk of acquiring NCDs? (N=2,326) Yes No I don't know	267(24.2%) 215(21.2%) 33(15.9%)	838(75.8%) 799(78.8%) 174(84.1%)	1.68(1.13-2.5) 1.42(.95-2.12) 1	0.50(0.17-1.5) 0.6(0.18-1.98) 1
8	Religious fasting benefits your health by reducing weight (N=883) Yes No	130(30.7%) 91(19.8%)	294(69.3%) 368(80.2%)	1.55(1.23-1.95) 1	2.20(1.46-3.32) 1
9	Have you ever practiced religious fasting? (N=2,304) Yes No	473(22.7%) 33(14.7%)	1607(77.3%) 191(85.3%)	1.54(1.12-2.14) 1	1.71(0.66-4.41) 1
10	How often do you feel stressed? (N=2,318) Always often Sometimes/infrequently Never	20(37.0%) 13(15.1%) 224(21.7%) 254(22.1%)	34(63.0%) 73(84.9%) 806(78.3%) 894(77.9%)	2.07(1.17-3.66) 0.63(0.34-1.15) 0.98(0.8-1.2) 1	1.8(0.55-5.84) 0.47(.16-1.36) 1.59(1.1-2.38) 1
11	Being physically inactive is harmful for health (N=2,290) Not harmful Moderately harmful Harmful Very harmful	78(18.3%) 46(17.7%) 273(25.5%) 110(20.7%)	349(81.7%) 214(82.3%) 798(74.5%) 422(79.3%)	0.86(0.62-1.18) 0.83(0.56-1.21) 1.31(1.02-1.69) 1	0.61(0.31-1.18) 0.79(0.37-1.69) 0.93(0.58-1.49) 1

#### 4.2.6.3 Predictors of hypertension or elevated blood pressure

In this section, the predictors of elevated blood pressure (BP) were assessed as depicted in Table 4.20. Age group 25-44 years had 78% reduced risk of having elevated blood pressure compared to the participants whose age ranged from 45-64 years, with AOR 0.22 (95%CI: 0.14-0.33). The risk of hypertension was increasing with advancing age and this finding is consistent with that of Prabhakaran *et al* (2005:62) and Mahmood *et al* (2011:45). Participants who engaged in low level physical activity were 2.01 times more likely to develop elevated BP than those who engaged in high level physical activity, with AOR 2.01 (95%CI: 1.22-3.32). This finding is similar to that of Oli *et al* (2013:4). Participants whose waist circumference was in the normal range had 37% reduction in elevated BP compared to those whose waist circumference was increased, with AOR, 0.63 (95%CI: 0.41-0.99). This is consistent with the findings of Balogun (2011:91). Participants who did not have mental stress had 27% reduced risk of having elevated BP compared to the participants who had mental stress, with AOR 0.73 (95%CI: 0.55-0.96). This finding is also in agreement with that of Skaal & Pengpid (2011:565). Participants who were not knowledgeable about cardiovascular diseases had 46% reduced risk of having elevated BP compared those who were knowledgeable, with AOR, 0.54(95%CI: 0.35-0.84) which is consistent with the finding of Aubert *et al* (1988:1140). Participants who reported that the food prepared outside their home tended to be too salty had a 54% reduced risk of having elevated BP compared to those who reported the food was not salty enough, with OR 0.46 (95%CI: 0.23-0.9). Participants who reported the food prepared outside their home tended to have normal salt content had 42% reduced risk of having elevated BP compared to those who reported the food was not salty enough, with AOR 0.58 (95%CI: 0.37-0.92). Participants who had BMI of <25kg/m<sup>2</sup> had a 45% reduced risk of having elevated BP compared to those whose BMI was >=25kg/m<sup>2</sup>, with AOR 0.55 (95%CI: 0.34-0.88), which is consistent with the finding of Mufunda *et al* (2006:62).

**Table 4.20 Predictors of elevated Blood Pressure (hypertension) among the study participants in Kiltte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Blood pressure	Odds Ratio with 95% CI
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		Elevated	Normal	Crude	Adjusted
1	Age group (N=2,347) 25-44 45-64	137(7.1%) 96(23.2%)	1797(92.9%) 317(76.8%)	0.31(0.24-0.39) 1	0.22(0.14-0.33) 1
2	Educational status (N=2,341) Less than first cycle First and second cycle High school Preparatory school College and University	86(12.1%) 62(9.0%) 27(7.4%) 8(6.2%) 50(11.1%)	624(87.9%) 624(91.0%) 336(92.6%) 122(93.8%) 402(88.9%)	1.11(0.77- 1.61) 0.80(0.54-1.18) 0.65(0.4-1.1) 0.53(0.24-1.14) 1	0.92(0.54-1.57) 0.96(0.58-1.61) 0.82(0.43-1.54) 0.67(0.24-1.89) 1
3	Physical activity category (N=2,011) Low category activity Moderate category activity High category activity	112(12.4%) 59(8.0%) 29(7.7%)	788(87.6%) 677(92.0%) 346(92.3%)	1.70(1.11-2.60) 1.04(0.65-1.65) 1	2.01(1.22-3.32) 1.24(0.73-2.11) 1
5	Waist circumference combined (N=2,347) Normal High	133(7.3%) 100(19.2%)	1694(92.7%) 420(80.8%)	0.38(0.3-0.48) 1	0.63(0.41-0.99) 1
7	Mental stress (N=2,340) No Yes	80(8.3%) 152(11.1%)	886(91.7%) 1222(88.9%)	0.75(0.58-0.97) 1	0.73(0.55-0.96) 1
8	Knowledge on CVDs (N=2,303) not knowledgeable knowledgeable	172(9.0%) 57(14.6%)	1740(91.0%) 334(85.4%)	0.62(0.47-0.82) 1	0.54(0.35-0.84) 1
9	How do you tend to find the foods others cook (out of your own home)? (N=2212) Too salty Normal Not salty enough	27(7.3%) 143(9.5%) 37(16.0%)	344(92.7%) 1367(90.5%) 194(84.0%)	0.41(0.24-0.7) 0.55(0.37-0.81) 1	0.46(0.23-0.9) 0.58(0.37-0.92) 1
10	Do you ever think about how much salt you have in your diet? N=2080 Yes No	188(10.4%) 17(6.3%)	1621(89.6%) 254(93.7%)	1.66(1.03-2.68) 1	1.08(0.59-1.95) 1
11	BMI category (N=2277) <25kg/m <sup>2</sup> >=25kg/m <sup>2</sup>	155(8.2%) 76(19.8%)	1738(91.8%) 308(80.2%)	0.41(0.32-0.53) 1	0.55(0.34-0.88) 1

## 4.2.7 Predictors of biochemical risk factors

### 4.2.7.1 Predictors of elevated blood sugar or hyperglycemia

The independent predictors of elevated blood sugar level were assessed as shown in Table 4.21. Being in the age group 25-44 years had an 88% reduced risk of having diabetes compared to the participants in the age group 45-64 years, with AOR 0.12 (95%CI: 0.04-0.33). This is in agreement with the finding of Majgi *et al* (2012:4). The risk of elevated blood sugar was 3.1 times more among those engaged in transportation-related physical activity than those who did not engage in transportation-related activity, with, AOR 3.1 (95%CI: 1.03-9.23). This is in agreement with the finding of Yarandi *et al* (2014:1519). There was 74% reduced risk of hyperglycemia among participants with feeling of nervousness, with AOR 0.26 (95%CI: 0.07-0.99). There was 69% reduced risk of elevated blood sugar level or hyperglycemia among participants who were not knowledgeable about type II diabetes compared to those who were knowledgeable, with AOR 0.31 (95%CI: 0.11-0.91). This could be due to differences in socio-economic status. There was also 72% reduced risk of elevated blood sugar level among the participants whose waist circumference was normal compared to those who had increased waist circumference, with AOR 0.28 (95%CI: 0.09-0.90). This is also in agreement with the finding of Yarandi *et al* (2014:1519).

**Table 4.21 Predictors of raised blood sugar among the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Blood sugar level		Odds Ratio with 95% CI	
		Elevated	Normal	Crude	Adjusted
1	Age group (N=682)				
	25-44	7(1.4%)	510(98.6%)	0.13(0.06-0.31)	0.12(0.04-0.33)
	45-64	17(10.3%)	148(89.7%)	1	1
2	Work related moderate physical activity (N=681)				
	Yes	5(2.2%)	223(97.8%)	0.52(0.2-1.38)	0.95(0.31-2.88)
	No	19(4.2%)	434(95.8%)	1	1
3	Travel related physical activity (N=682)				
	Yes	6(7.1%)	79(92.9%)	2.34(0.96-5.73)	3.1(1.03-9.23)
	No	18(3.0%)	579(97.0%)	1	1

4	Feeling of nervousness (N=681)				
	Yes	3(1.4%)	215(98.6%)	0.30(0.09-1.01)	0.26(0.07-0.99)
	No	21(4.5%)	442(95.5%)	1	1
5	Knowledge on CVDs (N=670)				
	not knowledgeable	16(3.1%)	497(96.9%)	0.61(0.27-1.40)	1.12(0.34-3.68)
	knowledgeable	8(5.1%)	149(94.9%)	1	1
6	Knowledge on type II diabetes (N=659)				
	Not knowledgeable	10(2.3%)	419(97.7%)	0.41(0.18-0.93)	0.31(0.11-0.91)
	knowledgeable	13(5.7%)	217(94.3%)	1	1
8	BMI category (N=2277)				
	<25kg/m <sup>2</sup>	14(2.9%)	465(97.1%)	0.55(0.25-1.22)	1.96(0.61-6.26)
	>=25kg/m <sup>2</sup>	10(5.3%)	179(94.7%)	1	1
9	Waist circumference (N=682)				
	Normal	9(2.0%)	441(98.0%)	0.31(0.14-0.70)	0.28(0.09-0.90)
	Elevated	15(6.5%)	217(93.5%)	1	1

#### 4.2.7.2 Predictors of elevated blood cholesterol

As depicted in Table 4.22, the predictors of elevated blood cholesterol level were assessed. There is 51% risk reduction of having elevated cholesterol level among the participants from Kiltel Awlaleo HDSS site compared to the participants from Mekelle city, with AOR 0.49 (95%CI: 0.26-0.93). This could be due to differences in life style behaviours such as physical activity and type of dietary intake between the populations of the two settings. Never married participants had 88% reduced risk of having elevated blood cholesterol level compared to those who were widowed, with AOR 0.12 (95%CI: 0.02-0.71). The possible explanation for this is differences in the exposure to behavioural risk factors of NCDs between the populations of varying marital status.

**Table 4.22 Predictors of elevated blood cholesterol level among the study participants in Kiltel Awlaleo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Blood cholesterol level		Odds Ratio with 95% CI	
		elevated	Normal	Crude	Adjusted
1	Address (N=479)				
	Kiltel Awlaleo HDSS	28(21.5%)	102(78.5%)	0.64(0.45-0.92)	0.49(0.26-0.93)
	Mekelle city	117(33.5%)	232(66.5%)	1	1
2	Gender (N=479)				
	Men	48(24.6%)	147(75.4%)	0.72(0.54-0.97)	0.93(0.54-1.59)
	Women	97(34.2%)	187(65.8%)	1	1

3	Age group (N=682)				
	25-44	99(27.7%)	258(72.3%)	0.74(0.55-0.98)	0.73(0.39-1.38)
	45-64	46(37.7%)	76(62.3%)	1	1
4	Marital status (N=473)				
	Never married	15(15.0%)	85(85.0%)	0.18(0.07-0.45)	0.12(0.02-0.71)
	Currently married/cohabiting	80(31.1%)	177(68.9%)	0.45(0.20-1.02)	0.41(0.16-1.06)
	Separated/Divorced	36(40.0%)	54(60.0%)	0.67(0.28-1.60)	0.7(0.26-1.86)
	Widowed	13(50.0%)	13(50.0%)	1	1
5	BMI Group(N=465)				
	<18.5kg/m <sup>2</sup>	10(13.2%)	66(86.8%)	0.21(0.07-0.58)	0.61(0.16-2.30)
	18.5-24.9 kg/m <sup>2</sup>	71(28.0%)	183(72.0%)	0.53(0.23-1.21)	1.1(0.38-3.14)
	25-29.9 kg/m <sup>2</sup>	47(43.1%)	62(56.9%)	1.03(0.44-2.46)	1.75(0.65-4.73)
	>=30 kg/m <sup>2</sup>	11(42.3%)	15(57.7%)	1	1
6	Waist circumference (N=479)				
	Normal	73(23.0%)	244(77.0%)	0.52(0.4-0.68)	0.67(0.30-1.51)
	Elevated	72(44.4%)	90(55.6%)	1	1
7	Waist to Hip Ratio (N=276)				
	Normal	52(29.4)	125(70.6%)	0.68(0.49-0.93)	0.75(0.4-1.43)
	Elevated	43(43.4%)	56(56.6%)	1	1

#### 4.2.7.3 Predictors of elevated blood triglycerides

Table 4.23 is displaying the predictors of elevated blood triglycerides. Participants who were eating raw meat or beef in the one month preceding the study were 3.16 times more likely to have elevated blood triglycerides than those who were not eating raw meat or beef, AOR 3.16 (95%CI: 1.14-8.77). Participants whose BMI was less than 25kg/m<sup>2</sup> had 65% reduced risk of having elevated blood triglycerides compared to those whose BMI was >= 25kg/m<sup>2</sup>, with AOR 0.35 (95%CI: 0.14-0.92). This could be due to the fact that eating meat and having large BMI might increase circulating triglycerides.

**Table 4.23 Predictors of raised blood triglycerides level among the study participants in Kilte Awlaleo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Blood Triglycerides level		Odds Ratio with 95% CI	
		Elevated	Normal	Crude	Adjusted
1	Address (N=475)				
	Kilte Awlaleo HDSS	28(21.9%)	100(78.1%)	0.61(0.43-0.87)	0.31(0.08-1.17)
	Mekelle city	125(36.0%)	222(64.0%)	1	1
2	Gender (N=475)				
	Men	55(28.4%)	139(71.6%)	0.81(0.62-1.07)	1.83(0.76-4.40)
	Women	98(34.9%)	183(65.1%)	1	1

3	Age group (N=475) 25-44 45-64	106(30.2%) 47(37.9%)	245(69.8%) 77(62.1%)	0.80(0.61-1.05) 1	1.04(0.40-2.69) 1
4	Did you eat raw meet/beef in the past one month?(N=442) Yes No	13(54.2%) 39(32.5%)	11(45.8%) 81(67.5%)	1.67(1.06-2.61) 1	3.16(1.14-8.77) 1
5	BMI Group(N=465) <25kg/m <sup>2</sup> ≥25kg/m <sup>2</sup>	85(25.6%) 66(49.6%)	247(74.4%) 67(50.4%)	0.52(0.40-0.66) 1	0.35(0.14-0.92) 1
6	Waist circumference (N=479) Normal Elevated	79(25.0%) 74(46.5%)	237(75.0%) 85(53.5%)	0.54(0.42-0.69) 1	0.59(0.21-1.69) 1
7	Work related vigorous physical activity (N=475) Yes No	143(34.2%) 10(17.5%)	275(65.8%) 47(82.5%)	1.95(1.09-3.48) 1	1.95(0.57-6.74) 1

#### 4.2.8 Predictors of mental stress

Predictors of mental stress were also assessed as shown in Table 4.24. Participants in the age group 25-44 years had a 36% reduced risk of having mental stress compared to those in the age group 45-64 years, AOR, 0.64 (95%CI: 0.48-0.85). Participants who completed preparatory school education had a 53% reduced risk of having mental stress compared to those participants who completed college or university education, AOR 0.47 (95%CI: 0.30-0.75). Compared to the widowed participants, participants whose marital status was single, married or cohabiting and separated or divorced had 66%, 71% and 65% reduced risk of having mental stress, respectively compared to widowed participants, with AOR 0.34 (95%CI: 0.18-0.67), 0.29 (95%CI: 0.15-0.53) and 0.35 (95%CI: 0.19-0.67). Participants who practiced work-related moderate physical activity were 1.66 times more likely to have mental stress compared to those who did not practice, with AOR 1.66 (95%CI: 1.34-2.04). Participants who did not have sedentary lives had 30% reduced risk of mental stress compared to those who had sedentary life with AOR 0.70 (95%CI: 0.58-0.85). Participants who did not chew Khat had a 75% reduced risk of mental stress compared to those who chewed Khat, with AOR 0.25 (95%CI: 0.13-0.49). Participants who were engaged in moderate sport-related physical activity had a 39% reduced risk of mental stress compared to those who did not participate in sport-related activities, with AOR 0.61 (95%CI: 0.47-0.79).

Participants who did not have knowledge of cardiovascular diseases were 1.32 times more likely to have mental stress compared to those who were knowledgeable on cardiovascular diseases, with AOR 1.32 (95%CI: 1.02-1.71). Similar to the above findings, other studies such as that by Sugathan (2008:558) reported that low socio-economic status was found to be a predictor of risk factors, including mental stress.

**Table 4.24 Predictors of mental stress among the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Mental stress		Odds Ratio with 95% CI	
		Yes	No	Crude	Adjusted
1	Gender(N=2,340)				
	Men	504(55.3%)	407(44.7%)	0.91(0.85-0.98)	0.88(0.69-1.11)
	Women	870(60.9%)	559(39.1%)	1	1
2	Age group (N=2,340)				
	25-44	1093(56.7%)	835(43.3%)	0.83(0.77-0.89)	0.64(0.48-0.85)
	45-64	281(68.2%)	131(31.8%)	1	1
3	Educational status (N=2,335)				
	Less than first cycle	442(62.4%)	266(37.6%)	1.15(0.90-1.47)	0.94(0.65-1.4)
	First and second cycle	389(57.0%)	294(43.0%)	0.92(0.72-1.17)	0.73(0.53-1.02)
	High school	217(59.9%)	145(40.1%)	1.04(0.78-1.37)	1.03(0.72-1.46)
	Preparatory school	57(43.8%)	73(56.2%)	0.54(0.37-0.80)	0.47(0.30-0.75)
	College and University	267(59.1%)	185(40.9%)	1	1
4	Marital status (N=2,305)				
	Never married	363(57.5%)	268(42.5%)	0.27(0.16-0.47)	0.34(0.18-0.67)
	Currently married/cohabiting	659(55.5%)	529(44.5%)	0.25(0.15-0.43)	0.29(0.15-0.53)
	Separated/Divorced	248(64.6%)	136(35.4%)	0.37(0.21-0.64)	0.35(0.19-0.67)
	Widowed	85(83.3%)	17(16.7%)	1	1
5	Work related moderate physical activity (N=2333)				
	Yes	477(65.3%)	253(34.7%)	1.17(1.1-1.25)	1.66(1.34-2.04)
	No	896(55.9%)	707(44.1%)	1	1
6	Sedentary life style (N=2,104)				
	No	647(56.6%)	497(43.4%)	0.87(0.81-0.93)	0.70(0.58-0.85)
	Yes	624(65.0%)	336(35.0%)	1	1
7	Chewing Khat (N=2,340)				
	No	1312(58.2%)	944(41.8%)	0.79(0.69-0.90)	0.25(0.13-0.49)
	Yes	62(73.8%)	22(26.2%)	1	1
8	Vigorous sport related physical exercise(N=2,337)				
	Yes	92(50.5%)	90(49.5%)	0.85(0.73-0.98)	0.87(0.60-1.26)
	No	1282(59.5%)	873(40.5%)	1	1
9	Knowledge on CVDs (N=2,303)				
	not knowledgeable	1150(60.3%)	758(39.7%)	1.16(1.05-1.29)	1.32(1.02-1.71)
	knowledgeable	203(51.9%)	188(48.1%)	1	1

10	Moderate sport physical activity (N=2,330)				
	Yes	187(50.3%)	185(49.7%)	0.83(0.75-0.93)	0.61(0.47-0.79)
	No	1184(60.5%)	774(39.5%)	1	1

#### 4.2.9 Predictors of risk factors of metabolic syndrome based on body mass index (BMI), waist circumference (WC) and waist to hip ratio (WHR)

##### 4.2.9.1 Raised BP (Hypertension)

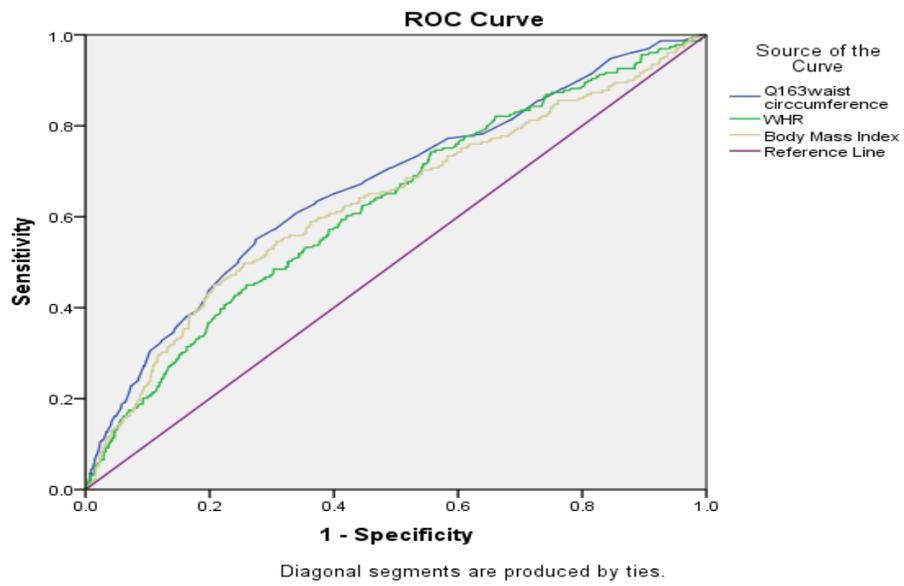
Based on the receiver-operating curve (ROC curve) depicted on Figure 4.25, the risk score for hypertension was generated using BMI, WC and WHR. Accordingly, the area under curve (AUC) was higher (fairly predicting) for waist circumference i.e.0.67 and 95% CI, (0.63-0.71) than that of BMI and WHR.

Area Under the Curve

Test Result Variable(s)	Area	Std. Error <sup>a</sup>	Asymptotic Sig. <sup>b</sup>	Asymptotic 95% CI	
				Lower Bound	Upper Bound
Waist circumference(WC)	0.67	.020	.000	0.63	0.71
Waist to Hip Ratio(WHR)	0.63	.020	.000	0.59	0.66
Body Mass Index(BMI)	0.63	.021	.000	0.59	0.67

The test result variable(s): waist circumference, WHR, Body Mass Index has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

a. Under the nonparametric assumption



b. Null hypothesis: true area = 0.5

At 80% sensitivity or 1-specificity, the values of the three predictors were:

WC=(Between 79.75-80.25 cm) Sensitivity=0.629-0.607 and 1-specificity=0.370-0.338

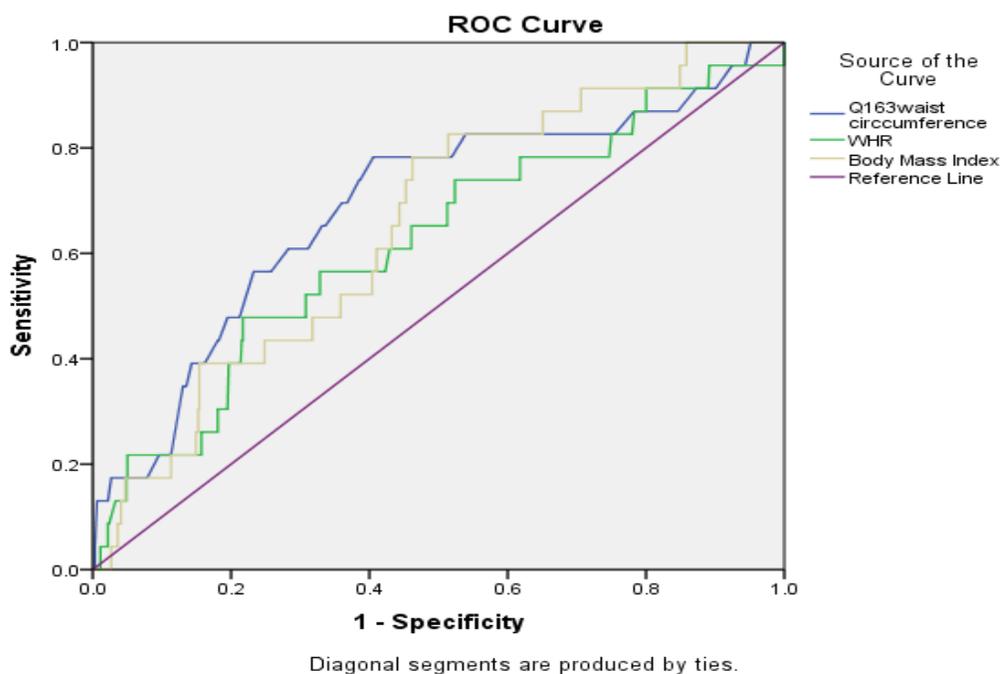
WHR=(.7978-.7980) Sensitivity=.799-.803 and 1-specificity =.651-.647

BMI=19.15-19.15kg/m<sup>2</sup> Sensitivity=.799-.803 and 1-specificity =.706-705

**Figure 4.25 Receiver Operating Curve (ROC) to identify the predictors of hypertension among the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

#### 4.2.9.2 Raised blood sugar level (Hyperglycemia)

Figure 4.26 depicts the risk score generated for hyperglycemia using three variables namely WC, BMI and WHR. ROC curve was used for this. The area under curve (AUC) was higher (satisfactorily predicting) for waist circumference i.e.0.70 and 95% CI, (0.60-0.81) than that of BMI and WHR. This is consistent particularly for BMI as revealed by Majgi *et al* (2012:4).



Area Under the Curve					
Test Result Variable(s)	Area	Std. Error <sup>a</sup>	Asymptotic Sig. <sup>b</sup>	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
WC	0.70	0.06	.002	0.60	0.81
WHR	0.62	0.06	.049	0.50	0.75
BMI	0.65	0.05	.013	0.55	0.76

The test result variable(s): Q163waist circumference, WHR has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

a. Under the nonparametric assumption

b. Null hypothesis: true area = 0.5

At 80% sensitivity or 1-specificity, the values of WC, WHR and BMI were:

WC= 79.25-78.50 Sensitivity =0.783-0.826 1-specificity =0.519-0.539

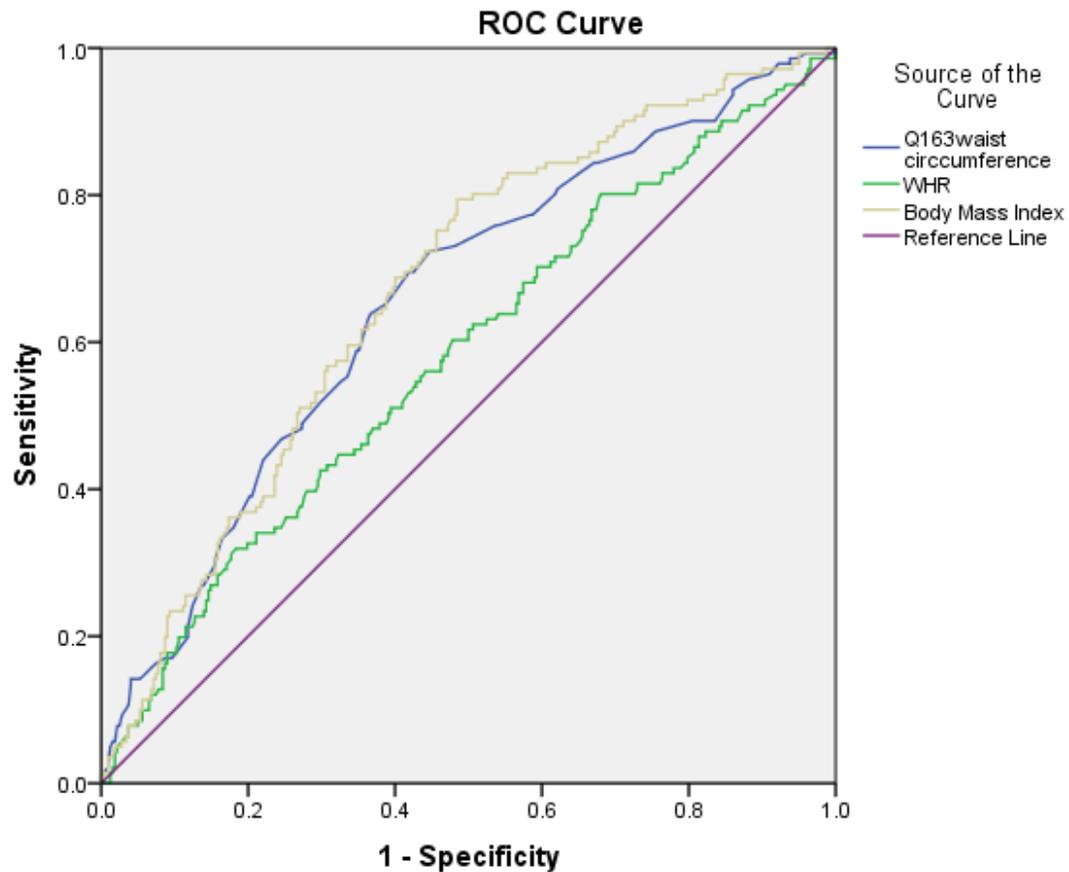
WHR=0.7936-0.7935 Sensitivity=0.783-0.826 1-specificity =0.747-0.750

BMI=21.99-21.88 Sensitivity=0.783-0.826 1-specificity=0.514-.514

**Figure 4.26 Receiver Operating Curve (ROC) to identify the predictors of hyperglycemia among the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

**4.2.9.3 Raised blood cholesterol level (Hypercholesterolemia)**

To identify the risk score for hypercholesterolemia, the WC, BMI and WHR were used. As shown in Figure 4.27, the AUC for WC and BMI were almost comparable 0.66 and 0.67 respectively with 95% CI, (0.60-0.71) and (0.62-0.72) respectively. The score of WHR was lower than that of BMI and WC.



Diagonal segments are produced by ties.

#### Area Under the Curve

Test Result Variable(s)	Area	Std. Error <sup>a</sup>	Asymptotic Sig. <sup>b</sup>	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
WC	0.66	.027	.000	0.60	0.71
WHR	0.58	.029	.006	0.52	0.64
BMI	0.67	.026	.000	0.62	0.72

The test result variable(s): waist circumference, WHR, Body Mass Index has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

a. Under the nonparametric assumption

b. Null hypothesis: true area = 0.5

At 1-specificity the values of WC, WHR and BMI were:

Waist 75.75-76.25      Sensitivity 0.773-0.801      1-specificity 0.587-0.618

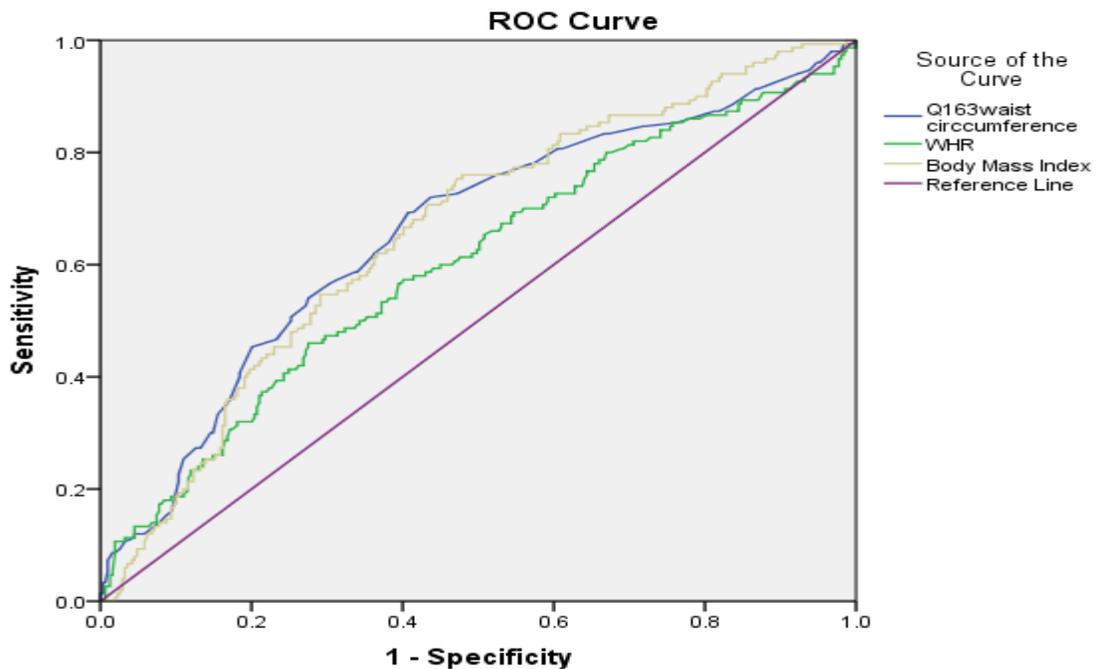
WHR .8032-.8022      Sensitivity .794-.801      1-specificity 0.677-0.680

BMI 21.14-21.15      Sensitivity 0.794-0.801      1-specificity .506-.506

**Figure 27 Receiver Operating Curve (ROC) to identify the predictors of hypercholesterolemia among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

#### 4.2.9.4 Hypertriglyceridemia

The risk score for hypertriglyceridemia was also identified using WC, BMI and WHR. As shown in Figure 4.28, the AUC for WC and BMI were comparable 0.66 for both, with 95% CI, (0.60-0.71) and (0.61-0.71) respectively. The score of WHR was lower than that of BMI and WC.



Diagonal segments are produced by ties.

**Area Under the Curve**

Test Result Variable(s)	Area	Std. Error <sup>a</sup>	Asymptotic Sig. <sup>b</sup>	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
WC	.66	.028	.000	.60	.71
WHR	.60	.029	.000	.55	.66
BMI	.66	.027	.000	.61	.71

The test result variable(s): waist circumference, WHR, Body Mass Index has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

a. Under the nonparametric assumption

b. Null hypothesis: true area = 0.5

The values of WC, BMI and WHR at 1-specificity were:

Waist 75.75-76.25 Sensitivity 0.780-0.807 1-specificity 0.573-0.605

WHR .8032 Sensitivity .80 1-specificity 0.670

BMI 20.43 Sensitivity 0.80 1-specificity .592

**Figure 4.28 Receiver Operating Curve (ROC) to identify the predictors of hypertriglyceridemia among the study participants in Kilte Awlaleo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

### **4.3 KNOWLEDGE, ATTITUDES AND PRACTICES RELATED TO NCDs AND THEIR RISK FACTORS**

#### **4.3.1 General knowledge, attitudes and practices related to NCDs**

The magnitudes of knowledge, practices and attitudes toward NCDs have been shown in Table 4.25. The majority 1988 (85.7% with 95% CI: 84.3-87.1%) of the study participants reported that NCDs could not be spread between people. This is slightly higher than that of Mongolia, Ministry of Health (2012:24) and Saeed *et al* (2009:4). This could be due to better exposure to awareness interventions in Tigray. About one third (33.6% with 95% CI: 31.7-35.5%) agreed that NCDs are less dangerous than infectious diseases. This is consistent with that of Mongolia, Ministry of Health (2012:24). Overall 1222 (43%) of the study participants agreed or strongly agreed that NCDs are less dangerous than infectious diseases. The prevalence of this misconception is less in Tigray than that of Mongolia, Ministry of Health (2012:24), which could be due to better

exposure to awareness interventions in Tigray. Seventy five percent of the study participants agreed or strongly agreed that NCDs are becoming common among Ethiopians. This is lower than that of Mongolia, Ministry of Health (2012:34), and this may be due to differences in sociocultural beliefs. Thirty-one (1.3% with 95% CI: 0.9-1.9%) of the study participants reported to have heart attack or stroke like health problems in their life time.

**Table 4.25 General knowledge attitudes and practices on NCDs among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S No	Characteristics	No	Percentage with 95% CI
1	NCDs cannot be spread between people(N=2319)		
	Yes	1988	85.7 (84.3-87.1)
	No	331	14.3(12.9-15.7)
2	NCDs are less dangerous than infectious diseases(N=2309)		
	Strongly agree	447	19.4(17.8-21)
	Agree	775	33.6 (31.7-35.5)
	Disagree	715	31.0(29-32.9)
	Strongly disagree	372	16.1(14.6-17.6)
	Mean±SD	2.44±0.98	
3	NCDs are becoming common among Ethiopians (N=2,292)		
	Strongly disagree	164	7.2(6.2-8.3)
	Disagree	408	17.8(16.3-19.4)
	Agree	1147	50.0(48-52.1)
	Strongly agree	573	25.0(23.3-26.8)
	Mean±SD	2.93±.84	
4	Ever been told to have heart attack or stroke(N=2,311)		
	Yes	31	1.3(0.9-1.9)
	No	2280	98.7(98.1-99.1)

#### **4.3.2 Knowledge, attitudes and practices on tobacco use**

The knowledge, attitudes and behaviours related to tobacco use were assessed as indicated in Table 4.26. Most participants, 2251 (95% CI: 96.0-97.5%) reported that smoking affects one's health. This is accurate belief is more widely spread in Tigray than in Mongolia, according to their Ministry of Health (2012:34) but lower than the findings of the study conducted in Tanzania by Mlunde (2011:60). These differences could be due to exposure to health information on the harm of smoking in Tigray. With regard to how much to smoke to harm one's health, 1,742, 77.1% (95% CI: 75.4-78.9%) reported

that any smoking could harm one's health. The majority, 2,214, 97.5% (95% CI: 96.8-98.1%) of the participants, reported smoking can harm one's lungs. As for the extent of the harm to the lungs, 66.9% (95% CI: 64.9-68.9%) reported that it is very harmful. Concerning smoking harm to the heart, 2,169, 96.2% (95% CI: 95.4-97.0%) reported that it could harm one's heart. About 1,348, 63% (95% CI: 60.9-65.0%) believed that smoking is very harmful to the heart. As for the harm of smoking around other people, 1986, 85.6% (95% CI: 84.2-87%) of the study participants believed that smoking around others could affect their health. The remaining 333, 14.4% reported that smoking could not affect another person's health or that or that they don't know if it is harmful. This belief is lower in Tigray than in Mongolia, according to their Ministry of Health (2012:34). More than half 1,182 (50.1%) of the study participants reported that they don't mind or do mind but allow people smoke in their homes. Most, 2,243, 93.4% of the study participants believed that it is important or very important to have a smoke free work place. More than 2 in 5 or 862, 40.5% (95% CI: 38.5-42.6%) of the study participants had not received any information on the harms of tobacco smoking from a health worker. About 146, 6.4% of the study participants perceived that tobacco smoking is not harmful or only moderately harmful to their health.

**Table 4.26 Knowledge, Attitudes and Practices on tobacco use among the study participants in Kilte Awlaleo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	No	Percentage with 95% CI
1	Does cigarette smoking affect your health? (N=2,325) Yes No I don't know	2251 31 43	96.8(96-97.5) 1.3(0.9-1.9) 1.8(1.4-2.5)
2	How much to smoke to harm health?(N=2,258) Any smoke At least once a week only daily smoking only a packet of cigarettes or more/day	1742 120 287 109	77.1(75.4-78.9) 5.3(4.4-6.3) 12.7(11.4-14.1) 4.8(4.0-5.8)
3	Does smoking harm your lungs?(N=2,271) Yes No I don't know	2214 30 27	97.5(96.8-98.1) 1.3(0.9-1.9) 1.2(0.8-1.7)
4	Extent of harm to the lungs (N=2,174) Harmful	719	33.1(31.1-35.1)

	Very harmful	1455	66.9(64.9-68.9)
5	Does smoking harm your heart?(N=2,254) Yes No I don't know	2169 36 49	96.2(95.4-97.0) 1.6(1.1-2.2) 2.2(1.6-2.8)
6	Extent of harm to the heart(N=2,141) Harmful Very harmful	793 1348	37.0(35.0-39.1) 63.0(60.9-65.0)
7	Do you think smoking around others could affect their health? (N=2,319) Yes No I don't know	1986 207 126	85.6(84.2-87.0) 9.0(7.8-10.1) 5.4(4.6-6.4)
8	Do you mind if people smoke in your home? (N=2,323) Don't mind I do mind but I allow it I don't allow it Mean $\pm$ SD	248 934 1141 2.4 $\pm$ 0.67	10.7(9.5-12.0) 40.2(38.2-42.2) 49.1(47.1-51.2)
9	How important is it to you to have a smoke free workplace? (N=2,323) Not important Moderately important Important Very important Mean $\pm$ SD	80 64 1023 1156 3.4 $\pm$ 0.71	3.4(2.8-4.2) 2.8(2.1-3.5) 44.0(42.0-46.1) 49.8(47.7-51.8)
10	Has a health worker ever talked to you about the harms of smoking?(N=2,126) Yes No	1264 862	59.5(57.4-61.5) 40.5(38.5-42.6)
11	In general, how harmful is smoking for your health? (N=2,303) Not harmful Moderately harmful Harmful Very harmful Mean $\pm$ SD	36 110 866 1291 3.48 $\pm$ 0.66	1.6(1.1-2.1) 4.8(4.0-5.7) 37.6(35.6-39.6) 56.1(54.0-58.1)

#### 4.3.3 Knowledge, attitudes and practices concerning alcohol use and misuse and related behaviours

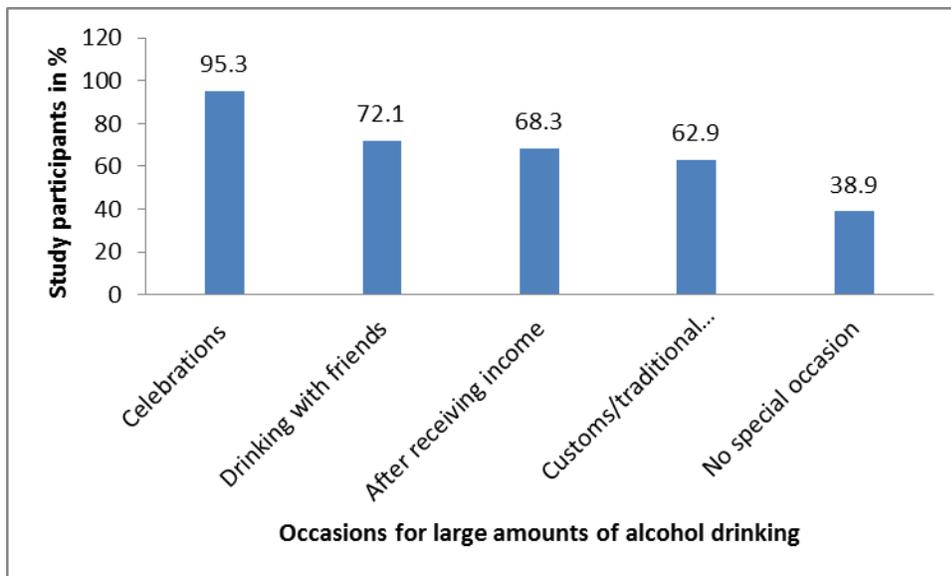
The knowledge, attitudes and practices concerning alcohol use and misuse were computed as shown in Table 4.27. Most, 2050 (88.2%) of the study participants agreed or strongly agreed that when Ethiopians consume alcohol they tend to drink large amounts at single time (binge drinking). About 1,503 or more than 2/3<sup>rd</sup>, 67.7% (95% CI: 65.7-69.6) of the study participants had consumed alcohol at some time in their lives. This is higher than that reported in China by Li *et al* (2013:653) and Bangladesh Ministry

of Health (2010:24). These could be due to the age and cultural differences between the three populations. Among the ever drinkers, 408, 25% (95% CI: 22.9-27.1) of them had drunk alcohol between waking up in the morning and midday in the one month preceding the study. The proportion of the study participants who had thought of reducing the amount of alcoholic drink was 981, 61.4% (95% CI: 59.0-63.8). The proportion of the study participants experienced driving a car was 156, 7.6% (95% CI: 6.5-8.8). Of those experienced driving a car, 15, 9.6% (95% CI: 5.7-15) drove car under the influence of alcohol. Of all the study participants, nearly half or 1,096, 48.4% (95% CI: 46.3-50.1) were not given any advice by the health workers about the harms of alcohol misuse. The majority 2,031 (89.1%) of the study participants perceived that drinking alcohol every day is harmful or very harmful to their health. This awareness in Tigray is higher than that reported by the Mongolian, Ministry of Health (2012:34), which might be due to better exposure in Tigray to information on the harms of alcohol. From Figure 4.29, the top three occasions reported by the study participants to consume large amount of alcohol were celebrations, being with friends and after receiving monthly income in 2,237 (95.3%), 1,692 (72.1%) and 1,603 (68.3%) of the study participants reporting these respectively. As also indicated in Figure 4.30, the reasons for alcohol drinking are being with friends, to enjoy, relax, forget problems, enhance digestion, and for deworming purposes. The three most frequently mentioned reasons were being with friends, to enjoy and relax in 392 (26.3%), 357(24%) and 253(17%) of the study participants respectively. This is also consistent with the findings from Mongolia, Ministry of Health (2012:49).

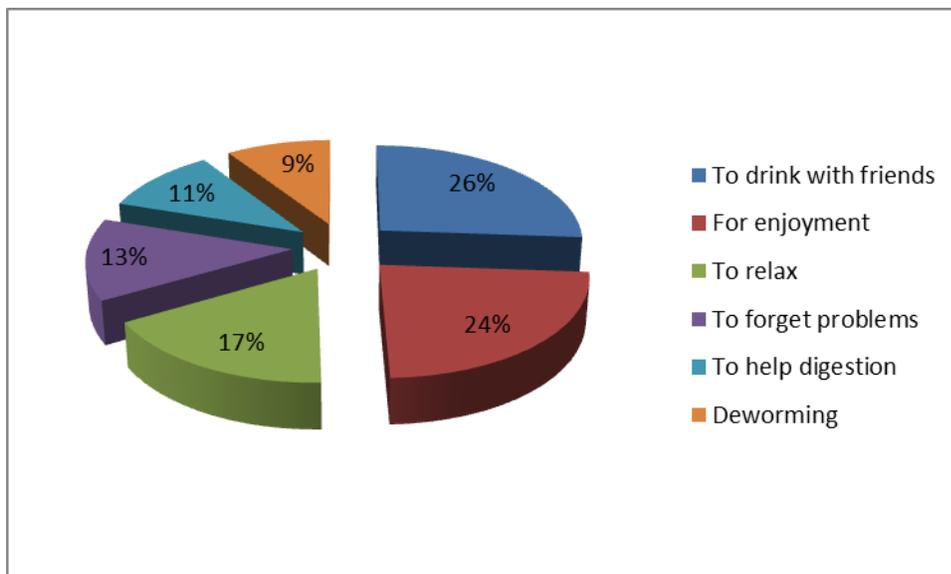
**Table 4.27 Knowledge, attitudes and practices on alcohol use and misuse among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	Number	Percentage with 95% CI
1	When Ethiopians drink alcohol they tend to drink large amounts at once (N=2,324)		
	Strongly Disagree	125	5.4(4.5-6.4)
	Disagree	149	6.4(5.5-7.5)
	Agree	1325	57.0(1.9-3.1)
	Strongly agree	725	31.2(29.3-33.1)
	Mean ± SD	3.14±.76	

2	Do you ever drink any alcohol? (N=2,220) Yes No	1503 717	67.7(65.7-69.6) 32.3(30.4-34.3)
3	In the past month, ever had an alcoholic drink between waking up in the morning and midday. (N=1,633) Yes No	408 1225	25.0(22.9-27.1) 75.0(72.9-77.1)
4	Have you ever thought there is a need to reduce the amount of alcoholic drink? (N=1597) Yes No	981 616	61.4(59.0-63.8) 38.6(36.2-41.0)
5	Do you drive a car? (N=2,066) Yes No	156 1910	7.6(6.5-8.8) 92.4(91.3-93.5)
6	Have you ever driven whilst influenced by alcohol? (N=156) Yes No	15 141	9.6(5.7-15.0) 90.4(85.0-94.3)
7	Have you ever been advised by a health worker about the harms of alcohol drinking? (N=2,125) Yes No	1096 1029	51.6(49.5-53.7) 48.4(46.3-50.1)
8	In general, how harmful is drinking alcohol every day to your health? (N=2,279) Not harmful Moderately harmful Harmful Very harmful Mean±SD	42 206 891 1140 3.37±0.73	1.8(1.3-2.5) 9.0(7.9-10.3) 39.1 (37.1-41.1) 50.0(48.0-52.1)



**Figure 4.29 Occasions on which large amounts of alcohol drinking are consumed by the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**



**Figure 4.30 Reasons for alcohol drinking by the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=1,489)**

#### 4.3.4 Knowledge, attitudes and practices on dietary intake

Table 4.28 demonstrates the knowledge, practices and attitudes related to dietary intake of the study participants. Most 2,270 (97.4%) of the study participants believed

that eating fruits and vegetables daily is important or very important. Only 60 (2.6%) of the study participants believed that eating fruits and vegetables daily was not important or only moderately important. More than 1,727 (74%) and 1,762 (75%) of the study participants reported eating fruits every day and vegetables every day, respectively, is very important. A considerable number, 341, 14.8% (95% CI; 13.4-16.3%) of the study participants reported that eating low amounts of fruits and vegetables is not harmful to their health. These findings are better than the beliefs held in Mongolia (Mongolian Ministry of Health (2012:49). The more beneficial beliefs in Tigray could be due to better access to information on the benefits of fruit and vegetable intake. Reasons for not consuming fruit were mentioned by the study participants as shown in Figure 4.31. The most common reason was a lack of knowledge about the benefits, lack of money to buy and lack of availability in 821(35%), 681(29%) and 493(21%) of the study participants respectively. This is almost consistent with the reports of Mongolia, Ministry of Health (2011:49).

More than half, 1,177, 50.1% (95% CI: 48.7-52.7%) of the study participants believed that Ethiopians eat too much raw meat or beef. The most common reason mentioned by 71.4% (95% CI: 68.7-74.0%) of the study participants for eating raw meat or beef was that it was due to customs or traditions. Ever eating of raw meat or beef was only practiced in 595, 26.9% (95% CI: 25.1-28.8) of the study participants. Among those who ever ate raw meat or beef, more than 1/5<sup>th</sup> or 120, 20.2% (95% CI: 17.1-23.5%) of the study participants had eaten raw meat in the one month preceding the study. The majority, 98, 81.7% (95% CI: 74.0-87.8%), eat raw meat sometimes. Only 9, 7.5% (95% CI; 3.7-13.3%) of the study participants eat raw meat or beef always on daily bases.

The majority, 1809, 87.0 % (95% CI, 85.5-88.4) of the study participants reported that they never thought about how much salt to have in their diet. The source of foods or drinks contributing to the largest amount of daily salt intake in most study participants were cooked foods and coffee in 1156, 54.5% (95% CI; 52.4-56.6%) and raw foods including milk, meat and vegetables in 821, 38.7% (95% CI; 36.7-40.8%). This pattern is similar to that reported by the Mongolia Ministry of Health (2011:49). The majority or 1,409, 61.6% (95% CI: 59.6-63.6%) of the study participants always added salt to their food when eating or cooking, which is consistent with the finding in India by Basu *et al*

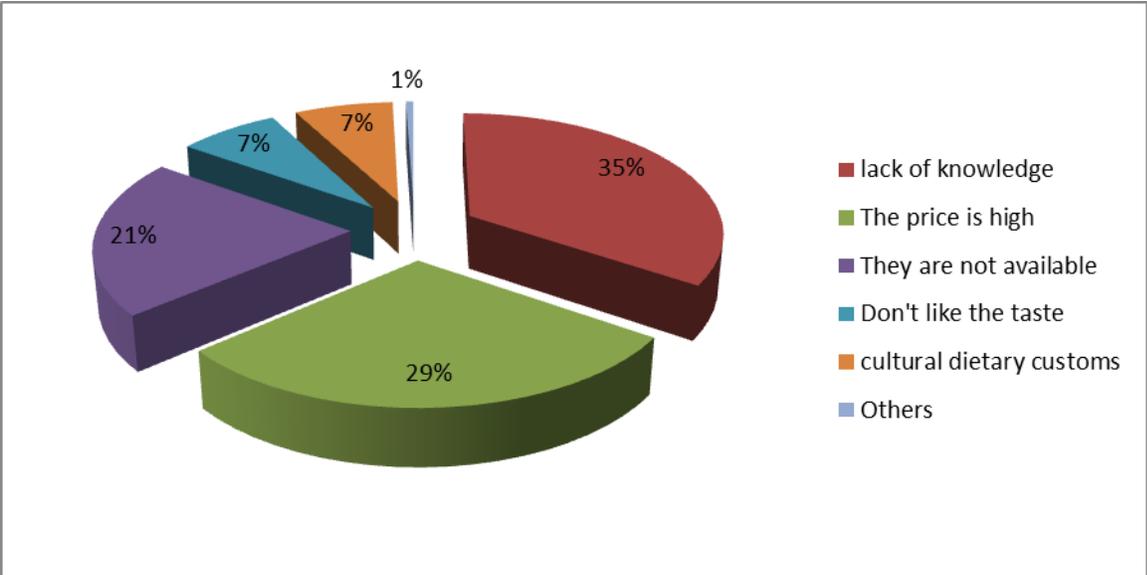
(2013:20). Of all the study participants, 371, 17.6% (95% CI: 16.0-19.2) of the study participants reported that they found foods to be too salty when they eat meals in homes or houses other than their own. Nearly 1 in 5 or 421, 19.1% (95% CI: 17.5-20.8%) of the study participants reported that the salt content of sausages, stew or chili was high. When preparing coffee, 229, 10.0% (95% CI: 8.8-11.3%) of the study participants add salt to it. Most, 1,860 (87.3%, with 95% CI: 85.9-88.7%) of the study participants believed that Ethiopians consume too much salt. The majority, 2,149, 93.1% of the study participants, believed that too much salt consumption is harmful or very harmful for one's health. This awareness is much better than that reported by the Mongolia Ministry of Health (2011:49), which could be due to exposure to awareness interventions in Tigray.

**Table 4.28 Knowledge, attitudes and practices on dietary intake among the study participants in Kilte Awlalo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	No	Percentage with 95% CI
1	How important is it for people to eat fruits and vegetables every day? (N=2,330)		
	Not important	19	0.8(0.5-1.2)
	Moderately important	41	1.8(1.3-2.4)
	Important	618	26.5(24.8-28.4)
	Very important	1652	70.9(69.0-72.7)
	Mean ± SD	3.68±.55	
2	How important is it to you to eat fruit every day? (N=2,332)		
	Not important	11	.5(0.2-0.8)
	Moderately important	30	1.3(0.9-1.8)
	Important	564	24.2(22.5-26.0)
	Very important	1727	74.1(72.3-75.8)
	Mean ± SD	3.72±.51	
3	How important is it to you to eat vegetables every day? (N=2,329)		
	Not important	9	.4(0.2-0.7)
	Moderately important	37	1.6(1.1-2.2)
	Important	521	22.4(20.7-24.1)
	Very important	1762	75.7(73.9-77.4)
	Mean ± SD	3.73±0.5	

4	In general, how harmful is eating low amounts of fruits and vegetables to your health? (N=2,302) Not harmful Moderately harmful Harmful Very harmful	341 313 1120 528	14.8(13.4-16.3) 13.6(12.1-15.0) 48.7 (46.6-50.7) 22.9 (21.3-24.7)
5	Do you think Ethiopians eat too much beef/raw meat? (N=2,322) Yes No	1177 1145	50.1(48.7-52.7) 48.8(47.3-51.3)
6	Reasons for eating raw meat/beef (N=1,121) Customs and traditions It is tasty It makes more healthier It is more nutritious others	800 156 142 19 4	71.4(68.7-74.0) 13.9(12.0-16.0) 12.7(10.8-14.7) 1.7(1.1-2.6) 0.4(0.1-0.9)
6	Have you ever eaten raw meat or beef? (N=2,209) Yes No	595 1614	26.9(25.1-28.8) 73.1(71.2-74.9)
7	Did you eat raw meat in the past one month?(N=595) Yes No	120 475	20.2(17.1-23.5) 79.8(76.5-82.9)
8	How frequent do you eat raw meat? (N=120) Always Sometimes Rarely	9 98 13	7.5(3.7-13.3) 81.7(74.0-87.8) 10.8(6.2-17.4)
9	Do you ever think about how much salt you have in your diet? (N=2,080) Yes No	1809 271	87.0(85.5-88.4) 13.0(11.6-14.5)
10	Source of food/drinks contributing to the largest amount of daily salt intake(N=2,120) Cooked foods and coffee Raw foods like milk, meat and vegetables Factory processed foods, biscuits, chili, sausages	1156 821 143	54.5(52.4-56.6) 38.7(36.7-40.8) 6.8(5.7-7.9)
11	How often do you add salt when cooking/eating meals (N=2288) Never Sometimes Often Always	70 586 223 1409	3.1(2.4-3.8) 25.6(23.9-27.4) 9.7(8.6-11.0) 61.6(59.6-63.6)
12	When you eat meals not at your own house, how do you find the food? (N=2112) Too salty Normal Not salty enough	371 1510 231	17.6(16.0-19.2) 71.5(69.5-73.4) 10.9(9.7-12.3)
13	Salt content of sausages/stew/Chili (2,202) Low Medium High	819 962 421	37.2(35.2-39.2) 43.7(41.6-45.8) 19.1(17.5-20.8)

14	When preparing coffee, do you usually add salt? (N=2,284) Yes No	229 2055	10.0(8.8-11.3) 90.0(88.7-91.2)
15	Do you think Ethiopians consume too much salt? (N=2,130) Yes No	1860 270	87.3(85.9-88.7) 12.7(11.3-14.1)
16	In general, how harmful is eating food with a lot of salt to your health?(N=2,308) Not harmful Moderately harmful Harmful Very harmful Mean ± SD	25 134 1198 951 3.33±0.64	1.1(0.7-1.6) 5.8(4.9-6.8) 51.9(49.9-53.9) 41.2(39.2-43.2)



**Figure 4.31 Reasons for not eating fruits and vegetables by the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

**4.3.5 Knowledge, attitudes and practices related religious fasting**

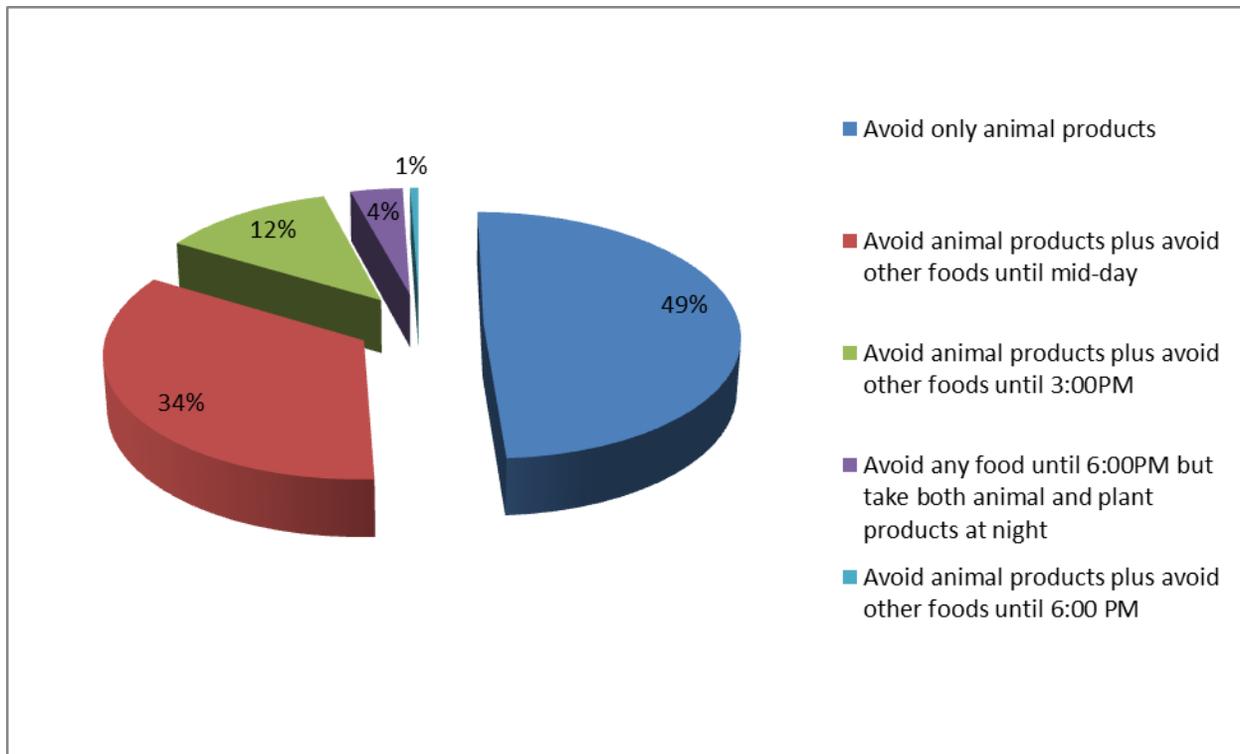
The knowledge, attitudes and practices pertaining to religious fasting were depicted in Table 4.29. The proportion of the study participants that reported religious fasting would reduce risk of acquiring NCDs was 1105, 47.5% (95% CI: 45.5-49.5). The remaining study participants reported that it would not reduce the risk or they did not have the idea. The proportion of the study participants that reported religious fasting is not beneficial to health was 1,247, 53.9% (95% CI: 51.9-56.0). More than half, 459, 52% (95% CI: 48.7-55.3) of participants reported that religious fasting does not reduce body

weight. The remaining reported that it would reduce body weight. Another 445, 50.5% (95% CI: 47.2-53.8) of the study participants believed that religious fasting benefits health by making them to feel healthy and strong. A large number, 842, 67.1% (95% CI: 64.5-69.7) of the participants believed that religious fasting does not have much effect on physical health. Most, 2080, 90.3% (95% CI: 89.0-91.4) of the study participants reported that they have never practiced religious fasting. Of those who practiced religious fasting in their lives, 1948, 95% (95% CI: 94.0-96.0) practiced religious fasting in the 12 months preceding the study.

**Table 4.29 Knowledge, attitudes and practices on religious fasting in relation to NCDs among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	No	Percentage with 95% CI
1	Do you think that religious fasting will reduce risk of acquiring NCDs? (N=2,326)		
	Yes	1105	47.5(45.5-49.5)
	No	1014	43.6(41.6-45.6)
	I don't know	207	8.9(7.8-10.1)
2	Religious fasting is beneficial to health? (N=2,312)		
	Yes	924	40.0(38.0-42.0)
	No	1247	53.9(51.9-56.0)
	I don't know	141	6.1(5.2-7.2)
3	Religious fasting benefits health by reducing weight? (N=883)		
	Yes No	424 459	48.0(44.7-51.3) 52.0(48.7-55.3)
4	Religious fasting benefits health by making feel healthy and strong? (N=881)		
	Yes	445	50.5(47.2-53.8)
	No	436	49.5(46.2-52.8)
5	Fasting does not have much effect on physical health (N=1,254)		
	Yes No	412 842	32.9(30.3-35.5) 67.1(64.5-69.7)
6	Have you ever practiced religious fasting? (N=2,304)		
	Yes No	2080 224	90.3(89.0-91.4) 9.7(8.7-11.0)
7	Have you practiced religious fasting in the past 12 months? (N=2,050)		
	Yes	1948	95.0(94.0-96.0)
	No	102	5.0(4.1-6.0)

The commonly practiced types of religious fasting were to avoid animal products (meat, milk and butter) only, avoid any animal products plus avoid any other foods until midday, avoid any animal products plus avoid any other foods until 3:00PM in the afternoon in 1,039 (49%), 721(34%) and 254(12%) of the study participants respectively (Figure 4.32).



**Figure 4.32 Types of religious fasting practiced by the study participants in Kille Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,121)**

#### 4.3.6 Knowledge and attitudes about physical exercise

As depicted in Table 4.30, 1,533, 66.3% (95% CI: 64.4-68.2%) of the study participants reported that a person should do physical exercise 5 or more times per week to stay healthy. This belief is more widely held in Ethiopia than in Mongolia (Mongolia Ministry of Health (2011:49), which could be due to better access in Ethiopia to information on the benefits of physical activity. The remaining participants mentioned that less frequent physical exercise is required to stay healthy. The most commonly cited reasons for not engaging in physical exercise were lack of knowledge on how to do it, no time for physical exercise and lack of willingness to do the physical exercise in 1,118, 49.3%

(95% CI: 47.2-51.3%), 543, 23.9% (95% CI: 22.2-25.7%) and 420, 18.5% (95%CI: 16.9-20.1%) of the study participants respectively. Nearly 687(30%) of the study participants responded that being physically inactive is not harmful for their health. This is almost consistent with that reported by Mongolia, Ministry of Health (2011:49).

**Table 4.30 Knowledge, attitudes and practices on physical exercise among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	No	Percentage with 95% CI
1	How often a person should do exercise to stay healthy? (N=2,312)		
	Monthly	144	6.2(5.3-7.3)
	Twice a month	35	1.5(1.1-2.1)
	Once a week	134	5.8(4.9-6.8)
	2-4 times per week	466	20.2(18.7-21.8)
	4 or more times per week	1533	66.3(64.4-68.2)
2	What is the main reason many people don't get this much exercise? (N=2,270)		
	No time	543	23.9(22.2-25.7)
	Too expensive	59	2.6(2.0-3.3)
	They don't know how to do it	1118	49.3(47.2-51.3)
	They don't want to do it	420	18.5(16.9-20.1)
	They think there is no need	128	5.6(4.7-6.6)
	Others	2	0.1(0.0-0.3)
3	How harmful is being physically inactive for your health? (N=2,290)		
	Not harmful	427	18.6(17.1-20.)
	Moderately harmful	260	11.4(10.1-12.7)
	Harmful	1071	46.8(44.7-48.8)
	Very harmful	532	23.2(21.5-25)
	Mean $\pm$ SD	2.75 $\pm$ 1	

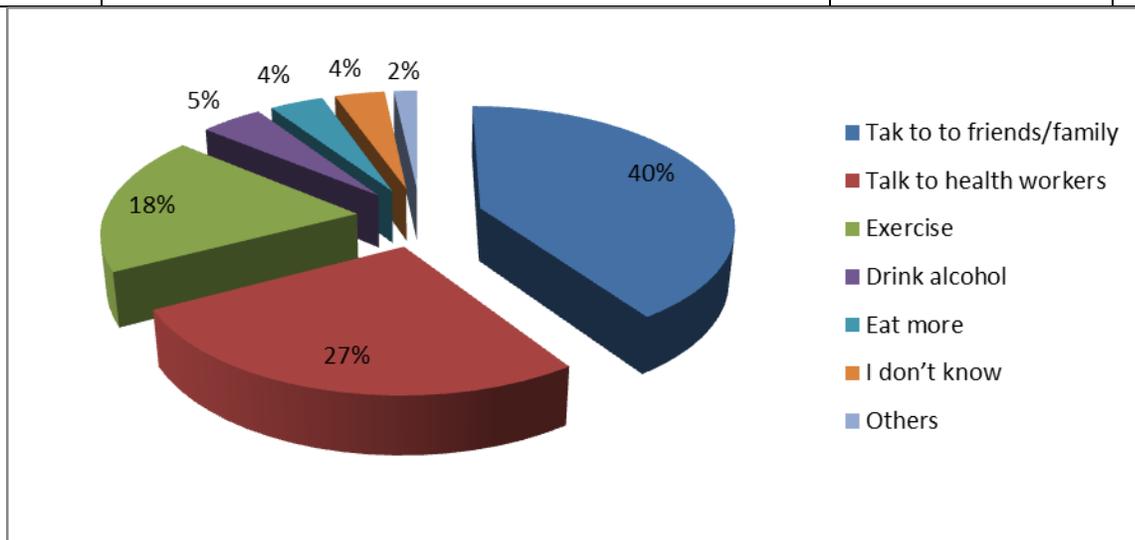
#### 4.3.7 Mental stress and its management

Mental stress and its management among the study participants were addressed in Table 4.31. Although the frequency of encountering mental stress varied, 1,170 (50.5%) of the study participants reported to have some sort of mental stress. This is lower than that of the study findings in Thailand by Supanee *et al* (2011:1754). The main causes of mental stress reported were lack of job 371(29.9%, 95% CI: 27.6-32.7%), relationship with family 300(24.2%, 95% CI: 22.0-26.8%) and financial problems 207(16.7%, 95% CI: 14.8-19.0%). There are mechanisms mentioned by the study participants to manage stress as shown in Figure 4.33. The most frequently mentioned mechanisms to manage

stress were talk to family members or friends, talk to health workers and doing physical exercise in 939(40%), 634 (27%) and 422 (18%) of the study participants, respectively.

**Table 4.31 Stress management among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	No	Percentage with 95% CI
1	How often do you feel stressed? (N=2,318)		
	Always	54	2.3(1.8-3.0)
	Often	86	3.7(3.0-4.5)
	Sometimes	1030	44.4(42.4-46.5)
	Never	1148	49.5(47.5-51.6)
2	What is the main cause of stress in your life? (N=1, 232)		
	Relationships with family	300	24.2(22.0-26.8)
	Relationships with others	183	14.7(13.0-16.9)
	School/University	95	7.6(6.3-9.3)
	Lack of job	371	29.9(27.6-32.7)
	Financial problems	207	16.7(14.8-19.0)
	Health related problems	80	6.4(5.2-8.0)
	Others	6	.5(0.2-1.0)



**Figure 4.33 Mechanisms to manage once own stress by the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

#### 4.3.8 Knowledge attitudes and practices related to high blood pressure (hypertension)

Knowledge attitudes and practices related to high blood pressure (hypertension) are depicted in Table 4.32. Nearly 3/4<sup>th</sup> or 1,717 (74.4 %) of the study participants knew

nothing about elevated blood pressure or had only heard the term before. The majority, 2,124 or 91.7% (95% CI: 90.1-92.4%), of the study participants responded that it is important that every person have his or her blood pressure checked. The recognition of this advice is more prevalent in Tigray than in Mongolia according to the Mongolia Ministry of Health (2011:49), and the recognition is probably a function of exposure to better information. A considerable number, 1,789 or 77.5% (95% CI: 75.8-79.2%) of the study participants responded that people of their age should have their blood pressure checked more frequently than once a year. Again, this recognition is better in Tigray than Mongolia (Mongolia Ministry of Health 2011:49). The remaining participants recommended less frequent blood pressure checks for people of their age. The main reasons mentioned by the study participants for not checking their blood pressure were didn't know they had to 721 (31.6%) don't think it is important 662 (29%), and don't have time (450 (19.7%). Of all the study participants, 2,055 or 88.7% (95% CI: 87.4-89.9%) responded that eating food with lot of salt can affect blood pressure, and 2,001 or 96.5% (95% CI: 95.7-97.3%) responded that taking food with a lot of salt affects blood pressure by raising it. Only seventy-one or 3.4% (95% CI: 2.7-4.3%) of the study participants responded that taking food with lot of salt would lower the blood pressure. The proportion of study participants that responded that high blood pressure could cause health problems was 2,022 or 94.5% (95% CI: 93.5-95.4%). As for the knowledge of the study participants about organs affected by high blood pressure, 2,003 or 90.3% (95% CI: 89.1-91.5%) reported that hypertension could affect the brain; 1,895 or 86.0% (95% CI: 84.5-87.5%) reported that it could affect the kidneys and 2,036 or 91.7% (95% CI: 90.5-92.8%) reported that hypertension could affect the heart. With regard to the knowledge about various interventions to reduce high blood pressure, 278 or 12.1% (95% CI: 10.8-13.5%), 340 or 14.9% (95% CI: 13.5-16.4%), 256 or 11.2% (95% CI: 10.0-12.7%) and 232 or 10.2% (95% CI: 9.0-11.5%) of the study participants erroneously responded that taking medication, losing weight, and changing diet are not effective to reduce high blood pressure respectively. This is consistent with the findings of the Mongolia Ministry of Health (2011:49).

**Table 4.32 Knowledge, attitudes and practices related high blood pressure among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	No	Percentage with 95% CI,
1	How much do you know about blood pressure? (N=2,316)		
	Nothing at all	643	27.8(26.0-29.6)
	Only heard the term before	1074	46.4(44.4-48.4)
	Know a little about it	481	20.8(19.2-22.5)
	Very familiar with it	118	5.1(4.3-6.0)
2	Do you think it is important that every person has his/her BP checked? (N=2,315)		
	Yes	2124	91.7(90.1-92.4)
	No	191	8.3(7.2-9.4)
3	How often do you think people of your age should have checked their BP?(N=2,308)		
	Not needed to check regularly	120	5.2(4.3-6.2)
	Every five years	18	0.8(0.5-1.2)
	Every two years	41	1.8(1.3-2.4)
	Once a year	340	14.7(13.3-16.2)
	More often than once a year	1789	77.5(75.8-79.2)
4	Main reason for not checking once blood pressure (N=2,281)		
	Don't have time	450	19.7(18.1-21.4)
	Don't know where to access the service	330	14.5(13.1-16.0)
	Don't think it is important	662	29.0(27.2-30.9)
	Don't know how	116	5.1(4.2-6.0)
	Didn't know I had to	721	31.6(29.7-33.5)
	Others	2	0.1(0.0-0.3)
5	Can eating food with a lot of salt affect blood pressure? (N=2,317)		
	Yes	2055	88.7(87.4-89.9)
	No	90	3.9(3.2-4.7)
	I don't know	172	7.4(6.4-8.5)
6	How would eating food with a lot of salt affect your blood pressure? (N=2,073)		
	Raise it	2001	96.5(95.7-97.3)
	Lower it	71	3.4(2.7-4.3)
	I don't know	1	.1(0.0-0.2)
7	Does high blood pressure cause health problems? (N=2,140)		
	Yes	2022	94.5(93.5-95.4)
	No	64	3.0(2.3-3.8)
	I don't know	54	2.5(1.9-3.3)
8	Does high blood pressure affect the brain? (N=2,217)		
	Yes	2003	90.3(89.1-91.5)
	No	80	3.6(2.9-4.4)
	I don't know	134	6.0(5.1-7.1)

9	Does high blood pressure affect the kidneys? (N=2,203) Yes No I don't know	1895 121 187	86.0(84.5-87.5) 5.5(4.6-6.5) 8.5(7.4-9.7)
10	Does high blood pressure affect the heart? (N=2,220) Yes No I don't know	2036 50 134	91.7(90.5-92.8) 2.3(1.7-2.9) 6.0(5.1-7.1)
11	The effectiveness of medication in reducing BP?(N=2,292) Not effective Effective Very effective Mean+SD	278 1145 869 2.26±0.66	12.1(10.8-13.5) 50.0(47.9-52.0) 37.9(35.9-39.9)
12	The effectiveness of losing weight in reducing BP?(N=2,277) Not effective Effective Very effective Mean+SD	340 1324 613 2.12±0.64	14.9(13.5-16.4) 58.1(56.1-60.2) 26.9(25.1-28.8)
13	The effectiveness of changing diet in reducing BP?(N=2,283) Not effective Effective Very effective Mean+SD	256 1235 792 2.23±0.64	11.2(10.0-12.7) 54.1(52.1-56.1) 34.7(32.8-36.7)
14	The effectiveness of exercise in reducing BP?(N=2,274) Not effective Effective Very effective Mean+SD	232 1111 931 2.31±0.65	10.2(9.0-11.5) 48.9(46.8-50.9) 40.9(38.9-43.0)

#### 4.3.9 Knowledge attitudes and practices related body weight

Knowledge, attitudes and practices related to body weight of the study participants was presented in Table 4.33. More than half, 1,188 or 53.1% (95% CI: 48.8-55.9) of the study participants had weighed in the 6 months preceding the study. The remaining 1,048 (46.9%) of study participants had not weighed this period. This frequency of weighing is comparable to that reported by Mongolia Ministry of Health (2011:49). With regard to feeling of body weight, 1,613(73.3%), 386 (17.5%), 176(9.2%) and 26(1.2%) of the study participants felt that they had normal-weight, underweight, overweight or very overweight respectively. The majority, 2,192 (95.1%), of the study participants responded that it is important or very important to have a normal body weight. This appreciation of the importance of ideal weight is higher than that reported by the Mongolia Ministry of Health (2011:49), and this is due to exposure better awareness

creation interventions. Fifty-nine percent of the subjects responded that being overweight is harmful or very harmful to health whereas 758 (32.9%) of the study participants reported being overweight is not harmful.

**Table 4.33 Knowledge, attitudes and practices related to body weight among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	No	Percentage with 95% CI
1	Have you weighed yourself in the past 6 months? (N=2,336)		
	Yes	1188	53.1(48.8-52.9)
	No	1048	46.9(42.9-46.9)
2	What do you feel about your body weight? (N=2,201)		
	Underweight	386	17.5(16-19.2)
	Normal weight	1613	73.3(71.4-75.1)
	Overweight	176	8.0(6.9-9.2)
	Very overweight	26	1.2(0.8-1.7)
	Mean ± SD	1.93±0.55	
3	How important is having a normal body weight to you? (N=2,305)		
	Not at all	33	1.4(1.0-2.0)
	Moderately important	80	3.5(2.8-4.3)
	Important	1064	46.2(44.1-48.2)
	Very important	1128	48.9(46.9-51.0)
	Mean ±SD	3.43±0.63	
4	How harmful is being overweight to your health? (N=2,302)		
	Not harmful	758	32.9(31.0-34.9)
	Moderately harmful	184	8.0(6.9-9.2)
	Harmful	770	33.4(31.5-35.4)
	Very harmful	590	25.6(23.9-27.4)
	Mean ± SD	2.52±1.2	

#### **4.3.10 Knowledge attitudes and practices concerning cardiovascular diseases (CVDs)**

The knowledge, attitudes and practices concerning CVDs are shown in Table 4.34. Most, 1,912(83.1%), of the study participants knew nothing at all about CVDs or only heard the term before. Pertaining to knowledge about stroke, 2,139 (93%) of the study participants knew nothing about stroke or only heard the term. The knowledge for both CVDs and stroke is lower than that reported by the Mongolia Ministry of Health (2011:34), which could be due to less information imparted to this study population on CVDs and stroke. About 2/3<sup>rd</sup>, 1,365 or 65.0% (95% CI: 62.9-67.0%) of the study

participants believed that CVDs are becoming common in Ethiopia. With regard to being concerned about developing CVDs by the study participants themselves, 1,802(71.3%) reported that they are concerned about developing CVDs. The remaining 456 or 28.7% (95% CI: 26.9-30.6%) were not concerned about developing CVDs. Most, 83.4% (95% CI: 81.9-84.9), of the study participants believed that smoking would increase someone's chances of getting cardiovascular diseases. However, 8.3% (95% CI: 7.2-9.5%), of the study participants believed that smoking would not increase someone's chances of getting cardiovascular diseases. Of the total study participants, 1919 or 85.8% (95% CI: 84.4-87.2%) believed that stress would increase chance of developing CVDs. More than 3/4<sup>th</sup>, 1,737 or 75.7% (95% CI: 73.9-77.4%) of the study participants reported that being overweight would increase someone's chances of getting cardiovascular diseases. The remaining participants reported that overweight would not cause CVDs or they were unsure about its consequences. Of the study participants, 1,608 or 69.9% (95% CI: 67.4-71.2%) of them responded that old age would increase the chance of getting CVDs. A large proportion or 1,058 or 48.0% (95% CI: 45.9-50.2%) of the study participants don't know if people with high blood pressure are more likely to have stroke. Eight hundred fifty-six (37.7%) of the study participants reported that CVDs are not preventable. This finding is inferior to that reported by the Mongolia Ministry of Health (2011:34).

**Table 4.34 Knowledge, attitudes and practices related to cardiovascular diseases among the study participants in Kilte Awlaelo HDSS site and Mekelle city, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	No	Percentage with 95% CI
1	How much do you know about heart disease? (N=2,303)		
	Nothing at all	667	29.0(27.1-30.8)
	Only heard the term	1245	54.1(52.0-56.1)
	Know a little about the disease	338	14.7(13.3-16.2)
	Very familiar with it	53	2.3(1.7-3.0)
	Mean ± SD	1.9±0.72	
2	How much do you know about stroke? (N=2,300)		
	Nothing at all	1277	55.5(53.5-57.6)
	Only heard the term	862	37.5(35.5-39.5)
	Know a little about the disease	125	5.4(4.6-6.4)
	Very familiar with it	36	1.6(1.1-2.1)
	Mean ± SD	1.53±0.67	

3	Do you think that cardiovascular diseases are becoming more or less in Ethiopia? (N=2,101) More Less Don't know	1365 272 464	65.0(62.9-67.0) 12.9(11.7-14.4) 22.1(20.4-23.9)
4	Are you concerned about developing cardiovascular diseases yourself? (N=2,297) Not at all Yes moderately Yes very Mean ± SD	659 1143 495 1.93±0.71	28.7(26.9-30.6) 49.8(47.7-51.8) 21.5(19.9-23.3)
5	Smoking would increase someone's chances of getting cardiovascular diseases. (N=2,300) Yes No Unsure	1919 191 190	83.4(81.9-84.9) 8.3(7.2-9.5) 8.3(7.2-9.4)
6	Stress would increase someone's chances of getting cardiovascular diseases. (N=2,310) Yes No Unsure	1983 153 174	85.8(84.4-87.2) 6.6(5.7-7.7) 7.5(6.5-8.7)
7	Being overweight would increase someone's chances of getting cardiovascular diseases. (N=2,296) Yes No Unsure	1737 269 290	75.7(73.9-77.4) 11.7(10.5-13.1) 12.6(11.3-14.0)
8	Older age would increase someone's chances of getting cardiovascular diseases. (N=2,320) Yes No Unsure	1608 305 389	69.9(67.4-71.2) 13.2(11.8-14.6) 16.9(15.3-18.3)
9	People with high blood pressure are more likely to have stroke. (N=2,119) True False I don't know	1,058 43 1018	49.9(47.8-52.1) 2.0(1.5-2.7) 48.0(45.9-50.2)
10	Cardiovascular diseases are preventable. (N=2,271) Agree Unsure Disagree	1415 778 78	62.3(60.3-64.3) 34.3(32.3-36.2) 3.4(2.7-4.2)

#### 4.3.11 Knowledge, attitudes and practices concerning type II diabetes

Knowledge, attitudes and practices of the study participants concerning type II diabetes are depicted in Table 4.35. About 1,636(71.5%) of the study participants knew nothing about type II diabetes or only heard the term. This level of awareness is not as good as

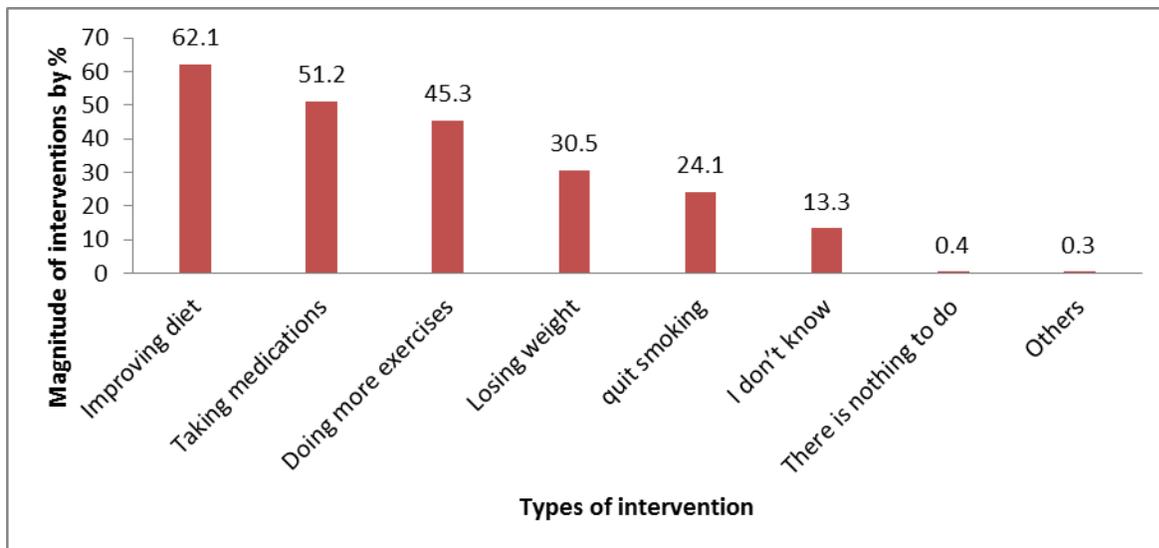
that reported by the Mongolia Ministry of Health (2011:49). More than 1/3<sup>rd</sup>, 808 or 34.8% (95% CI: 32.8-36.7%) of the study participants reported they didn't know if diabetes is present when there is too much sugar in the blood. One hundred fifty participants or 6.5% (95% CI: 5.5-7.5%) responded that diabetes is not when there is too much sugar in the blood. This indicates low knowledge about diabetes in this study population. Nine hundred seventy-seven, 42.1% (95% CI: 40.1-44.1%) of the study participants reported did not know if diabetes could not cause loss of sensation in the feet. Three hundred and ninety, 16.8% (95% CI: 15.3-18.4%) of the study participants reported that diabetes could not cause loss of sensation in foot. More than 1/4<sup>th</sup>, 509 or 25.4% (95% CI, 23.7-27.2%), of the study participants responded that people with diabetes could not live normal lives. A large proportion, 678 or 29.2% (95% CI: 27.4-31.1%), of the participants also reported that they did not know if one with diabetes could live normal life. Of all the study participants, 323 or 13.9% (95% CI: 12.6-15.4%) reported that diabetes does not damage the heart. Nine hundred and twenty-four, 39.8% (95% CI; 37.8-41.8%), of the study participants did not know if diabetes could damage people's heart. Only 650 or 28.1% (95% CI: 26.3-29.9%) of the study participants responded that diabetes could cause blindness. The remaining participants responded that they did not know if diabetes could or could not cause blindness. Three hundred and ninety-four, 17.0% (95% CI: 15.5-18.6%), of the study participants responded that diabetes cannot be prevented and 724 or 31.2% (95% CI: 29.4-33.1%) did not know if it is not preventable. This level of knowledge is comparable to that reported by the Mongolia Ministry of Health (2011:49). Only 1/3<sup>rd</sup>, 767 or 33.1% (95% CI: 31.3-35.1%) of the study participants reported that one could feel normal and healthy but still have diabetes. In more than half, 1,166 or 52.5% (95% CI: 50.4-54.6%), of the study participants had never received any information about diabetes from health workers

**Table 4.35 Knowledge, attitude and practices related to diabetes mellitus type 2 among the study participants in Kilte Awlaleo HDSS site and Mekelle city, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	No	Percentage with 95% CI
1	How much do you know about diabetes? (N=2,287)		

	Nothing at all Only heard the term before Know a little about the disease Very familiar with it Mean $\pm$ SD	544 1092 585 66 2.08 $\pm$ 0.78	23.8(22.1-25.6) 47.7(45.7-49.8) 25.6(23.8-27.4) 2.9(2.3-3.6)
2	Diabetes is when there is too much sugar in the blood. (N=2,325) True False I don't know	1367 150 808	58.8(56.8-60.8) 6.5(5.5-7.5) 34.8(32.8-36.7)
3	Diabetes cannot cause loss of sensation in your foot (N=2,320) True False I don't know	390 953 977	16.8(15.3-18.4) 41.1(39.1-43.1) 42.1(40.1-44.1)
4	Even if I have diabetes, I can live a normal life. (N=2,320) True False I don't know	1052 590 678	45.3(43.3-47.4) 25.4(23.7-27.2) 29.2(27.4-31.1)
5	Diabetes does not damage your heart. (N=2,321) True False I don't know	323 1074 924	13.9(12.6-15.4) 46.3(44.3-48.3) 39.8(37.8-41.8)
6	Diabetes can cause blindness. (N=2,317) True False I don't know	650 717 950	28.1(26.3-29.9) 30.9(29.1-32.9) 41.0(39.0-43.0)
7	Diabetes cannot be prevented. (N=2,318) True False I don't know	394 1200 724	17.0(15.5-18.6) 51.8(49.7-53.8) 31.2(29.4-33.1)
8	You can feel normal and healthy, but still have diabetes. (N=2,314) True False I don't know	767 702 845	33.1(31.3-35.1) 30.3(28.5-32.2) 36.5(34.6-38.5)
9	Has a health worker ever spoken to you about how you can prevent diabetes? (N=2,221) No Yes I don't know/don't remember	1166 773 282	52.5(50.4-54.6) 34.8(32.8-36.8) 12.7(11.4-14.1)

Figure 4.34 outlined the most common interventions to reduce diabetes mentioned by the study participants. The three main interventions identified were improving diet, taking medications and doing physical exercise in 62.1%, 51.2% and 45.3% of the study participants respectively.



**Figure 4.34 Interventions to reduce the chance of getting diabetes as perceived by the study participants in Kiltse Awlaleo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2,347)**

#### **4.3.12 Knowledge, attitudes and practices related to breast cancer**

The findings of knowledge, attitudes and practices of the study participants about breast cancer are displayed in Table 4.36. Most, 1099(86.6%), of the study participants were not knowledgeable about breast cancer. This is much lower than the findings in India by Fotedar *et al* (2013:119). This is because the study populations are very different. The latter population was made up of nurses. The lack of knowledge found in the present study was higher than that of Mongolia, Ministry of Health (2012:71); e.g., the subjects in Tigray are less knowledgeable about breast cancer. Four hundred and forty-one, 34.9% (95% CI: 32.3-37.6%). study participants were not worried that breast cancer can affect them or their families. This demonstrates less concern than the subjects of the Mongolian Ministry of Health (2012:71) study and reflects knowledge differences between the two populations about breast cancer. Five hundred and eighty-two, 46.4% (95% CI: 43.7-49.2%), of the study participants did not know that finding breast cancer early means there is better chance of being cured. This level of knowledge is much lower than the finding in Pakistan by Maqsood *et al* (2009:419), which could be explained by access to health information on breast cancer and related matters. Six hundred and thirteen, 48.9% (95% CI: 46.1-51.7%), of the study participants responded

that it is possible for women to detect early signs of breast cancer by self-examination. Nine hundred and ninety-three, 79.4% (95% CI: 77.1-81.6%), of the participants did not know how to examine the breasts for abnormality or signs of breast cancer. This lack of knowledge is similar to Fotedar *et al* (2013:119). In the three years preceding the study, 1,006 or 80.5% (95% CI: 78.3-82.7%) of the study participants did not practice self-examination of their own breasts. In the past 3 years, 1148 or 92.2% (95% CI: 90.6-93.6%) of the study participants' breasts were not examined by health workers.

**Table 4.36 Knowledge, attitude and practices related to breast cancer among the women study participants in Kilte Awlaelo HDSS site and Mekelle city, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	No	Percentage with 95% CI
1	How much do you know about breast cancer?(N=1268)		
	Nothing at all	533	42.0(39.3-44.8)
	Only heard the term before	566	44.6(41.9-47.4)
	A little about the disease	140	11.0(9.4-12.9)
	Very familiar with it	29	2.3(1.6-3.2)
2	Do you worry that breast cancer can affect you or your family?(N=1264)		
	Not at all	441	34.9(32.3-37.6)
	Sometimes	562	44.5(41.7-47.2)
	Often	261	20.6(18.5-23.0)
3	Finding Breast cancer early means there is better chance of becoming well again (N=1254)		
	True	640	51.0(48.3-53.8)
	False	32	2.6(1.8-3.5)
	I don't know	582	46.4(43.7-49.2)
4	It is possible for women to look for early signs of breast cancer by self-examination (N=1254)		
	True	605	48.2(45.5-51.0)
	False	36	2.9(2.0-3.9)
	I don't know	613	48.9(46.1-51.7)
5	Do you know how to examine your breasts for abnormality or signs of breast cancer (N=1251)		
	Yes	258	20.6(18.5-22.9)
	No	993	79.4(77.1-81.6)
6	In the past 3 years, have you ever self-examined your own breast (N=1249)		
	Yes	243	19.5(17.3-21.7)
	No	1006	80.5(78.3-82.7)

7	In the past 3 years, did you have P/E of your own breast by health worker (N=1245)		
	Yes	97	7.8(6.4-9.4)
	No	1148	92.2(90.6-93.6)

#### 4.3.13 Knowledge, attitudes and practices related to cervical cancer

Knowledge, attitudes and practices regarding breast cancer have been addressed in Table 4.37. Most, 1123(88.2%), of the study participants had no or poor knowledge of cervical cancer. This is consistent with the study conducted in Ukraine by Kivistik *et al* (2011:3) and is a lower level of knowledge than that reported by the Mongolia Ministry of Health (2011:74). This is most likely due to differences in exposure to reproductive health information. Nine hundred and sixty-seven (76.1%) of the participants did not have any idea about recommended frequency of having a Pap smear or the usefulness of visual inspection (VIA) of the cervix for cancer using acetic acid (VIA). The majority, 1,101 or 89.1% (95% CI: 87.3-90.7%), of the study participants have not had Pap smear or VIA in the three years preceding the study. Forty-three, 9.0% (95% CI: 6.6-11.8%) of the study participants were informed that they tested positive for cervical precancerous lesion or were going to develop it. Four hundred and ninety-eight, 39.5% (95% CI: 37.4-42.9%) did not worry that cervical cancer can affect them or their families. Four hundred and seventy-three, 43.6 (95% CI: 41.5-46.1), had female children under 14 years of age. Seven hundred and forty-five, (77.5%), did not know that cervical cancer can be prevented by vaccine. These findings are more negative than those reported by the Mongolia Ministry of Health (2011:74). More than 1/3<sup>rd</sup>, 33.9% (95% CI: 31.2-35.7%), of the subjects in the present study had their first sexual intercourse before the age of 15 years and more than half of the study participants had their first sexual intercourse before the age of 18 years. The mean  $\pm$  SD age for first sexual intercourse was 17.3  $\pm$  3.5 years. This is almost in agreement with the Ethiopian Demographic and Health Survey (EDHS) in 2011 by Central Statistical Agency [Ethiopia] and ICFInternational (2012:59). Seven hundred and forty, 64.7% (95% CI: 62.1-66.4%), had their first menses before the age of 15 years. The mean age for the first menses among the study participants was 15.2 $\pm$ 1.7 years. About one-fifth of the subjects, 21.7% (95% CI: 19.4-23.8%) had 2 or more marriages in their life time. The mean number of marriages

among the female study participants was  $1.13 \pm 0.8$ . About half, 52.5% (95% CI: 50.2-54.3), had 2-4 births. More than one-fifth had 5 or more births in their life time. The mean number of births was  $3.10 \pm 2.23$ . The usual place for childbirth was a hospital for 448 or 40.7% (95% CI: 37.8-43.6%) of the women, followed by home delivery for 387(35.1%). The proportion of women who acknowledged having an abortion was 242 or 20.2% (95% CI: 18.0-22.5%) and, of these, 103 or 42.9% (95% CI: 40.3-45.1%) had 2 or more abortions. The prevalence of female genital mutilation was 68 or 7.2% (95% CI: 5.1-9.3%). Fewer than 10% (8.4%, 95% CI: 6.3-10.5%) of the study participants, had sex partners or husbands who had another wife or sex partner. The prevalence of having history of sexually transmitted infections was 351 or 34.5% (95% CI: 32.6-36.6%). This is higher than that of (EDHS) in 2011 by Central Statistical Agency [Ethiopia] and ICF International (2012:59). This could be due to increased unsafe sexual behaviours among this study population.

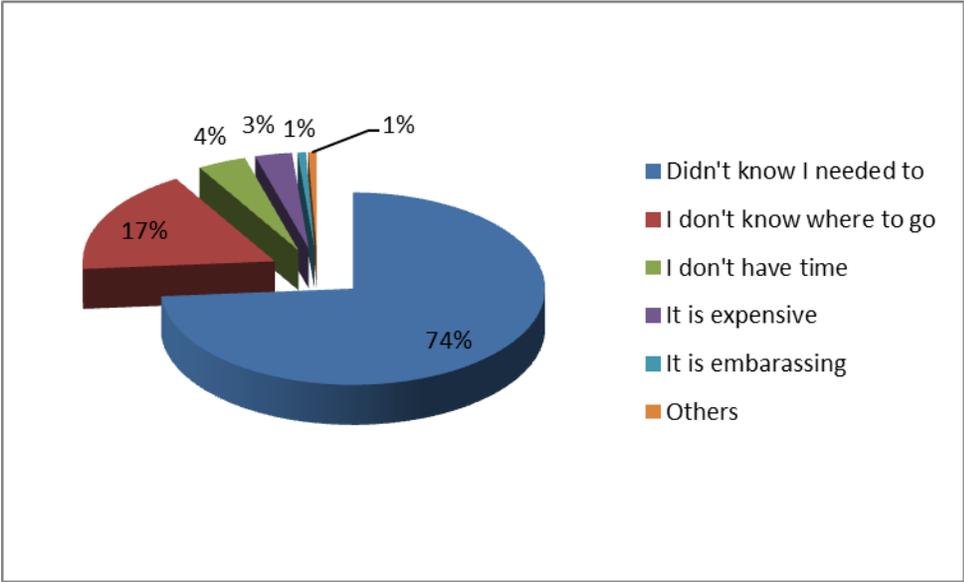
**Table 4.37 Knowledge, attitudes and practices related to cervical cancer among the female study participants in Kilt Awlaelo HDSS site and Mekelle city, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	No	Percentage with 95% CI
1	How much do you know about cervical ca?(N=1,272)		
	Nothing at all	550	43.2(40.5-46.0)
	Only heard the term before	573	45.0(42.3-47.8)
	A little about the disease	96	7.5(6.2-9.1)
	Very familiar with it	53	4.2(3.2-5.4)
2	Do you know how often it is recommended to have Pap smear or VIA? (N=1270)		
	Yearly	161	12.7(10.9-14.6)
	Every three years	52	4.1(3.1-5.3)
	Every five years	90	7.1(5.8-8.6)
	I don't know	967	76.1(73.7-78.4)
3	During the last three years, have you had a Pap smear/VIA (N=1245)		
	No	1109	89.1(87.3-90.7)
	Yes	136	10.9(9.3-12.8)
4	Have you ever been told that you tested positive for cervical cancer or going to develop it so far? (N=480)		
	Yes	43	9.0(6.6-11.8)
		437	91.0(88.2-93.4)

	No		
5	Do you worry that cervical ca can affect you or your family? (N=1241) Not at all Sometimes Often	498 514 249	39.5(37.4-42.9) 40.8(38.7-44.2) 19.7(17.9-22.4)
6	Do you have female children under 14 years of age (N=1082) Yes No	473 611	43.6 (41.5-46.1) 56.4 (54.3-58.7)
7	Cervical cancer can be prevented by vaccine (N=957) Yes No I don't know	212 31 714	22.2(19.6-24.9) 3.2(2.3-4.5) 74.6(71.8-77.3)
8	Age at first sexual intercourse (N=1,095) <15 years 15-17 years >=18 years Mean ± SD	371 195 529 17.3 ± 3.5	33.9 (31.2-35.7) 17.8 (15.3-19.6) 48.3(46.5-50.1)
9	Age at first menses (N=1143) <15 years >=15 years Mean ± SD	740 403 15.2± 1.7	64.7(62.1-66.4) 35.3(33.2-37.6)
10	Number of marriages (N=1087) 0-1 marriages >=2 marriages Mean +SD	851 236 1.13± 0.8	78.3(76.2-81.1) 21.7(19.4-23.8)
11	Number of births (N=1,095) 0 1 2-4 >=5 Mean ±SD	54 230 575 236 3.10 ±2.23	4.9 (2.8-6.7) 21.0(19.1-23.2) 52.5(50.2-54.3) 21.6 (19.9-23.6)
12	Place of birth (N=1101) Home Clinic Health center Hospital Elsewhere	387 19 244 448 3	35.1(32.4-38.0) 1.7(1.1-2.6) 22.2(19.8-24.7) 40.7(37.8-43.6) 0.3(0.1-0.7)

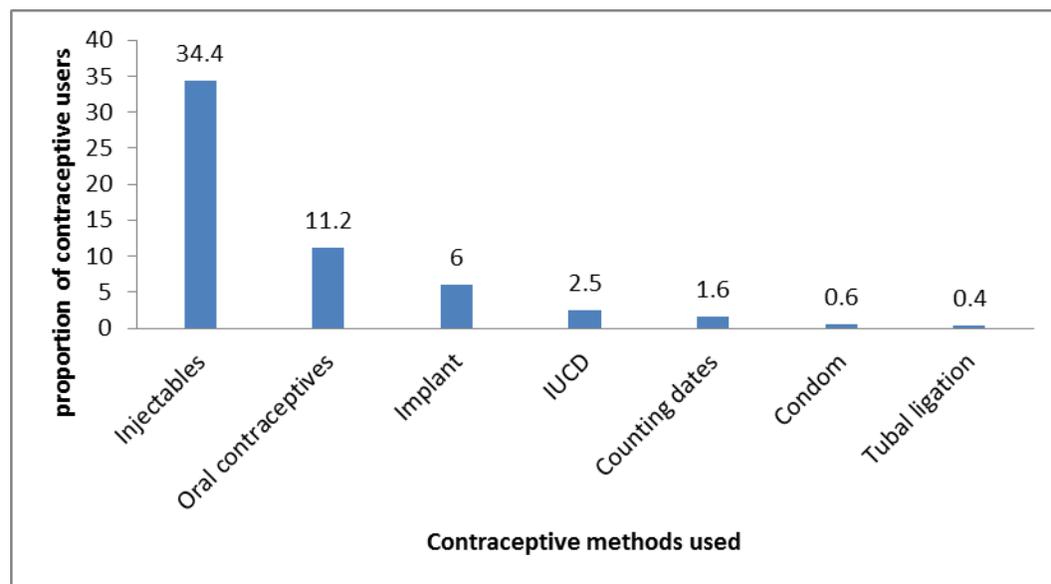
13	History of abortion (N=1200) Yes No	242 958	20.2(18.0-22.5) 79.8(77.5-82.0)
14	Number of abortion (N=240) 1 times ≥2 times	137 103	57.1 (55.2-59.3) 42.9(40.3-45.1)
15	Have you ever been circumcised (N=950) Yes No	68 882	7.2(5.1-9.3) 92.8(90.6-94.8)
16	Does your partner have another wife/female sex partner? (N=774) Yes No	65 709	8.4 (6.3-10.5) 91.6(89.5-93.7)
17	Have you ever had history of sexually transmitted infections? (N=1.017) Yes No	351 666	34.5(32.6-36.6) 65.5 (63.5-67.6)

The main reasons outlined by the study participants for not having a Pap smear or VIA were that they did not know that they needed to have Pap smear or VIA (74%), not knowing where to obtain these (17%), lack of time to have the services (4%), expense (3%) and embarrassment (1%) (Figure 4.35).



**Figure 4.35 Reasons for not having Pap smear or VIA by the female study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=1,008)**

As shown in Figure 4.36, the proportion of the study participants receiving contraceptive methods was 56.7%. The most commonly used contraceptive methods were injectables (34.4%), oral contraceptive pills (11.2%) and implants (6%).



**Figure 4.36 Types of contraceptives and proportion of users among the female study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=674)**

#### 4.3.14 Perceptions of body shape and size and related conditions

Table 38 shows the perceptions of the study participants about body shape and size. Interestingly, 111 or 4.8% (95% CI: 4.0-5.7%) of the study participants perceived that being overweight is a sign of good health and 86 or 3.7% (95% CI: 3.0-4.5%) did not have any idea if being overweight is a sign of good health. Of all the study participants, 119 or 5.1% (95% CI: 4.3-6.1%) believed that overweight or obese individuals are most likely wealthy; however, 81 or 3.5% (95% CI: 2.8-4.3%) did not have any idea about this. One hundred and ninety-four, 8.4% (95% CI: 7.3-9.6%) of the study participants perceived that overweight or obesity is a sign of attractiveness. These misperceptions are consistent with those findings in South Africa as noted by Skaal and Pengpid (2011:565) and in USA by Mama *et al* (2011:284). Being overweight or obese is seen as unattractive by 761 or 41.2% (95% CI: 38.9-43.4%) of the participants, and a sign of

health problems by 626 or 33.9% (95% CI: 31.7-36.0%) of the participants. Being slim is a sign of poor health as perceived by 197, 8.5% (95% CI: 7.5-9.7%) of the study participants. Of all, 105 (4.6%) of the study participants wanted the body size of their spouses to be obese or overweight. Most, 1,807 or 81.4% (95% CI: 79.8-83.0%), of the study participants described their body size and shape as normal at the time of the study. Only 194 (8.7%) of the study participants perceived themselves to be overweight or obese. Concerning their feelings about their body shape 1,979, 85.5% (95% CI: 84.0-86.9%) reported that they liked their body size and shape, and 278, 12.0% (95% CI: 10.7-13.4%) disliked their body shape and size. These findings are in agreement with the study in USA by Gross (2005:1612). More than 3/4<sup>th</sup>, 1,747 or 75.7% (95% CI: 73.9-77.4%) experienced comments about their body shape and size. Two hundred and ninety-six, 16.9%, had been told that they were overweight or obese. The majority, 2,001 or 87.3% (95% CI: 85.9-88.7%), perceived that there are adverse consequences as the result of being overweight or obese. The remaining 290(12.7%) perceived there are no adverse consequences or did not know if there are adverse effects. A sizeable proportion, 513 or 22.2% (95% CI: 20.5-23.9%) of the study participants believed that eating beef or raw meat is beneficial for their body size and shape. Nearly one-third, 739 or 31.9% (95% CI: 30.0-33.8%), of the participants responded that frequent feeding of plant products including fruit and green leafy vegetables would negatively affect their body size and shape.

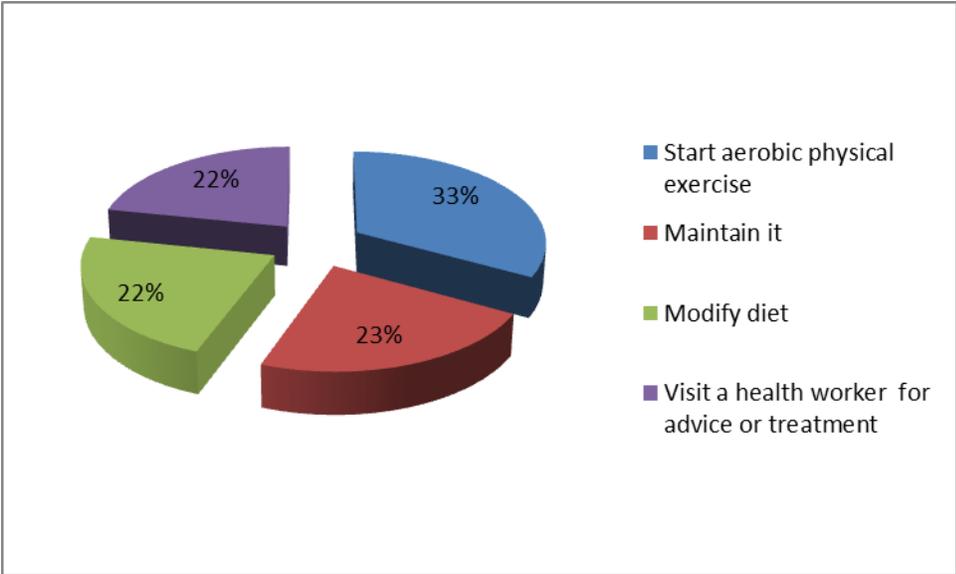
**Table 4.38 Perception of body shape and size among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	No	Percentage with 95% CI
1	Overweight is a sign of good health. (N=2,324) Yes No I don't know	111 2127 86	4.8(4.0-5.7) 91.5(90.3-92.6) 3.7(3.0-4.5)
2	Overweight/obese individuals are most likely wealthy. (N=2,318) Yes No I don't know	119 2118 81	5.1(4.3-6.1) 91.4(90.2-92.5) 3.5(2.8-4.3)

3	Overweight is a sign of attractiveness.(N=2,309) Yes No I don't know	194 2034 81	8.4(7.3-9.6) 88.1(86.7-89.4) 3.5(2.8-4.3)
4	Reasons for not saying overweight/obesity is not a sign of attractiveness. (N=1,849) Ugliness Shamefulness Frustrations A sign of health problem	761 208 254 626	41.2(38.9-43.4) 11.2(9.9-12.8) 13.7(12.2-15.4) 33.9(31.7-36.0)
5	Being slim is a sign of illness or poor health. (N=2,305) Yes No I don't know	197 2038 70	8.5(7.5-9.7) 88.4(87.1-89.7) 3.0(2.4-3.8)
6	What do you like to be the body size of your spouse? (N=2,265) Obese Overweight Normal Underweight I don't know	9 96 2000 38 122	.4(0.2-0.7) 4.2(3.5-5.1) 88.3(86.9-89.6) 1.7(1.2-2.3) 5.4(4.5-6.4)
7	How do you describe your body size currently?(N=2,219) Obese Overweight Normal Underweight I don't know	14 180 1807 203 15	0.6(0.4-1.0) 8.1(7.0-9.3) 81.4(79.8-83.0) 9.1 (8.0-10.4) 0.7 (0.4-1.1)
8	How do you feel about your current body size and shape?(N=2,315) I like it I dislike it I don't know	1979 278 58	85.5 (84.0-86.9) 12.0(10.7-13.4) 2.5(1.9-3.2)
9	Have you experienced others comment about your body size and shape? (N=2,307) Yes No I don't know	1,747 498 62	75.7(73.9-77.4) 21.6(19.9-23.3) 2.7(2.1-3.4)
10	What were others comments about your body size and shape? (N=1,747) Obese Overweight Normal weight Underweight I don't know	34 262 1097 316 38	1.9(1.4-2.7) 15.0(13.4-16.7) 62.8(60.5-65.0) 18.1(16.3-20.0) 2.2(1.6-2.9)
11	Is there any adverse consequence as the result of overweight or obesity? (N=2,291)		

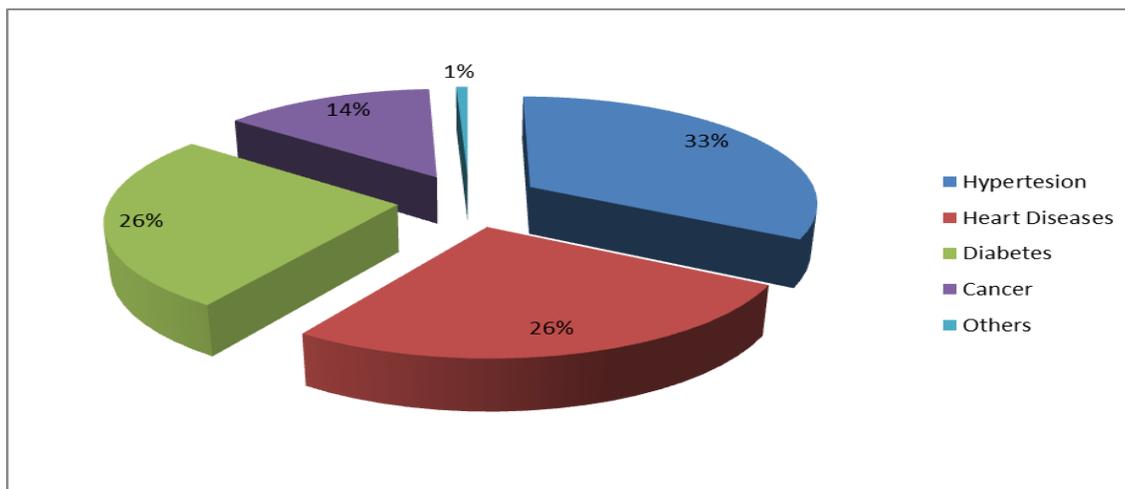
	Yes	2001	87.3(85.9-88.7)
	No	164	7.2(6.2-8.3)
	I don't know	126	5.5(4.6-6.5)
12	Frequent feeding of animal products including raw meat/beef is beneficial to our body size and shape. (N=2,315)		
	1. Yes	513	22.2(20.5-23.9)
	2. No	1642	70.9(69.1-72.8)
	3. I don't know	160	6.9(5.9-8.0)
13	Frequent feeding of plant products like fruits, green leafy vegetables will negatively affect your body size and shape (N=2,320)		
	Yes	739	31.9(30.0-33.8)
	No	1499	64.6(62.7-66.6)
	I don't know	82	3.5(2.8-4.3)

As shown in Figure 4.37, the study participants perceived that they would take the following interventions to reduce overweight or obesity for themselves. The interventions suggested were aerobic exercises (33%), dietary modification (22%), and visit to a health worker for treatment or advice (22%). Surprisingly, 23% responded that they would maintain being overweight or obesity which indirectly indicates misperception of risk factors related to body size and shape.



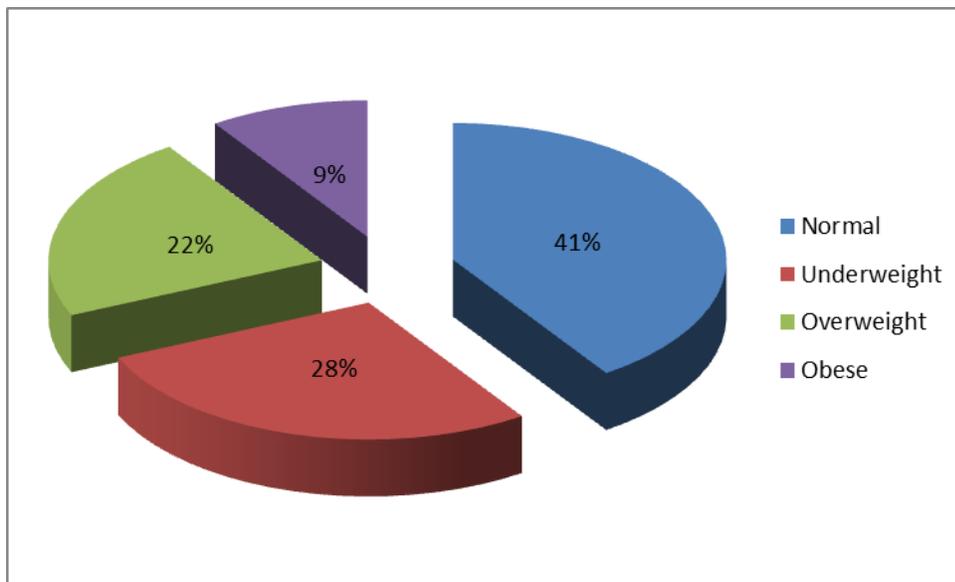
**Figure 4.37 Measures taken for overweight or obesity by the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013- January, 2014**

The study participants perceived various health problems as the result of obesity or overweight as shown in Figure 4.38. Hypertension (33%), heart disease (26%), diabetes (26%) and cancer (14%) were identified as adverse consequences of obesity.



**Figure 4.38 Health consequences of overweight or obesity as reported by the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2001)**

A cross tabulation of body size classified by the study participants and their actual BMI was made. The proportion of the participants who correctly classified their body size as normal, underweight, overweight and obese was 41%, 28%, 22% and 9%, respectively (Figure 4.39). Participants whose BMI was in the normal category were more likely to correctly identify their body size and shape. This also indicates that the majority of the study participants (59%) misclassified their body size and shape as normal, 72% misclassified their body size and shape as underweight, 78% misclassified as their body shape and size as overweight and 91% misclassified their body size as obese. This is consistent with the studies done in South Africa by Skaal and Pengpid (2011:565) and in USA by Gross (2005:1612).



**Figure 4.39 Proportion of body size and shape correctly reported by the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=2144)**

#### **4.3.15 Predictors for knowledge and practices of NCDs**

##### **4.3.15.1 Predictors of knowledge on NCDs**

Predictors of knowledge about NCDs were assessed among the study participants as shown in Table 4.39. Residents of Kilte Awlaelo were 2.26 times more likely to have poor or no knowledge on NCDs compared to those from Mekelle, OR 2.26 (95% CI: 1.62-3.16). This is not in agreement with the study in South Africa by Phaswana-Mafuya, *et al* (2013:5). Married or cohabiting study participants had 67% reduced risk of poor or no knowledge for NCDs compared to those who were widowed i.e. widowed participants were more likely to have poor or no knowledge of NCDs than were married or cohabiting participants. Married or cohabiting participants might have been better exposed to health information compared to the widowed ones. There was an increased risk of having poor or no knowledge on NCDs among the study participants with less than first cycle, first and second cycle and preparatory school compared to college or university level educated people with AOR, 4.85 (95% CI: 2.56-9.18), 3.26(95% CI: 1.75-6.07) and 3.0(95% CI: 1.16-7.76), respectively. This is a similar finding to that of Saeed *et al* (2009:4). Participants who were aware of the adverse consequences of cigarette smoking were more likely to have adequate knowledge of NCDs than were

participants who were unaware of such negative consequences. Study participants who knew that smoking around other people (second-hand smoke) could affect their health had a 48% reduced risk of having poor/no knowledge compared to those who did not know the effect smoking around others, AOR and 95% CI, 0.52(0.30-0.90). The above finding about cigarette smoking could be due to exposure to health information on the adverse consequences of smoking among the knowledgeable people. Study participants who have never been advised by health workers to reduce alcohol had 40% reduced risk of having poor or no knowledge compared to those who have not been advised, AOR and 0.60 (95% CI: 0.44-0.81). This could be strongly attributed to the knowledge gained as the result of the advice given by health workers. Study participants who reported that it important to eat vegetables every day were 1.79 times more likely to have poor or no knowledge compared to those who reported that it is very important to eat vegetables every day, AOR 1.79 (95% CI, 1.29-2.48). Study participants who tended to find the foods others cook (out of their own home) were too salty had a 76% reduced risk of having poor or no knowledge compared to those who reported the foods were not salty, AOR 0.24 (95% CI, 0.10-0.56). Study participants who believed that religious fasting would reduce the risk of acquiring NCDs had 65% reduced risk of having poor or no knowledge compared to those reported that religious fasting would not reduce risk of acquiring NCDs, AOR 0.35(95% CI, 0.22-0.54).

**Table 4.39 Predictors of knowledge on NCDs among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013- January, 2014**

S. No	Characteristics	Knowledge on NCDs		Odds Ratio with 95% CI	
		Poor/no knowledge	Has knowledge	Crude	Adjusted
1	Address (N=2,319)				
	Kilte Awlaelo HDSS	191(26.5%)	530(73.5%)	3.02(2.48-3.69)	2.26(1.62-3.16)
	Mekelle city	140(8.8%)	1458(91.2%)	1	1
2	Marital status (N=2,286)				
	Never married	62(9.9%)	562(90.1%)	0.24(0.15-0.40)	0.85(0.43-1.67)
	Currently married/cohabiting	154(13.1%)	1026(86.9%)	0.33(0.21-0.52)	0.51(0.28-0.94)
	Separated/Divorced	80(21.1%)	300(78.9%)	0.06(0.36-0.95)	0.73(0.38-1.39)
	Widowed	32(31.4%)	70(68.6%)	1	1

3	Educational level (N=2,314) Less than first cycle First and second cycle High school Preparatory school College and University	193(27.5%) 86(12.7%) 26(7.2%) 9(7.0%) 17(3.8%)	510(72.5%) 590(87.3%) 334(92.8%) 120(93.0%) 429(96.2%)	9.55(5.72-15.94) 3.68(2.16-6.28) 1.96(1.05-3.68) 1.89(0.82-4.35) 1	4.85(2.56-9.18) 3.26(1.75-6.07) 1.91(0.95-3.83) 3.0(1.16-7.76) 1
4	Does smoking affect your health? (N=2,305) Yes No I don't know	300(13.4%) 5(16.1%) 23(54.8%)	1932(86.6%) 26(83.9%) 19(45.2%)	0.13(0.07-0.24) 0.16(.05-0.49) 1	0.28(0.10-0.80) 0.16(0.01-1.93) 1
5	Smoking around others could affect their health (N=2,299) Yes No I don't know	215(10.9%) 57(27.7%) 54(43.2%)	1753(89.1%) 149(72.3%) 71(56.8%)	0.16(0.11-0.24) 0.50(0.32-0.80) 1	0.52(0.30-0.90) 0.70(0.37-1.31) 1
6	Ever drink any alcohol (N=2,202) Yes No	242(16.2%) 74(10.5%)	1252(83.8%) 634(89.5%)	1.55(1.21-1.98) 1	1.15(0.81-1.63) 1
7	Have you ever been advised by health workers to reduce alcohol? (N=2,109) Yes No	123(11.3%) 187(18.4%)	967(88.7%) 832(81.6%)	0.62(0.50-0.76) 1	0.60(0.44-0.81) 1
8	How important is to you to eat vegetables every day? (N=2,309) Not important Moderately important Important Very Important	5(55.6%) 15(40.5%) 127(24.4%) 181(10.4%)	4(44.4%) 22(59.5%) 393(75.6%) 1562(89.6%)	10.8(2.87-40.53) 5.88(2.99-11.55) 2.79(2.17-3.59) 1	6.64(0.53-83.7) 2.11(0.84-5.29) 1.79(1.29-2.48) 1
9	Have you ever eaten raw meat/beef? (N=2,191) Yes No	64(10.8%) 257(16.1%)	528(89.2%) 1342(83.9%)	0.67(0.52-0.87) 1	0.86(0.60-1.23) 1
10	How often do you add salt when cooking or eating meals? (N=2,266) Never Sometimes Often Always	2(2.9%) 66(11.5%) 22(10.0%) 231(16.5%)	67(97.1%) 507(88.5%) 199(90.0%) 1172(83.5%)	0.15(0.04-0.62) 0.66(0.49-0.89) 0.56(0.35-0.89) 1	0.15(.02-1.16) 0.87(0.58-1.32) 0.88(0.51-1.51) 1
11	How do you tend to find the foods others cook(out of your own home) (N=2,099) Too salty Normal Not salty enough	14(3.8%) 264(17.6%) 35(15.3%)	350(96.2%) 1240(82.4%) 194(84.7%)	0.22(0.12-0.42) 1.18(0.80-1.73) 1	0.24(0.10-0.56) 0.90(0.56-1.44) 1

12	Do you think religious fasting will reduce risk of acquiring NCDs? (N=2,305)				
	Yes	114(10.4%)	980(89.6%)	0.23(0.16-0.33)	0.35(0.22-0.54)
	No	148(14.7%)	859(85.3%)	0.35(0.25-0.48)	0.56(0.37-0.86)
	I don't know	68(33.3%)	136(66.7%)	1	1

#### 4.3.15.2 Predictors of knowledge about CVDs

The predictors of knowledge on CVDs were identified as indicated in Table 4.40. Participants of the study whose educational status was less than first cycle (grades 1-4) were 6 times more likely to have poor or no knowledge on CVDs compared to those who completed college or university education, AOR 6.0 (95% CI: 3.23-11.24). Those participants who completed first (grades 1-4) and second (grades 5-8) cycles education and those who completed high school education (grades 9-10) were also 3.48 and 4.3 times more likely to have poor or no knowledge about CVDs respectively compared to those completed college and university education, AOR 3.48 (95% CI: 2.14-5.64) and 4.30 (95% CI: 2.21-8.36). This is consistent with the findings of a study in the USA by Donna and Kathleen (2011:5). In this research, study participants who were advised by health workers to reduce the amount of alcohol intake had 37% reduced risk of having poor knowledge compared to those who were not advised, AOR 0.63(95% CI: 0.43-0.93). Study participants who believed that religious fasting would reduce their weight had 41% reduced risk of having poor/no knowledge about CVDs compared to those who did not believe so, AOR 0.59(95% CI: 0.40-0.88). Participants who reported that high blood pressure can cause health problems had 50% reduced risk of having poor or no knowledge on CVDs compared to those who did not report so, AOR 0.50(95% CI: 0.25-0.99). This also could be due to increased exposure to awareness interventions about CVDs among the study participants who reported that high blood pressure could cause health problems.

**Table 4.40 Predictors of knowledge about CVDs among the study participants in Kilte Awlaleo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013- January, 2014**

S. No	Characteristics	Knowledge about CVDs		Odds Ratio with 95% CI	
		Poor or no	Has	Crude	Adjusted

		knowledge	knowledge		
1	Age Group (N=2,303) 25-44 45-64	1561(82.1%) 351(87.3%)	340(17.9%) 51(12.7%)	0.67(0.49-0.92)	1.05(0.58-1.88) 1
	Gender (N=2,303) Men Women	713(79.4%) 1199(85.3%)	185(20.6%) 206(14.7%)	0.93(0.89-0.97)	0.82(0.54-1.25) 1
2	Educational level (N=2,298) Less than first cycle First and second cycle High school Preparatory school College and University	631(90.8%) 594(88.4%) 301(84.8%) 101(78.3%) 280(62.6%)	64(9.2%) 78(11.6%) 54(15.2%) 28(21.7%) 167(37.4%)	9.55(5.72-15.94) 3.68(2.16-6.28) 1.96(1.05-3.68) 1.89(0.82-4.35)	6.0(3.23-11.24) 3.48(2.14-5.64) 4.30(2.21-8.36) 1.45(0.64-3.27) 1
4	Smoking around others could affect their health (N=2,283) Yes No I don't know	1598(81.7%) 178(87.7%) 118(95.2%)	358(18.3%) 25(12.3%) 6(4.8%)	0.16(0.11-0.24) 0.50(0.32-0.80)	0.58(0.16-1.99) 0.29(0.06-1.28) 1
5	Have you ever been advised by health workers to reduce alcohol. (N=2,096) Yes No	860(79.5%) 869(85.7%)	222(20.5%) 145(14.3%)	0.65(0.51-0.81)	0.63(0.43-0.93) 1
6	Religious fasting benefits your health by reducing weight (N=874) Yes No	313(74.5%) 392(86.3%)	107(25.5%) 62(13.7%)	0.46(0.33-0.65)	0.59(0.40-0.88) 1
7	Can eating foods with a lot of salt affect your BP? (N=2,290) Yes No I don't know	1659(81.7%) 81(90.0%) 161(94.7%)	371(18.3%) 9(10.0%) 9(5.3%)	0.26(0.19-0.37) 0.41(0.22-0.76)	0.71(0.20-2.44) 0.79(0.15-4.29) 1
8	Does high BP cause health problems? (N=2,119) Yes No I don't know	1647(82.3%) 59(93.7%) 52(96.3%)	355(17.7%) 4(6.3%) 2(3.7%)	0.18(0.10-0.30) 0.25(0.11-0.57)	0.50(0.25-0.99) 0.67(0.31-1.23) 1
9	One of Consequences overweight/obesity is Hypertension (N=2,186) Yes No	1571(81.7%) 239(91.2%)	353(18.3%) 23(8.8%)	0.43(0.28-0.67)	0.86(0.38-1.99) 1

10	Consequence of overweight or obesity is Heart Diseases (N=2,168)				
	Yes	1254(81.1%)	293(18.9%)	0.63(0.49-0.83)	0.61(0.36-1.02)
	No	541(87.1%)	80(12.9%)	1	1

#### 4.3.15.3 Predictors of knowledge about type II diabetes

The predictors of knowledge on type II diabetes were identified in Table 4.41. Males were more likely to be knowledgeable about type II diabetes than were females. There was a 29% reduced risk of being not knowledgeable among men compared to women participants, AOR 0.71 (95% CI: 0.55-0.92). This is not in agreement with (Mongolia Ministry of Health 2011:49) which could be due to better exposure to health information on diabetes in men of the current study. Study participants whose educational status was less than first cycle (grades 1-4) were 3.3 times more likely to have poor knowledge compared to those who completed college and university or postgraduate education, AOR 3.30 (95% CI: 2.20-4.93). Similarly, study participants who completed first and second cycle, high school and preparatory school were found to have increased risk of poor knowledge about type II diabetes compared to those who completed college or university and postgraduate education with AOR 2.74 (95% CI: 1.92-3.90), 2.36 (95% CI: 1.62-3.43) and 2.32 (95% CI: 1.30-4.15), respectively. Government employees had a 50% reduced risk of having poor knowledge on type II diabetes compared to unemployed participants with AOR 0.50 (95% CI: 0.28-0.89). Those participants who ever thought about how much salt to have in their diet had 44% reduced risk of having poor knowledge on type II diabetes than who did not do so, AOR 0.56 (95% CI: 0.37-0.85). Not adding salt and sometimes adding salt to food while cooking or eating were found to be associated with poor knowledge on diabetes II diabetes compared to adding salt to food always, AOR 2.9(1.1-7.5) and OR 1.81 (95% CI: 1.32-2.47) respectively. Study participants who reported a person should have physical exercise at least once in a month to stay healthy were 2.13 times more likely to have poor knowledge compared to those who reported a person should engage in a physical exercise for 5 or more times per week, AOR 2.13 (95% CI: 1.07-4.22). Study participants who felt stressed always had 51% reduced risk of having poor knowledge on type II diabetes, AOR 0.49

(95% CI: 0.25-0.97). Study participants who did not receive any information from a health worker on type II diabetes were 2.7 times more likely to have poor knowledge compared to those who received information, AOR 2.7 (95% CI: 2.2-3.2).

**Table 4.41 Predictors of knowledge about Type II Diabetes among the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Knowledge on Type II Diabetes		Odds Ratio with 95% CI	
		Not Knowledgeable	Knowledgeable	Crude	Adjusted
1	Gender (N=2,287)				
	Men	553(63.2%)	322(36.8%)	0.52(0.43-0.63)	0.71(0.55-0.92)
	Women	1083(76.7%)	329(23.3%)	1	1
2	Educational level (N=2,282)				
	Less than first cycle	588(84.2%)	110(15.8%)	6.3(4.74-8.25)	3.30(2.20-4.93)
	First and second cycle	508(76.0%)	160(24.0%)	2.25(1.46-3.47)	2.74(1.92-3.90)
	High school	246(69.3%)	109(30.7%)	2.37(1.75-3.21)	2.36(1.62-3.43)
	Preparatory school	88(70.4%)	37(29.6%)	1.68(1.29-2.21)	2.32(1.30-4.15)
	College and University	201(46.1%)	235(53.9%)	1	1
3	Occupation (N=2,258)				
	Gov't employee	154(47.2%)	172(52.8%)	1.96(1.20-3.18)	0.50(0.28-0.89)
	Non-gov't employee	84(63.6%)	48(36.4%)	1.0(0.57-1.75)	0.99(0.51-1.90)
	Self-employed	614(75.1%)	204(24.9%)	0.58(0.37-0.92)	0.99(0.58-1.71)
	Student	55(56.1%)	43(43.9%)	1.37(0.76-2.47)	0.62(0.30-1.28)
	House-wife	374(79.2%)	98(20.8%)	0.46(0.28-0.75)	0.93(0.52-1.67)
	retired	18(72.0%)	7(28.0%)	0.68(0.26-1.80)	0.72(0.24-2.19)
	Farmer	261(87.3%)	38(12.7%)	0.26(0.15-0.44)	1.43(0.72-2.82)
	Unemployed	56(63.6%)	32(36.4%)	1	1
4	Smoking around others could affect their health (N=2,299)				
	Yes	1355(69.8%)	586(30.2%)	1.97(1.23-3.15)	1.36(0.72-2.56)
	No	162(80.6%)	39(19.4%)	1.1(0.61-1.95)	1.39(0.66-2.93)
	I don't know	100(82.0%)	22(18.0%)	1	1
5	Do you ever think about how much salt you have in your diet? (N=2,035)				
	Yes	1229(69.2%)	548(30.8%)	0.39(0.27-0.56)	0.56(0.37-0.85)
	No	220(85.3%)	38(14.7%)	1	1

6	How often do you add salt when cooking or eating meals? (N=2,266) Never Sometimes Often Always	61(89.7%) 451(79.4%) 149(70.0%) 937(67.6%)	7(10.3%) 117(20.6%) 64(30.0%) 450(32.4%)	0.24(0.11-0.53) 0.54(0.43-0.68) 0.89(0.65-1.22) 1	2.9(1.1- 7.5) 1.81(1.32-2.47) 1.32(0.90-1.95) 1
7	In your opinion, how often a person should exercise to stay healthy (N=2,257) Monthly Twice a month Once a week 1-4 times per week 5 or more times per week	118(83.1%) 30(85.7%) 114(86.4%) 336(73.2%) 1012(68.0%)	24(16.9%) 5(14.3%) 18(13.6%) 123(26.8%) 477(32.0%)	2.32(1.47-3.64) 1.80(1.11-2.923) 0.78(0.40-1.51) 0.82(0.29-2.33) 1	2.13(1.07-4.22) 0.91(0.29-2.82) 1.18(0.66-2.10) 0.95(0.71-1.28) 1
8	How often do you feel stressed? (N=2,264) Always often Sometimes/infrequently Never	31(58.5%) 54(63.5%) 702(69.9%) 830(74.0%)	22(41.5%) 31(36.5%) 303(30.1%) 291(26.0%)	0.49(0.28-0.87) 0.61(0.35-1.07) 0.81(0.40-1.63) 1	0.49(0.25-0.97) 0.63(0.36-1.10) 0.80(0.63-1.02) 1
9	Consequence overweight or obesity is Diabetes (N=2,149) Yes No	1046(68.8%) 474(75.4%)	474(31.2%) 155(24.6%)	0.72(0.58-0.89) 1	0.89(0.68-1.15) 1
10	Has a health worker spoken to you about how you can prevent diabetes? (N=2,182) No Yes	1121(78.5%) 436(57.8%)	307(21.5%) 318(42.2%)	1.36(1.27-1.45) 1	2.66(2.2-3.23) 1

#### 4.3.15.4 Predictors of blood pressure measurement

Predictors for blood pressure measurement by the study participants were identified as shown in Table 4.42. Men were 1.89 times more likely not to get their blood pressure measured compared to women, AOR 1.89 (95% CI: 1.31-2.74). This could be due to better health seeking behaviour among women for some reproductive health problems. The study participants who believed that religious fasting would reduce body weight had 36% reduced risk of not getting their blood pressure measured compared to those who do not believe so, AOR 0.64 (95% CI: 0.44-0.93). Those who were advised by a health worker to reduce alcohol had 40% reduced risk of not getting their blood pressure measured compared to those who were not advised, 0.60 (95% CI: 0.41-0.87). Having poor knowledge of cardiovascular diseases (CVDs) was 3.5 times more likely to

increase the risk of not getting blood pressure measured compared to being knowledgeable, AOR 3.50 (95% CI: 2.19-5.61). Those who reported that a person should engage in physical exercise for 1-4 days in a week to stay healthy had 51% reduced risk of not getting their blood pressure measured with AOR 0.49 (95% CI: 0.30-0.79). Participants who thought they know how much salt to have in their diet had 76% reduced risk of not getting their blood pressure measured compared to those who did not bother about their the salt content of their diet, AOR 0.24 (95% CI: 0.12-0.48). The participants who reported to add salt sometimes to their food while cooking or eating meals had 3.28 times more likely not to get their blood pressure measured compared to those who did not add salt always, AOR3.28 (95% CI: 1.98-5.43). Participants who believed that being overweight or obese is not harmful to health were 1.62 times more likely not to get their blood pressure measured compared to those who reported that it is very harmful, AOR 1.62 (95% CI: 1.31-2.01). Participants who believed that cigarette smoking is moderately harmful to health were 4.1 times more likely not to get their blood pressure measured compared to those who reported that it is very harmful, AOR 4.1(95% CI: 1.36-12.26). This shows participants with inadequate or suboptimal knowledge are less likely to undergo blood pressure measurement.

**Table 4.42 Predictors of blood pressure measurement among the study participants in Kilde Awlalo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Blood Pressure measured		Odds Ratio with 95% CI	
		No	Yes	Crude	Adjusted
1	Gender (N=2,337)				
	Men	553(60.7%)	358(39.3%)	1.24(1.15-1.34)	1.89(1.31-2.74)
	Women	697(48.9%)	729(51.1%)	1	1
2	Smoking around others could affect their health (N=2,312)				
	Yes	1029(51.9%)	952(48.1%)	0.53(0.36-0.78)	0.57(0.24-1.38)
	No	122(58.9%)	85(41.1%)	0.71(0.45-1.12)	0.38(0.12-1.19)
	I don't know	83(66.9%)	41(33.1%)	1	1
3	Religious fasting benefits your health by reducing weight (N=882)				
	Yes	175(41.4%)	248(58.6%)	0.65(0.57-0.74)	0.64(0.44-0.93)
	No	293(63.8%)	166(36.2%)	1	1

4	Have you ever been advised by health workers to reduce alcohol? =2,118) Yes No	518(47.3%) 601(58.7%)	576(52.7%) 423(41.3%)	0.81(0.74-0.88) 1	0.60(0.41-0.87) 1
6	Consequence overweight or obesity is Hypertension (N=2,211) Yes No	1056(54.2%) 128(48.5%)	891(45.8%) 136(51.5%)	1.12(0.98-1.28) 1	1.64(0.9-3.01) 1
7	Knowledgeable on CVDs (N=2,296) Not knowledgeable Knowledgeable	1093(57.4%) 129(33.0%)	812(42.6%) 262(67.0%)	1.74(1.50-2.01) 1	3.50(2.19-5.61) 1
8	In your opinion, how often a person should exercise to stay healthy (N=2,257) Monthly Twice a month Once a week 1-4 times per week 5 or more times per week	87(61.3%) 27(77.1%) 71(53.0%) 238(51.2%) 806(52.7%)	55(38.7%) 8(22.9%) 63(47.0%) 227(48.8%) 723(47.3%)	1.42(1.0-2.02) 3.03(1.37-6.71) 1.01(0.71-1.44) 0.94(0.76-1.16) 1	1.1(0.53-2.29) 1.01(0.22-4.62) 0.53(0.24-1.18) 0.49(0.30-0.79) 1
9	Do you ever think about how much salt you have in your diet? (N=2,073) Yes No	870(48.3%) 206(76.0%)	932(51.7%) 65(24.0%)	0.64(0.59-0.69) 1	0.24(0.12-0.48) 1
10	How often do you add salt when cooking or eating meals (N=2,281) Never Sometimes Often Always	58(84.1%) 397(67.9%) 112(50.2%) 651(46.4%)	11(15.9%) 188(32.1%) 111(49.8%) 753(53.6%)	6.1(3.17-11.72) 2.44(1.99-2.99) 1.17(0.88-1.55) 1	2.40(0.74-7.83) 3.28(1.98-5.43) 1.67(0.91-3.09) 1
11	Being overweight is harmful for health (N=2,295) Not harmful Moderately harmful Harmful Very harmful	443(58.6%) 89(48.6%) 416(54.3%) 275(46.6%)	313(41.4%) 94(51.4%) 350(45.7%) 315(53.4%)	0.57(0.33-0.96) 0.52(0.24-1.14) 0.87(0.55-1.37) 1	1.62(1.31-2.01) 1.09(0.78-1.51) 1.36(0.9-1.69) 1
12	Smoking is harmful for health. (N=2,296) Not harmful Moderately harmful Harmful Very harmful	23(63.9%) 90(81.8%) 503(58.4%) 608(47.2%)	13(36.1%) 20(18.2%) 359(41.6%) 680(52.8%)	1.98(0.99-3.94) 5.03(3.06-8.27) 1.57(1.32-1.87) 1	1.19(0.21-6.71) 4.1(1.36-12.26) 1.08(0.72-1.61) 1

#### 4.3.15.5 Predictors of blood glucose measurement

Predictors for blood glucose measurement by the study participants are shown in Table 4.43. Residents of Kilte Awlaelo were 3.53 times more likely not to practice blood glucose measurement compared to residents from Mekelle city, AOR 3.53(95% CI: 1.57-7.94). This could be attributed to less health care seeking behaviours or suboptimal knowledge of diabetes among the residents of Kilte Awlaelo. Participants whose educational status was less than first cycle and first and second cycle were found to have an increased of risk of not practicing blood glucose measurement, AOR 4.7 (95% CI: 2.03-10.69) and 2.52 (95% CI: 1.33-4.76), respectively. This could be due to the fact that educated people have more access to health services than people who were illiterate or who have minimal education. Subjects who were never married, currently married or cohabiting, separated or divorced were found to increase the risk of not measuring blood glucose measurement, AOR 15.6 (95% CI: 5.1-47.5), 3.55 (95% CI: 1.38-9.12) and 4.83 (95% CI: 1.60-14.6), respectively. Study participants who believed that religious fasting would reduce their weight had 45% reduced risk of not measuring their blood glucose, AOR, 0.55 (95% CI: 0.33-0.93). Subjects who were not knowledgeable about CVDs were 1.91 times more likely to not have their blood glucose measured, AOR 1.91 (95% CI: 1.07-3.41). Participants who engaged in sports-related moderate physical activity had 47% reduced risk of not getting their blood glucose measured compared to participants who did not engage in such activities, AOR 0.53 (95% CI: 0.28-0.99). Participants who were not knowledgeable about type II diabetes were 1.78 times more likely to not having their blood glucose measured compared to participants who were knowledgeable, AOR 1.78 (95% CI: 1.01-3.13). This is because less knowledgeable people are less likely to practice or engage in positive health behaviours.

**Table 4.43 Predictors of blood glucose measurement among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Blood glucose measured		Odds Ratio with 95% CI	
		No	Yes	Crude	Adjusted

1	Address (N=2,336) Kilte Awlaelo HDSS Mekelle city	698(95.9%) 1369(85.1%)	30(4.1%) 239(14.9%)	1.13(1.10-1.16) 1	3.53(1.57-7.94) 1
2	Age group (N=2336) 25-44 45-64	1717(89.2%) 350(85.2%)	208(10.8%) 61(14.8%)	1.05(1.00-1.09) 1	1.45(0.73-2.86) 1
3	Educational level (N=2,332) Less than first cycle First and second cycle High school Preparatory school College and University	664(93.8%) 618(90.9%) 319(87.9%) 113(86.9%) 349(77.4%)	44(6.2%) 62(9.1%) 44(12.1%) 17(13.1%) 102(22.6%)	4.41(3.023-6.43) 2.91(2.07-4.10) 2.12(1.44-3.11) 1.941.12-3.39) 1	4.7(2.03-10.69) 2.52(1.33-4.76) 1.68(0.78-3.60) 1.04(0.36-3.0) 1
4	Marital Status (N=2,301) Never married Currently married/cohabiting Separated/Divorced Widowed	580(92.1%) 1030(86.9%) 343(89.3%) 80(78.4%)	50(7.9%) 155(13.1%) 41(10.7%) 22(21.6%)	3.19(1.84-5.55) 1.83(1.11-3.02) 2.30(1.30-4.08) 1	15.6(5.1-47.5) 3.55(1.38-9.12) 4.83(1.60-14.6) 1
5	Religious fasting benefits your health by reducing weight (N=880) Yes No	341(80.8%) 419(91.5%)	81(19.2%) 39(8.5%)	0.39(0.26-0.59) 1	0.55(0.33-0.93) 1
6	Have you ever been advised by health workers to reduce alcohol? =2,118) Yes No	943(86.4%) 924(89.9%)	148(13.6%) 104(10.1%)	0.96(0.93-0.99) 1	1.35(0.81-2.24) 1
7	Knowledgeable on CVDs (N=2,295) Not knowledgeable Knowledgeable	1735(91.1%) 291(74.6%)	170(8.9%) 99(25.4%)	1.22(1.15-1.30) 1	1.91(1.07-3.41) 1
8	Moderate sport activity (N=2,326) Yes No	308(82.8%) 1750(89.6%)	64(17.2%) 204(10.4%)	0.92(0.88-0.97) 1	0.53(0.28-0.99) 1
9	Have you ever eaten raw meat/beef? (N=2,203) Yes No	487(82.3%) 1455(90.3%)	105(17.7%) 156(9.7%)	0.91(0.88-0.95) 1	0.68(0.42-1.12) 1
10	Knowledge status on diabetes (N=2,278) Not knowledgeable Knowledgeable	1504(92.1%) 513(79.5%)	129(7.9%) 132(20.5%)	1.16(1.11-1.23) 1	1.78(1.01-3.13) 1
11	Consequence overweight is obesity is Diabetes (N=2187) Yes No	1344(87.0%) 587(91.4%)	201(13.0%) 55(8.6%)	0.95(.92-0.98) 1	1.39(0.77-2.51) 1

#### 4.3.15.6 Predictors of body weight measurement

Predictors for body weight measurement by the study participants were in Table 4.44. Subjects who were from Kilte Awlaelo was 2.10 times more likely not to get their body weight measured compared to the Mekelle city residents, AOR 2.10 (95% CI:1.08-4.08). This could be due to low health seeking behaviour among the residents of Kilte Awlaelo (predominantly a rural setting). Participants whose educational status was high school level were less likely to be weighed than those who completed university or college and post graduate education, AOR 1.1 (95% CI: 1.47-2.58). Participants who ate raw meat were less likely to get weighed than those who did not eat raw meat, AOR 0.49 (95% CI: 0.26-0.91). Participants practicing vigorous sports-related physical activity were more likely to be weighed than subjects not practicing such intensity of physical activity, AOR 0.64(95% CI: 0.55-0.83). Similarly, practicing moderate sport related physical activity had 78% reduced risk of not measuring body weight compared to not practicing such intensity of physical activity, AOR 0.22 (95% CI:0.08-0.62). Interestingly, participants who were not knowledgeable about NCDs had 81% reduced risk of not measuring their body weight compared to the knowledgeable individuals, AOR 0.19 (95% CI: 0.05-0.70). Being unknowledgeable on type II diabetes was 2.4 times more likely not to measure once body weight compared to those who were knowledgeable on type II diabetes, AOR 2.41 (95% CI:1.97-2.96). Participants who reported that being overweight or obese could result in is diabetes had 54% reduced risk of not getting their body weight measured compared to those who did not report so, AOR 0.46 (95% CI:0.24-0.88).

**Table 4.44 Predictors of body weight measurement in the six months preceding the study among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Weight measured in the last 6 months		Odds Ratio with 95% CI	
		No	Yes	Crude	Adjusted
1	Address (N=2,236) Kilte Awlaelo HDSS Mekelle city	445(65.6%) 603(38.7%)	233(34.4%) 955(61.3%)	1.70(1.56-1.84) 1	2.10(1.08-4.08) 1

2	Gender (N=2,337) Men Women	334(38.3%) 714(52.4%)	539(61.7%) 649(47.6%)	0.73(0.66-0.81) 1	1.51(0.81-2.79) 1
3	Age group (N=2,236) 25-44 45-64	802(43.5%) 246(62.6%)	1041(56.5%) 147(37.4%)	0.70(0.63-0.76) 1	0.49(0.21-1.16) 1
4	Educational Level (N=2,232) Less than first cycle First and second cycle High school preparatory school College and University	433(64.6%) 303(46.3%) 137(38.7%) 48(39.0%) 126(29.3%)	237(35.4%) 352(53.7%) 217(61.3%) 75(61.0%) 304(70.7%)	4.41(3.40-5.72) 2.08(1.60-2.69) 1.52(1.13-2.05) 1.54(1.02-2.34) 1	1.14(0.42-3.10) 0.72(0.33-1.6) 1.1(1.47-2.58) 0.96(0.21-4.37) 1
5	Monthly income in Ethiopian Birr (N=862) <500 Birr 500-999 Eth Birr 1000-1999 Eth Birr ≥2000 Eth Birr	140(57.6%) 70(54.3%) 100(40.7%) 81(33.2%)	103(42.4%) 59(45.7%) 146(59.3%) 163(66.8%)	2.74(1.89-3.95) 2.39(1.54-3.70) 1.38(0.95-1.99) 1	0.99(0.41-2.37) 1.14(0.47-2.77) 1.16(0.57-2.37) 1
6	Have you ever eaten raw meat/beef? (N=2,121) Yes No	196(34.0%) 782(50.6%)	381(66.0%) 762(49.4%)	0.67(0.59-0.76) 1	0.49(0.26-0.91) 1
7	Religious fasting benefits your health by reducing weight (N=842) Yes No	152(37.0%) 240(55.7%)	259(63.0%) 191(44.3%)	0.66(0.57-0.77) 1	0.76(0.44-1.33) 1
8	Vigorous sport related physical exercise. (N=2,232) Yes No	52(29.2%) 994(48.4%)	126(70.8%) 1060(51.6%)	0.60(0.48-0.76) 1	0.64(0.55-0.83) 1
9	Moderate sport activity (N=2,225) Yes No	80(21.8%) 963(51.8%)	287(78.2%) 895(48.2%)	0.42(0.35-0.51) 1	0.22(0.08-0.62) 1
10	Knowledgeable on NCDs (N=2,218) Not knowledgeable Knowledgeable	822(43.4%) 218(67.5%)	1073(56.6%) 105(32.5%)	0.64(0.59-0.70) 1	0.19(0.05-0.70) 1
11	Knowledge on Type II Diabetes (N=2,186) Not knowledgeable knowledgeable	834(53.9%) 191(29.8%)	712(46.1%) 449(70.2%)	1.81(1.59-2.05) 1	2.41(1.97-2.96) 1
12	Consequence of overweight or obesity is Diabetes (N=2,094) Yes No	607(41.6%) 353(55.7%)	853(58.4%) 281(44.3%)	0.75(0.68-0.82) 1	0.46(0.24-0.88) 1

#### **4.3.15.7 Predictors of poor or no knowledge on breast cancer**

Predictors for poor or no knowledge of breast cancer by the women study participants were identified are indicated in Table 4.45. With regard to the relationship between educational status and knowledge of breast cancer, being illiterate was found to increase the risk of having poor or no knowledge of breast cancer, AOR 6.14 (95% CI: 1.10-34.78) and 6.82 (95% CI: 1.10-42.28) respectively. This is consistent with the findings in India by Fotedar *et al* (2013:119). By marital status, being single, married or cohabiting and divorced were found to increase the likelihood of having poor or no knowledge of breast cancer, AOR 2.79(95% CI: 1.1-7.38), 3.21(95% CI: 1.42-7.24) and 2.77 (95% CI: 1.15-6.65), respectively. Orthodox Christians and Muslims were found to have lower levels of knowledge about breast cancer compared to participants following other religions, AOR 4.38(95% CI: 1.0-19.1) and 8.69 (95% CI: 1.22-61.88), respectively. This could be due to less exposure to awareness raising opportunities on breast cancer among the Orthodox and Muslim religions followers. Participants who were not worried at all that breast cancer could affect them or their families were 6.43 times more likely to have poor knowledge on breast cancer compared to those who were worried often times, AOR 6.43 (95% CI:3.08-13.44). Participants who were worried sometimes that breast cancer could affect them or their families were 2.52 times more likely to have poor knowledge on breast cancer compared to those who were worried often times, AOR 2.52( 95% CI:1.58-4.03) which is consistent with the findings of the of Mongolia Ministry of Health (2011:71). Study participants reporting that finding breast cancer early means one can have a better chance of a cure were more likely to have greater knowledge of breast cancer than those who did not know this, AOR 0.35 (95% CI: 0.14-0.89). Study participants who knew how to examine their breast for any sign of abnormality had a higher knowledge of breast cancer than those who did not know how to do so, AOR 0.23 (95% CI: 0.15-0.36).

**Table 4.45 Predictors of poor knowledge/no knowledge on breast cancer among female study participants in Kilte Awlaleo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	Poorly /Not Knowledgeable about breast cancer		OR with 95% CI	
		Yes	No	Crude	Adjusted
1	Residence (N=1,271)				
	Kilte Awlaleo	480(90.6%)	50 (9.3%)	1.85(1.30-2.62)	1.08(.63-1.85)
	Mekelle city	619 (83.9)	122(15.6%)	1	1
2	Education level (N=1,266)				
	Illiterate	384(93.4%)	27(6.6%)	5.17(1.54-17.33)	6.14(1.10-34.78)
	Read and write	104(92.0%)	9(8.0%)	4.20(1.11-15.92)	6.82(1.10-42.28)
	First cycle completed	134(87.6%)	19(12.4%)	2.57(0.74-8.872)	4.21(0.75-23.50)
	Second cycle completed	198(89.2%)	24(10.8%)	3.00(0.89-10.16)	4.96(0.92-26.7)
	High School completed	131(81.4%)	30(18.6%)	1.59(0.47-5.33)	2.50(.48-12.99)
	Preparatory school	47 (82.5%)	10(17.5%)	1.71(0.45-6.48)	3.74(.62-22.46)
	College/University	88(65.7%)	46(34.3%)	0.70(0.21-2.31)	1.77(.35-8.91)
	Post graduate degree	11(73.3%)	4(26.7%)	1	1
3	Marital status (N=1244)				
	Never married	135(80.8%)	32 (19.2%)	0.84(0.44-1.63)	2.79(1.1-7.38)
	Married/Cohabiting	569(86.9%)	86 (13.1%)	1.32(0.74-2.37)	3.21(1.42-7.24)
	Separated	113(89.7%)	13(10.3%)	1.74(.79-3.82)	2.62(.97-7.10)
	Divorced	178(89.0%)	22(11.0%)	1.62(.81-3.25)	2.77(1.15-6.65)
	Widowed	80(83.3%)	16(16.7%)	1	1
4	Religion (N=1262)				
	Orthodox	1032(86%)	160(13.4%)	1.93(0.70-5.31)	4.38(1.0-19.1)
	Muslim	46(92.0%)	4(8.0%)	3.60(0.87-14.99)	8.69(1.22-61.88)
	Others	15(75.0%)	5(25.0%)	1	1
5	Do you worry that breast cancer can affect you or your family? (N=1301)				
	Not at all	434(96.9%)	14 (3.1%)	10.53(5.78-19.20)	6.43(3.08-13.44)
	Sometimes	500(84.9%)	89 (15.1%)	1.86(1.30-2.66)	2.52(1.58-4.03)
	Often	196(74.2%)	68(25.8%)	1	1
6	Finding breast cancer early means you have better chance of becoming well again (N=1248)				
	True	496(77.5%)	144(22.5%)	0.12(0.07-0.19)	0.35(0.14-0.89)
	False	28(93.3%)	2(6.7%)	0.48(0.11-2.15)	3.19(.57-17.91)
	I don't know	559(96.7%)	19(3.3%)	1	1

7	It is possible for women to look for early signs of breast cancer in their own breasts by self-examination (N=1,248)				
	True	464(76.9%)	139(23.1%)	0.12(.07-0.19)	0.76(0.30-1.92)
	False	30(83.3%)	6(16.7%)	0.18(.07-0.48)	0.41(0.12-1.38)
	I don't know	588(96.6%)	21(3.4%)	1	1
8	Do you know how to examine your own breasts for any abnormality or signs of breast cancer (N=1,245)				
	Yes	159(62.1%)	97(37.9%)	0.12(0.09-0.18)	0.23(0.15-0.36)
	No	920(93.0%)	69(7.0%)	1	1
9	Had a P/E of your breast by a health worker (N=1,235)				
	Yes	64(67.4%)	31(32.6%)	3.70(2.32-5.89)	0.72(0.40-1.32)
	No	1008(88.%)	132(11.6%)	1	1

#### 4.3.15.8 Predictors of breast self-examination

Predictors for breast self-examination (BSE) by the women study participants were identified are presented in Table 4.46. Residents from Kilte Awlaelo HDSS were less likely to practice BSE than those from Mekelle city, AOR 0.57 (95% CI: 0.33-0.98). This could be due to low knowledge about breast cancer among the residents of Kilte Awlaelo. Study participants whose age was 25-34, 35-44, 45-54 years were more likely to practice BSE compared to the age group 55-64 year old participants with AOR 3.0 (95% CI: 1.13-7.93), 3.70 (95% CI: 1.14-8.26) and 3.03 (95% CI: 1.04-8.89), respectively. This is consistent with the findings in Pakistan by Maqsood *et al* (2009:419). Compared to the unemployed participants, government employees, non-government employees, self-employed individuals, housewives and farmers were less likely to practice BSE, AOR 0.07 (95% CI: 0.024-0.22), 0.14 (95% CI: 0.03-0.62), 0.20 (95% CI: 0.08-0.48), 0.40 (95% CI: 0.16-0.95) and 0.17(95% CI: 0.05-0.55) respectively. Such outcomes demonstrate poor knowledge of breast cancer among the latter groups of participants as the result of less exposure to awareness interventions. Study participants who knew nothing about breast cancer and who heard the term before were less likely to practice BSE compared to those who were very familiar with breast cancer, AOR 0.11 (95% CI: 0.03-0.39) and 0.29 (95% CI: 0.09-0.92) respectively. Participants were who not worried at all and worried only sometimes about breast cancer that breast

cancer could affect them or their families were more likely to increase the BSE practices compared to those often worried, AOR 2.97 (95% CI: 1.43-6.1) and 2.97 (95% CI: 1.61-5.48), respectively. Study participants who perceived that it is possible for women to detect early signs of breast cancer in their own breasts by self-examination were 5.86 times more likely to do BSE compared to those who did not know this, AOR 5.86 (95% CI: 2.43-14.1). Participants who knew how to examine their own breasts for any abnormality or signs of breast cancer were 4.04 times more likely to practice BSE compared to those who did not know how to do BSE, AOR 4.04(95% CI: 2.57-6.37). Participants who had physical examinations of their breasts by a health worker were 9.7 times more likely to have breast cancer AOR 9.7 (95% CI: 4.96-18.98). This would indicate that these individuals sought health care for possible breast abnormalities.

**Table 4.46 Predictors of breast self-examination among the female study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	Breast Self-Examination		OR with 95% CI	
		Yes	No	Crude	Adjusted
1	Residence (N=1,249)				
	Kilte Awlaelo	53(10.2%)	468 (89.8%)	0.32(0.23-0.46)	0.57(0.33-0.98)
	Mekele	190(26.1%)	538(73.9%)	1	1
2	Age group(N=1,214)				
	25-34	136 (20.5%)	528(79.5%)	0.35(0.16-0.73)	3.0(1.13-7.93)
	35-44	62(20.5%)	240(79.5%)	0.34(0.16-0.75)	3.70(1.14-8.26)
	45-54	27(18%)	123(82%)	0.41(0.18-0.93)	3.03(1.04-8.89)
	55-64	8(8.2%)	90(91.8%)	1	1
3	Occupation (N=1,232)				
	Government	28(18.8%)	121(81.2%)	0.29(0.14-0.59)	0.07(.024-0.22)
	Non-government	6(27.3%)	16(72.7%)	0.47(0.16-1.42)	0.14(0.03-0.62)
	Self-employed	71(18.8%)	307(81.2%)	0.29(0.15-0.55)	0.20(0.08-0.48)
	Student	5(21.7%)	18(73.3%)	0.35(0.11-1.10)	0.28(0.06-1.36)
	Housewife	95(23.2%)	315(76.8%)	0.38(0.20-0.71)	0.40(0.16-0.95)
	Retired	1(6.2%)	15(93.8%)	0.08(0.01-0.69)	0.09(0.01-1.32)
	Farmer	15(7.9%)	174(92.1%)	0.11(0.05-0.24)	0.17(0.05-0.55)
Unemployed	20(44.4%)	25(55.6%)	1	1	
4	Knowledge of Breast Cancer (N=572)				
	Nothing at all	28(18.8%)	121(81.2%)	0.03(.01-0.08)	0.11(0.03-0.39)
	Only heard the term	6(27.3%)	16(72.7%)	0.24(0.11-0.53)	0.29(0.09-0.92)
	Knows a little about Very familiar with it	71(18.8%)	307(81.2%)	0.54(0.23-1.24)	0.43(0.14-1.37)
		5(21.7%)	18(78.3%)	1	1

5	Do you worry that breast cancer can affect you or your family? (N=1,242) Not at all Sometimes Often	37(8.5%) 169(30.6%) 37(14.4%)	396(91.5%) 383(69.4%) 220(85.6%)	0.56(0.34-0.90) 2.62(1.77-3.89) 1	2.97(1.43-6.1) 2.97(1.61-5.48) 1
6	Finding breast cancer early means you have better chance of becoming well again (N=1,247) True False/I don't know	222(34.9%) 21(3.4%)	415(65.1%) 589 (96.6%)	15.0(9.43-23.9) 1	2.27(0.96-5.34) 1
7	It is possible for women to look for early signs of breast cancer in their own breasts by self-examination(N=1,247) True False/I don't know	226(37.5%) 17(2.6%)	376(62.5%) 628(97.4%)	22.2(13.3-36.9) 1	5.86(2.43-14.1) 1
8	Do you know how to examine your own breasts for any abnormality or signs of breast cancer(N=1,243) Yes No	138(53.7%) 105(10.6%)	119(46.3%) 883(89.4%)	9.75(7.1-13.4) 1	4.04(2.57-6.37) 1
9	Had a P/E of your breast by a health worker(N=1239) Yes No	63(66.3%) 179(15.6%)	32(33.7%) 965(84.4%)	10.6(6.7-16.7) 1	9.7(4.96-18.98) 1

#### 4.3.15.9 Predictors of poor/no knowledge on cervical cancer

Predictors for poor or no knowledge of cervical cancer by the female study participants were identified in Table 4.47. Study participants who have never given birth were more likely to have knowledge than cervical cancer compared to those who had given 5 or more births, AOR 0.22 (95% CI: 0.07-0.68). Study participants who reported that it is recommendable to have Pap smear or VIA every year, every three years and every five years had a greater knowledge of cervical cancer than those who did not know the frequency for Pap smear or VIA testing at all. Having a history of abortion had 54% reduced risk of poor or no knowledge of cervical cancer than having no history of abortion, AOR 0.46 (95% CI: 0.27-0.78). This could be due to exposure to knowledge or information on cervical cancer among study participants who aborted.

**Table 4.47 Predictors of poor/no knowledge on cervical cancer among female study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	Poorly /Not Knowledgeable about cervical cancer		OR with 95% CI	
		Yes	No	Crude	Adjusted
1	Residence (N=1,271)				
	Kilte Awlaelo	484(91.8%)	43(8.2%)	1.07(1.03-1.11)	1.01(0.59-1.73)
	Mekelle city	639(85.8%)	106(14.2%)	1	1
2	Age Group (N=1,272)				
	25-44	888(87.1%)	132(12.9%)	0.93(0.89-0.97)	0.61(0.29-1.28)
	45-64	235(93.3%)	17(6.7%)	1	1
3	Number of births (N=1,070)				
	0 births	42(77.8%)	12(22.2%)	0.31(0.14-0.70)	0.22(0.07-0.68)
	1 birth	191(85.3%)	33(14.7%)	0.52(0.29-0.94)	0.52(0.23-1.16)
	2-4 births	501(89.3%)	60(10.7%)	0.75(0.44-1.28)	0.89(0.43-1.86)
	>=5 births	212(91.8%)	19(8.2%)	1	1
4	Do you know how often it is recommended to have Pap smear or VIA (N=1269)				
	Yearly	108(67.1%)	53(32.9%)	0.12(0.08-0.19)	0.15(0.08-0.28)
	Every three years	24(46.2%)	28(53.8%)	0.05(0.03-0.09)	0.03(0.01-0.09)
	Every five years	76(84.4%)	14(15.6%)	0.32(0.17-0.61)	0.14(0.05-0.36)
	I don't know	912(94.4%)	54(5.6%)	1	1
5	History of Abortion (N=1,235)				
	Yes	197(83.1%)	40(16.9%)	0.92(0.87-0.98)	0.46(0.27-0.78)
	No	843(90.0%)	94(10.0%)	1	1

6	Q359 History of STI (N=987)				1.38(0.79-2.41)
	Yes	287(85.9%)	47(14.1%)	0.96(0.91-1.01)	1
	No	584(89.4%)	69(10.6%)	1	

#### 4.3.15.10 Predictors of practices of cervical cancer screening

Predictors for practices of cervical cancer screening among the female study participants are identified in Table 4.48 below. Study participants whose education levels were first (grades 1-4) and second (grades 5-8) cycles completed and high school completed were less likely not to get cervical screening compared to those who completed university or college education AOR 0.41 (95% CI: 0.19-0.87) and 0.23(0.10-0.52) respectively. This is not consistent with the findings in Nepal by Gyenwali *et al* (2013:4375). This may show lack of awareness on the existence of cervical cancer screening services in literate women in this study. Participants who knew nothing at all about cervical cancer and those who only heard the term were more likely not to practice cervical cancer screening compared to those who were very familiar with cervical cancer, AOR 19.2 (95% CI: 7.57-48.51) and 10.3 (95% CI: 4.62-22.80), respectively. This is consistent with the findings in Estonia by Kivistik *et al* (2011:3). Study participants who reported that it is recommended to have a Pap smear or VIA every year, every three years and every five years were more likely to practice cervical cancer screening compared to those who did not know the frequency of Pap smear or VIA, AOR 0.35(95% CI: 0.19-0.65), 0.14(0.06-0.32) and 0.1(0.05-0.19). Participants having history of abortion were more likely to undertake cervical cancer screening compared to those who did not have abortion before, AOR 0.60 (95% CI: 0.36-0.99). This could also be due to exposure to better knowledge of cervical cancer when getting abortion services at health institutions.

**Table 4.48 Predictors for practices of cervical cancer screening among women study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S.No	Characteristics	Cervical cancer screening		OR with 95% CI	
		No	Yes	Crude	Adjusted
1	Residence (N=1,245)				
	Kilte Awlaelo	466(92.1%)	40(7.9%)	1.06(1.02-1.1)	0.85(0.50-1.46)
	Mekelle city	643(87.0%)	96(13.0%)	1	1

2	Age Group (N=1,245) 25-44 45-64	882(88.1%) 227(93.0%)	119(11.9%) 17(7.0%)	0.95(0.91-0.99) 1	0.82(0.42-1.59) 1
3	Education level (N=1,243) Less than first cycle First and second cycle High school Preparatory school College and University	471(92.7%) 332(89.0%) 129(81.6%) 50(90.9%) 127(85.2%)	37(7.3%) 41(11.0%) 29(18.4%) 5(9.1%) 22(14.8%)	2.21(1.26-3.87) 1.40(0.80-2.45) 0.77(0.42-1.41) 1.73(0.62-4.83) 1	0.52(0.23-1.15) 0.41(0.19-0.87) 0.23(0.10-0.52) 1.26(0.33-4.82) 1
4	How much do you know about cervical ca? (N=1,244) Nothing at all Only heard the term before A little about the disease Very familiar with it	516(96.6%) 513(91.1%) 55(57.9%) 24(46.2%)	18(3.4%) 50(8.9%) 40(42.1%) 28(53.8%)	33.44(16.28-68.70) 11.97(6.45-22.20) 1.60(0.81-3.17) 1	19.2(7.57-48.51) 10.3(4.62-22.80) 1.63(0.70-3.79) 1
5	Do you know how often it is recommended to have Pap smear or VIA (N=1244) Yearly Every three years Every five years I don't know	120(75.0%) 28(54.9%) 57(66.3%) 903(95.4%)	40(25.0%) 23(45.1%) 29(33.7%) 44(4.6%)	0.15(0.09-0.23) 0.06(0.03-0.11) 0.10(0.06-0.16) 1	0.35(0.19-0.65) 0.14(0.06-0.32) 0.1(0.05-0.19) 1
6	Do you worry that cervical ca can affect you or your family (N=1,229) Not at all Sometimes Often	455(93.2%) 437(87.8%) 202(83.1%)	33(6.8%) 61(12.2%) 41(16.9%)	2.80(1.72-4.56) 1.45(0.95-2.23) 1	1.44(0.76-2.74) 1.67(0.91-3.05) 1
7	History of Abortion (N=1,151) Yes No	198(83.5%) 824(90.2%)	39(16.5%) 90(9.8%)	0.93(0.87-0.98) 1	0.60(0.36-0.99) 1

#### 4.3.15.11 Predictors of poor perception on body size and shape

The predictors of poor perception about body size and shape are shown in Table 4.49. Residents from Kilde Awlaelo were 3.16 times more likely to report overweight as a sign of good health compared to those from Mekelle, AOR 3.16 (95% CI: 1.94-5.14). Participants with poor knowledge of CVDs are 2.19 times more likely to have poor perception compared to those who were knowledgeable AOR 2.19 (1.06-4.51). Study participants responding that being obese or overweight does not necessarily mean being wealthy had 99.6% reduced risk of poor perception about body size and shape compared to those who did not have any idea AOR 0.004 (95% CI: 0.001-0.010). The

above determinants of poor perception are consistent with of the findings in USA by Mama *et al* (2011:284) but they are inconsistent with the findings in Malay by Tan Zhao (2010:38) demonstrating differences in the levels of knowledge of body size and its adverse consequences.

**Table 4.49 Predictors for poor perception on body size and shape among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Overweight is a sign of good health		Odds Ratio with 95% CI	
		Yes	No	Crude	Adjusted
1	Address (N=2,324) Kilte Awlaelo HDSS Mekelle city	129(17.9%) 68(4.2%)	592(82.1%) 1535(95.8%)	4.22(3.19-5.58) 1	3.16(1.94-5.14) 1
2	Age group (N=2324) 25-44 45-64	140(7.3%) 57(14.0%)	1777(92.7%) 350(86.0%)	0.52(0.39-0.70) 1	0.72(0.42-1.22) 1
3	Knowledgeable on NCDs (N=2300) Yes No	129(6.5%) 64(19.4%)	1841(93.5%) 266(80.6%)	0.34(0.26-0.45) 1	1.12(0.63-1.98) 1
4	Knowledgeable on CVDs (N=2291) No Yes	173(9.1%) 18(4.7%)	1731(90.9%) 369(95.3%)	1.95(1.22-3.14) 1	2.19(1.06-4.51) 1
5	Knowledgeable on Type II Diabetes (N=2278) Yes No	28(4.3%) 166(10.2%)	617(95.7%) 1467(89.8%)	0.43(0.29-0.63) 1	1.26(0.71-2.25) 1
6	Obese/overweight are most likely to be wealthy (N=2317) Yes No I don't know	67 (56.3%) 57(2.7%) 71(87.7%)	52(43.7%) 2060(97.3%) 10(12.3%)	0.18(0.09-0.39) 0.004(0.002-.01) 1	0.06(0.02-1.17) .004(.001-.010) 1

#### 4.4 FINDINGS OF THE CASE CONTROL STUDY

##### 4.4.1 Socio-demographic characteristics of cases and controls

The socio-demographic characteristics of the study participants for the matched case control study are presented Table 4.50. Thirty four (32.7%) of the cases and 70(67.3%) of the controls were from Kilte Awlaelo HDSS site. Eighty three (33.5%) of the cases and 165 (66.5%) of the controls were from Mekelle city. Forty seven (31.8%) of the

cases and 101 (68.2%) of the controls were men. Seventy (34.3%) of the cases and 134 (65.7%) of the controls were women. Age wise, 66 (31.9%) of cases and 141 (68.1%) of controls were in the age group 25-44 years and the remaining 51 (35.2%) of cases and 94 (64.8%) of controls were in the age group 45-64 years. The median age of both cases and controls was 40 years (range 25-64 years). By ethnicity, the majority (111) of the cases and 233 of the controls were Tigre. The marital status of most cases and controls was married or cohabiting. The educational level of most cases and controls was first (grades 1-4) and second (grades 5-8) cycles education followed by less than first (grades 1-4) cycle, including illiterates. The mean and standard deviation of number of years spent on formal education by both cases and controls was 9.5 ±4.1 years. The majority of the cases reported their income was between more than quintile 1 and ≤ quintile 2 and most controls reported to have monthly income of ≤quintile 1. By occupation, most of the cases and controls were self-employed and formally employed, respectively. The predominant religion for both cases and controls was Orthodox Christianity.

**Table 4.50 Socio-demographic characteristics of the study participants on determinants of hypertension in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Participants type		
		Cases	Controls	Total
1	Address (=352) Kilte Awlaelo HDSS Mekelle city	34(32.7%)	70(67.3%)	104(100.0%)
		83(33.5%)	165(66.5%)	248(100.0%)
2	Gender (N=352) Men Women	47(31.8%)	101(68.2%)	148(100.0%)
		70(34.3%)	134(65.7%)	204(100.0%)
3	Age Group (N=352) 25-44	66(31.9%)	141(68.1%)	207(100.0%)
	45-64	51(35.2%)	94(64.8%)	145(100.0%)
	Median and range	40 (25-64)years	40(25-64) years	
4	Ethnicity (N=350) Tigre	111(32.3%)	233(67.7%)	344(100.0%)
	Amhara	3(75.0%)	1(25.0%)	4(100.0%)
	Others	1(50.0%)	1(50.0%)	2(100.0%)
5	Marital status (N=349) Never married	17(31.5%)	37(68.5%)	54(100.0%)
	Married/Cohabiting	62(30.5%)	141(69.5%)	203(100.0%)
	Separated/Divorced	25(44.6%)	31(55.4%)	56(100.0%)

	Widowed	12(33.3%)	24(66.7%)	36(100.0%)
6	Education (N=351) Less than first cycle First and second cycle High school and Preparatory College and University Mean SD years on formal education = 9.5±4.1 years	29(33.0%) 50(37.0%) 15(32.6%) 22(26.8%)	59(67.0%) 85(63.0%) 31(67.4%) 60(73.2%)	88(100.0%) 135(100.0%) 46(100.0%) 82(100.0%)
7	Monthly Income (N=317) <=Quantile 1 >Q1 and <=Q2 >Q2 and <=Q3 >Q3 and <=Q4 >Q4	31(25.4%) 51(40.2%) 1(14.3%) 2(66.7%) 13(22.4%)	91(74.6%) 76(59.8%) 6(85.7%) 1(33.3%) 45(77.6%)	122(100.0%) 127(100.0%) 7(100.0%) 3(100.0%) 58(100.0%)
8	Occupation (N=348) Formally employed Self employed Student Housewife Retired Farmer Unemployed	22(23.2%) 49(40.5%) 1(50.0%) 23(36.5%) 2(33.3%) 8(19.5%) 8(40.0%)	73(76.8%) 72(59.5%) 1(50.0%) 40(63.5%) 4(66.7%) 33(80.5%) 12(60.0%)	95(100.0%) 121(100.0%) 2(100.0%) 63(100.0%) 6(100.0%) 41(100.0%) 20(100.0%)
9	Religion (N=349) Orthodox Muslim Others	111(33.1%) 2(18.2%) 2(66.7%)	224(66.9%) 9(81.8%) 1(33.3%)	335(100.0%) 11(100.0%) 3(100.0%)

#### 4.4.2 Socio-demographic determinants of hypertension

The socio-demographic determinants of hypertension were assessed using binary logistic regression analysis for hypertension as indicated in Table 4.51. Socio-demographic variables having a p value  $\leq 0.25$  on crude analysis were fitted into the final model to identify the independent predictors after adjustment. Accordingly, only four variables - marital status, occupation, income and religion - were found to be eligible. Income of  $\leq$  quintile 1 had 90% reduced risk of being a case of hypertension compared to those whose income was greater than quintile 4, AOR, 0.1(95% CI: 0.004-0.84). This is consistent with the findings reported by the Bangladesh Ministry of Health (2010:24). The other variables did not have statistically significant associations with being a case of hypertension.

**Table 4.51 Socio-demographic determinants of hypertension among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Participants type		Odds Ratio with 95% CI	
		Cases	Controls	Crude	Adjusted
1	Marital Status (N=349)				
	Never married	17(31.5%)	37(68.5%)	0.92(0.37-2.26)	0.49(0.14-1.64)
	currently married/cohabiting	62(30.5%)	141(69.5%)	0.88(0.41-1.87)	0.69(0.28-1.72)
	Separated/divorced	25(44.6%)	31(55.4%)	1.61(0.68-3.85)	1.28(0.47-3.49)
	Widowed	12(33.3%)	24(66.7%)	1	1
2	Occupation (N=348)				
	Formally employed	22(23.2%)	73(76.8%)	0.45(0.16-1.25)	0.35(0.09-1.36)
	Self employed	49(40.5%)	72(59.5%)	1.02(0.39-2.68)	0.95(0.27-3.29)
	Student	1(50.0%)	1(50.0%)	1.50(0.08-27.61)	0.90(0.23-3.42)
	Housewife	23(36.5%)	40(63.5%)	0.86(0.31-2.42)	1.14(0.12-10.7)
	Retired	2(33.3%)	4(66.7%)	0.75(0.11-5.11)	0.47(0.18-6.12)
	Farmer	8(19.5%)	33(80.5%)	0.36(0.11-1.19)	0.33(0.08-1.41)
	Unemployed	8(40.0%)	12(60.0%)	1	1
3	Income (N=317)				
	<=Quantile 1	13(22.4%)	45(77.6%)	0.14(0.01-1.72)	0.1(0.004-0.84)
	>Q1 and <=Q2	31(25.4%)	91(74.6%)	0.17(0.02-1.94)	0.10(0.01-1.22)
	>Q2 and <=Q3	51(40.2%)	76(59.8%)	0.34(0.03-3.80)	0.20(0.02-2.59)
	>Q3 and <=Q4	1(14.3%)	6(85.7%)	0.08(0.003-2.05)	0.003( 0.001-2.7)
	>Q4	2(66.7%)	1(33.3%)	1	1
4	Religion (N=349)				
	Orthodox	111(33.1%)	224(66.9%)	0.25(0.022-2.76)	0.69(0.02-20.7)
	Muslim	2(18.2%)	9(81.8%)	0.11(0.01-1.92)	0.09(0.001-6.81)
	Others	2(66.7%)	1(33.3%)	1	1

#### 4.4.3 Behavioural determinants of hypertension

The behavioural determinants of hypertension are presented in Table 4.52. Variables having a p value of  $\leq 0.25$  with being a case of hypertension on crude or bivariate analysis and those believed to have biological relationship were fit into the final model after adjusting for potential confounders. Accordingly, participants engaged in vigorous work related physical activity were 2.5 times more likely to be a case of hypertension than those who did not engage in such physical activity, AOR 2.5(95% CI: 1.11-5.61). In contrast there was 50% reduced risk of being hypertensive among participants who were engaged in moderate work related physical activity compared to those who did not engage in such activities, AOR 0.50 (95% CI: 0.25-0.99). Drinking alcohol for less than 10 years duration had 70% reduced risk of being hypertensive compared to those who

drank alcohol for  $\geq 10$  years duration, AOR 0.30 (95% CI: 0.15-0.59). Except the finding on work-related vigorous physical exercise, the above findings are consistent with the study in India by Sunil *et al* (2011:11). The remaining explanatory variables were not found to be statistically significantly associated with being hypertensive.

**Table 4.52 Behavioural determinants of hypertension among the study participants in Kilde Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Participants type		Odds Ratio with 95% CI	
		Cases	Controls	Crude	Adjusted
1	Ever drink alcohol (N=350)				
	Yes	82(32.8%)	168(67.2%)	0.97(0.70-1.34)	2.03(0.58-7.03)
	No	34(34.0%)	66(66.0%)	1	1
2	Currently drinking alcohol (N=351)				
	Yes	68(36.0%)	121(64.0%)	1.21(0.90-1.65)	1.50(0.66-3.37)
	No	48(29.6%)	114(70.4%)	1	1
3	How often do you use salt daily in your diet? (N=336)				
	Always	75(27.6%)	197(72.4%)	0.23(0.05-0.98)	0.24(0.03-1.73)
	Sometimes	9(40.9%)	13(59.1%)	0.42(0.1-2.2)	0.34(0.03-3.7)
	Occasionally	16(47.1%)	18(52.9%)	0.53(0.11-2.59)	0.36(0.04-3.32)
	None	5(62.5%)	3(37.5%)	1	1
4	Does your work involve vigorous intensity activity? (N=352)				
	Yes	23(46.9%)	26(53.1%)	1.51(1.08-2.13)	2.5(1.11-5.61)
	No	94(31.0%)	209(69.0%)	1	1
5	Does your work involve moderate intensity activity? (N=352)				
	Yes	37(21.5%)	135(78.5%)	0.48(0.35-0.67)	0.50(0.25-0.99)
	No	80(44.4%)	100(55.6%)	1	1
6	Do you do vigorous intensity sports? (N=352)				
	Yes	10(58.8%)	7(41.2%)	1.84(1.20-2.82)	2.05(0.55-7.64)
	No	107(31.9%)	228(68.1%)	1	1
7	Do you do moderate intensity sports for at least 10 minutes (N=352)				
	Yes	24(58.5%)	17(41.5%)	1.96(1.44-2.67)	1.21(0.37-3.97)
	No	93(29.9%)	218(70.1%)	1	1
8	Do you walk or use a bicycle for 10 minutes (N=352)				
	Yes	92(30.6%)	209(69.4%)	0.62(0.45-0.87)	0.63(0.25-1.62)
	No	25(49.0%)	26(51.0%)	1	1

9	Duration of Alcohol drinking (N=255)				
	<10 years	22(15.7%)	118(84.3%)	0.37(0.24-0.57)	0.30(0.15-0.59)
	>=10 years	49(42.6%)	66(57.4%)	1	1

#### 4.4.4 Physical measurement determinants of hypertension

The physical measurement determinants of hypertension are indicated in Table 4.53. Variables having a p value of  $\leq 0.25$  with being a case of hypertension on crude or bivariate analysis and those believed to have biological relationship were fit to the final model after adjusting for potential confounders as it has been done for other determinants before. Three variables - namely body mass index (BMI), waist circumference (WC) and waist to hip ratio (WHR) - were fit into the final model of binary logistic regression. Having normal waist circumference had 42% reduced risk of being hypertensive compared to those whose WC was raised AOR 0.58 (95% CI: 0.34-0.98). This is consistent with the findings in India by Sunil *et al* (2011:11) in Nigeria by Balogun (2011:91). BMI and WHR did not have statistically significant association with hypertension when fitted to the final model although they had statistically significant differences on crude or bivariate analysis.

**Table 4.53 Physical measurement determinants of hypertension among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014 (N=350)**

S. No	Characteristics	Participants type		Odds Ratio with 95% CI	
		Cases	Controls	Crude	Adjusted
1	BMI (N=348)				
	<25kg/m <sup>2</sup>	71(27.8%)	184(72.2%)	0.62(0.46-0.83)	0.62(0.36-1.10)
	>=25kg/m <sup>2</sup>	42(45.2%)	51(54.8%)	1	1
2	Waist circumference (N=344)				
	Normal	57(26.3%)	160(73.7%)	0.61(0.45-0.82)	0.58(0.34-0.98)
	Raised	55(43.3%)	72(56.7%)	1	1
3	WHR (N=343)				
	Normal	61(29.3%)	147(70.7%)	0.79(0.58-1.07)	0.93(0.56-1.56)
	Raised	50(37.0%)	85(63.0%)	1	1

#### 4.4.5 Perception related determinants of hypertension

The perception-related determinants of hypertension are presented in Table 4.54. Variables having a p value of  $\leq 0.25$  with being a case of hypertension on crude or bivariate analysis and those believed to have biological relationship were fit to the final model after adjusting for potential confounders. Study participants reported to maintain their weight if perceived or told to be overweight or obese were 6.72 times more likely to be hypertensive compared to those did not want to maintain their weight, AOR 6.72 (95% CI: 3.14-14.4). This indicates that such perception might have come after being diagnosed for hypertension. Participants who responded that being overweight or obese has positive health consequence were 6.63 times more likely to be hypertensive compared to those who did not know anything, AOR 6.63 (95% CI: 1.1-40.80).

**Table 4.54 Perception related determinants of hypertension among the study participants in Kilte Awlaelo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Participants type		Odds Ratio with 95% CI	
		Cases	Controls	Crude	Adjusted
1	If you feel or told you are overweight or obese, you will try to maintain it. (N=352)				
	Yes	31(62.0%)	19(38.0%)	2.18(1.64-2.88)	6.72(3.14-14.4)
	No	86(28.5%)	216(71.5%)	1	1
2	Frequent feeding of animal products including raw meat is beneficial to body size and shape (N=352)				
	Yes	25(21.4%)	92(78.6%)	0.34(0.09-1.36)	0.49(0.10-2.51)
	No	87(39.0%)	136(61.0%)	0.80(0.21-3.06)	1.07(0.22-5.29)
	I don't know	4(44.4%)	5(55.6%)	1	1
3	There is positive health consequence as the result of overweight or obesity (N=351)				
	Yes	112(37.0%)	191(63.0%)	6.74(1.56-29.14)	6.63(1.1-40.80)
	No	3(13.0%)	20(87.0%)	1.73(0.26-11.38)	3.29(0.20-53.5)
	I don't know	2(8.0%)	23(92.0%)	1	1
4	Consequences of overweight or obesity is hypertension (N=333)				
	Yes	104(36.6%)	180(63.4%)	1.63(0.95-2.81)	1.11(0.39-3.14)
	No	11(22.4%)	38(77.6%)	1	1

#### 4.4.6 Mental stress related determinants of hypertension

The mental stress related determinants of hypertension have been indicated in Table 4.55. Variables having a p value of  $\leq 0.25$  with being a case of hypertension on crude or bivariate analysis and those believed to have a biological relationship were fit to the final model after adjusting for potential confounders. Study participants who felt to have poor digestion had 61% reduced risk of being hypertensive compared to those who did not feel so AOR 0.39(95% CI: 0.20-0.75). Participants who felt nervous, tense or worried were 1.63 times more likely be hypertensive compared to those who did not feel nervous, AOR 1.63 (95% CI: 1.0-2.75). Participants who lost interest in things were 5.46 times more likely to be hypertensive than those who did not have similar feelings, AOR 5.46 (95% CI: 1.47-20.2). The other variables did not have statistically significant differences when fitted into the final model. This is consistent with the findings in India by Sunil *et al* (2011:11).

**Table 4.55 Mental stress determinants of hypertension among the study participants in Kiltel Awlaleo HDSS site and Mekelle City, Tigray, Ethiopia December, 2013-January, 2014**

S. No	Characteristics	Participants type		Odds Ratio with 95% CI	
		Cases	Controls	Crude	Adjusted
1	Digestion poor (N=352)				
	Yes	15(19.5%)	62(80.5%)	0.53(0.33-0.85)	0.39(0.20-0.75)
	No	102(37.1%)	173(62.9%)	1	1
2	Feel nervous tense or worried (N=352)				
	Yes	39(40.2%)	58(59.8%)	1.31(0.97-1.78)	1.63(1.0-2.75)
	No	78(30.6%)	177(69.4%)	1	1
3	Lost interest in things (N=352)				
	Yes	9(69.2%)	4(30.8%)	(2.17(1.47-3.22)	5.46(1.47-20.2)
	No	108(31.9%)	231(68.1%)	1	1
4	Do you have uncomfortable feelings in your stomach (N=352)				
	Yes	7(18.4%)	31(81.6%)	0.53(0.27-1.04)	0.55(0.22-1.41)
	No	110(35.0%)	204(65.0%)	1	1
5	Are you easily tired? (N=352)				
	Yes	18(23.7%)	58(76.3%)	0.66(0.43-1.02)	1.65(0.34-1.23)
	No	99(35.9%)	177(64.1%)	1	1

#### 4.4.7 Overall independent predictors of hypertension

The independent predictors of hypertension have been indicated in Table 4.56. Variables having statistically significant differences with previous analysis of logistic regression were fit into the logistic regression model to identify independent predictors. The odds of being hypertensive was 3.43 times more among those engaged in vigorous work related physical activity than those who did not engage, AOR 3.43 (95% CI: 1.49-7.94). The odds of being hypertensive was reduced by 72% among the participants who drank alcohol for less than 10 years than those who drank for 10 or more years, AOR 0.28 (95% CI: 0.14-0.54). The odds of being hypertensive among participants having normal waist circumference were less by 64% compared to those with raised waist circumference, AOR 0.36(95% CI: 0.18-0.71). The odds of being hypertensive among participants with mental stress like feeling of poor digestion was reduced by 74%, AOR 0.26(95% CI: 0.1-0.67). The odds of being hypertensive among participants who were nervous, tense or worried was 2.95 times more likely compared to those who did not have such feelings, AOR 2.95 (95% CI: 1.39-6.25). The odds of being hypertensive was 5.26 times more among those participants who lost interest in things compared to those who did not have such stress, AOR 5.26(95% CI: 1.01-27.5). Except for the finding on the work related vigorous physical exercise, all other determinants of hypertension were consistent with of the findings in India by Sunil *et al* (2011:11) and in Nigeria by Balogun (2011:91).

**Table 4.56 Overall determinants of hypertension among the study participants in Kilte Awlaelo HDSS site and Mekele City, Tigray, Ethiopia December, 2013- January, 2014**

S. No	Characteristics	Participants type		Odds Ratio with 95% CI	
		Cases	Controls	Crude	Adjusted
1	Does your work involve vigorous intensity activity? (N=352)				
	Yes	23(46.9%)	26(53.1%)	1.51(1.08-2.13)	3.43(1.49-7.94)
	No	94(31.0%)	209(69.0%)	1	1
2	Does your work involve moderate intensity activity? (N=352)				
	Yes	37(21.5%)	135(78.5%)	0.48(0.35-0.67)	0.53(0.27-1.02)
	No	80(44.4%)	100(55.6%)	1	1

3	Duration of Alcohol drinking (N=) <10 years >=10 years	22(15.7%) 49(42.6%)	118(84.3%) 66(57.4%)	0.37(0.24-0.57) 1	0.28(0.14-0.54) 1
4	Waist circumference (N=344) Normal Raised	57(26.3%) 55(43.3%)	160(73.7%) 72(56.7%)	0.61(0.45-0.82) 1	0.36(0.18-0.71) 1
5	If you fill or told you are overweight or obese...I will try to maintain it (N=352) Yes No	31(62.0%) 86(28.5%)	19(38.0%) 216(71.5%)	2.18(1.64-2.88) 1	1.82(0.66-5.0) 1
6	Adverse Consequence as the result of overweight or obesity (N=351) Yes No I don't know	112(37.0%) 3(13.0%) 2(8.0%)	191(63.0%) 20(87.0%) 23(92.0%)	6.74(1.56-29.14) 1.73(0.26-11.38) 1	4.34(0.75-25.0) 1.24(0.12-12.9) 1
7	Digestion poor (N=352) Yes No	15(19.5%) 102(37.1%)	62(80.5%) 173(62.9%)	0.53(0.33-0.85) 1	0.26(0.1-0.67) 1
8	Feel nervous tense or worried (N=352) Yes No	39(40.2%) 78(30.6%)	58(59.8%) 177(69.4%)	1.31(0.97-1.78) 1	2.95(1.39-6.25) 1
9	Lost interest in things (N=352) Yes No	9(69.2%) 108(31.9%)	4(30.8%) 231(68.1%)	2.17(1.47-3.22) 1	5.26(1.01-27.5) 1

#### 4.5 CONCLUSION

In this chapter, the results and discussions have been presented. The findings on the magnitude of risk factors of NCDs have indicated that knowledge, perceptions, attitudes and practices on NCDs and the risk factors, predictors of the risk factors of NCDs and knowledge and behaviours about NCDs have been addressed. The socio-demographic, behavioural, physical, biological, perception and mental stress related determinants of hypertension have also been outlined. Discussions for the results were made by comparing with the findings of similar literatures produced on NCDs across the globe. Based on the findings generated in this study, an identification and intervention model of NCDs risk factors will be developed and discussed in chapter 5.

## **CHAPTER 5**

### **Model development**

#### **5.1 INTRODUCTION**

In the preceding chapter, management of data, detailed analyses and discussion of the findings of the study were presented. The results of this study have provided insights into the epidemiology of preventable risk factors of NCDs among the adult population. The magnitude of the risk factors of NCDs was assessed during this study. Knowledge, perceptions, attitudes and behaviour of the study participants toward the NCDs were described. Determinants of hypertension were identified. This evidence serves as the impetus for the researcher to develop a model that would enhance the understanding of the NCDs risk factors, their underlying conditions (predictors) and public health interventions. This model will provide guidance that will enable health care workers, the public health leadership, the general community and other stakeholders to identify the underlying conditions of the NCDs, risk factors and public health interventions to alleviate the occurrence of the risk factors and their impact or consequences. Bull and Bauman (2011:20) and the Ministry of Health of Malaysia (2011:10) also support the relevance of identifying risk factors of NCDs and the need to introduce primary public health preventive measures. This chapter therefore focuses on model development using findings from data analysis. To promote readers' understanding of the process of model development, this chapter commences with explanation of the term model, followed by discussions of its elements, approaches to model development, applications of model development and description of the model developed for NCDs' risk factors identification and intervention.

#### **5.2 MODEL: ITS MEANING**

The term "model" is becoming increasingly familiar among researchers and healthcare professionals. Assuming that the term "model" is interpreted and understood in a similar fashion by diverse professionals would be a mistake. To date, there is a range of understandings and explanations given to the term model. Examples of terms used to refer to a model are conceptual framework and conceptual model. This could result in confusion in understanding the meaning of the term by the researchers and healthcare professionals. To minimise confusion and to enhance health care professionals' and

researchers' insight into the notion of model and its development, it is imperative, although seemingly difficult, to develop a universal definition of the term model. While the aim of this study is not to establish a universal definition on the term "model", the researcher believes that it is important to offer an operational definition that guides the focus of this chapter. Doing so will create a clear sense of direction for the researcher and readers. To do this, a number of extant definitions are explored as indicated below.

A model is another method or device often used by scientists and it is a verbal, mathematical, or graphical construct representing a phenomenon (Busha & Harter 1980:10). According to Clarke (2005:47), a model is a concept used for general expressions of particular phenomenon. A conceptual model can guide research by providing a visual representation of theoretical constructs (and variables) of interest. It can also be a diagram indicating sets of relationships between factors that may, for example, impact upon a target condition (Creswell 1994:17). In other words, a model could be in the form of a diagram that defines theoretical entities, objects, or conditions of a system and the relationships between them (Flew 1984:236; Ford 2000:252). A model, according to Pickett, Kolasa and Jones (2007:61), is a conceptual construct that represents or simplifies the structure of the material world or interactions in that world.

As indicated above, a number of definitions have been given by different authors. The definition coined by Creswell (1994:17) is believed to best fit the purpose of this study in defining the term model. The definition is selected because this particular study is assessing factors underlying the NCDs' risk factors and also the relationship between the risk factors themselves. The descriptive and explanatory elements of this definition do not only represent its functions or purposes, but they also denote that model development involves a number of phases or stages. Associated with the notion of model development are the elements which comprise the model. These are now discussed below, as the term model cannot be understood in the absence of its components.

### **5.3 MODEL: ITS ELEMENTS**

Based on a literature review, models are in the main made up of three distinct but interrelated elements. These elements are referred to as variables, constructs and theoretical models, and are discussed in the order listed.

According to Kerlinger (1983:33), a variable is defined as a property that takes on different values. Babbie (1983:20) also defined variables as a logical grouping of attributes. Attributes are characteristics or qualities that describe an object. For example if gender is a variable then male and female are the attributes. If residence is the variable, then urban, semi-urban, and rural become the attributes. Variables can be defined in terms of measurable factors through a process of operationalization. Variables will convert difficult concepts into easily understandable concepts which then can be measured empirically. It is essential to define the term as variables so that they can be quantified and measured. That is, the variables have to be able to work for one to operate or become operational (Aparna Bhaduri & Marie Farrell. 1981:70).

Different categories of variables have been documented. There are variables termed as continuous (where the variables are assumed to have infinite values between two points), and discrete (the variables are assumed to have finite values between two points or discrete quantities) (Polit & Beck 2004:37). The second group of variables are categorical (commonly classified as nominal and dichotomous) as described by (Kerlinger 1983:35; Polit & Beck 2004:38). An expression of set variables explaining a thematic area is referred to as constructs.

As indicated in Oxford Dictionaries (2011:170), constructs are mental abstractions that we used to express the ideas, people, organisations, events and/or objects/things in which we are interested. Constructs are a way of bringing theory down to earth, helping to explain the different components of theories, as well as measure/observe their behaviour.

Constructs often lack clarity and precision; they are ambiguous. However, constructs need to be expressed (i.e., made explicit) in a way that is clear, precise, and non-ambiguous, so that they can be shared (i.e., researchers, but also participants, must have a common understanding). Also, constructs need to be made explicit so that they

can be (a) criticised, (b) related to other constructs, (c) operationally defined, and (d) tested (i.e., they are measurable). As a result, theoretical or nominal definitions are used to provide conceptual clarity, using synonyms to express the construct we are interested in (Rioux1997:101).

Whilst constructs are sometimes mistaken for variables, they are not variables. Instead, we use variables to operationalize (i.e., measure) the constructs in which we are interested. Constructs can be mistaken for variables because some constructs may only be represented by one variable, such that the construct name and the variable name are the same (e.g., the construct and variable, sex). Therefore, constructs need to be translated from the abstract (i.e., mental ideas; mental abstractions) to the concrete (i.e., measurable/testable in the form of variables). In other words, we are re-stating constructs as variables, with variables also having their own attributes (e.g., gender having the attributes male/female, which is important, because gender is a classic example of where constructs/variables, and their attributes, can be confused). The role of the operational definition is to precisely describe how to measure the characteristics of a construct. By characteristics, we mean the mental abstractions/ideas within constructs that ultimately are measurable in the form of variables and their attributes. It is these variables and their attributes that are measured (Nahapiet & Ghoshal 1998:252).

In conclusion, constructs are the building blocks of theories and theoretical models, helping to explain how and why certain phenomena behave the way that they do.

Theoretical models are theories designed to explain an entire situation or behaviour, with the idea that they would eventually be able to predict that behaviour or a theoretical model is an attempt to explain a system or process basing it on a known theory or group of related theories. Such a model could be diagrammatic or explained in narrative. The issue is to explain different factors that contribute to or explain a given phenomenon and how these factors are interconnected among themselves (Caldwell 2012:2).

Caldwell (2012:3) also noted that a good theoretical model should specify

- The determinants of and influences on the health behaviour or outcome to be impacted by the behavioral intervention;
- All important mediators and moderators;
- The psychosocial and/or biological theories that inform the model and its specific parts. In most cases there will be several theories that inform a theoretical model;
- Which intervention components and mediators are aimed at, and
- Which intervention components, if any, are expected to interact with each other.

Sometimes the theoretical model is not a model of health behaviour per se, but a model of maintaining treatment fidelity, promoting adherence or compliance.

As noted by Kaplan (1964:267), a theoretical model is a tool that can promote theory construction. Theoretical models are useful in order to: (a) set the boundaries/scope of the research project in terms of the theories and constructs that will be studied and measured; (b) illustrate the research hypotheses to be tested, and the predictions that are being made (if any) about the relationship between the constructs under study; and (c) provide a roadmap at the end of literature review chapter which brings together one's research hypotheses, theories, and constructs that have been critically discussed in a way that can be clearly tested. Ultimately, theoretical models are useful frameworks for the researcher and the consumers of research, helping to describe what a researcher is studying in a clear, succinct, and visual way. Theoretical models, therefore, provide an overall picture of what your research is trying to achieve.

Unfortunately, theoretical models are often poorly constructed and fail to illustrate the links between theory, the constructs the researcher identified, and the hypotheses (and their predictions, if any) that the researcher will have constructed.

All in all, valid and reliable evidence from literature review and the analysis of extant study findings have to be gathered and thematised in order to display a sound theoretical model that depicts the relationship between the underlying conditions (risk factors) and outcome (health problem). These models ultimately help in implementing appropriate public health interventions that address healthcare problems. This is an

indication of the importance of having distinct components of a model, as without them it is difficult to develop models and evaluate them in practice. Now that the elements of model have been discussed, it is time to turn to approaches to model development.

#### **5.4 APPROACHES TO MODEL BUILDING AND THEIR PRACTICAL APPLICATION**

Model building is considered an effective research method. It assists investigators and scientists to relate more accurately to reality. Added to this, it aids investigators and scientists to describe, predict, test and understand complex systems or events.

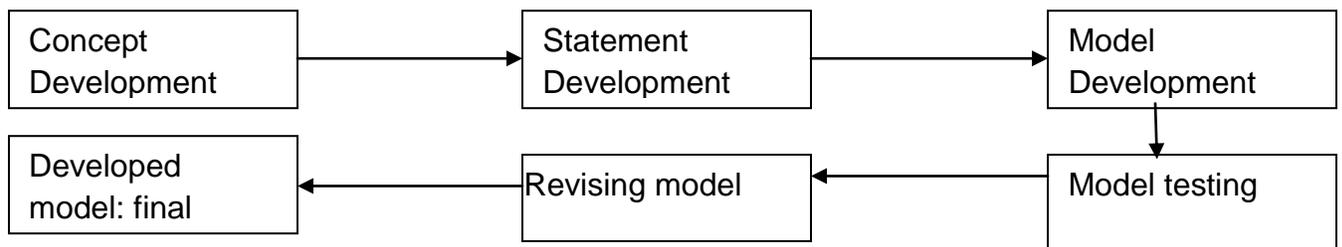
Development of a model is an iterative process that is usually guided by three interrelated approaches: derivation, synthesis and analysis (Walker & Avant 2011: 58). Before continuing with this debate, it is fitting to offer brief explanations of these approaches followed by their application.

Derivation concerns the steps model developers may take to transpose and re-structure any of the elements of a model from one context or situation to another. This approach is not only applicable to subject areas where there are no models, they can also be utilised in fields where existing models are outdated and innovative ways of understanding the world are needed. Synthesis, on the other hand, relates to actions that model developers may employ to put together pieces of disjointed information to form a meaningful whole with the view of formulating a model. From Polit and Beck's view, this approach is more applicable in circumstances where there are no explicit or clearly defined theoretical structures or models. Generally, model developers use this approach in the data collection phase or analysis and interpretation phases of the research process. In a study of factors influencing patients self-harming behaviours, for example, researchers may use synthesis to arrange the factors into clusters as well as assigning names to the same. It is the same approach Smith, Flowers and Larkin (2009:70) employed in naming themes and superordinate themes in interpretative phenomenological analysis. In fact, synthesis is a common approach used by qualitative researchers in formulating and naming emergent themes from data analysis.

Analysis is the final approach to model development. It is about examining concepts, statements, and their relationships to each other and to the entire data set of a study (Newman, Smith, Pharris & Jones 2008:64). Adopting this approach allows for

concepts, theories and statements to be refined; in other words, develop a better understanding of phenomenon examined. Analysis as an approach is applicable especially in situations where there is a body of extant and relevant literature to allow for the dissection of the whole into its component parts to better understand the same, as asserted by (Bloom 1956:205).

The approaches thus far discussed may have to be repeated on several occasions before achieving a well-formulated or refined model. To put it elegantly, the iterativeness of the model building process simply indicates that model developers may move back and forth among the strategies or repeatedly employ a specific strategy until the desired quality of the model developed is achieved. It must be stated that utilisation of a single approach may not address the needs for quality model construction. Thus, the use of a mixture of approaches is recommended as the strength of one may help alleviate the weaknesses of the other. Below is a diagrammatical representation of the phases of theoretical model development to illustrate their interrelatedness (figure 5.1).



**Figure 5.1 Phases of theoretical model development**

### **5.5 MODEL DEVELOPMENT: AN APPLICATION**

The approaches of choice identified for the development of the model in this study are synthesis and analysis. The application of these approaches is demonstrated here using two intellectual processes, induction and deduction. The strategy of synthesis is inductive as it is data-based. Analysis, on the other hand, may involve both theorising and inductive and deductive processes. Although the present study is a quantitative study, it utilised the process of synthesis for the generation of concepts from both the extant literature and study findings. This process was adopted iteratively until the point of theoretical saturation. It was at this point the researcher commenced the application of the approach of analysis. This, in essence, involved a close examination of the concepts identified for both similarities and differences and clustering those that were

similar into thematic categories (constructs). These themes (constructs) and their relationships are illustrated in figure 5.2. Finally a theoretical model entitled “Identification and Public Health Intervention Model for Risk Factors related to NCDs” was developed as depicted in figure 5.3.

## **5.6 DESCRIPTION OF THE NCDS RISK FACTORS IDENTIFICATION AND INTERVENTION MODEL**

Prior to conducting the study a range of literature sources was consulted to develop concepts and constructs on the NCDs’ risk factors and underlying conditions. The literature sources consulted had different scopes and validity in addressing constructs underlying the NCDs and their risk factors. Based on the knowledge obtained from the literature, gaps were identified. Statements indicating the NCDs and their factors situation were discussed, a conceptual framework was developed based upon the relationship between the NCDs and their risk factors and other underlying conditions, (figure 1.1 in chapter 1) and objectives were set. To test the model, data were collected and analysed rigorously to identify the independent predictors (socio-demographic, behavioural and biological risk factors; knowledge, perceptions and attitude and mental stress) for the NCDs. The analyses have been based on the thematic areas (constructs) identified to meet the study objectives. The tested model was revised in light of the existing theoretical models developed by different researchers in different disciplines. A theoretical model that best fits the context of this model was used (Creswell 1994). Finally, the NCDs’ risk factors identification and public health intervention model was developed based on the evidence generated in this study (figure 5.3).

This model primarily addresses public health measures (preventive aspects). Hence, the developed model is believed to be able to have high impact in reducing morbidity, mortality and disability due to the NCDs. Figure 5.3 is the schematic presentation of the NCDs’ risk factors identification and intervention model. In addition to these, the model could be applicable in primary health care settings and at the community level.

### Associated conditions

### Risk factors

### Potential interventions

- Gender(Men)
- Widowed marital status
- Khat chewing

Tobacco smoking

- Awareness raising interventions on the harms of tobacco smoking and Khat chewing emphasizing on high risk group
- Design tobacco smoking cessation strategy for smokers
- Implement other tobacco control strategies

- Gender(Men)
- Rural(residence)
- Low educational status
- Religion
- Khat chewing
- Presence of mental stress
- occupation

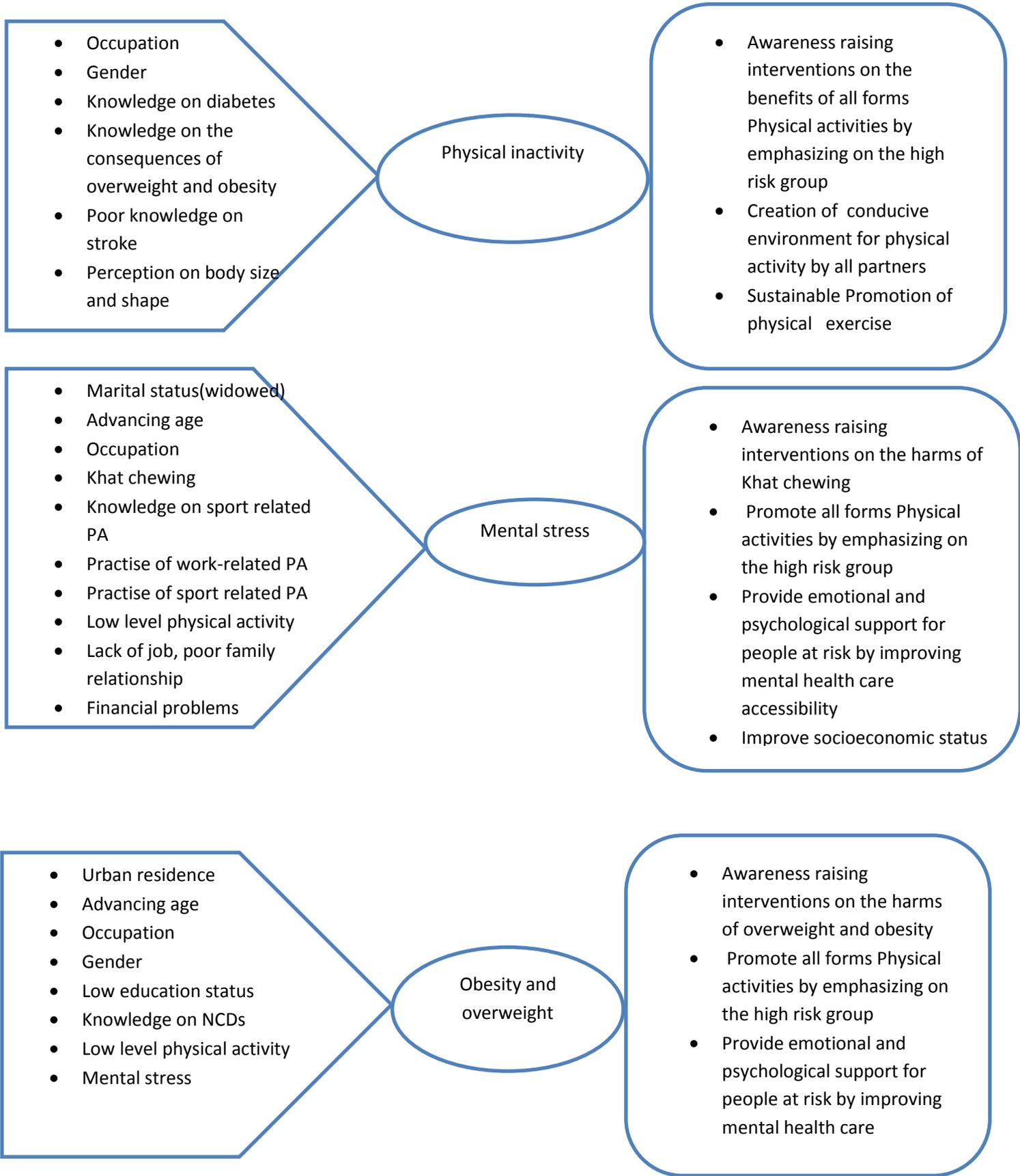
Alcohol consumption

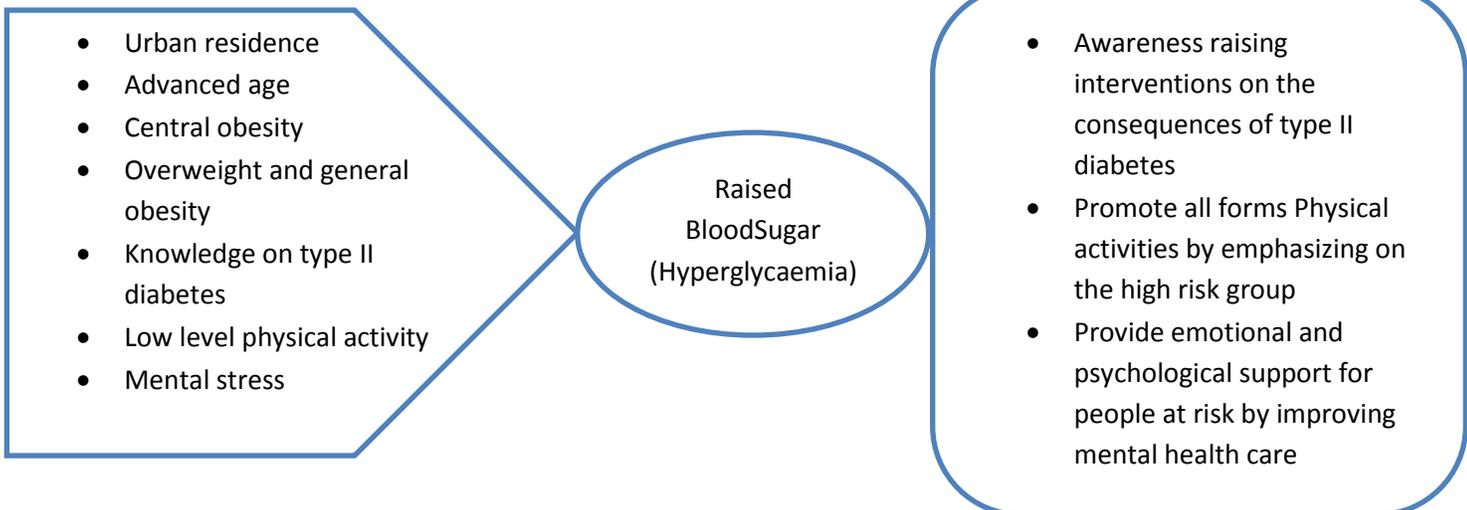
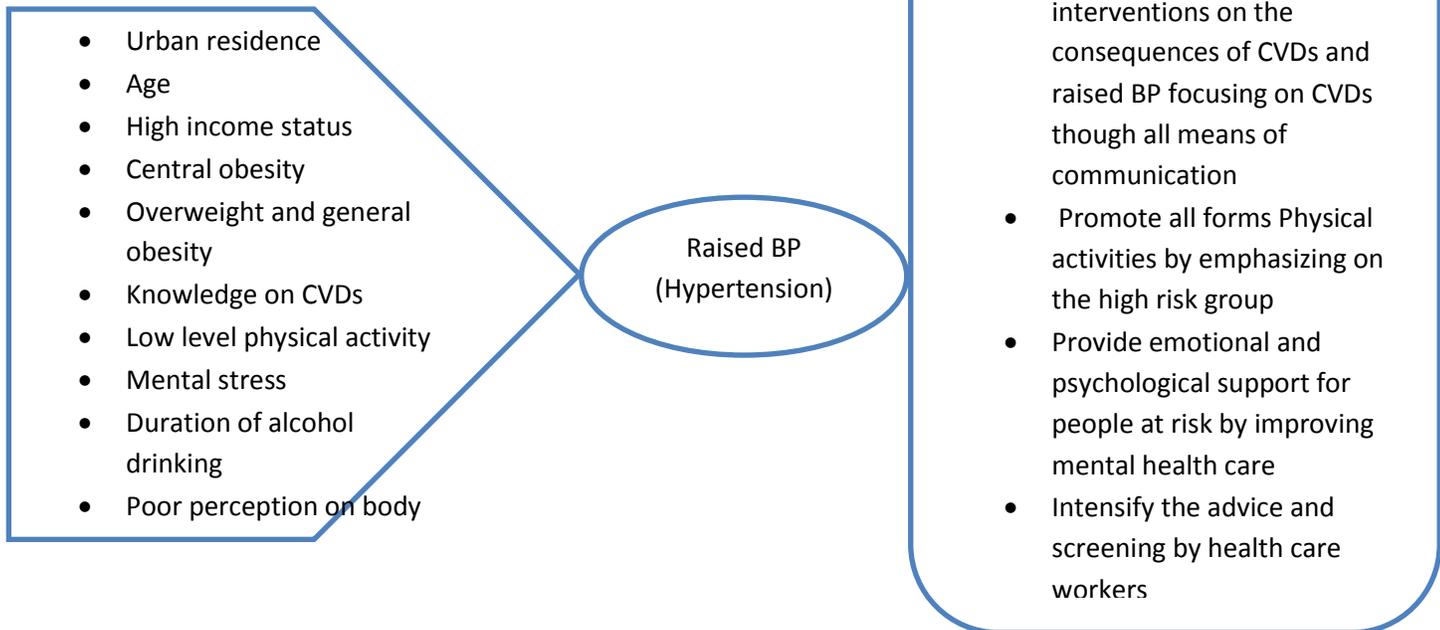
- Awareness raising interventions on the harms of alcohol misuse and Khat chewing emphasizing on high risk group including minors
- Reduce mental stress by improving socioeconomic and health statuses Implement alcohol misuse cessation strategies
- Implement alcohol misuse control strategies

- Monthly Income
- Gender
- Knowledge on CVDs

Inadequate intake of Fruits and Vegetables and feeding of raw meat/beef

- Awareness raising interventions on the benefits of optimal fruits and vegetables intake
- Inter-sectoral collaboration to improve availability and accessibility to fruits and vegetables
- Improving the socioeconomic status by creating alternative income generation





- Being a rural resident
- Gender (women)
- Formal employment
- Marital status (widowed)
- Low educational status
- Not receiving advice from a health worker
- Mental stress
- Knowledge on the consequence of tobacco
- Poor perception on NCDs
- Knowledgeable on the

Poor knowledge on NCDs including CVDs and DM

- Awareness raising interventions on NCDs through all media of communication
- Integrate NCDs into the Health Extension Program
- Provide emotional and psychological support for people at risk by improving mental health care accessibility
- Improve socioeconomic status and
- Provision of detailed advice on NCDs risk factors by Health care workers for all clients and patients visiting

- Gender
- Knowledge on NCDs, CVDs, salt intake and diabetes
- Advice by a health worker
- Poor perceptions on body size and shape and tobacco use
- Being a rural resident
- Educational status
- Poor knowledge on fasting diet

Blood pressure, Blood sugar and Weight measurement

- Awareness raising interventions on physical and biochemical through all media of communication by emphasizing on the high risk groups
- Improve socioeconomic status and
- Provision of detailed advice and physical and biochemical by Health care workers for all clients and patients visiting health institutions.

- Advanced age
- Being a rural resident
- Poor knowledge on breast cancer
- Occupation
- Religion
- Knowledge on importance of breast awareness
- Knowledge on importance of early screening

Breast Cancer Awareness and screening

- Awareness raising interventions on Breast cancer through all media of communication by emphasizing on the high risk groups
- Improve socioeconomic status and
- Provision of breast examination by Health care workers for all clients and patients visiting health institutions.

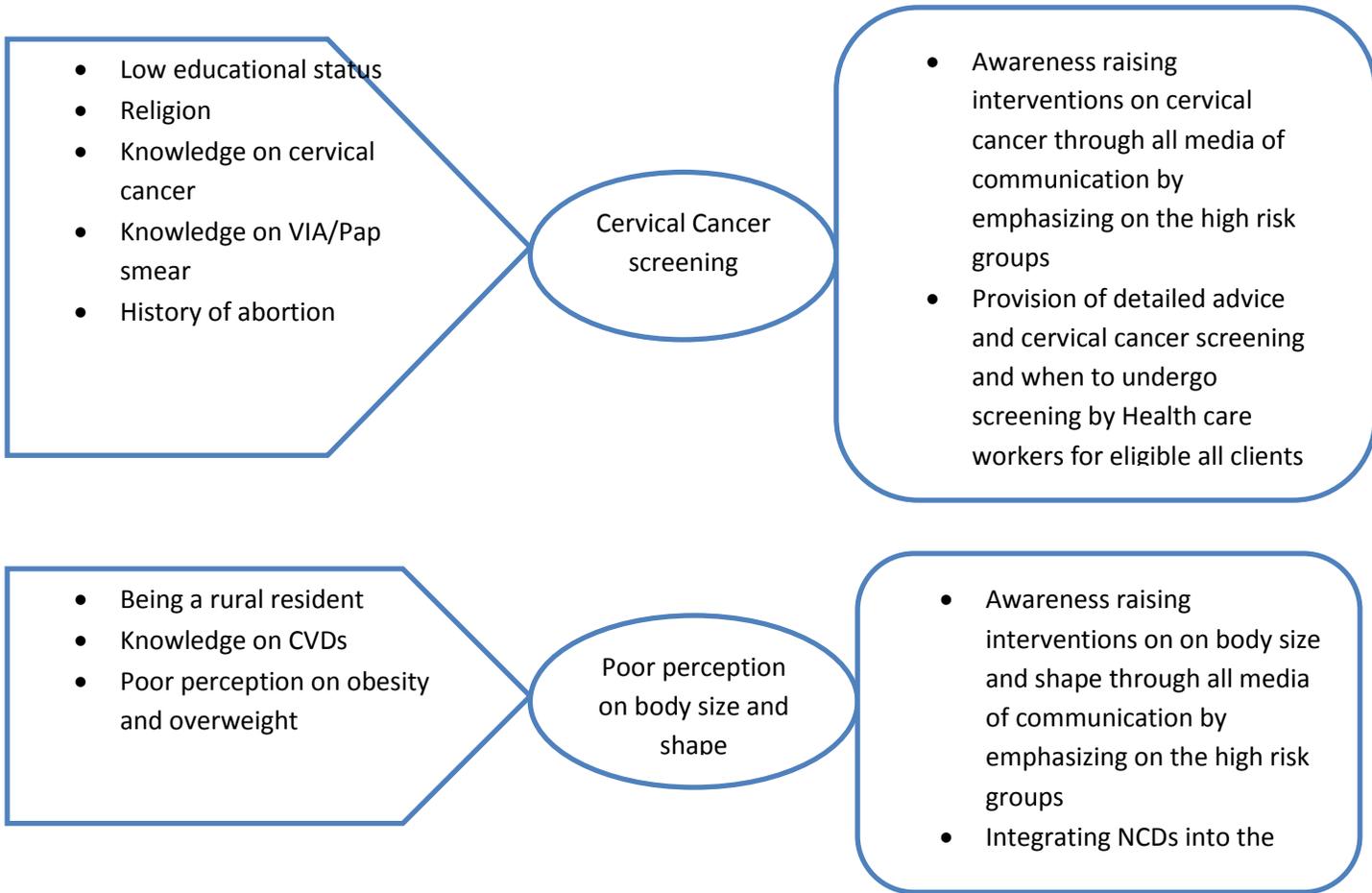


Figure 5.2 constructs of underlying conditions (predictors), NCDs risk factors and public health interventions

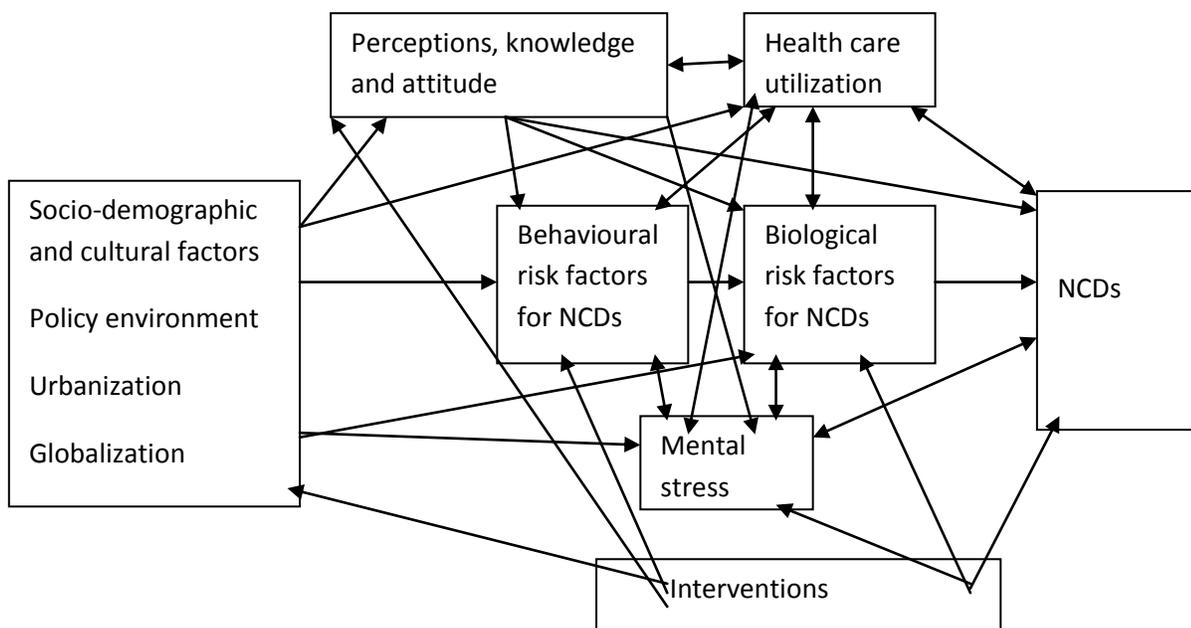


Figure 5.3 NCDs risk factors identification and public health intervention model

## **5.7 STRENGTHS AND WEAKNESSES of the MODEL**

This model was developed from information from the extant literature and analysis of the findings of the study. The identified risk factors of NCDs and preventive measures that may influence care provision and access are not weighted to their degree of influence. It is worth noting that the influence of the identified risk factors on individuals may vary from individual to individual. From a quantitative viewpoint, this lack of weighting of influential factors makes this model limited. It is therefore critical that a future study is conducted to address this area of concern, as doing so would enhance the utility of this model. Despite this, the researcher believes the model has wider adaptability in its current form as it takes into account individual variations in response to the influential factors because of the extensive literature review conducted and the validity of the study findings. This model serves an educative support for care professionals in enhancing their understanding of risk factors of NCDs and preventive measures. Even though the model has practical utility, there is support for future researchers to test in other settings and populations with the view of enhancing the model's predictability value.

## **5.8 CONCLUSION**

This chapter has offered discussions of the term model, its elements and approaches to developing a model. The model developed from the extant literature and data of this study is critically discussed here, including its strengths, weaknesses and contribution to the body of knowledge. The next chapter is about conclusions, limitations and recommendations of the study.

## CHAPTER 6

### Conclusions, limitations and recommendations

#### 6.1 INTRODUCTION

This chapter encompasses the conclusions, limitations and recommendations made on the epidemiology of preventable risk factors of NCDs among the adult population of Tigray.

The purpose of this study is to assess the epidemiology of preventable risk factors of NCDs among the adult population in Tigray, Northern Ethiopia to enable policy makers to develop evidence-based NCDs prevention policies and public health interventions to ultimately reduce morbidity, mortality and disability from these health problems. In this respect, the following research questions were addressed.

- What is the magnitude of behavioural and biological risk factors for NCDs?
- What are the predictors of the behavioural and biological risk factors of NCDs?
- What is the status of knowledge, attitude and practices with regard to NCDs and their risk factors?
- Which factors were predicting the knowledge and practices on the risk factors of NCDs?
- What perceptions are prevailing in the study participants in relation to their body size and shape?
- What are the determinants of hypertension among the study participants?

The objectives of this study were:

- To identify the prevalence of preventable risk factors of NCDs using a stepwise approach;
- To describe the knowledge, attitudes and behaviours of preventable risk factors of NCDs in the adult population of the study setting;
- To examine the determinants of hypertension among the adult population; and
- To develop a risk factor identification model for NCDs

The research design employed was a quantitative, descriptive cross-sectional study for the objectives 1 and 2. For the objective 3, a matched case control study design was employed.

This chapter summarizes the research findings based on the research questions and objectives set to assess the epidemiology of preventable risk factors of NCDs among the adult population in Tigray, Northern Ethiopia. This chapter also deals with the limitations and recommendations to be made on the epidemiology of preventable risk factors to aid the development of the risk identification model on averting the burden of NCDs. This will help policy makers to make sound decisions in instituting effective public health interventions to reduce risk factors of NCDs. The conduct of further research will also be recommended.

## **6.2 SUMMARY OF THE RESEARCH FINDINGS FOR THE DESCRIPTIVE CROSS-SECTIONAL STUDY**

This section summarises the findings to assess the magnitude of the preventable risk factors of NCDs, knowledge attitude and practices of NCDs and their risk factors, perceptions related to body size and shape and the predictors for these.

### **6.2.1 Distribution of the preventable risk factors of NCDs**

In this section, the main findings on distribution of behavioural and biological risk factors for NCDs among the study population are summarised.

#### **6.2.1.1 Distribution and predictors of behavioural risk factors of NCDs**

##### **6.2.1.1.1 Tobacco use**

The prevalence of current tobacco smoking was not high (2.3%). There is significant difference in tobacco smoking by age and gender. There were more smokers in the younger age group (25-44 years), and cigarette smoking is rising in this age group population compared to the older age (45-64 years). The magnitude of current smoking was higher in men than women, 5.3% versus 0.4%, respectively. The majority (63%) of the current smokers were daily smokers. The distribution of daily cigarette smoking was also higher in men than in women and in the younger than older age group. The study participants initiated tobacco smoking at early ages and the mean age for initiation of tobacco smoking was 19.3 years. Men initiated tobacco smoking in the earlier age than women. The mean duration of tobacco smoking was higher in the age group 45-64

years than 25 -44 years old. The prevalence of never smoking in the past also was not high (1.6%). It was higher in men than women and in the younger age than the older counterparts. The prevalence of current smokeless tobacco use was small (0.2%) and no difference by age and gender was noted. The magnitude of never use of smokeless tobacco was slightly higher (0.6%) than that of current use with age and gender difference.

The prevalence of second hand smoking at home was high (6.8%) and it was higher in men than women and in the younger than older age group. The mean number of days for being exposed to second hand smoking at home was nearly 3 days in a week. The second hand smoking prevalence at workplace and other closed areas was high (10.6%). There was significant difference by gender and age in terms of exposure to such second hand smoking. The mean duration participants were exposed for such smoking was nearly 4 days in a week.

After adjusting for possible confounders, the independent predictors of tobacco smoking among the study participants were being self-employed by occupation (protective effect), male gender (risk), never married and married or cohabiting (protective effect) and chewing Khat (risk).

#### **6.2.1.1.2 Alcohol consumption**

The magnitude of ever consumption of all type of alcoholic drinks (local and standard alcohol) among the study participants was considerably high (66.8%). The trend of alcohol consumption increased with advancing age. There was also significant difference in alcohol consumption by gender; i.e., the magnitude was higher in men than women. The majority (92%) of the ever alcohol drinkers consumed alcohol in the 12 months period preceding the study. Nearly 1 in 5 persons consumed alcohol frequently ranging from daily to 1-4 days in a week. Frequent alcohol consumption was practiced mostly by men and older people (45-64 years of age). Among the study participants who consumed alcohol in the one year preceding the study, most (87.7%) had consumed alcohol consumption in the 30 days preceding the study. The average number of standard alcohol consumed during one drinking occasion in 30 days

preceding the study was high (4 per occasion) which was higher in the younger age group but with similar patterns among men and women. The number of times binge drinking was experienced in 30 days preceding the study was also high (4.3 times). Alcohol consumption with meals was generally high. Weekends are the most common days to consume more alcohol, including the standard alcohol.

The following were found to be independent predictors for alcohol consumption among the study participants: Being from predominantly rural setting (Kilte Awlaelo HDSS site), government employees, non-government employees, self-employed respondents, house wife, retired, farmer, less educated, men, feeling of stress and nervous, reporting that daily consumption of alcohol is harmful, and khat chewing were found to increase the risks of consuming alcohol. Being Muslim was found to be protective against alcohol drinking.

#### **6.2.1.1.3 Fruit, vegetables oil and beef intake**

The average number of days in a typical week fruit is consumed was very small (1.7 days). The number of servings in one of those days was also very small (1.3 servings). The average number of days that vegetables are consumed in a typical week was also small (1.9 days). The number of servings of vegetables on one of those days in a week was also small (1.6 servings). There was no significant difference by age and gender. Most study participants (69.4%) had one fruit serving per day. A considerable number (6%) of the study participants did not have any servings and only very small proportion (0.8%) had five or more servings of fruits per day. Generally the number fruits and vegetables serving among the study population were suboptimal.

The commonly used oil or fat for the preparation of meal by most (82%) of the study participants was vegetable oil which is an encouraging finding. Men and younger people tended to consume more meals not prepared at home.

The following were found to be predictors of no fruit intake.

- Generally those with small monthly income were more likely not to use fruits.
- Better attitudes or moderate concerns on developing cardiovascular diseases were related to the consumption of fruit.

- Being knowledgeable on the role of improving diet in controlling diabetes was related to the consumption of fruit.

The predictors of raw meat or beef consumption were the following.

- Men were more likely to consume beef or raw meat.
- Being knowledgeable on the importance of fruits and vegetables was related to lower consumption of beef or raw meat.

#### **6.2.1.1.4 Physical activity**

Work-related vigorous physical activity for at least 10 minutes per day was experienced by a small proportion of individuals (14.2%). The work-related vigorous physical activity did not vary by age; however, men were more engaged in such kinds of activities than women. The mean number of days participants engaged in work-related vigorous intensity physical activity was fairly high (5 days in a week) with slight gender and age differences. The work-related moderate intensity physical activity was experienced by a limited number of people (31.3%). The engagement in work-related moderate intensity physical activity decreased with increasing age and it was higher in men than women. The mean number of days the people engaged in work-related moderate intensity was satisfactory (4.7 days in a week). Men and younger age participants had more engagement in work-related moderate physical activities.

The engagement in transportation-related (walking or bicycle riding) physical activity was high (86.5%) with no significant differences according to age; however, it was higher in men than women. The mean number of days for engaging in walking or bicycle activity per week was fairly high (4.3 per week). The recreational vigorous intensity physical activity was experienced by small proportion of individuals (7.8%) and this was higher in the younger and female participants. The average number of days the participants engaged in vigorous recreational activity was fairly high (4.6 days in a week) with no significant difference by age and gender.

The prevalence of recreational moderate intensity physical activity was also low (15.9%) and this was higher in the younger and male participants. The mean number of days for

moderate recreational activity engagement by the study participants was also moderately high (4.3 days in a week).

The level of physical activity was computed using metabolic equivalent based on the time spent for work, transportation and recreation related physical activities. The prevalence of low level physical activity or <600 MET-minutes per week was high (44.8%). The prevalence of moderate level physical activity (600-3000 MET-minutes per week) was low (36.6%). The prevalence of high level ( $\geq$ 3000 MET-minutes per week) physical activity was very small (18.6%). The prevalence for low and moderate level activities was decreasing with increasing age. The high level physical activity was increasing with increasing age. Gender wise, the low level physical activity was higher in women than men. Men experienced higher level physical activity than women.

The mean median and IQR time spent on sedentary sitting on an average day among the study participants was high (127.6, 60 and 30-150 in minutes, respectively). Women tended to spend more time for sedentary sitting than men.

The predictors of low level physical activity were the following.

- Being from Kilde Awlaelo HDSS site (which is predominantly a rural setting) was associated with higher levels of physical activity.
- Men were less likely than women to have low level physical activity.
- Non-government employees were more likely to have low level physical activity.
- Having lack of knowledge on type II diabetes was found to be associated with low level physical activity.
- Having good attitudes about body size and shape was found to be associated with higher level of physical activities.

#### **6.2.1.1.5 Khat chewing**

The magnitude of ever Khat chewing among the study participants was not high (3.3%). Khat chewing was higher in men than women and in the younger than older age group. Most of the ever Khat chewers consumed Khat in the 12 months preceding the study. Half (50%) of the participants consumed Khat on weekly basis. Most (72%) smoked

cigarettes while chewing Khat with varying frequency. More than half (57.1%) of the study participants drank alcohol following Khat chewing to break the effect of Khat. Some participants also consumed shisha or other substances while chewing Khat.

#### **6.2.1.1.6 Mental stress**

The magnitude of mild mental stress is very high (92.6%) followed by moderate, moderately severe and very severe mental stress in decreasing order. Women were generally more affected than men study participants. The most commonly observed mental stresses observed were feelings of nervousness, being tense or worried, having headaches, or sleeping badly.

The predictors of mental stress were the following.

- Participants in the age group 25-44 years were less likely to experience mental stress than older subjects.
- Having completed preparatory school was negatively associated with mental stress.
- Single, married or cohabiting and separated or divorced participants were less likely to have mental stress than widowed subjects.
- Subjects practicing work-related moderate physical activity were more likely to have mental stress .
- Sedentary life style was found to be positively associated with having mental stress.
- Being engaged in moderate sports-related physical activity was negatively associated with having mental stress.
- Poor knowledge on cardiovascular diseases was positively associated with having mental stress.

#### **6.2.1.2 Distribution and predictors of biological risk factors of NCDs**

##### **6.2.1.2.1 Raised Blood pressure (hypertension)**

About half (46.5%) of the study participants had never had their blood pressure measured by a health worker. This was higher in women and older age participants. The prevalence of hypertension among the participants by history was 5% and was

higher in older age and female participants. Less than half (45.2%) of the participants received drugs in two weeks preceding the study. Most of the participants received advice to reduce salt, lose weight, stop smoking start or do more exercise but the advice was not consistently comprehensive among people diagnosed with hypertension. Some with hypertension visited traditional healers and some of them took herbal or traditional remedies. The overall prevalence of hypertension (by history and physical measurement) was somewhat high (9.9%) and it was slightly higher in men than women and significantly higher in the older than younger age group.

. The independent predictors of hypertension were the following.

- Participants in the age group 25-44 years were less likely to have hypertension than older subjects.
- Low level physical activity was positively associated with hypertension.
- Normal waist circumference was negatively associated with hypertension.
- Having mental stress was positively associated with hypertension.
- Being knowledgeable about cardiovascular diseases was positively associated with hypertension indicating the knowledge might have come after being diagnosed with hypertension or the knowledge possessed by the participants was not comprehensive.
- Being concerned about the salt content in one's meal was negatively associated with hypertension.
- Normal BMI (BMI <25kg/m<sup>2</sup>) was negatively associated with having hypertension.

#### **6.2.1.2.2 Hyperglycemia (Diabetes)**

Only a small proportion (11.5%) of the respondents had blood sugar measurement within their lifetimes. However, the prevalence of diabetes by history was relatively high (5.6%). It was slightly higher in women than men and older age the younger age people. The interventions (treatments) and advice given by the health workers seemed to not comprehensive in that a considerable proportion of people diagnosed of diabetes visited traditional healers and a quarter of diabetic patients used herbal or traditional remedies to treat their diabetes. The prevalence of hyperglycemia or diabetes by biochemical measurement was 2.5%. The magnitude of diabetes by biochemical measurement was

also higher in women than men and in the age group 45-64 than 25-44 years. The overall prevalence of diabetes (by history and biochemical measurement) was relatively high (3.5%).

The independent predictors of hyperglycemia (diabetes) were:

- Subjects 45-64 years of age were more likely to have diabetes than younger subjects.
- Being engaged in travel-related physical activity was positively associated with hyperglycemia/diabetes. This implied the presence of other underlying factors to be investigated.
- Feeling of nervousness was found to be negatively associated (protective effect) with hyperglycemia/diabetes
- Being knowledgeable about diabetes was negatively associated (had protective effect) with diabetes. This indicates the acquisition of knowledge might have occurred after being diagnosed to have diabetes.
- Having normal waist circumference was found to be negatively associated with hyperglycemia/diabetes or normal waist circumference had protective effect for hyperglycemia.

#### **6.2.1.2.3 Body Mass Index (BMI)**

The prevalence of BMI  $25\text{kg}/\text{m}^2$  and above was high (16.8%). On the other hand, the magnitude of underweight was also high (20.8%), indicating rampant chronic energy deficiency. The prevalence of being overweight or obese was higher among women than men. Obesity and overweight tends to increase with advancing age.

The following were independent predictors of overweight and obesity.

- People from a predominantly rural setting (Kilte Awlaelo HDSS site) were less likely to be overweight or obese than those from an urban setting.
- Subjects in the age group 25-44 years were less likely to be overweight or obese than older subjects.
- Being housewife by occupation was associated with being overweight or obese.
- Subjects having less than formal education were less likely to be overweight or obese than more educated subjects.

- Men were less likely to be overweight or obese compared to women.
- Being knowledgeable about the effects of religious fasting on reducing NCDs was associated with overweight or obese.

#### **6.2.1.2.4 Waist Circumference (WC) and Waist to Hip Ratio (WHR)**

The magnitude of increased and substantially increased WC both in men and women was high (22.2%). The WC in women and older age group was generally higher than that of men and younger age group respectively. The overall prevalence of increased and substantially increased WHR was also high (28.3%). The WHR was higher in women and older age than men and younger age group participants.

The predictors of WC were:

- Age group 25-44 years was less likely to have raised WC than older subjects.
- Non-government employees were less likely to have raised WC.
- Male subjects were less likely to have raised WC than female subjects.
- Not engaged in work-related vigorous physical activity was associated with raised WC.
- Being knowledgeable on the effects of religious fasting in reducing NCDs was associated with raised WC.
- Feelings of stress were associated with raised WC.

#### **6.2.1.2.5 Fasting Blood Cholesterol**

The magnitude of hypercholesterolemia was high at 30.3%. Hypercholesterolemia was higher in women than men and in the older than younger study participants.

The predictors of raised blood cholesterol level were:

- Being from predominantly rural setting (Kilte Awlaleo HDSS site) was negatively associated with raised cholesterol. Subjects from the rural setting were less likely to have elevated cholesterol levels than those from urban setting.
- Never married participants were less likely to have raised blood cholesterol level than married/cohabiting subjects.

#### **6.2.1.2.6 Fasting Blood Triglycerides (TG)**

The prevalence of hypertriglyceridemia was similarly high (32.2%). It was higher in women than men and in the older than younger study participants.

The predictors of raised TG were:

- Eating raw meat or beef in one month preceding the study was associated with raised blood TG.
- Participants with BMI < ( $25\text{kg/m}^2$ ) was negatively associated with having raised blood TG.

#### **6.2.1.3 Distribution of both behavioural and biological risk factors**

The majority (98.7%) of the participants had at least one of the risk factors for NCDs. Having three risk factors was the more common pattern and was present in more than 27% of the study participants. With regard to the trend of the risk factors with age of the participants, the following were observed.

- Alcohol use had an increasing trend with advancing age.
- Physical inactivity or low physical activity had a declining trend up until the age 54.
- Fruit intake increased starting from 35 years onwards.
- Tobacco and Khat use had a declining trend with increasing age.
- Raised BP, WC, WHR and BMI had increasing trends with advancing age and
- Raised fasting blood sugar, fasting cholesterol and fasting TG showed an increasing trend with increasing age.

As far as metabolic risk factors (hypertension, hyperglycemia, overweight or obesity, hypercholesterolemia and hypertriglyceridemia) are concerned, nearly one-third of the participants had one of these risk factors. The proportion of the study participants with at least three components of the metabolic risk factors (metabolic syndrome) was 2.2%. Compared to BMI and WHR, the WC was the best predictor of hypertension, hyperglycemia, hypercholesterolemia and hypertriglyceridemia.

## **6.2.2 Knowledge, attitudes and Practices related to NCDs and their risk factors**

### **6.2.2.1 General knowledge, attitude and practices related to NCDs and their predictors**

The majority (85.7%) of the study participants were knowledgeable that NCDs could not be spread between people. In terms of misperception on the severity of NCDs, more than a third (33.6%) of the participants perceived that NCDs are less dangerous than infectious diseases. A small proportion (1.3%) of the participants reported to have heart attack or stroke like health problems.

Independent predictors of knowledge of NCDs were:

- Study participants predominantly from rural settings (Kilte Awlaelo HDSS) were more likely to have poor or no knowledge of NCDs.
- Married or cohabiting study participants were less likely to have poor or no knowledge of NCDs.
- Less educated were more likely to have poor/no knowledge of NCDs.
- Having perception of cigarette smoking could affect once health were less likely to have poor or no knowledge of NCDs.
- Reporting that smoking around other people could affect their health was negatively associated with poor or no knowledge of NCDs.
- Being advised by health workers to reduce alcohol was negatively associated with poor or no knowledge of NCDs.
- Having poor attitude towards the importance of eating vegetables every day was positively associated with poor or no knowledge of NCDs.
- Study participants who tended to find the foods others cook (out of their own home) was too salty were less likely to have poor or no knowledge of NCDs.
- Perceiving that religious fasting would reduce risk of acquiring NCDs was negatively associated with poor or no knowledge of NCDs.

### **6.2.2.2 Knowledge, attitudes and practices related to tobacco use**

Most (96.8%) of the participants knew that smoking affects one's health regardless of how much one smoked. The majority of the participants reported that smoking is very harmful to the lungs and heart. Most (85.6%) of the participants understood that

second-hand smoking is harmful. A considerable proportion of the participants (50.1%) reported that they don't mind or do mind but allow it if people smoke in their homes. Having a smoke-free work place was suggested by most of the participants. Information on the harm of tobacco smoking from a health worker was not imparted to a considerable number of study participants. Undesirable or negative attitudes on the harm of tobacco smoking have been reflected by few study participants.

#### **6.2.2.3 Knowledge, attitudes and practices related to alcohol use and misuse**

Most (88.2%) study participants reported that when Ethiopians consume alcohol they tend to binge drinking. More than two-thirds (67.7%) of the study participants had never consumed alcohol. A quarter of the ever drinkers drank alcohol between waking up in the morning and midday in one month preceding the study. Thoughts of reducing the amount of alcoholic consumed were reflected by large number (61.4%) of participants. Of those experienced driving a car, 1 in 10 individuals drove a car whilst being influenced by alcohol. A large proportion (48.4 %) did not receive any advice on the harm of alcohol misuse from any of the health workers. The majority (89.1%) of the study participants had good attitude on the harm of drinking alcohol. The most frequently listed occasions reported by the study participants to consume large amount of alcohol were celebrations, being with friends and after receiving monthly income. The reasons for alcohol drinking were being with friends, to enjoy, relax, forget problems, enhance digestion, and for deworming purposes.

#### **6.2.2.4 Knowledge, attitudes and practices related to dietary intake**

Eating fruits and vegetables every day was perceived to be important or very important by the majority (97.4%) of the study participants. A proportion (14.8%) of the study participants had incorrect perceptions; i.e., eating low amounts of fruits and vegetables is not harmful to their health. Reasons for not consuming fruits were lack of knowledge about its benefits, lack of money to buy fruits, and unavailability of the same. More than half, 50.1% (95% CI: 48.7-52.7) of the study participants believed that Ethiopians eat too much raw meat or beef. The commonest reasons for eating raw meat or beef were customs and traditions. Ever eating of raw meat or beef was practiced by 26.9% of the study participants. A small proportion (7.5%) of the study participants ate raw meat or beef always on daily bases. The majority (87%) of the study participants never thought

about how much salt to have in their diet. The source of foods or drinks contributing to the largest amount of daily salt intake in most study participants were cooked foods and coffee in 54.5% and raw foods, including milk, meat and vegetables in 38.7% of the participants. The majority (61.6%) of the study participants always added salt to their food when eating or cooking. The majority (93.1%) of the study participants had good attitude on the harm of salt consumption on people's health.

#### **6.2.2.5 Knowledge, attitudes and practices related to religious fasting**

Almost half (47.5%) of study participants reported that religious fasting would reduce risk of acquiring NCDs. In contrast, more than half (53.9%) of the participants reported that religious fasting is not beneficial to health. Nearly half (48%) of the participants reported that fasting reduces body weight. More than half (50.5%) of the study participants believed that religious fasting benefits health by making people feel healthy and strong. Most (90.3%) of the study participants never practiced religious fasting. The commonly practiced types of fasting were avoiding any animal products (meat, milk and butter) only, avoiding any animal products plus avoiding any other foods until midday, and avoiding any animal products plus avoiding any other foods until 3:00 PM.

#### **6.2.2.6 Knowledge and attitudes about physical exercise**

The proportion of participants who were not knowledgeable about how frequent to practice physical exercise to stay healthy was high (1/3<sup>rd</sup>). The commonest reasons for not engaging in physical exercise were lack of knowledge on how to do it, no time for physical exercise and no willingness to do the physical exercise. Nearly 1/3<sup>rd</sup> had undesirable health outcomes for being physically inactive.

#### **6.2.2.7 Mental stress and its management**

The prevalence of experiencing mental stress of any type was high (50.5%) but with varying frequency. The main causes of mental stress reported by participants were lack of job, poor family relationship and financial problems. The commonly mentioned mechanisms to manage stress were talking to family members, friends, health workers, and doing physical exercise.

#### **6.2.2.8 Knowledge, attitudes and practices related to high blood pressure (BP) and predictors of BP measurement**

Nearly three-fourths (74.4 %) of the study participants lacked knowledge about raised BP. The majority of the study participants were of the opinion that it is important to people to have their BP checked frequently. The main reasons for not checking one's BP were lack of knowledge, not considering it as important, and lack of time. The majority (88.7%) of the study participants responded that eating food with a lot of salt can affect blood pressure and most (96.5%) responded that taking food with a lot of salt affects can raise people's blood pressure. The majority of the participants were knowledgeable on the adverse consequences of raised blood pressure on body organs, including the brain, kidneys and heart. The knowledge of different interventions for reducing high BP was promising but not comprehensive.

The predictors of BP measurement were:

- Men were more likely not to get their BP measured.
- Inadequate or sub-optimal knowledge and negative attitudes about CVDs risk factors make participants less likely to undergo blood pressure measurement.
- Believing that religious fasting would reduce body weight was associated with not undertaking BP measurement.
- Being advised by a health worker to reduce body weight was associated with BP measurement.
- Having poor knowledge on CVDs was positively associated with not getting BP measured.
- Being knowledgeable on the frequency of physical activity to stay healthy was associated with getting BP measured.
- Being knowledgeable on the amount of salt intake was associated with getting BP measured.
- Practicing adding salt to once food was positively associated not getting their BP measured.
- Undesirable attitudes about being overweight or obesity is not harmful to health was positively associated with not getting their BP measured, and

- Undesirable attitudes about cigarette smoking or the belief that cigarette smoking is only moderately harmful to health were positively associated with not getting their BP measured.

#### **6.2.2.9 Knowledge, attitudes and practices related to body weight and predictors of body weight measurement**

The practice of body weight measurement was not high (53.1%) among the study participants. Most (73.3%) of the participants stated that they had normal body weight. The majority (95.1%) of the study participants knew that it is important or very important to have a normal body weight. Nearly one-third (32.9%) of the study participants had the inaccurate perception that being overweight is not harmful.

Predictors for body weight measurement were:

- Being from predominantly rural setting (Kilte Awlaelo) was positively correlated to not getting once body weight measured.
- Low educational status was positively related to not measuring body weight.
- Eating raw meat was associated with having once body weight measured.
- Practicing sport-related physical activity was associated with measuring body weight.
- Being not knowledgeable on type II diabetes was associated with not having measured body weight.
- Feeling that overweight or obesity could result in diabetes was associated with getting body weight measured.

#### **6.2.2.10 Knowledge, attitudes and practices related to cardiovascular diseases (CVDs) and the predictors of poor knowledge of CVDs**

Most (83.1%) of the study participants were not knowledgeable on CVDs (83.1%) in general and about stroke (93%) in particular. About two-thirds (65.0%) of the participants believed that CVDs are becoming common in Ethiopia. A significant proportion of participants were not concerned about developing CVDs. Most of the study participants believed that smoking; stress, being overweight and old age would increase the chance of getting CVDs. A large proportion (48.0%) of participants did not know that people with high blood pressure are more likely to have stroke. The prevalence of misperception of CVDs are not preventable was high (37.7%).

The predictors of poor knowledge of CVDs were

- Low educational status was positively associated with poor knowledge of CVDs.
- Advice by health workers to reduce the amount of alcohol intake was associated with having good knowledge of CVDs
- Belief of religious fasting that it would reduce body weight was associated with having good knowledge of CVDs, and
- Being knowledgeable about the consequences of blood pressure was related to the risk of having poor or no knowledge of CVDs.

#### **6.2.2.11 Knowledge, attitudes and practices related to type II diabetes and predictors of poor knowledge and blood glucose measurement**

Lack of knowledge of type II diabetes was very high (71.5%). More than one-third (34.8%) of the study participants reported that they didn't know that diabetes is about too much sugar in the blood. This indicates considerably low knowledge status of type II diabetes in this study population. The health consequences of type II diabetes on different body organs were not well understood by many of the study population. There was also the misconception that diabetes is not preventable at all. Only one-third (33.1%) of the study participants reported that one can feel normal and healthy but still have diabetes. More than half (52.5%) of the study participants did not receive any information about diabetes from health workers. The most common interventions to reduce diabetes reported by the study participants were improving diet, taking medications and doing physical exercise.

The predictors of poor knowledge of type II diabetes were:

- Men were less likely to have poor knowledge of type II diabetes
- Low educational status was positively associated with poor knowledge of type II diabetes
- Being a government employee was negatively associated with having poor knowledge of type II diabetes.
- Being concerned about how much salt to have in a diet was associated with having good knowledge of type II diabetes.

- Poor knowledge of the frequency of physical exercise was positively associated with poor knowledge of type II diabetes.
- Feeling of stress was associated with having good knowledge of type II diabetes.
- Not receiving any information from a health worker on type II diabetes was positively associated with having poor knowledge of type II diabetes.

The predictors for not practicing blood glucose measurement were:

- Being from predominantly rural setting (Kilte Awlaleo HDSS) increases the risk of having had blood glucose measurement.
- Being less educated increases the risk of not practicing blood glucose measurement.
- Never married, currently married or cohabiting, separated or divorced tend to increase the risk of not measuring blood glucose measurement as opposed to widowed.
- Believing that religious fasting would reduce body weight was related to measuring blood glucose.
- Being unknowledgeable on CVDs was 1.91 times more likely to increase the risk of not measuring once blood glucose.
- Being engaged in sports-related moderate physical activity increased the probability of getting blood glucose measured.
- Being unknowledgeable on type II diabetes increased the risk of not getting blood glucose measured.

#### **6.2.2.12 Knowledge, attitudes and practices related to breast cancer and predictors of poor knowledge and breast self-examination (BSE)**

Most (86.6%) of the female study participants were not knowledgeable about breast cancer. More than one third of study participants were not worried that breast cancer could affect them or their families. A large proportion (46.4%) of the study participants did not know the benefits of early detection of breast cancer. More than half did not know that it is possible for women to detect early signs of breast cancer by self-examination. Nearly 8 in 10 women (79.4%) did not know how to examine breasts for abnormality or signs of breast cancer. The magnitude of not practicing breast self-

examination and non-examination of breasts by health workers was very high 80.5% and 92.2%, respectively.

Predictors for poor or no knowledge on breast cancer were:

- Low educational status was noted to increase the risk of having poor or no knowledge of breast cancer.
- Being single, married or cohabiting and divorced marital statuses were found to increase the likelihood of having poor or no knowledge of breast cancer compared to widowed participants.
- Being Orthodox Christian and Muslim were found to increase the likelihood of having poor knowledge of breast cancer compared to other religion followers.
- Being not worried at all that breast cancer could affect individuals and/ or their families was observed to increase the risk of having poor knowledge of breast cancer.
- Being worried sometimes that breast cancer could affect individuals and/ or their families was noted to increase the risk of having poor knowledge of breast cancer.
- Being knowledgeable about the benefits of early diagnosis of breast cancer was associated with having knowledge of breast cancer.
- Being knowledgeable about how to examine one's breast for any sign of abnormality was associated with having knowledge of breast cancer.

Predictors for BSE were:

- Being predominantly from rural setting (Kilte Awlaelo HDSS) reduces the likelihood of practicing BSE.
- Being young (younger age group) increases the likelihood of BSE.
- Being a government employee, non-government employee, self-employed, housewife and farmer decrease the likelihood of practicing BSE. Study participants who knew nothing about breast cancer, but have heard about the term before were less likely to practice BSE.
- Not being worried at all and worried only sometimes about breast cancer that breast cancer could affect one or once families was associated with the practice of BSE.

- Being knowledgeable on the benefit of early diagnosis of breast cancer was associated with practicing BSE.
- Being knowledgeable on how to examine one's own breasts for any abnormality or signs of breast cancer is associated with the practice of BSE.
- Having physical examination of one's breasts by a health worker is associated with practicing BSE.

### **6.2.2.13 Knowledge, attitudes and practices related to cervical cancer and their predictors**

Most (88.2%) of the female study participants had poor knowledge or no knowledge about cervical cancer. More than three-fourths (76.1%) of the participants did not have any idea about the recommended frequency of having a Pap smear or visual inspection of the cervix with acetic acid (VIA). The majority (89.1%) of the study participants have never had a Pap smear or VIA. The main reasons for not having a Pap smear or VIA were, not knowing that these tests were recommended, not knowing where to have these, lack of time to receive the services, cost, and feelings of embarrassment. Among the study participants who underwent Pap smear or VIA, 9% of them were informed that they tested positive or were going to develop cervical cancer. Four in ten women did not worry that cervical cancer could affect them or their families. Most (77.5%) of women did not know that cervical cancer can be prevented by vaccine. More than one in three had their first sexual intercourse before the age of 15 years and more than half of the study participants had their first sexual intercourse before the age of 18 years. More than 1 in 5 women had 2 or more marriages in their lifetimes. More than one-fifth had 5 or more births in their lifetime. The usual places for delivery were hospital and home. More than 1 in 5 women had a history of abortion. The prevalence of female genital mutilation was also high (7.2%). The proportion of women whose sex partner or husband had another wife or concurrent sex partner was high (8.4%). The prevalence of having a history of sexually transmitted infections was striking (34.5%). The proportion of the study participants receiving any kinds of contraceptive method was fairly high (56.7%).

The predictors for poor or no knowledge of cervical cancer were:

- Never giving birth reduces the likelihood of having poor knowledge of cervical cancer.
- Being knowledgeable on when to have Pap smear and VIA increases likelihood of having good knowledge on cervical cancer and.
- Having a history of abortion increased the likelihood of having good knowledge of cervical cancer.

The predictors for practices of cervical cancer screening were:

- Having low educational status increased the probability of practicing cervical cancer screening.
- Being unknowledgeable increases the likelihood of not practicing cervical cancer screening.
- Being knowledgeable about when to have a Pap smear or VIA reduces the probability of not practicing cervical cancer screening.
- Having a history of abortion is associated with a lower frequency of cervical cancer screening.

#### **6.2.2.14 Perceptions about body shape and size**

The misperception that being overweight or obese is a sign of good health exists among the study participants. There was also a belief that overweight or obese individuals were most likely wealthy. A significant proportion (8.4%) of the study participants claimed that being overweight or obese was a sign of attractiveness. There was also misperception that being slim is a sign of poor health in 8.5% of the study participants. Some 4.6% of the study participants wanted the body size of their spouses to be obese or overweight. Most (81.4%) of the study participants described their body size and shape as normal. Only 194 (8.7%) of the study participants perceived their body weight as overweight or obese. Most (85.5%) reported that they liked their body size and shape. A sizeable proportion (22.2%) of the study participants believed that eating beef or raw meat is beneficial for their body size and shape. Another misperception observed was related to diet. Nearly one-third of the participants responded that frequent eating of plant products would negatively affect their body size and shape. Interventions suggested by the study participants to reduce being overweight or obese were as follows: engagement in aerobic exercise, modification of

dietary intake, and paying visits to health workers for treatment and /or advice. Nearly 1 in 4 individuals responded that being overweight or obese does not negatively affect one's health which indicates the seriousness of misperception on risk factors related to body size and shape. Hypertension, heart disease, diabetes and cancer were the perceived health problems reported to be associated with being overweight and obesity. Most participants were unable to correctly classify their body size and shape.

The predictors of poor perception on body size and shape were:

- Being from a predominantly rural setting (Kilte Awlaelo HDSS) is associated with poor perceptions of body size and shape.
- Having a poor knowledge of CVDs increases the risk of people having poor perceptions on body size and shape.
- Knowing that being obese or overweight does not necessarily mean being wealthy reduces the risk of people having poor perceptions their body size and shape.

### **6.3 SUMMARY OF THE RESEARCH FINDINGS FOR THE CASE CONTROL STUDY**

This section outlines the determinants of hypertension or raised blood pressure. The determinants of hypertension include socio-demographic, behavioural, physical, perception-related, mental stress-related and biological factors. The determinants are shown with their actual effect size on hypertension in the results section of this thesis.

#### **6.3.1 Socio-demographic determinants of raised BP or hypertension**

- The only independent socio-demographic predictor of hypertension was low income status; i.e., low income was found to not be associated with having hypertension.

#### **6.3.2 Behavioural determinants of raised BP or hypertension**

- Being engaged in vigorous work-related physical was found to increase the odds of hypertension.
- Being engaged in moderate work-related physical activity reduced the risk of being hypertensive, and
- Drinking alcohol for less than 10 years duration reduced the odds of being hypertensive.

### **6.3.3 Physical measurement determinants of raised BP or hypertension**

- WC was the only variable that appeared to have statistical significance with hypertension; i.e., having normal waist circumference reduced the odds of being hypertensive.

### **6.3.4 Perception related determinants of raised BP or hypertension**

- Having poor perception on maintaining obesity or overweight were found to increase the odds of being hypertensive, and
- Perceiving that being overweight or obese has positive health consequence was found to increase the odds of being hypertensive.

### **6.3.5 Mental stress related determinants of raised BP or hypertension**

- Feelings of having poor digestion decreased the odds of being hypertensive.
- Feeling nervous, tense or worried was found to increase the odds of being hypertensive, and
- Feelings of loss of interest in things were found to increase the odds of being hypertensive.

### **6.3.6 Overall independent predictors of raised blood pressure or hypertension**

- Being engaged in vigorous work-related physical was found to increase the odds of hypertension.
- Drinking alcohol for less than 10 years duration was noted to reduce the odds of being hypertensive.
- Having normal waist circumference was found to reduce the odds of being hypertensive.
- Feeling of having poor digestion was noted to decrease the odds of being hypertensive.
- Feeling nervous, tense or worried was found to increase the odds of being hypertensive and.
- Feelings of loss of interest in things were found to increase the odds of being hypertensive.
-

## **6.4 RECOMMENDATIONS**

Based on the findings obtained from this study, a number of recommendations are made under the following thematic categories.

- Magnitude and predictors of preventable risk factors of NCDs,
- Status of knowledge, perceptions, attitude and behaviours of NCDs and their risk factors and,
- Determinants of hypertension.

### **6.4.1 Recommendations on the preventable risk factors of NCDs and their predictors**

It is imperative that different entities namely the Ministry of Health and other public sectors including the education sector, mass media, the metropolitan administration, the Ministry of Trade, Ministry of Tourism, regulatory bodies, civic society organisations and others should work in a concerted manner to alleviate the prevailing risk factors for NCDs among the community. The underlying conditions (predictors) for the risk factors should also be addressed using the strategies and interventions indicated below.

#### **6.4.1.1 Combating tobacco use**

The following efforts should be in place to reduce the use of tobacco by the community in general and by the young members of society in particular. Public awareness raising activities on the harm of tobacco use should be widely implemented using appropriate tools and channels of communication and by addressing the harmful aspects of tobacco use in the health extension program. The anti-tobacco activities including awareness raising activities should be implemented to the general public by giving emphasis on men and younger age group. The specific activities to be planned are the following:

- The use of tobacco in public places, including workplaces, closed areas, and institutions like schools, restaurants, shopping malls, hospitals etc. should be discouraged and institutions should develop rules and regulations that enable them to control tobacco use in their premises to ultimately reduce second hand tobacco smoking.
- Children and adolescents should not be exposed to tobacco smoking at home, in schools and other recreational places to prevent early initiation of tobacco use.
- The use of smokeless tobacco should also be discouraged in all efforts that deal with the control of tobacco.

- Promote best practices in specified segments of the population (including the practices of self-employed people in this study) to the general public. Chewing Khat should also be discouraged by raising the awareness of the harmful aspects because chewing Khat is correlated with tobacco use. Tobacco users should be encouraged to cease the use of tobacco through different cessation strategies including provision of free treatment.
- The government should increase taxes on tobacco and control illicit trades of tobacco to ultimately reduce the number of cigarette smokers.

#### **6.4.1.2 Reducing use of Alcohol, Khat and Shisha**

The use of alcohol by majority of the study participants has been described in this study. The use of Khat and Shisha has also been documented in few participants. Thus the following public health measures should be instituted:

- Chewing Khat should be discouraged by raising the awareness of individuals on its health adverse consequences.
- The public should regularly be informed through community conversation and other means of communication about the benefits of spending their free time by engaging themselves in different healthy lifestyle activities instead of using harmful substances including cigarettes and Khat.
- The consumption of Khat should be discouraged and legal enforcement should be in place ultimately by the government.
- The legal system, policy and strategic planning documents for controlling the production, distribution, sale and use of tobacco should be strengthened by designing a clear plan of tobacco control at all levels.
- Fostering of inter-sectoral collaboration in the fight against tobacco use should regularly be conducted to maximize success in creating a tobacco-free generation. Using appropriate tools and channels of communication, awareness raising interventions should be widely carried out on the harm that results from the misuse of alcohol. The awareness raising interventions should be addressing all segments of the population with special emphasis on youth, men, older age,

rural settings and include this issue in the health extension program for its sustainable implementation.

- The harms of misuse of alcohol including binge drinking should be widely informed to the community.
- The misuse of alcohol despite its nature (local and standard) should be discouraged.
- Children and adolescents should not be exposed to alcohol use and health information has to be widely imparted to the wider public.
- Substance use, including Khat chewing, should be discouraged and controlling mechanisms on the use such substances have to be instituted.
- Regulatory bodies should develop critical strategies to control the production, distribution, selling and use of Khat and other psychoactive substances including Shisha and others and ensure the implementation of these by involving different partners.
- The public should be sustainably informed about the benefits of spending their free time, particularly the weekends, by engaging themselves in different healthy life styles instead of using harmful substances including alcohol and recreational places where alcohols are not consumed have to be widely instituted.
- The legal system for controlling the production, distribution, sell and use and of alcohol should be strengthened.
- Intersectoral collaboration should be fostered to minimise the misuse of alcohol.
- Best practices on alcohol cessation or reduction in alcohol use should be scaled up in areas where alcohol is misused.
- The community should be motivated to seek for counselling services in health institutions whenever they encounter any type of mental stress instead of consuming alcohol as a coping strategy.
- The use of alternatives to alcoholic drinks should be promoted during public events, celebrations, etc.
- Health institutions should establish units dealing with substance abuse/misuse including alcohol.

#### **6.4.1.3 Preventing unhealthy diet**

Healthy diets including adequate consumption of fruits and vegetables (five servings every day) is one of the principal public health measures in the NCDs prevention. Based on this study's findings, the following interventions should be implemented to tackle NCDs related to consuming unhealthy diets:

- Nutrition literacy emphasizing the benefits of daily intake of fruit and vegetables and diversification should be implemented and strengthened in a way that it reaches every segment of the population using proper tools and channels of communication including dietary demonstrations in the community.
- Production of diversified fruits and vegetables should be promoted by responsible sectors including the Ministry of Agriculture to ensure availability and accessibility.
- The socio-economic status of the community should be improved through creating income generation alternatives by involving the community in small scale businesses so that they can afford to buy fruits and vegetables for their daily consumption,
- The culture of frequent consumption of fruit should be promoted to the wider public to create a healthy community with fewer problems of NCDs.
- Awareness raising interventions focusing on the risk factors of NCDs in general and of CVDs in particular should be implemented to the general public.
- The wider use of vegetable oil should be promoted and encouraged in the general public.
- The harms of consuming raw meat/beef should be emphasised to the general public, particularly men, through various and appropriate channels of communication and build the decision-making power of the people in quitting the use of undesirable foods including raw meat/beef.

#### **6.4.1.4 Promoting physical exercise**

This study revealed that a low level physical activity is still rampant among the study participants. Factors related to the low level physical activity have also been identified. Thus the following public health measures regarding public health activities are recommended:

- Promote the health benefits of physical activities including work, transport and leisure time related activities of various intensities in the general public so that the risk of developing NCDs will be markedly reduced.
- Recommendations about the intensity, duration and frequency of the physical exercise of adults should be presented to the community especially emphasizing these to women with practical and feasible demonstrations.
- Recreational/sports-related physical activities should be widely promoted and opportunities should be created and facilitated by different sectors to enable the community practice of sports- related physical activities.
- Sedentary life styles should be discouraged and the harmful aspects have to be presented to the community, particularly women and urban residents. All segments of the population practicing low level physical activities should be motivated to practice physical activities of varying intensity based on their capacity and health status.
- The perceptions of the community about body size and shape should be improved to build positive attitudes that ultimately encourage the practice of physical activities through different awareness-creation mechanisms.
- Integration of healthy behaviours including physical exercise to the package of health extension programs both in urban and rural settings should be implemented to support the community in adopting such healthy behaviours.
- Fostering of inter-sectoral collaboration in promoting the knowledge and practice of physical exercise in the community and scaling up best practices to the wider public should be practical in a sustainable manner.

#### **6.4.1.5 Reducing mental stress**

The study has revealed that mental stress of varying degrees is prevailing among the study participants. Factors related to the mental stress were also identified. Thus the following recommendations are made to reduce the magnitude of mental stress:

- People with mental stress regardless of its intensity should visit health institutions to obtain appropriate care and counseling services. Interventions to address

social and health problems including income, education and life style should be sought.

- Physical activities should be promoted to reduce mental stress and knowledge of the community about NCDs prevention should be scaled up to reduce mental stresses.
- Strengthen and provide mental health services at different levels in health institutions.

#### **6.4.1.6 Reducing biological risk factors for NCDs (hypertension, hyperglycemia, hypercholesterolemia, hypertriglyceridemia, overweight and obesity)**

The biological risk factors for NCDs have been documented in this study. The magnitude of these factors varies in the study participants. Most of these biological risk factors are attributed to the behavioural risk factors mentioned in the above sections (sections 5.4.1.1 to 5.4.1.5). The public health measures recommended in the above sections will be helpful in reducing the magnitude of the biological risk factors. In addition to these, the following public measures should be instituted:

- The community should be informed about the importance of frequent BP checkups through different channels of communication. Health facilities should encourage their clients and patients to have their BP monitored if they are experiencing other illnesses.
- Health posts (the lowest health care unit in Ethiopia) should be able to screen for high blood pressure because they are located in the community. Older people should get frequent checks of their BP.
- Health facilities should be able to provide comprehensive preventive measures and treatment (both definitive and supportive treatments for NCDs).
- Health professionals should comprehensively teach their clients about the harm of taking unproven remedies including herbs to treat their hypertension and should be cautioned about visiting traditional healers.
- Moderate and vigorous intensity physical activities should be recommended to people with hypertension if not contraindicated.

- High BMI and central obesity should be reduced through physical exercise and dietary modifications.
- Awareness on NCDs and CVDs should be improved among the community to reduce the risk of hypertension.
- Knowledge and practice of minimizing salt intake should be improved in the community to control the risk of hypertension.
- The benefits of screening for diabetes should be promoted among the community and health institutions should provide diabetes screening services.
- The screening services for diabetes using simple and inexpensive procedures such as measuring sugar in the urine should be offered at the lowest health service delivery units.
- Health professionals should provide comprehensive treatment and advice to diabetic patients and discourage the use of herbal medicine and visiting traditional healers.
- Older age people should be frequently get screened for diabetes and hypertension and need to be informed of results so they can improve their life style.
- Central obesity should be reduced though physical exercise and dietary modification to reduce the risk of diabetes.
- The benefits of having a normal BMI and waist circumference should be widely communicated to the community.
- Every segment of the community should be given special attention to screen for their BMI and central obesity with emphasis on old age, women and urban dwellers.
- The benefits of taking less fatty foods and those primarily from plant sources or “fasting foods” (i.e. foods without animal products) should be promoted to the community by all concerned to improve knowledge.

- Awareness creation interventions aimed at reducing high BMI and central obesity should especially target the affluent, women and older people.
- The community should be informed that reducing and managing stressful situations may be helpful in reducing increased waist circumference and high BMI.
- People with higher economic status and sedentary life style should be advised to start on sports-related or other vigorous physical activities.
- Screening for hypercholesterolemia and hypertriglyceridemia should be promoted in the community and health institutions should create conducive environment for this, urban dwellers and overweight people should be given special emphasis.
- Other practices including the harmful effects of eating of raw meat/beef should be conveyed to the community.
- Appropriate advice should be given along with the treatment of hypercholesterolemia and hypertriglyceridemia.
- The measurement of waist circumference should be used in the screening for the presence of metabolic risk factors including hypertension, hyperglycemia, overweight/obesity, hypercholesterolemia and hypertriglyceridemia in the community and primary health care facilities.

#### **6.4.2 Public health measures to improve knowledge, perceptions, attitudes and behaviours toward NCDs and their risk factors**

The level of knowledge, perceptions, attitudes and behaviours pertaining to NCDs and their risk factors has been identified. Factors related to these have also been identified. Hence, the following interventions are recommended:

- Awareness raising interventions on the risk factors of NCDs should be given to the general public with special attention for those who are less educated and in low socio-economic status.
- Health facilities should impart health information on the risk factors of NCDs in sustainable fashion so that wrong perceptions on NCDs could be avoided and

healthy life styles, including fruit and vegetables consumption and avoiding fatty foods can be adopted.

- The knowledge on the harm of second-hand smoking should be relayed to the community.
- Thought of reducing the amount of alcoholic consumption should be encouraged by health workers and families.
- People should avoid driving vehicles after drinking alcohol.
- People should be encouraged to avoid binge drinking during celebrations, after receiving monthly income, when being with friends or on other occasions. They should be informed that binge drinking is indeed harmful
- Wrong perceptions of eating fruit and vegetables should be tackled by imparting appropriate information.
- The harm of feeding on beef or raw meat has to be relayed to the community. The salt content of many food items should be minimized and sustainable health information has to be imparted to the community to reduce salt intake.
- The frequency of physical exercise to be practiced per week to stay healthy should be encouraged, and information relating to this should be relayed to the general community. Apart from awareness creation, community members should be trained on how to engage in appropriate physical exercise and find time to engage in the same.
- The sources of mental stresses have to be tackled, and people affected by mental stress should be encouraged to visit health workers if stress levels are high and persistent.
- Knowledge of CVD in general and hypertension in particular should be raised using various means of communication. The benefits of frequent BP measurement and the harm of hypertension on body organs should also be communicated to communities.
- Health workers should impart basic and comprehensive knowledge of CVDs, stroke and BP, and the importance of having frequent BP measurements to communities. A special focus of this intervention should be on groups with misconceptions about body shape and size.

- General and basic information on NCDs risk factors should be imparted on the community to support frequent checkups of their body weight and increase their knowledge of CVDs particularly for those with low educational status or misconceptions about body weight and shape.
- Knowledge of type II diabetes and blood glucose measurement among the general community should be improved by health information given by health professionals and other people using friendly and accessible channels of communication emphasizing certain segments of population including men, low educational status and people with misconceptions about the risk factors of CVDs.
- Concerned bodies should continuously support by encouraging and reinforcing the behaviours of those people who already are having their blood pressure measured and who are knowledgeable about type II diabetes.
- Awareness creation interventions about breast cancer including early detection and preventive measures including avoiding exposure to behavioural and biological risk factors of NCDs should be implemented in for womemen using appropriate channels of communication.
- Health workers should do breast examination whenever examining women (e.g. during family planning) and plan to educate women on the importance of frequent BSE, how to practice it and what to report. This should be addressed at all segments of the population with emphasis on those from rural settings, low socioeconomic and educational statuses, older age, women with a family history of cancer, and women who do not get their breast examined by a health worker.
- Women with misconceptions and negative attitudes about BSE should be given special support to equip them with the basic knowledge and skills of BSE.
- Awareness creation interventions about cervical cancer including cervical cancer screening tests and prevention measures should be given to all women.
- Avoiding unsafe sex and vaccination can prevent cervical cancer. Such information should be made known to the general public.

- Teenagers should be encouraged to delay sexual intercourse. Thus, families and gender-based institutions such as schools and certain legal bodies should work in partnership to achieve this.
- Adolescent reproductive health services should be made available to increase the awareness and reduce risk of undesirable reproductive health problems, including sexually transmitted infections, unsafe abortion, unplanned pregnancy, etc.
- Harmful traditional practices including female genital mutilation and polygamous marital relationships have to be discouraged. Concerned organisations including the legal enforcing bodies should critically work on this.
- The community should be informed of the consequences of unsafe abortion. If an abortion is indicated, it should be carried out only by skilled professionals in a health care setting.
- Sexually transmitted infections should be prevented using safer sexual practices and this has to be communicated to the general public using appropriate channels of communication.
- Although current coverage is promising, family planning services should be supported and expanded.
- All concerned bodies should educate the public on the adverse health consequences of being overweight or obese and recognize that these are not the signs of good health, attractiveness and wealthy.
- People should be informed about what about normal body size and shape, and
- The benefits of frequent eating of fruit and vegetables and the harmful aspects of frequent consumption of animal products should be made known to the general public.

#### **6.4.3 Determinants of hypertension**

Determinants of hypertension have been identified in this study. Based on the independent predictors identified, the following recommendations are made:

- Sport-related physical activities should be encouraged. The general public is to be encouraged to undertake physical activities.

- Alcohol misuse and longtime time alcohol consumption should be avoided and drinkers should be supported to get rid of such behaviours. Alcohol cessation programs should be free and widely available.
- Central obesity should be prevented to minimize the risk of hypertension and people with increased WC have to be advised to start on lifestyle measures such as exercise and dietary modification.
- Mental stresses should be assessed for severity and, if indicated, managed by visiting health institutions. Causative economic and social factors should be avoided mitigated when possible.

#### **6.4.4 Further research**

- This study should be replicated at the national level to picture of NCDs and their risk factors at national level.
- Observational and interventional studies should be undertaken to assess the relationship between work-related physical exercise and hypertension, mental stress and other determinants of overweight or obesity.
- An observational study to assess the effects of diabetes on hypertension and the effects of hypertension on diabetes to be undertaken.
- Determinants of cervical and breast cancers should be identified using observational studies.
- Assessment of strategies in increasing awareness and improving screening for NCDs should be conducted.
- Assessment of application of NCDS risk factors identification and intervention model for screening and early identification of cases with common NCDs.

#### **6.5 CONTRIBUTIONS OF THIS STUDY**

- The magnitude of behavioural and biological risk factors of NCDs in the study setting has been identified.
- Factors associated with behavioural and biological risk factors were outlined.
- The status of knowledge, perceptions, attitude and behaviours toward NCDs and their risk factors were determined.

- Factors associated with poor knowledge and practices of healthy behaviours toward NCDs and their risk factors were identified
- Predictors of hypertension were identified.
- A model (figure 5.3) depicting NCDs risk factors identification and interventions has been developed.
- Based on these findings, various interventions will be implemented at the study settings based on the model developed as discussed below.
- The model depicted in figure 5.3 shows the relationship among the socioeconomic conditions; behavioural risk factors of NCDs; biological risk factors of NCDs; mental health factors; knowledge, attitudes and perceptions toward the NCDs and their risk factors and the major NCDs. Based on these, interventions targeting the most affected segments of the population could be instituted through improving socio-economic conditions, raising awareness, and integrating NCDs and their risk factors to the routine health care delivery system. These interventions will have a remarkable contribution in curbing the burden of NCDs and their consequences in the community where the study was conducted and could be scaled up to other settings accordingly.

## **6.6 LIMITATIONS**

- The study was limited to one predominately rural and one urban setting of Tigray settings, (Kilte Awlaelo HDSS and Mekelle city).
- The majority (more than 60%) of the study participants were women.
- Some study participants could not accurately state their exact ages to the data collectors.
- Some study participants declined to give their blood for the biochemical tests.

Despite the above limitations, the study identified the magnitude of the risk factors of NCDs among the study population, and knowledge, attitude and behaviours related with the risk factors of NCDs and underlying factors were also successfully identified. The sample size in this study is large enough and the findings can be generalized to similar settings in other parts of the country. The tool for data collection was comprehensive. The planned study design was properly employed and the data quality control mechanisms were in place to ensure the generation of valid results. Furthermore, a

matched case control study design was employed to assess the determinants of hypertension. Finally based on the findings, a NCDs risk factors identification and intervention model has been developed.

## **6.7 CONCLUSION**

If the NCDs and their risk factors are to be tackled successfully, the epidemiology of these risk factors has to be identified. This study has clearly indicated the risk factors of NCDs that existed with varying magnitudes, and some of them with alarming rate. The knowledge status of the study participants on the NCDs' risk factors vary. Some participants had better knowledge on some of the risk factors and poor knowledge on others. Thus, the overall knowledge status of the study participants was poor and not comprehensive. Misconceptions and negative attitudes towards some behaviour including dietary life style and their implications on body shape and size were high. Determinants of hypertension were indicated. This showed that multifaceted public health interventions should be in place to successfully prevent and control NCDs and their consequences.

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## **Abbreviations and Acronyms**

AA	African American
ACIPH	Addis Continental Institute of Health
AOR	Adjusted Odds Ratio
AU	African Union
AUC	Area under Curve
BG	Blood Glucose
BMI	Body Mass Index
BMR	Basal Metabolic Rate
BP	Blood Pressure
BSE	Breast Self-Examination
CASHD	Coronary Atherosclerotic Heart Disease
CSA	Central Statistical Agency
CHD	Coronary Heart Disease
CI	Confidence Interval
Cm	Centimeter
CNCD	Chronic Non-communicable Diseases
CVD	Cardiovascular Disease
DALY	Disability Adjusted Life Year
DBP	Diastolic Blood Pressure
DM	Diabetes Mellitus

EDHS	Ethiopian Demographic and Health Survey
EPI data	Epidemiological information data
FCTC	Framework Convention on Tobacco Control
FDRE	Federal Democratic Republic of Ethiopia
FMOH	Federal Ministry of Health
FPG	Fasting Plasma Glucose
HC	Health Centre
HCWs	Health Care Workers
HDL	High Density Lipoproteins
HDL-C	High Density Lipoprotein-Cholesterol (HDL-C)
HDSS	Health and Demographic Surveillance System
HIV	Human Immunodeficiency Virus
HP	Health Post
HEP	Health Extension Programme
HEW	Health Extension Worker
HSDP	Health Sector Development Programme
ICF	Inter-census Federation International
IDF	International Diabetes Federation
IFG	Impaired Fasting Glucose
IHD	Ischaemic Heart Disease
IMF	International Monetary Fund

IMR	Infant Mortality Rate
INDEPTH	An International Network for the Continuous Demographic Evaluation of Populations and Their Health in Developing Countries
INTERHEART	A Global Case-Control Study of Risk Factors for Acute Myocardial Infarction
IQR	Interquartile Range
JNC	Joint National Committee on Prevention, Evaluation, and Treatment report
kg/m <sup>2</sup>	Kilogram per metre squared
LEB	Life Expectancy at Birth
MDG	Millennium Development Goal
METs	Metabolic Equivalent
Min	Minutes
Mg/dl	Milligram per deciliter
MmHg	Millimetres of Mercury
mmol/L	Millimol/Litre
MOFED	Ministry of Finance and Economic Development
MOH	Ministry of Health
MONICA	Multinational MONItoring of trends and determinants in Cardiovascular disease
NCDs	Non-communicable Diseases

NGO	Nongovernmental Organization
OR	Odds Ratio
OW/O	Overweight or Obesity
PA	Physical Activity
PAL	Physical Activity Level
Pap smear	Papanecoluoue smear
PHCU	Primary Health Care Unit
PPS	Probability Proportionate to Size
R <sup>2</sup>	Regression coefficient
RHB	Regional Health Bureau
ROC curve	Receiver's Operating Characteristics curve
SBP	Systolic Blood Pressure
SD	Standard Deviation
SES	Socioeconomic Status
SPSS	Statistical Package for Social Sciences
SSA	Sub-Saharan Africa
STEPS	STEPwise Surveillance (of chronic disease risk factors)
STI	Sexually Transmitted Infections
TC	Total Cholesterol
TG	Triglyceride
U5MR	Under-five Mortality Rate

UNICEF	United Nations' Children's Emergency Fund
UN	United Nations
VIA	Visual Inspection with Acetic acid
WHO	World Health Organization
WHR	Waist to Hip Ratio
Wk	Week



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የሳይንስና ቴክኖሎጂ ሚኒስቴር  
The Federal Democratic Republic of Ethiopia  
Ministry of Science and Technology

ቁጥር 310/306/05  
Ref. No.

ቀን 10/11/05  
Date

To: Ethiopian Public Health Association

Addis Ababa

Re: Epidemiology of Preventable Risk Factors for Non-Communicable Diseases among Adults in Tigray, Northern Ethiopia

Dear sir/Mr./s/Dr.

The National Research Ethics Review committee (NRERC) has reviewed the aforementioned project protocol in an expedited manner. We are writing to advise you that NRERC has granted

*Full Approval*

To the above named project, for a period of **one year (July 17, 2013- July 16, 2014)**. All your most recently submitted documents have been approved for use in this study. The study should comply with the standard international and national scientific and ethical guidelines. Any change to the approved protocol or consent material must be reviewed and approved through the amendment process prior to its implementation. In addition, any adverse or unanticipated events should be reported within 24-48 hours to the NRERC. Please ensure that you submit progress report once in a four month and annual renewal application 30 days prior to the expiry date.

We, therefore, request your esteemed organization to ensure the commencement and conduct of the study accordingly and wish for the successful completion of the project.

With regards,

Yohannes Sitotaw

Secretary of NRERC



- Cc
- Alemayehu Bekele (PI)
  - Mekele University, College of Health Science
  - Tigray Regional Health Bureau
  - University of South Africa

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You may Contact

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P.O.Box 2490

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**UNIVERSITY OF SOUTH AFRICA  
Health Studies Higher Degrees Committee  
College of Human Sciences  
ETHICAL CLEARANCE CERTIFICATE**

**HS HDC/150/2013**

Date: 20 February 2013 Student No: 5025-498-7  
Project Title: Epidemiology of preventable risk factors for non-communicable diseases among the adult population in Tigray, Northern Ethiopia.  
Researcher: Alemayehu Bekele Mengesha  
Degree: D Litt et Phil Code: DPCHS04  
Supervisor: Prof S Benedict  
Qualification: PhD  
Joint Supervisor: -

**DECISION OF COMMITTEE**

**Approved**

**Conditionally Approved**



**Prof L Roets**

**CHAIRPERSON: HEALTH STUDIES HIGHER DEGREES COMMITTEE**

**Dr MM Moleki**



**ACTING ACADEMIC CHAIRPERSON: DEPARTMENT OF HEALTH STUDIES**

**PLEASE QUOTE THE PROJECT NUMBER IN ALL ENQUIRES**

MEKELLE CITY ADMINISTRATION

MEKELE

Dear Madam/Sir,

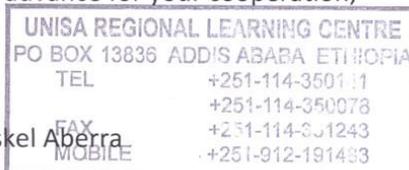
The University of South Africa (UNISA) extends warm greetings to you and the staff of your esteemed Administration. Mr. Alemayehu Bekele Mengesha (Student No 50254987) is studying his PhD degree in the Department of Health Sciences at UNISA. He is writing his Doctoral thesis under the title "*Epidemiology of Preventable Risk Factors for Non-communicable Diseases among the Adult Population in Tigray, Northern Ethiopia.*"

He has secured ethical clearance for his study from the Department of Health Studies (UNISA) and has now reached the stage of data collection. We are therefore writing you this letter to kindly request your support to the student by allowing him to conduct the study and also to provide him with basic information on study population frame.

Thanking you in advance for your cooperation,



Tsige GebreMeskel Aberra



Deputy Director – Academic and ICT Support



COLLEGE OF HEALTH SCIENCES  
MEKELE UNIVERSITY  
MEKELE

Dear Madam/Sir,

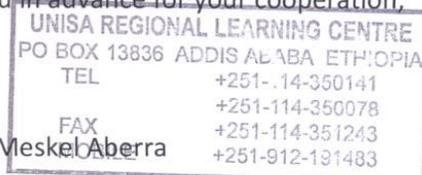
The University of South Africa (UNISA) extends warm greetings to you and the staff of your esteemed University. Mr. Alemayehu Bekele Mengesha (Student No 50254987) is studying his PhD degree in the Department of Health Sciences at UNISA. He is writing his Doctoral thesis under the title "***Epidemiology of Preventable Risk Factors for Non-communicable Diseases among the Adult Population in Tigray, Northern Ethiopia.***"

He has secured ethical clearance for his study from the Department of Health Studies (UNISA) and has now reached the stage of data collection. We are therefore writing you this letter to kindly request your support to the student by allowing him to conduct the study in Kilite-Awulalo Health and Demographic surveillance site (HDSS) and also to provide him information on study population frame.

Thanking you in advance for your cooperation,



Tsige GebreMeskel Aberra



Deputy Director – Academic and ICT Support



**Questionnaire I: Cross-sectional study on NCDs risk factors and knowledge,  
perceptions attitudes and behaviours  
University of South Africa (UNISA)**

**Department of Health Studies**

A questionnaire on a study entitled: ***Epidemiology of Preventable Risk Factors for Non-Communicable Diseases among the Adult Population in Tigray, Northern Ethiopia***

Hello Dear Sir/Madam!

My name is -----, I am representing the study team coordinated and led by Alemayehu Bekele Mengesha, a doctoral student at the University of South Africa. I am collecting data on the study entitled: ***Epidemiology of Preventable Risk Factors for Non-Communicable Disease among the Adult Population in Tigray, Northern Ethiopia***. This study will make an important contribution to identifying the preventable risk factors of non-communicable diseases. The knowledge, perceptions, attitudes and behaviours of people towards the preventable risk factors of non-communicable diseases will also be assessed. The questionnaire has three components; Face-to-face interviews and physical measurements including measurement of blood pressure, heart rate, waist circumference, hip circumference, weight and height will be done. A small specimen of your blood will be taken from your finger tip by gently pricking your finger to assess for blood glucose, cholesterol and triglycerides level. Hence, your participation in this study is highly beneficial in order to generate information on the aforementioned issues. Any information you provide will remain confidential. Your name will not be identified in relation to your personal information. For unclear questions, you are kindly requested to ask the interviewer for clarity. If you don't feel comfortable during the interview, physical or biochemical measurements you are free to discontinue your participation. The data collection process will take 25 to 40 minutes. There is no direct benefit to you for participating; however, the information obtained from the study may benefit the people of our country through using it for the design of programs to reduce the risk factors. The only risks to you might be a slight pain and minimal bleeding at the site of finger prick when your blood is taken and a very remote risk of infection at this site. You will be informed of your measurements but not the results of your blood tests. You will **NOT** be tested for HIV. Did you understand the aim of the study? Yes ( ) No ( ). Are you willing to participate in the study? Yes ( ) No ( ).  
Signature of the participant.....

Location and Date		Response	Code
1	Cluster/Centre/Village ID	_ _ _ _	I1
2	Cluster/Centre/Village name		I2
3	Interviewer ID	_ _ _ _	I3
4	Number of Visits	1 2 3	
5	Date of completion of the instrument	_ _ _ _ _ dd mm year	I4
<b>Participant Id Number</b> _ _ _ _ _			
Consent, Interview Language and Name		Response	Code
6	Consent has been read and obtained	Yes 1 No 2 <b>If NO, END</b>	I5

7	Interview Language	Tigrigna 1 [Amharic] 2 [Others, specify_____] 3	I6
8	Time of interview (24 hour clock)	____ : ____ hrs mins	I7
9	Family Surname		I8
10	First Name		I9
<b>Additional Information that may be helpful</b>			
11	Contact phone number where possible		I10
12	Location of the respondent's Residence (GPS) measurement	Altitude _____ metres above sea level Longitude _____ Degrees East Latitude _____ Degrees North	I11
<b>CORE: Demographic Information</b>			
<b>Question</b>		<b>Response</b>	<b>Code</b>
13	Sex ( <i>Record Male / Female as observed</i> )	Male 1 Female 2	C1
14	What is your date of birth? <i>Don't Know 77 77 7777</i>	____ ____ ____ ____ ____ <i>If known, Go to</i> C4 dd mm year	C2
15	How old are you?	Years ____	C3
16	In total, how many years have you spent at school or in full-time study (excluding pre-school)?	Years ____	C4
<b>EXPANDED: Demographic Information</b>			
17	What is the <b>highest level of education</b> you have completed?	Illiterate 1 Read and write 2 First cycle completed 3 Second Cycle completed 4 High school( Grade 10) completed 5 Preparatory School completed 6 College/University completed 7 Post graduate degree 8 Refused 88	C5
18	What is your <i>Ethnic group</i> ?	Tigre 1 Amhara 2 Others specify_____ 3 Refused 88	C6

19	What is your <b>marital status</b> ?	Never married 1 Currently married 2 Separated 3 Divorced 4 Widowed 5 Cohabiting 6 Refused 88	C7
20	What is your Religion?	Orthodox 1 Catholic 2 Muslim 3 Protestant 4 Others 5 Refused 88	C8
21	Which of the following best describes your <b>main work</b> status over the past 12 months?  <i>[INSERT COUNTRY-SPECIFIC CATEGORIES]</i>	Government 1 Non-government 2 Self-employed 3 Student 4 Housewife 5 Retired 6 Farmer 7 Unemployed 8 Refused 88	C9
22	How many people between 25-64 years, including yourself, live in your household?	Number of people <input type="text"/>	C10
23	Taking <b>the past year</b> , can you tell me what the average earnings of the household have been? <i>(RECORD ONLY ONE, NOT ALL 3)</i>	Per week <input type="text"/> <i>Go to T1</i>	C11a
		OR per month <input type="text"/> <i>Go to T1</i>	C11b
		OR per year <input type="text"/> <i>Go to T1</i>	C10c
		Refused 88	C10d
24	If you don't know the amount, can you give an <b>estimate</b> of the annual household income if I read some options to you? Is it <i>[INSERT QUINTILE VALUES IN LOCAL CURRENCY]</i>  <i>(READ OPTIONS)</i>	≤ Quintile (Q) 1 1 More than Q 1, ≤ Q 2 2 More than Q 2, ≤ Q 3 3 More than Q 3, ≤ Q 4 4 More than Q 4 5 Don't Know 77 Refused 88	C12

**Step 1 Behavioural Measurements**

**CORE: Tobacco Use**

Now I am going to ask you some questions about various health behaviours. This includes behaviours like smoking,

drinking alcohol, eating fruits and vegetables and physical activity. Let's start with tobacco.

Question		Response	Code
25	Do you currently smoke any <b>tobacco products</b> , such as cigarettes, cigars or pipes? <i>(USE SHOWCARD)</i>	Yes 1 No 2 <i>If No, go to T6</i>	T1
26	Do you currently smoke tobacco products <b>daily</b> ?	Yes 1 No 2 <i>If No, go to T6</i>	T2
27	How old were you when you <b>first started</b> smoking daily?	Age (years) <input type="text"/> <input type="text"/> <i>If Known, go to T5a</i> Don't know 77	T3
28	Do you remember how long ago it was?	In Years <input type="text"/> <input type="text"/> <i>If Known, go to T5a</i>	T4a
	<i>(RECORD ONLY 1, NOT ALL 3)</i>	OR in Months <input type="text"/> <input type="text"/> <i>If Known, go to T5a</i>	T4b
	<i>Don't know 77</i>	OR in Weeks <input type="text"/> <input type="text"/>	T4c
29	On average, <b>how many</b> of the following do you smoke each day?  <i>(RECORD FOR EACH TYPE, USE SHOWCARD)</i>  <i>Don't Know 77</i>	Manufactured cigarettes <input type="text"/> <input type="text"/>	T5a
		Hand-rolled cigarettes <input type="text"/> <input type="text"/>	T5b
		Pipes full of tobacco <input type="text"/> <input type="text"/>	T5c
		Cigars, cheroots, cigarillos <input type="text"/> <input type="text"/>	T5d
		Other <i>T5other, If Other, go to T5other, <input type="text"/> <input type="text"/> else go to T9</i>	T5e
		Other (please specify): <input type="text"/>	T5other <i>Go to T9</i>

EXPANDED: Tobacco Use			
Question		Response	Code
30	In the past, did you <b>ever</b> smoke <b>daily</b> ?	Yes 1 No 2 <i>If No, go to T9</i>	T6
31	How old were you when you <b>stopped</b> smoking <b>daily</b> ?	Age (years) Don't Know 77 <input type="text"/> <i>If Known, go to T9</i>	T7
32	How <b>long ago</b> did you stop smoking daily?  <i>(RECORD ONLY 1, NOT ALL 3)</i>  <i>Don't Know 77</i>	Years ago <input type="text"/> <i>If Known, go to T9</i>	T8a
		OR Months ago <input type="text"/> <i>If Known, go to T9</i>	T8b
		OR Weeks ago <input type="text"/>	T8c
33	Do you <b>currently use</b> any <b>smokeless tobacco</b> such as ... <i>[snuff, chewing tobacco, betel]</i> ? <i>(USE SHOWCARD)</i>	Yes 1 No 2 <i>If No, go to T12</i>	T9
34	Do you <b>currently use</b> <b>smokeless tobacco</b> products <b>daily</b> ?	Yes 1 No 2 <i>If No, go to T12</i>	T10
35	On average, how many <b>times a day</b> do you use ....  <i>(RECORD FOR EACH TYPE, USE SHOWCARD)</i>  <i>Don't Know 77</i>	Snuff, by mouth <input type="text"/>	T11a
		Snuff, by nose <input type="text"/>	T11b
		Chewing tobacco <input type="text"/>	T11c
		Betel, quid <input type="text"/>	T11d
		Other <input type="text"/> <i>If Other, go to T11other, else go to T13</i>	T11e
		Other (specify) <input type="text"/> <i>Go to T13</i>	T11other
36	In the <b>past</b> , did you <b>ever use</b> smokeless tobacco such as <i>[snuff, chewing tobacco, or betel]</i> <b>daily</b> ?	Yes 1 No 2	T12
37	During the past 7 days, on how many days did someone <b>in your home</b> smoke when you were present?	Number of days Don't know 77 <input type="text"/>	T13
38	During the past 7 days, on how many days did someone smoke in closed areas <b>in your workplace</b> (in the building, in a work area or a specific office) when you were present?	Number of days Don't know or don't work in a closed area 77 <input type="text"/>	T14

CORE: Alcohol Consumption		
The next questions ask about the consumption of alcohol.		
Question	Response	Code

39	Have you <b>ever</b> consumed an alcoholic drink such as beer, wine, spirits, fermented cider or locally 'Araque', 'Tej', 'Tella' or 'Sewa' <i>[add other local examples]?</i> (USE SHOWCARD OR SHOW EXAMPLES)	Yes 1  No 2 <i>If No, go to D1</i>	A1a
40	Have you consumed an alcoholic drink within the <b>past 12 months</b> ?	Yes 1 No 2 <i>If No, go to D1</i>	A1b
41	During the past 12 months, <b>how frequently</b> have you had at least one alcoholic drink?  (READ RESPONSES, USE SHOWCARD)	Daily 1 5-6 days per week 2 1-4 days per week 3 1-3 days per month 4  Less than once a month 5	A2
42	Have you consumed an alcoholic drink within the <b>past 30 days</b> ?	Yes 1 No 2 <i>If No, go to D1</i>	A3
43	During the past 30 days, on how many <b>occasions</b> did you have at least one alcoholic drink?	Number Don't know 77 <input type="text"/>	A4
44	During the past 30 days, when you drank alcohol, <b>on average</b> , how many <b>standard alcoholic drinks</b> did you have during one drinking occasion? (USE SHOWCARD)	Number Don't know 77 <input type="text"/>	A5
45	During the past 30 days, what was the <b>largest number</b> of standard alcoholic drinks you had on a single occasion, counting all types of alcoholic drinks together?	Largest number Don't Know 77 <input type="text"/>	A6
46	During the past 30 days, how many times did you have (for <b>men: five or more</b> for <b>women: four or more</b> ) Standard alcoholic drinks in a single drinking occasion?	Number of times Don't Know 77 <input type="text"/>	A7
<b>EXPANDED: Alcohol Consumption</b>			
47	During the past 30 days, when you consumed an alcoholic drink, how often was it with meals? Please do not count snacks.	Usually with meals 1 Sometimes with meals 2 Rarely with meals 3  Never with meals 4	A8

48	<p>During each of the <b>past 7 days</b>, how many standard alcoholic drinks did you have each day?</p> <p>(USE SHOWCARD)</p> <p>Don't Know 77</p>	Monday <input type="text"/>	A9a
		Tuesday <input type="text"/>	A9b
		Wednesday <input type="text"/>	A9c
		Thursday <input type="text"/>	A9d
		Friday <input type="text"/>	A9e
		Saturday <input type="text"/>	A9f
		Sunday <input type="text"/>	A9g
<b>CORE: Diet</b>			
<p>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.</p>			
<b>Question</b>		<b>Response</b>	<b>Code</b>
49	<p>In a typical week, on how many days do you <b>eat fruit</b>?</p> <p>(USE SHOWCARD)</p>	<p>Number of days <input type="text"/> <input type="text"/> <i>If Zero days, go to D3</i></p> <p>Don't Know 77</p>	D1
50	<p>How many <b>servings</b> of fruit do you eat on <b>one</b> of those days? (USE SHOWCARD)</p>	<p>Number of servings <input type="text"/></p> <p>Don't Know 77 <input type="text"/></p>	D2
51	<p>In a typical week, on how many days do you <b>eat vegetables</b>? (USE SHOWCARD)</p>	<p>Number of days <input type="text"/> <input type="text"/> <i>If Zero days, go to D5</i></p> <p>Don't Know 77</p>	D3
52	<p>How many <b>servings</b> of vegetables do you eat on one of those days? (USE SHOWCARD)</p>	<p>Number of servings <input type="text"/></p> <p>Don't know 77 <input type="text"/></p>	D4
<b>EXPANDED: Diet</b>			
53	<p>What type of <b>oil or fat is most often</b> used for meal preparation in your household?</p> <p>(USE SHOWCARD)</p> <p>(SELECT ONLY ONE)</p>	<p>Vegetable oil 1</p> <p>Lard or suet 2</p> <p>Butter or ghee 3</p> <p>Margarine 4</p> <p>Other 5 <i>If Other, go to D5 other</i></p> <p>None in particular 6</p> <p>None used 7</p> <p>Don't know 77</p>	D5
		<p>Other <input type="text"/></p>	

54	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 <input type="text"/> <input type="text"/> Don't know 77	D6
----	---	---	----

**CORE: 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, fishing or hunting for food, seeking employment. *[Insert other examples if needed]*. 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.

Question	Response	Code	
<b>Work</b>			
55	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like <i>[carrying or lifting heavy loads, digging or construction work]</i> for at least 10 minutes continuously? <i>[INSERT EXAMPLES] (USE SHOWCARD)</i>	Yes 1  No 2 <i>If No, go to P 4</i>	P1
56	In a typical week, on how many days do you do vigorous-intensity activities as part of your work?	Number of days <input type="text"/>	P2
57	How much time do you spend doing vigorous-intensity activities at work on a typical day?	Hours <input type="text"/> : <input type="text"/> minutes <input type="text"/> : <input type="text"/> hrs mins	P3 (a-b)
58	Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such	Yes 1	P4

	as brisk walking [or carrying light loads] for at least 10 minutes continuously? [INSERT EXAMPLES] (USE SHOWCARD)	No 2 If No, go to P 7	
59	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Number of days <input type="text"/>	P5
60	How much time do you spend doing moderate-intensity activities at work on a typical day?	Hours : <input type="text"/> : <input type="text"/> minutes hrs mins	P6 (a-b)
<b>Travel to and from places</b>			
The next questions exclude the physical activities at work that you have already mentioned. Now I would like to ask you about the usual way you travel to and from places. For example to work, for shopping, to market, to place of worship. [Insert other examples if needed]			
61	Do you walk or use a bicycle (pedal cycle) for at least 10 minutes continuously to get to and from places?	Yes 1 No 2 If No, go to P 10	P7
62	In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?	Number of days <input type="text"/>	P8
63	How much time do you spend walking or bicycling for travel on a typical day?	Hours : <input type="text"/> : <input type="text"/> minutes hrs mins	P9 (a-b)
<b>Recreational activities</b>			
The next questions exclude the work and transport activities that you have already mentioned. Now I would like to ask you about sports, fitness and recreational activities (leisure), [Insert relevant terms].			
64	Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like [running or football] for at least 10 minutes continuously? [INSERT EXAMPLES] (USE SHOWCARD)	Yes 1 No 2 If No, go to P 13	P10
65	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (leisure) activities?	Number of days <input type="text"/>	P11
66	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hours : <input type="text"/> : <input type="text"/> minutes hrs mins	P12 (a-b)

67	Do you do any moderate-intensity sports, fitness or recreational ( <i>leisure</i> ) 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? [INSERT EXAMPLES] (USE SHOWCARD)	Yes 1  No 2 If No, go to P16	P13
68	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational ( <i>leisure</i> ) activities?	Number of days <input type="text"/>	P14
69	How much time do you spend doing moderate-intensity sports, fitness or recreational ( <i>leisure</i> ) activities on a typical day?	Hours : minutes <input type="text"/> : <input type="text"/> hrs mins	P15 (a-b)
<b>EXPANDED: Physical Activity</b>			
<b>Sedentary behaviour</b>			
The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent sitting at a desk, sitting with friends, traveling in car, bus, train, reading, playing cards or watching television, but do not include time spent sleeping. [INSERT EXAMPLES] (USE SHOWCARD)			
70	How much time do you usually spend sitting or reclining on a typical day?	Hours : minutes <input type="text"/> : <input type="text"/> hrs mins	P16 (a-b)

<b>Expanded : Khat Chewing</b>			
The next questions ask about chewing Khat. Khat ( <i>Catha edulis</i> ) is a plant grown commonly in the horn of Africa. Its young buds and tender leaves are chewed to attain a state of euphoria and stimulation.			
<b>Question</b>		<b>Response</b>	<b>Code</b>
71	Have you ever chewed khat? (USE SHOWCARD OR SHOW EXAMPLES)	Yes 1  No 2 If No, go to MS1	K1a
72	Have you chewed khat in the <b>past 12 months</b> ?	Yes 1 No 2 If No, go to MS1	K1b
73	During the past 12 months, <b>how frequently</b> have you had khat? (READ RESPONSES, USE SHOWCARD)	Daily 1 weekly 2 monthly 3  Very occasionally 4	K2
74	Have you chewed khat within the <b>past 30 days</b> ?	Yes 1  No 2 If No, go to MS1	K3

75	During the past 30 days, on how many <b>occasions</b> did you have khat?	Number Don't know 77 <input type="checkbox"/>	K4
76	During the past 30 days, when you consumed khat, how often was it with cigarette smoking?	Always 1 Sometimes 2 Rarely 3 Never 4	K5
77	During the past 30 days, when you consumed khat, how often was it followed by alcohol drinking to break the effect of khat? <i>Don't Know 77</i>	Always 1 Sometimes 2 Rarely 3 Never 4	K6
78	During the past 30 days, when you consumed khat, how often was it accompanied by consuming Shisha or other stimulants (Please mention if any)?	Always 1 Sometimes 2 Rarely 3 Never 4 Other stimulants specify _____	K7 (a-b)
79	During each of the past 7 days, did you have khat each day?  (Please Showcard)	Monday Yes ___ No ___ Tuesday Yes ___ No ___ Wednesday Yes ___ No ___ Thursday Yes ___ No ___ Friday Yes ___ No ___ Saturday Yes ___ No ___ Sunday Yes ___ No ___	K8a-K8g

**Mental stress (Optional) Using SRQ 20 Instrument**

	SRQ20	YES	NO	Code
80	Do you often have Headaches?			MS1
81	Is your appetite poor?			MS2

82	Do you sleep badly?			MS3
83	Are you easily frightened?			MS4
84	Do your hands shake?			MS5
85	Do you feel nervous, tense or worried?			MS6
86	Is your digestion is poor?			MS7
87	Do you have trouble thinking clearly?			MS8
88	Do you feel un happy?			MS9
89	Do you cry more than usual?			MS10
90	Do you find it difficult to enjoy your daily activities?			MS11
91	Do you find it difficult to make decisions?			MS12
92	Is your daily work suffering?			MS13
93	Are you unable to play a useful part in life?			MS14
94	Have you lost interest in things?			MS15
95	Do you feel that you are a worthless person?			MS16
96	Has the thought of ending your life been in your mind?			MS17
97	Do you feel tired all the time?			MS18
98	Do you have un comfortable feelings in your stomach?			MS19
99	Are you easily tired?			MS20

<b>CORE: History of Raised Blood Pressure</b>			
<b>Question</b>		<b>Response</b>	<b>Code</b>
100	Have you ever had your blood pressure measured by a doctor or other health worker?	Yes 1 No 2 <i>If No, go to H6</i>	H1
101	Have you ever been told by a doctor or other health worker that you have raised blood pressure or hypertension?	Yes 1 No 2 <i>If No, go to H6</i>	H2a
102	Have you been told in the past 12	Yes 1	H2b

	months?	No 2	
<b>EXPANDED: History of Raised Blood Pressure</b>			
103	Are you currently receiving any of the following treatments/advice for high blood pressure prescribed by a doctor or other health worker?		
	Drugs (medication) that you have taken in the past two weeks	Yes 1 No 2	H3a
	Advice to reduce salt intake	Yes 1 No 2	H3b
	Advice or treatment to lose weight	Yes 1 No 2	H3c
	Advice or treatment to stop smoking	Yes 1 No 2	H3d
	Advice to start or do more exercise	Yes 1 No 2	H3e
104	Have you ever seen a traditional healer for raised blood pressure or hypertension?	Yes 1 No 2	H4
105	Are you currently taking any herbal or traditional remedy for your raised blood pressure?	Yes 1 No 2	H5
<b>CORE: History of Diabetes</b>			
<b>Question</b>		<b>Response</b>	<b>Code</b>
106	Have you ever had your blood sugar measured by a doctor or other health worker?	Yes 1 No 2 <i>If No, go to M1</i>	H6
107	Have you ever been told by a doctor or other health worker that you have raised blood sugar or diabetes?	Yes 1 No 2 <i>If No, go to M1</i>	H7a
108	Have you been told in the past 12 months?	Yes 1 No 2	H7b
<b>EXPANDED: History of Diabetes</b>			
109	Are you currently receiving any of the following treatments/advice for diabetes prescribed by a doctor or other health worker?		
	Insulin	Yes 1	H8a

		No 2	
	Drugs (medication) that you have taken in the past two weeks	Yes 1 No 2	H8b
	Special prescribed diet	Yes 1 No 2	H8c
	Advice or treatment to lose weight	Yes 1 No 2	H8d
	Advice or treatment to stop smoking	Yes 1 No 2	H8e
	Advice to start or do more exercise	Yes 1 No 2	H8f
110	Have you ever seen a traditional healer for diabetes or raised blood sugar?	Yes 1 No 2	H9
111	Are you currently taking any herbal or traditional remedy for your diabetes?	Yes 1 No 2	H10

## Step 2 Physical Measurements

### CORE: Height and Weight

Question		Response	Code
112	Interviewer ID	_ _ _ _	M1
113	Device IDs for height and weight	Height _ _ _ Weight _ _ _	M2a M2b
114	Height	in Centimetres (cm) _ _ _ _ . _	M3
115	Weight <i>If too large for scale 666.6</i>	in Kilograms (kg) _ _ _ _ . _	M4
116	<b>For women:</b> Are you pregnant?	Yes 1 <i>If Yes, Stop the interview</i> No 2	M5

### CORE: Waist

117 8	Device ID for waist	_ _ _	M6
118	Waist circumference	in Centimetres (cm) _ _ _ _ . _	M7

### CORE: Blood Pressure

119	Interviewer ID		_____	M8
120	Device ID for blood pressure		____	M9
121	Cuff size used	Small 1 Medium 2 Large 3		M10
122	Reading 1	Systolic (mmHg)	_____	M11a
		Diastolic (mmHg)	_____	M11b
123	Reading 2	Systolic (mmHg)	_____	M12a
		Diastolic (mmHg)	_____	M12b
124	Reading 3	Systolic (mmHg)	_____	M13a
		Diastolic (mmHg)	_____	M13b
125	During the past two weeks, have you been treated for raised blood pressure with drugs (medication) prescribed by a	Yes 1 No 2		M14
<b>EXPANDED: Hip Circumference and Heart Rate</b>				
126	Hip circumference	in Centimeters (cm)	_____ . ____	M15
127	Heart Rate			
	Reading 1	Beats per minute	_____	M16a
	Reading 2	Beats per minute	_____	M16b
	Reading 3	Beats per minute	_____	M16c

<b>Step 3 Biochemical Measurements</b>				
<b>CORE: Blood Glucose</b>				
<b>Question</b>		<b>Response</b>		<b>Code</b>
128	During the past 12 hours have you had anything to eat or drink, other than water?	Yes 1 No 2		B1
129	Technician ID		_____	B2
130	Device ID		____	B3
131	Time of day blood specimen taken (24 hour clock)	Hours : minutes	____ : ____ hrs mins	B4
132	Fasting blood glucose	mmol/l	____ . ____	B5

	<i>Choose accordingly: mmol/l or mg/dl</i>	mg/dl <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/>	
133	Today, have you taken insulin or other drugs (medication) that have been prescribed by a doctor or other health worker for raised blood glucose?	Yes    1 No     2	B6
<b>CORE: Blood Lipids</b>			
134	Device ID	<input type="text"/> <input type="text"/> <input type="text"/>	B7
135	Total cholesterol <i>Choose accordingly: mmol/l or mg/dl</i>	mmol/l <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/>	B8
		mg/dl <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/>	
136	During the past two weeks, have you been treated for raised cholesterol with drugs (medication) prescribed by a doctor or other health worker?	Yes    1 No     2	B9
<b>EXPANDED: Triglycerides and HDL Cholesterol</b>			
137	Triglycerides <i>Choose accordingly: mmol/l or mg/dl</i>	mmol/l <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/>	B10
		mg/dl <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/>	
138	HDL Cholesterol <i>Choose accordingly: mmol/l or mg/dl</i>	mmol/l <input type="text"/> . <input type="text"/> <input type="text"/>	B11
		mg/dl <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/>	

**Questionnaire on KNOWLEDGE, ATTITUDES AND BEHAVIOURS SURVEY ON NON-COMMUNICABLE DISEASES**

<b>1. General Knowledge and Attitudes related to Non- Communicable Diseases (GK)</b>			
Question	Response		QN
<p><i>I would like to ask you some questions about health, focusing on a group of diseases called non-communicable diseases or NCDs.</i></p> <p><i>Please tell me if the following is true, false or you don't know:</i></p>			
1	A non-communicable disease is one that cannot be spread between people?	True    1 False   2 I don't know   3	GK1K
<p><i>Non-communicable diseases are a group of diseases that include heart disease, diabetes and cancers. These are diseases that you cannot catch, but that develop from a number of factors, usually over a long time.</i></p> <p><i>Please tell me if you strongly disagree, disagree, agree or agree strongly with the following sentences:</i></p>			

2	Non-communicable diseases are less dangerous than infectious diseases.	Strongly disagree 1	Disagree 2	Agree 3	Strongly agree 4	GK2A	
3	Non-communicable diseases are common amongst Ethiopians	Strongly disagree 1	Disagree 2	Agree 3	Strongly agree 4	GK3A	
4	Have you ever been told you have or had any of the following:  <b>(Nr. 4 and 5 to be addressed only to women)</b> <i>If person is unsure, ask question again. If still unsure, answer "no".</i>	High blood pressure Diabetes Heart attack or stroke Breast cancer Cervical cancer	1 2 3 4 5	Yes 2 Yes 2 Yes	1 1 1 1 1 2 1 2	No No No No No No No No	GK4
<i>I would now like to ask you about smoking and tobacco.</i>							
5	Regarding tobacco smoking, please choose which one applies to you.	I have never smoked I'm a Previous/Ex-smoker I am a current smoker, but not every day I am currently a daily smoker				1 2 3 4	GK5P

3. Knowledge, Attitudes and Practices on NCD Behavioural Risk Factors (RF)						
TOBACCO USE						QN
6	Does smoking affect your own health?	Yes 1 No 2 (skip next 5 questions) I don't know 3 (skip next 5 questions)				RF1K
7	How much do you have to smoke for it to harm your health? (read)	Any smoke harms your health 1 You must smoke at least once a week 2 Only daily smoking is harmful 3 Only a packet of cigarettes or more per day is harmful 4				RF2A
8	Does smoking harm your lungs?	Yes 1 No 2 (skip next) I don't know 3 (skip next)				RF3K
9	If yes: "Is it harmful or very harmful?"	Harmful 1 Very harmful 2				RF4A

10	What about your heart, does smoking harm your heart?	Yes 1 No 2 (skip next) I don't know 3 (skip next)	RF5K								
11	If yes: "Is it harmful or very harmful?"	Harmful 1 Very harmful 2	RF6A								
→→→Now, a question about smoking near other people.											
12	Do you think smoking around others could affect <u>their</u> health?	Yes 1 No 2 I don't know 3	RF7K								
<i>How about smoking at home.</i>											
13	Do you mind if people smoke in your home?  You don't mind, you do mind but allow it or you don't allow it.	Don't mind 1 I do mind but I allow it 2 I don't allow it 3	RF8A								
<i>What about work?</i>											
14	How important is it to you to have a smoke-free workplace? Is it not important, quite important, important or very important.	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Not at all</td> <td>Moderately important</td> <td>Important</td> <td>Very important</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	Not at all	Moderately important	Important	Very important	1	2	3	4	RF9A
Not at all	Moderately important	Important	Very important								
1	2	3	4								
15	Has a health worker ever talked to you about the harms of smoking?	Yes 1 No 2	RF10P								
<b>ALCOHOL USE</b> <i>The next few questions will be about alcohol; including beer, 'Tella'/'Sewa' (Local beer), 'Tej'(local whisky), vodka, wine, Araque (local vodka), and whisky</i>											
16	Do you agree strongly, agree, disagree or disagree strongly with this statement?  In general, when Ethiopians drink alcohol, they tend to drink large amounts at once. <i>(can repeat once)</i>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Strong agree</td> <td>Agree</td> <td>Disagree</td> <td>Strongly disagree</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	Strong agree	Agree	Disagree	Strongly disagree	1	2	3	4	RF11A
Strong agree	Agree	Disagree	Strongly disagree								
1	2	3	4								

17	On which of the following occasions would Ethiopians commonly drink large amounts of alcohol?	Celebrations	Yes 1	No 2	RF12P
		Customs or traditions	Yes 1	No 2	
		Drinking with friends or family	Yes 1	No 2	
		After receiving your income	Yes 1	No 2	
There is usually no special reason					
<i>And now regarding your own drinking.</i>					
18	Do you <u>ever</u> drink any alcohol?		Yes 1	No 2 (skip next 4 →)	RF13P
19	I will now give you 5 common reasons for dinking alcohol. Please rank the following reasons starting with the most common reason you drink, to the least common?	To forget your problems	1	___	RF14P
		To relax	2	___	
		For enjoyment	3	___	
		To drink with friends	4	___	
		To help digestion	5	___	
		For deworming	6	___	
<i>Next, I would like to ask you about drinking at certain times of the day.</i>					
20	In the past month, have you ever had an alcoholic drink between waking up in the morning and midday?		Yes 1	No 2	RF15P
The next question is a little bit personal, but we ask everyone. Don't feel embarrassed.					
21	Have you ever thought there is a need to reduce the amount of alcohol you drink?		Yes 1	No 2	RF16P
The next question is about driving.					
22	Do you drive a car?		Yes 1	No 2 (skip next)	RF17P
23	Have you ever driven whilst influenced by alcohol?		Yes 1	No 2	RF18P
→→→Finally,					
24	Have you ever been advised by health workers about the harms of drinking alcohol?		Yes 1	No 2	RF19P
<b>Diet</b>					
<i>Changing focus, let's talk about a healthy diet</i>					

25	<p>In general, how <u>important</u> is it for people to eat fruit and vegetables every day?</p> <p>Not important, moderately important, important or very important?</p>	<table border="1"> <tr> <td>Not</td> <td>Moderately important</td> <td>Important</td> <td>Very important</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	Not	Moderately important	Important	Very important	1	2	3	4	RF20A								
Not	Moderately important	Important	Very important																
1	2	3	4																
<p>Ok, I would like to ask you about <u>your</u> diet</p>																			
26	<p>How important is it to <u>you</u> to eat fruit everyday?</p> <p>Not important, moderately important, important or very important?</p>	<table border="1"> <tr> <td>Not</td> <td>Moderately important</td> <td>Important</td> <td>Very important</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	Not	Moderately important	Important	Very important	1	2	3	4	RF21A								
Not	Moderately important	Important	Very important																
1	2	3	4																
<p><i>Now a question about vegetables. For this question, we are only asking about green and coloured vegetables. Not potatoes, grains or rice.</i></p> <p style="text-align: center;"><u>Green and coloured vegetables. Not potatoes, grains or rice.</u></p>																			
27	<p>How important is it to you to eat vegetables everyday?</p> <p>Not important, moderately important, important or very important?</p>	<table border="1"> <tr> <td>Not</td> <td>Moderately important</td> <td>Important</td> <td>Very important</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	Not	Moderately important	Important	Very important	1	2	3	4	RF22A								
Not	Moderately important	Important	Very important																
1	2	3	4																
<p><i>Now, about the diet of Ethiopians generally. Many Ethiopians don't eat a lot of fresh fruits and vegetables.</i></p>																			
28	<p>What do you think are the main reasons Ethiopians don't eat more fruits and vegetables?</p> <p>(Open ended, more than one ok, do not prompt)</p> <p>Only: "Anything else?"</p>	<table style="width: 100%;"> <tr> <td style="text-align: right;">Price</td> <td style="text-align: left;">1</td> </tr> <tr> <td style="text-align: right;">Availability</td> <td style="text-align: left;">2</td> </tr> <tr> <td style="text-align: right;">Taste</td> <td style="text-align: left;">3</td> </tr> <tr> <td style="text-align: right;">Lack of knowledge</td> <td style="text-align: left;">4</td> </tr> <tr> <td style="text-align: right;">Cultural/Dietary Customs</td> <td style="text-align: left;">5</td> </tr> <tr> <td style="text-align: right;">Synthetic and imported foods are more important</td> <td style="text-align: left;">6</td> </tr> <tr> <td style="text-align: right;">Fruits and vegetables are less nutritious</td> <td style="text-align: left;">7</td> </tr> <tr> <td style="text-align: right;">Other (specify)_____</td> <td style="text-align: left;">8</td> </tr> </table>	Price	1	Availability	2	Taste	3	Lack of knowledge	4	Cultural/Dietary Customs	5	Synthetic and imported foods are more important	6	Fruits and vegetables are less nutritious	7	Other (specify)_____	8	RF23P
Price	1																		
Availability	2																		
Taste	3																		
Lack of knowledge	4																		
Cultural/Dietary Customs	5																		
Synthetic and imported foods are more important	6																		
Fruits and vegetables are less nutritious	7																		
Other (specify)_____	8																		
<p><i>I would like to ask you about Beef that you eat: this includes raw meat, butter and other milk products.</i></p>																			
29	<p>In general, do you think Ethiopians eat too much beef/raw meat?</p>	<table style="width: 100%;"> <tr> <td style="text-align: right;">Yes</td> <td style="text-align: left;">1</td> </tr> <tr> <td style="text-align: right;">No</td> <td style="text-align: left;">2 skip next question</td> </tr> </table>	Yes	1	No	2 skip next question	RF24A												
Yes	1																		
No	2 skip next question																		

30	From the following or other, what is the main reason people eat Beef/raw meat?  (read)	<p style="text-align: right;"> Customs and traditions 1  Taste 2  For health 3  It is more nutritious 4  Other (specify)_____ 5 </p>	RF25P																								
31	Have you ever eaten raw meat/Beef ?	<p style="text-align: right;"> Yes 1  No 2 (Skip next) </p>																									
	Did you eat raw meat/Beef in the past one month?	<p style="text-align: right;"> Yes 1  No 2 (skip next) </p>																									
	If your response to the above questions is Yes, How frequent do you feed on raw meat/Beef?	<p style="text-align: right;"> Always 1  Sometimes 2  Rarely 3  Never 4 </p>																									
<i>And now some questions on salt in your diet.</i>																											
31	Do you ever think about how much salt you have in your diet?	<p style="text-align: right;"> Yes 1  No 2 </p>	RF26A																								
32	Which of the following sources contributes the largest amount of salt to the daily diet of an Ethiopian? (read all)	<p style="text-align: right;"> The salt they add themselves to food and drinks (like coffee) 1  From raw foods such as milk, meat and vegetables 2  From factory-made foods such as bread, Chilli, sausages and biscuits 3 </p>	RF27K																								
33	How often do you add salt when cooking or eating meals? Never, sometimes, often or always.	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Never</td> <td>Sometimes</td> <td>Often</td> <td>Always</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	Never	Sometimes	Often	Always	1	2	3	4	RF28P																
Never	Sometimes	Often	Always																								
1	2	3	4																								
34	When you eat meals not at your own house, do you tend to find the food others cook too salty, normal or not salty enough? This includes restaurants, friends.	<p style="text-align: right;"> Too salty 1  Normal 2  Not salty enough 3 </p>	RF29A																								
35	I will now read out some foods and I would like you to tell me if they are high, medium or low in salt:	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Food</td> <td>Low</td> <td>Medium</td> <td>High</td> </tr> <tr> <td>Injera</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>Bread</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>Potato chips</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>Pickled vegetables</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>Sausages/stew /Chilli</td> <td>1</td> <td>2</td> <td>3</td> </tr> </table>	Food	Low	Medium	High	Injera	1	2	3	Bread	1	2	3	Potato chips	1	2	3	Pickled vegetables	1	2	3	Sausages/stew /Chilli	1	2	3	RF30K
Food	Low	Medium	High																								
Injera	1	2	3																								
Bread	1	2	3																								
Potato chips	1	2	3																								
Pickled vegetables	1	2	3																								
Sausages/stew /Chilli	1	2	3																								

36	Now, a question about the traditional coffee. When preparing coffee tea, do you usually add salt?	Yes 1 No 2 (skip next)	RF31P
37	Approximately how many cups of coffee/tea do you drink each day?	Less than 1 each day 1	RF32P
38	In general, do you think Ethiopians consume too much salt?	Yes 1 No 2	RF33A
<i>Now, I am going to ask you about religious fasting</i>			
39	Do you think that religious fasting will reduce risk of acquiring NCDs?	Yes 1 No 2 I don't know 3	RF 34A
40	Religious Fasting is beneficial for health.	Yes 1 No 2 I don't know 3	RF35K
41	If your response to Question 40 is yes, how does the religious fasting benefits your health?	It reduces weight 1 It makes us feel healthy and strong 2 Others (specify)-----3 I don't know 88	RF36K
42	If your response to Question 40 is No, would you tell us your reason?	Fasting is only helpful for spiritual strength 1 Fasting does not have much effect on physical health 2 Others(specify_____) 3 I don't know 88	RF37K
43	Have you ever practised religious fasting?	Yes 1 No 2 (If no skip to the Exercise section)	RF38P
44	Have you practised fasting in the last 12 months	Yes 1 No 2 (If not skip to the Exercise section)	RF39P
45	If your response to Question 44 is yes, what kind of fasting did you practise? (multiple responses are possible)	Avoiding only Animal products 1 Avoiding animal products and also avoid anything until mid-day 2 Avoiding animal products and also avoid anything until late afternoon 3 Avoiding animal products and also avoid anything until 6:00 PM 4 Avoid anything until 6:00 PM but takes both animal and plant products at night 5 Others (specify_____) 6	RF40P
<b>Exercise</b>			
<i>Let's talk about exercise and health now:</i>			
46	In your opinion how often a person should do exercise to stay healthy?  (List)	Monthly 1 Twice a month 2 Once a week 3 1-4 times per week 4 5 or more times per week 5	RF34K

<i>The recommended amount of exercise to stay healthy is at least for 10mins, 5 times a week. But many Ethiopians don't get this much exercise.</i>											
47	What are the main reasons many Ethiopians don't get this much exercise? From the following options, choose <u>one</u> .	No time 1 Too expensive 2 They don't know how 3 They don't want to 4 They think there is not need 5 Other (specify)_____ 6	RF35P								
<b>Stress Management</b>											
<i>Now I am going to ask you about stress</i>											
48	From day to day, how often do you feel stressed?	Always. 1 Often 2 Sometimes/Infrequently 3 No, never 4 (skip next)	RF36A								
49	What is currently the main cause of stress in your life?  Choose from the following list.	Family 1 Relationships 2 School/university 3 Work/Lack of work 4 Money 5 Health 6 Other (specify)_____ 7	RF37A								
50	In general, please list any ways that someone could reduce their own stress?  (Open ended, no prompt)	Exercise 1 Talk to friends/family 2 Eat 3 Talk to health workers 4 Drink some alcohol 5 I don't know 6 Other (specify)_____ 7	RF38A								
<b>High Blood Pressure</b>											
<i>OK, Now let's talk about blood pressure</i>											
51	How much do you know about "blood pressure"?  Nothing at all. You have only heard the term before but know nothing more. You know a <u>little</u> about blood pressure You are very familiar with it.	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Nothing at all</td> <td>I have <u>only</u> heard the term before</td> <td>I know a <u>little</u> about it</td> <td>I am <u>very</u> familiar with it</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	Nothing at all	I have <u>only</u> heard the term before	I know a <u>little</u> about it	I am <u>very</u> familiar with it	1	2	3	4	RF39K
Nothing at all	I have <u>only</u> heard the term before	I know a <u>little</u> about it	I am <u>very</u> familiar with it								
1	2	3	4								
<i>Blood pressure is the level of pressure in your blood vessels. It is measured by a doctor or other health worker.</i>											
52	Do you think it is	Yes 1	RF40A								

	important that Ethiopians have their blood pressure checked?	No	2		
53	Approximately, how regularly do you think Ethiopians your age should have their blood pressure checked? Please choose either:	It is not needed to check regularly	1	RF41K	
		Every 5 years	2		
		Every 2 years	3		
		Once a year	4		
		More often than once a year	5		
<i>But many Ethiopians do not get their blood pressure checked regularly.</i>					
54	What do you think is the main reason that they do not check their blood pressure regularly? Please choose one. (Read)	Don't have time	1	RF42A/P	
		Don't know where to access service	2		
		Don't think it is important	3		
		Don't know	4		
		Others (specify) _____	6		
		Didn't know I had to	5		
<i>It is ok if you do not know the answer but:</i>					
55	Can eating food with a lot of salt affect blood pressure?	No	2 (skip next)	RF43K	
		I don't know	3 (skip next)		
		Yes	1		
56	How would eating food with a lot of salt affect you blood pressure? Would it raise or lower your blood pressure?	I don't know	3 (skip next)	RF44K	
		Lower it	2		
		Raise it	1		
57	Does high blood pressure can cause health problems?	No	2 (Skip next)	RF45K	
		I don't know	3 (skip next)		
		Yes	1		
58	Does high blood pressure affect the following body parts:	Yes	No	I don't know	RF46K
	The brain	1	2	3	
	The kidneys	1	2	3	
	The heart	1	2	3	
<i>Finally, before we move on, I would like to ask you about ways to reduce your blood pressure.</i>					

59	I will now list 4 potential treatments or activities.  Please rate each of them as not effective, effective or very effective to <u>reduce blood pressure</u> .		Not effective	Effective	Very effective	RF47A
		Medication	1	2	3	
		Losing weight	1	2	3	
		Changing your diet	1	2	3	
		Exercise	1	2	3	

**Weight**  
*Now we will talk about body weight*

60	Have you weighed yourself in the last 6 months?		Yes 1 No 2	RF48P
----	---	--	---------------	-------

61	Regarding your body weight, do you feel you are: (read all)		Underweight 1 Normal weight 2 Overweight 3 Very overweight 4	RF49A
----	--	--	---	-------

62	How important is having a normal body weight to you?  Not important, moderately important, important or very important.		<table border="1"> <tr> <td>Not at all</td> <td>Moderately important</td> <td>Important</td> <td>Very important</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	Not at all	Moderately important	Important	Very important	1	2	3	4	RF50A
Not at all	Moderately important	Important	Very important									
1	2	3	4									

**Summary of RF**  
*So we have talked a lot about diet, exercise, smoking and more.*

63	For each of the following things, please rate <u>how</u> harmful you think each one is for your health?  Please rate as not harmful, moderately harmful, harmful or very harmful.  (Do not prompt, but can repeat the question/rating)		Not	Moderately harmful	Harmful	Very harmful	RF51A
		Drinking alcohol every day	0	1	3	4	
		Eating food with lots of salt	0	1	3	4	
		Smoking	0	1	3	4	
		Being overweight	0	1	3	4	
		Eating low amounts of fruit and vegetable	0	1	3	4	
		Being physically	0	1	3	4	

		inactive					
--	--	----------	--	--	--	--	--

#### 4. Knowledge, Attitudes and Practices Related to Cardiovascular Diseases (CD)

Question	Response	Code
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*I would now like to ask you some questions about cardiovascular diseases.*

64	<p>How much do you know about “heart disease”?</p> <p>Nothing at all. You have only heard the term before but know nothing more. You know a <u>little</u> about heart disease You are very familiar with it.</p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">Nothing at all</td> <td style="width: 25%;">I have <u>only</u> heard the term before</td> <td style="width: 25%;">I know a <u>little</u> about the disease</td> <td style="width: 25%;">I am <u>very</u> familiar with it</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	Nothing at all	I have <u>only</u> heard the term before	I know a <u>little</u> about the disease	I am <u>very</u> familiar with it	1	2	3	4	CD1K
Nothing at all	I have <u>only</u> heard the term before	I know a <u>little</u> about the disease	I am <u>very</u> familiar with it								
1	2	3	4								

65	<p>And what about “stroke”?</p> <p>How much do you know about this disease?</p> <p>Nothing at all. You have only heard the term before but know nothing more. You know a <u>little</u> about stroke You are very familiar with it.</p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">Nothing at all</td> <td style="width: 25%;">I have <u>only</u> heard the term before</td> <td style="width: 25%;">I know a <u>little</u> about the disease</td> <td style="width: 25%;">I am <u>very</u> familiar with it</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	Nothing at all	I have <u>only</u> heard the term before	I know a <u>little</u> about the disease	I am <u>very</u> familiar with it	1	2	3	4	CD2K
Nothing at all	I have <u>only</u> heard the term before	I know a <u>little</u> about the disease	I am <u>very</u> familiar with it								
1	2	3	4								

*Cardiovascular diseases are a group of diseases that affect the heart and brain, and their blood vessels. It includes heart attacks, where a part of the heart muscle is injured and strokes where the brain is injured.*

66	<p>In general, do you think cardiovascular diseases are becoming more or less common in Ethiopia?</p>	<p>More1 Less2 Don't know 3</p>	CD3K
----	---	---	------

67	<p>Are you concerned about developing cardiovascular diseases yourself? Please answer either no, yes moderately or yes very.</p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 33%;">Not at all</td> <td style="width: 33%;">Yes, moderately</td> <td style="width: 33%;">Yes, Very</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> </tr> </table>	Not at all	Yes, moderately	Yes, Very	1	2	3	CD4A
Not at all	Yes, moderately	Yes, Very							
1	2	3							

*The next question will ask you about things someone might do in their everyday life or things about a person that makes them more likely to get heart disease.*

68	<p>I will read 5 things, one at a time. Please tell me if you think they would increase someone's</p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">Yes</td> <td style="width: 25%;">No</td> <td style="width: 25%;">Unsure</td> </tr> <tr> <td>Smoking</td> <td>1</td> <td>2</td> <td>3</td> </tr> </table>		Yes	No	Unsure	Smoking	1	2	3	CD5K
	Yes	No	Unsure								
Smoking	1	2	3								

	chances of getting cardiovascular diseases or not. It is ok if you are unsure.	Stress	1	2	3		
		Being overweight	1	2	3		
		Older age	1	2	3		
<i>Next, please answer true, false or I don't know</i>							
69	People with high blood pressure are more likely to have a stroke.				True 1 False 2 I don't know 3		CD6K
<i>Finally.</i>							
70	Cardiovascular diseases can be prevented. <i>Do you agree, disagree, or not know?</i>	Agree	Unsure	Disagree			CD7K
		1	2	3			

### 5. Knowledge, attitudes and practices related Breast and cervical cancer (BCC)

Question	Response									
<i>I would now like to focus on another group of diseases, cancers. First, breast cancer or cancer that affects the breasts.</i>										
<b>Breast cancer</b>										
71	How much do you know about breast cancer?  Nothing at all. You have only heard the term before but know nothing more. You know a <u>little</u> about breast cancer You are very familiar with it.	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Nothing at all</td> <td>I have <u>only</u> heard the term before</td> <td>I know a <u>little</u> about the disease</td> <td>I am <u>very</u> familiar with it</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	Nothing at all	I have <u>only</u> heard the term before	I know a <u>little</u> about the disease	I am <u>very</u> familiar with it	1	2	3	4
Nothing at all	I have <u>only</u> heard the term before	I know a <u>little</u> about the disease	I am <u>very</u> familiar with it							
1	2	3	4							
72	Do you worry that breast cancer can affect you or your family?  <i>(If yes, ask "how often do you worry about it, sometimes or often?")</i>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>No, Not at all</td> <td>Yes, sometimes</td> <td>Yes, often</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> </tr> </table>	No, Not at all	Yes, sometimes	Yes, often	1	2	3		
No, Not at all	Yes, sometimes	Yes, often								
1	2	3								
<i>Now I am going to give you two statements. Please tell me if the following is true, false or you don't know.</i>										
73	Finding breast cancer early means you have a better chance of	True 1 False 2 I don't know 3								
		BCC3K								

	becoming well again.												
74	It is possible for women to look for early signs of breast cancer in their own breasts, by self-examination.		True 1 False 2 I don't know 3		BCC4K								
<i>Breast self-examination is a method used where women such as yourself can check their <u>own</u> breasts for signs of breast cancer without needing to see a doctor.</i>													
75	Do you know how to examine your own breasts for abnormality or signs of breast cancer?  <i>(to be addressed only to women)</i>		Yes 1 No 2		BCC5K								
<i>Regarding breast testing, please answer yes or no to the following questions.</i>													
76	During the last 3 years did you:  <i>(to be addressed only to women, if they are unsure then answer no)</i>	Have you ever self-examined your own breasts?  Had a physical examination of your breasts by a health worker	Yes 1 Yes 1	No 2 No 2	BCC6P BCC7P								
<b>Cervical Cancer</b>													
Now I would like to ask you some more questions about cancers.													
77	How much do you know about cervical cancer?  Nothing at all. You have only heard the term before but know nothing more. You know a <u>little</u> about cervical cancer You are very familiar with it.	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Nothing at all</td> <td>I have <u>only</u> heard the term before</td> <td>I know a <u>little</u> about the disease</td> <td>I am <u>very</u> familiar with it</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	Nothing at all	I have <u>only</u> heard the term before	I know a <u>little</u> about the disease	I am <u>very</u> familiar with it	1	2	3	4			BCC8K
Nothing at all	I have <u>only</u> heard the term before	I know a <u>little</u> about the disease	I am <u>very</u> familiar with it										
1	2	3	4										
Cervical cancer is a cancer that affects females. It is an unhealthy growth or cancer of the female genital part called the cervix. A pap smear and Visual Inspection with Acetic Acid (VIA) are tests doctors use that look for this disease.													
78	Do you know how often it is recommended for adult women in Ethiopia to have a pap smear/VIA?		Yearly 1 Every three years 2 Every 5 years 3 I don't know 4		CCC1K								

79	During the last 3 years, have you had a pap-smear/VIA?	Yes 2(skip next) No 1	CCC2P						
80	If not, what was the main reason you didn't have a pap smear/VIA? Please choose one: (List)	I don't have time 1 I didn't know I needed to 2 It is expensive 3 I don't know where to go 4 It is embarrassing 5 Others (specify)_____ 6	CCC3P						
81	If yes to question 79, have you ever been told that you have cervical cancer or going to develop it so far?	1. Yes 2. No	CCC4P						
82	Do you worry that cervical cancer can affect you or your family?  <i>(If yes, ask "how often do you worry about it, sometimes or often?")</i>	<table border="1"> <tr> <td>No, Not at all</td> <td>Yes, sometimes</td> <td>Yes, often</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> </tr> </table>	No, Not at all	Yes, sometimes	Yes, often	1	2	3	CCC5A
No, Not at all	Yes, sometimes	Yes, often							
1	2	3							
83	Do you have female children under 14 years of age?	Yes 1 No 2	CCC10P						
Ok. Now I would like to ask you about childhood vaccinations, which can prevent many diseases.									
84	Do you know if cervical cancer can be prevented by vaccine?	Yes, it can 1 No, it cannot 2 I don't know 3	CCC11K						
Now I am going to ask you about sexual history, contraceptive use, number of children you have and related conditions.									
85	What was your age at first sexual intercourse? (for those already married)	_____ I don't know___	CCC12P						
86	At what age have you seen your first menses?	_____ years I don't know_____	CCC13P						
87	How many times did you get married? (if not married or single = 0)	_____ times Single 0	CCC14P						
88	Can you tell me the number of births you had so far?	_____ I don't know---	CCC15P						
89	Where have you delivered your last child?	1. At home 2. Clinic 3. Health Centre 4. Hospital 5. Elsewhere (specify___)	CCC16P						
90	Have you ever had history of abortion?	1. Yes 2. No	CCC17P						
91	If yes, how many	_____	CCC18P						

	times?	I don't know _____	
92	How old is your first child?	_____ Years	CCC19P
93	How old is your last child?	_____ Years	CCC20P
94	What are the contraceptive methods you or your partner used to avoid pregnancy so far? (Multiple answer is possible)	<ol style="list-style-type: none"> <li>1. Never used</li> <li>2. Counting dates</li> <li>3. Oral Contraceptives</li> <li>4. Injectable</li> <li>5. IUCD</li> <li>6. Implant</li> <li>7. Condom</li> <li>8. Tubal ligation</li> </ol> Others (specify)	CCC21P
To be used for women using oral contraceptives or injectable only			
95	At what age have you started using the contraceptive method?	_____ Years	CCC22P
96	At what age have you stopped using contraceptive the method? (For current users write the time of data collection)	_____ Years	CCC23P
97	Are you using the contraceptive method now?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>	CCC24P
98	Have you ever been circumcised (mutilated) during your child age?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>	CCC25P
99	If your answer is yes to the above question, at what age were you circumcised?	_____ Years	CCC26P
100	Does your partner have another wife/female sex partner?	Yes      1 No        2	CCC27P
101	If your answer is yes to the above question, how many wives/partners does he have?	_____	CCC28P
102	At what time have you stopped practicing sex?	<ol style="list-style-type: none"> <li>1. Today</li> <li>2. Yesterday</li> <li>3. Long time ago</li> </ol>	CCC29P
103	Have you ever had history of sexually transmitted infections?	Yes      1 No        2	CCC30P

**. Knowledge, Attitudes and Practices Related to Diabetes Mellitus type 2**

Question		Response																																	
<i>Next, In this next part, I will ask you some important questions about diabetes.</i>																																			
104	<p>How much do you know about diabetes?</p> <p>Nothing at all. You have only heard the term before but know nothing more. You know a <u>little</u> about diabetes You are very familiar with it.</p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Nothing at all</td> <td>I have <u>only</u> heard the term before</td> <td>I know a <u>little</u> about the disease</td> <td>I am <u>very</u> familiar with it</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	Nothing at all	I have <u>only</u> heard the term before	I know a <u>little</u> about the disease	I am <u>very</u> familiar with it	1	2	3	4	D1K																								
Nothing at all	I have <u>only</u> heard the term before	I know a <u>little</u> about the disease	I am <u>very</u> familiar with it																																
1	2	3	4																																
<i>Regarding diabetes.</i>																																			
105	<p>Please answer the following statements about diabetes with true, false or I am unsure:</p> <p>(Questions can be repeated twice)</p>	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;"></th> <th style="width: 10%; text-align: center;">True</th> <th style="width: 10%; text-align: center;">False</th> <th style="width: 10%; text-align: center;">I don't know</th> </tr> </thead> <tbody> <tr> <td>Diabetes is when there is too much sugar in the blood</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Diabetes cannot cause loss of sensation in your feet</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Even if I have diabetes, I can live a normal life</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Diabetes does not damage your heart</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Diabetes can causes blindness</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Diabetes cannot be prevented</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> <tr> <td>You can feel normal and healthy, but still have diabetes</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> </tbody> </table>		True	False	I don't know	Diabetes is when there is too much sugar in the blood	1	2	3	Diabetes cannot cause loss of sensation in your feet	1	2	3	Even if I have diabetes, I can live a normal life	1	2	3	Diabetes does not damage your heart	1	2	3	Diabetes can causes blindness	1	2	3	Diabetes cannot be prevented	1	2	3	You can feel normal and healthy, but still have diabetes	1	2	3	D2K
	True	False	I don't know																																
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You can feel normal and healthy, but still have diabetes	1	2	3																																
<i>Regarding diabetes. There are many things that people do in everyday life that increase their chance of getting diabetes. Also, though there are things people can do to reduce their chances of getting diabetes.</i>																																			
106	<p>Can you think of things a person can do to reduce their chances of getting diabetes?</p> <p>If answer is "no", then ask, "is this because you don't know or there is nothing a person can do"?</p>	<table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 70%;">Improving their diet</td> <td style="width: 10%; text-align: center;">1</td> </tr> <tr> <td>Taking medications</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Doing more exercise</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Losing weight</td> <td style="text-align: center;">4</td> </tr> <tr> <td>Quit smoking</td> <td style="text-align: center;">5</td> </tr> <tr> <td>I don't know</td> <td style="text-align: center;">6</td> </tr> <tr> <td>There is nothing someone can do</td> <td style="text-align: center;">7</td> </tr> <tr> <td>Others (specify) _____</td> <td style="text-align: center;">8</td> </tr> </tbody> </table>	Improving their diet	1	Taking medications	2	Doing more exercise	3	Losing weight	4	Quit smoking	5	I don't know	6	There is nothing someone can do	7	Others (specify) _____	8	D3K																
Improving their diet	1																																		
Taking medications	2																																		
Doing more exercise	3																																		
Losing weight	4																																		
Quit smoking	5																																		
I don't know	6																																		
There is nothing someone can do	7																																		
Others (specify) _____	8																																		
107	Has a health worker ever spoken to you about how you can prevent diabetes?	<table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 70%;"></td> <td style="width: 10%; text-align: center;">No</td> <td style="width: 10%; text-align: center;">1</td> </tr> <tr> <td></td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">2</td> </tr> <tr> <td></td> <td style="text-align: center;">Don't know/Don't remember</td> <td style="text-align: center;">3</td> </tr> </tbody> </table>		No	1		Yes	2		Don't know/Don't remember	3	D4P																							
	No	1																																	
	Yes	2																																	
	Don't know/Don't remember	3																																	

*That is all on diabetes.*

Questionnaire on Perception of Body size and Shape

**4. Perceptions of the interviewee on body size and shape**

PERCEPTIONS		Response	QN
1	Overweight/obesity is a sign of good health.	1. Yes 2. No 3. I don't know	PBSS1
2	If someone is overweight or obese he/she is most likely to be wealthy.	1. Yes 2. No 3. I don't know	PBSS2
3	Overweight/obesity is a sign of attractiveness.	1. Yes 2. No 3. I don't know	PBSS3
4	If your response to question number 3 is no, what is your reason for saying no?	1. Ugliness 2. Shamefulness 3. Frustrations 4. Others (specify _____ _)	PBSS4
5	Being slim is a sign of illness or poor health.	1. Yes 2. No 3. I don't know	PBSS5
6	What do you like to be the body size of your spouse?	1. Obese 2. Overweight 3. Normal 4. Underweight 5. I don't know	PBSS6
7	How do you describe your body size currently?	1. Obese 2. Overweight 3. Normal 4. Underweight 5. I don't know	PBSS7
8	How do you feel about your current body size and shape?	1. I like it 2. I dislike it 3. I don't know	PBSS8
9	Have you experienced others comment about your body size and shape?	1. Yes 2. No 3. I don't know	PBSS8

10	If your response to Question number 9 is yes, What was their comment?	<ol style="list-style-type: none"> <li>1. Obese</li> <li>2. Overweight</li> <li>3. Normal</li> <li>4. Underweight</li> <li>5. I don't know</li> </ol>	PBSS10
11	What will you do if you are feel or told that you are overweight or obese?	<ol style="list-style-type: none"> <li>1. I will try to maintain it.</li> <li>2. I will visit a health worker for advice or possible treatment.</li> <li>3. I will start aerobic physical exercise.</li> <li>4. I will modify my diet.</li> <li>5. Others (specify_____ )</li> </ol>	PBSS11
12	Is there any consequence as the result of overweight or obesity?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> <li>3. I don't know</li> </ol>	PBSS12
13	If your response to the above Question is yes, would you mention some?	<p style="text-align: center;"><b><u>Yes</u></b></p> <p><b><u>No</u></b></p> <ol style="list-style-type: none"> <li>1. Diabetes</li> <li>2. Hypertension</li> <li>3. Heart Diseases</li> <li>4. Cancer</li> <li>5. Others (specify_____ )</li> </ol>	PBSS13
14	Frequent feeding of animal products including raw meat/beef is beneficial to our body size and shape.	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> <li>3. I don't know</li> </ol>	PBSS14
15	Frequent feeding of plant products like fruits, green leaves and vegetables will negatively affect our body size and shape.	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> <li>3. I don't know</li> </ol>	PBSS15

## Questionnaire II: Case- control study on Hypertension

University of South Africa (UNISA)

Department of Health Studies

A questionnaire on a study entitled: ***Epidemiology of Preventable Risk Factors for Non-Communicable Diseases among the Adult Population in Tigray, Northern Ethiopia***

Hello Dear Sir/Madam!

My name is -----, I am representing the study team coordinated and led by Alemayehu Bekele Mengesha, a doctoral student at the University of South Africa. I am collecting data on the study entitled: ***Epidemiology of Preventable Risk Factors for Non-Communicable Disease among the Adult Population in Tigray, Northern Ethiopia***. This study will make an important contribution to identifying the preventable risk factors of non-communicable diseases. The knowledge, perceptions, attitudes and behaviours of people towards the preventable risk factors of non-communicable diseases will also be assessed. This questionnaire has two components; Face-to-face interviews and physical measurements including measurement of blood pressure, heart rate, waist circumference, hip circumference, weight and height will be done. Hence, your participation in this study is highly beneficial in order to generate information on the aforementioned issues. Any information you provide will remain confidential. Your name will not be identified in relation to your personal information. For unclear questions, you are kindly requested to ask the interviewer for clarity. If you don't feel comfortable during the interview, physical or biochemical measurements you are free to discontinue your participation. The data collection process will take 25 to 40 minutes. There is no direct benefit to you for participating; however, the information obtained from the study may benefit the people of our country through using it for the design of programs to reduce the risk factors. There is no risk as the result of the interview or the physical measurement. Did you understand the aim of the study? Yes ( ) No ( ). Are you willing to participate in the study? Yes ( ) No ( ).

Signature of the participant.....

### Part one: Socio-demographic Characteristics

Location and Date		Response	Code
1	Cluster/Centre/Village ID	_ _ _	CCI1
2	Cluster/Centre/Village name		CCI2
3	Interviewer ID	_ _ _	CCI3
4	Number of visits	1 2 3	
5	Date of completion of the instrument	_ _   _ _   _ _ _ _  dd mm year	CCI4
		Participant Id Number  _ _ _   _ _ _   _ _ _	
Consent, Interview Language and Name		Response	Code

6	Consent has been read and obtained	Yes 1 No 2 <b>If NO, END</b>	CCI5
7	Interview Language <i>[Insert Language]</i>	Tigrigna 1 <i>[Amharic]</i> 2 <i>[Others, specify_____]</i> 3	CCI6
8	Time of interview (24 hour clock)	: hrs        mins	CCI7
9	Family Surname		CCI8
10	First Name		CCI9
<b>Additional Information that may be helpful</b>			
11	Contact phone number where possible		CCI10
12	Location of the respondent's Residence (GPS) measurement	Altitude _____metres Longitude_____Degrees East Latitude_____Degrees North	
<b>Demographic Information</b>			
<b>Question</b>		<b>Response</b>	<b>Code</b>
12	Sex ( <i>Record Male / Female as observed</i> )	Male 1 Female 2	CCC1
13	What is your date of birth? <i>Don't Know 77 77 7777</i>	/    /    If known, Go to C4 dd        mm        year	CCC2
14	How old are you?	Years	CCC3
15	In total, how many years have you spent at school or in full-time study (excluding pre-school)?	Years	CCC4
16	What is the <b>highest level of education</b> you have completed?  <i>[INSERT COUNTRY-SPECIFIC CATEGORIES]</i>	Illiterate 1 Read and write 2 First cycle completed 3 Second Cycle completed 4 High school( Grade 10) completed 5 Preparatory School completed 6 College/University completed 7 Post graduate degree 8 Refused 88	CCC5

17	What is your Religion?	Orthodox 1 Catholic 2 Muslim 3 Protestant 4 Others 5 Refused 88	CCC6
18	What is your <i>Ethnic group</i> ?	Tigre 1 Amhara 2 Others specify____ 3 Refused 88	CCC7
19	What is your <b>marital status</b> ?	Never married 1 Currently married 2 Separated 3 Divorced 4 Widowed 5 Cohabiting 6 Refused 88	CCC8
20	Which of the following best describes your <b>main work</b> status over the past 12 months?  [INSERT COUNTRY-SPECIFIC CATEGORIES]  (USE SHOWCARD)	Government employee 1 Non-government Self-employed 2 3 Student 4 Housewife 5 Retired 6 Farmer 7 Unemployed 8  Refused 88	CCC9
21	How many people older than 25-64 years, including yourself, live in your household?	Number of people <input type="text"/>	CCC9
22	Taking <b>the past year</b> , can you tell me what the average earnings of the household have been? (RECORD ONLY ONE, NOT ALL 3)	Per week <input type="text"/> Go to T1	CCC10a
		OR per month <input type="text"/> Go to T1	CCC10b
		OR per year <input type="text"/> Go to T1	CCC10c
		Refused 88	CCC10d
23	If you don't know the amount, can you give an <b>estimate</b> of the annual household income if I read some options to you? Is it [INSERT QUINTILE VALUES IN	≤ Quintile (Q) 1 1 More than Q 1, ≤ Q 2 2	CCC11
		More than Q 2, ≤ Q 3 3 More than Q 3, ≤ Q 4 4 More than Q 4 5	

LOCAL CURRENCY]	Don't Know 77	
(READ OPTIONS)	Refused 88	

<b>Part II. Risk Behaviours for Hypertension</b>		
QUESTION	RESPONSE	CODE
24	Have you ever smoked cigarettes? 1. Yes 2. No 3. I don't know	CCR1
25	Do you smoke currently? 1. Yes 2. No 3. I don't know	CCR2
26	If your Question to Number-25 is <b>Yes</b> , What is the number of cigarettes you smoke per day?  <input type="text"/>	CCR3
27	For how long did you smoke?  <input type="text"/>	CCR4
28	Have you ever drunk Alcohol? 1. Yes 2. No 3. I don't know	CCR5
29	Are you currently drinking alcohol? 1. Yes 2. No 3. I don't know	CCR6
30	Do drink alcohol every day? 1. Yes 2. No 3. I don't know	CCR7
31	What kind of Alcohol do you drink oftentimes? (Tick all that are applicable)  1. <i>Beer,</i> 2. <i>Tella/Sewa(Local beer)</i> 3. <i>Tej(local Wine)</i> 4. <i>vodka</i> 5. <i>wine</i> 6. <i>Araque (local vodka)</i> 7. <i>Whisky</i> 8. <i>Others, Specify___</i>	<b><u>Yes No</u></b>  CCR8(a-h)
32	What is the amount of alcohol you drink every day? (Identify the type and alcohol you take every day)  <input type="text"/>	CCR9

33	For how long did you drink Alcohol?	In years <input type="text"/>	CCR10
34	Have you ever chewed khat?	1. Yes 2. No 3. I don't know	CCR11
35	Are you chewing khat currently?	1. Yes 2. No 3. I don't know	CCR12
36	How frequent did you chew khat?	1. Every day 2. Every week 3. Occasionally 4. I don't know 88. Refused	CCR13
37	For how long did you chew khat?	In Years <input type="text"/>	CCR14
38	How often do use salt daily in your diet?	1. Always 2. Sometimes 3. Occasionally 4. None	CCR15
39	What kind of diet do you feed every day?	1. Beef/fat and other animal products 2. Mixed diet 3. Vegetarian	CCR16
40	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like [ <i>carrying or lifting heavy loads, digging or construction work</i> ] for at least 10 minutes	Yes 1  No 2 <i>If No, go to P 4</i>	P1
41	In a typical week, on how many days do you do vigorous-intensity activities as part of your work?	Number of days <input type="text"/>	P2
42	How much time do you spend doing vigorous-intensity activities at work on a typical day?	Hours : minutes <input type="text"/> : <input type="text"/> hrs mins	P3 (a-b)
43	Does your work involve moderate-intensity activity, that causes small increases in breathing or heart rate such as brisk walking [ <i>or carrying light loads</i> ] for at least 10 minutes continuously?	Yes 1  No 2 <i>If No, go to P 7</i>	P4
44	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Number of days <input type="text"/>	P5

45	How much time do you spend doing moderate-intensity activities at work on a typical day?	Hours : minutes <u>   </u> : <u>   </u> hrs                                    mins	P6 (a-b)
46	Do you walk or use a bicycle ( <i>pedal cycle</i> ) for at least 10 minutes continuously to get to and from places?	Yes 1 No 2 <i>If No, go to P 10</i>	P7
47	In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?	Number of days  <u>   </u>	P8
48	How much time do you spend walking or bicycling for travel on a typical day?	Hours : minutes <u>   </u> : <u>   </u> hrs                                    mins	P9 (a-b)
49	Do you do any vigorous-intensity sports, fitness or recreational ( <i>leisure</i> ) activities that cause large increases in breathing or heart rate like [ <i>running or football</i> ] for at least 10 minutes continuously? <i>[INSERT EXAMPLES] (USE</i>	Yes 1 No 2 <i>If No, go to P 13</i>	P10
50	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational ( <i>leisure</i> ) activities?	Number of days <u>   </u>	P11
51	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hours : minutes <u>   </u> : <u>   </u> hrs                                    mins	P12 (a-b)
52	Do you do any moderate-intensity sports, fitness or recreational ( <i>leisure</i> ) activities that cause a small increase in breathing or heart rate such as brisk walking, [ <i>cycling, swimming, volleyball</i> ] for at least 10 minutes continuously? <i>[INSERT EXAMPLES] (USE SHOWCARD)</i>	Yes 1 No 2 <i>If No, go to P16</i>	P13
53	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational ( <i>leisure</i> ) activities?	Number of days <u>   </u>	P14
54	How much time do you spend doing moderate-intensity sports, fitness or recreational ( <i>leisure</i> ) activities on a typical day?	Hours : minutes <u>   </u> : <u>   </u> hrs                                    mins	P15 (a-b)

55	How much time do you usually spend sitting or reclining on a typical day?	Hours : minutes hrs <input type="text"/> <input type="text"/> : mins <input type="text"/> <input type="text"/>	P16 (a-b)
56	Height	in Centimetres (cm) <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/>	M3
57	Weight	in Kilograms (kg) <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> . <input type="text"/>	M4
58	Waist circumference	in Centimetres (cm) <input type="text"/> <input type="text"/> <input type="text"/>	M5
59	Hip circumference	in Centimeters (cm) <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	M6

Questionnaire on Perception of Body size and Shape

**4. Perceptions of the interviewee on body size and shape**

PERCEPTIONS		Response	QN
1	Overweight/obesity is a sign of good health.	1. Yes 2. No 3. I don't know	PBSS1
2	If someone is overweight or obese he/she is most likely to be wealthy.	1. Yes 2. No 3. I don't know	PBSS2
3	Overweight/obesity is a sign of attractiveness.	1. Yes 2. No 3. I don't know	PBSS3
4	If your response to question number 3 is no, what is your reason for saying no?	5. Ugliness 6. Shamefulness 7. Frustrations 8. Others (specify _____ _)	PBSS4
5	Being slim is a sign of illness or poor health.	1. Yes 2. No 3. I don't know	PBSS5
6	What do you like to be the body size of your spouse?	6. Obese 7. Overweight 8. Normal 9. Underweight	PBSS6

		10. I don't know	
7	How do you describe your body size currently?	6. Obese 7. Overweight 8. Normal 9. Underweight 10. I don't know	PBSS7
8	How do you feel about your current body size and shape?	4. I like it 5. I dislike it 6. I don't know	PBSS8
9	Have you experienced others comment about your body size and shape?	1. Yes 2. No 3. I don't know	PBSS8
10	If your response to Question number 9 is yes, What was their comment?	6. Obese 7. Overweight 8. Normal 9. Underweight 10. I don't know	PBSS10
11	What will you do if you are feel or told that you are overweight or obese?	6. I will try to maintain it. 7. I will visit a health worker for advice or possible treatment. 8. I will start aerobic physical exercise. 9. I will modify my diet. 10. Others (specify _____ —)	PBSS11
12	Is there any consequence as the result of overweight or obesity?	1. Yes 2. No 3. I don't know	PBSS12
13	If your response to the above Question is yes, would you mention some?	<b><u>No</u></b> 6. Diabetes 7. Hypertension 8. Heart Diseases 9. Cancer 10. Others (specify _____ —)	PBSS13
14	Frequent feeding of animal products including raw meat/beef is beneficial to our body size and shape.	1. Yes 2. No 3. I don't know	PBSS14

15	Frequent feeding of plant products like fruits, green leaves and vegetables will negatively affect our body size and shape.	1. Yes 2. No 3. I don't know	PBSS15
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**Mental Stress (risk factors) for Hypertension**

	SRQ20	YES	NO	Code
1	Do you often have Headaches?			MS1
2	Is your appetite poor?			MS2
3	Do you sleep badly?			MS3
4	Are you easily frightened?			MS4
5	Do your hands shake?			MS5
6	Do you feel nervous, tense or worried?			MS6
7	Is your digestion is poor?			MS7
8	Do you have trouble thinking clearly?			MS8
9	Do you feel un happy?			MS9
10	Do you cry more than usual?			MS10
11	Do you find it difficult to enjoy your daily activities?			MS11
12	Do you find it difficult to make decisions?			MS12
13	Is your daily work suffering?			MS13
14	Are you unable to play a useful part in life?			MS14
15	Have you lost interest in things?			MS15
16	Do you feel that you are a worthless person?			MS16
17	Has the thought of ending your life been in your mind?			MS17
18	Do you feel tired all the time?			MS18
19	Do you have un comfortable feelings in your stomach?			MS19
20	Are you easily tired?			MS20

Thank you for your participation;

ብሔራዊ ክልላዊ መንግስቲ ትግራይ  
ቢሮ ሕዳድ ጥዕና



ie Government of the National Regional  
State of Tigray, Bureau of Health

Ref. 2526/334/05

Date 28/03/05

ቁጥር \_\_\_\_\_

ቁጥር \_\_\_\_\_

To Ministry of Science and Technology  
National Research and Ethics Review committee  
Addis Ababa

**Subject: support letter for ethical clearance**

Alemayehu Bekele Mengesha is a doctoral student in health studies at the University of South Africa (UNISA), under the supervision of Prof. Susan Benedict. He requested our bureau for permission to conduct a study in the Tigray regional state Mekelle City administration and kilte-Awlaelo in partial fulfillment of his PhD dissertation. The study entitles "Epidemiology of Preventable Risk Factors for Non-Communicable Disease (NCDs) among the Adult Population in Tigray, Northern Ethiopia."

This study is believed to have significant importance in identifying the magnitude and preventable risk factors of NCDs in and assessing the knowledge, perception, attitudes and behaviour of people towards the NCDs preventable risk factors. This is because the region has limited information on this particular public health problem. It will also ultimately outline NCDs prevention model. Hence the study will be a remarkable input for the bureau in developing further planning on NCDs and related issues.

Thus the bureau has permitted the investigator to conduct the study in the aforementioned parts of the region. We would also like to request the national research and Ethics review committee to clear the study ethically in the earliest possible time to facilitate the conduct of the study.

Respectfully!



Ibrahim hassen

For deputy bureau head

Cc

To ato Alemayehu Bekele

A.A

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7	251-034-440-02-22	251-034-440-88-30	tigrayhealth@ethionet.et	Mekelle, Tigray, Ethiopia
	251-034-441-01-03	Fax	E-mail	
	251 034 440 71 90			

**ዩኒቨርሲቲ ደቡብ አፍሪካ**

**ክፍሉ ትምህርቲ ጥዕና**

ቃለ መጠይቅ ካብ መፅናዕታዊ ርእሲ ኢፒደሚዮሎጂ ንምክልኻል ዝከኣል ሓደጋ ተቓላፊነት ዘይተመሓለፍቲ ሕማማት ካብ ዓበይቲ ካብ ትግራይ ሰሜን ኢትዮጵያ

ጥዲና ይሃበለይ !

ኣነ ሽመይ \_\_\_\_\_ ይበሃል :: ኣነ ካብ ዩኒቨርሲቲ ደቡብ አፍሪካ ናይ ዶክተራት ተምሃራይ ዝኾኑ ኣይተ ኣለማዮህ በቀለ መንገሻ ዘካይድዎ መፅናዕቲ ኣባል መፅናዕታዊ ጉጅለ እየ:: ኣነ ዝርገሐ ሓደጋ ተቓላፊነት ምክልኻል ዝከኣል ዘይተመሓለፍቲ ሕማማት ካብ ዓበይቲ ብዝብል ርእሲ ዝተዳለወ ኣብትግራይ ዝካየድ መፅናዕቲ (Epidemiology of preventable Risk factors for Non-Communicable Disease among the Adult population in Tigray, Northern Ethiopia) መረዳኢታ ኣብምትእኻኻብ ይርከብ :: እዚ መፅናዕቲ እዚ ዝርገሐ ሓደጋታት ተቓላፊነት ዘይተመሓለፍቲ ሕማማት ካብ ምንጻር ዕዘዝ ኣበርክቶ ከምዘህልዎ ይእመን :: ብተወሳኺውን ሕ/ሰብ ካብ ሓደጋ ተቓላፊነት ዘይተመሓለፍቲ ሕማማት ዘለዎ ኣፍልጦ ፣ግንዛብ ፣ ዝንባላን ባህርያትን ዳህሳስ ክካየድ እዩ::

እዚ ቃለ መጠይቅ ሰለስተ ትሕዝቶ ዘለዎ እንትኸውን ንሳቶም እዉን ብኣካል ዝካየድ ቃለ መጠይቅ ከም ዓቕን ፀቕጢ ደም ፣ ትርግታ ልቢ፣ ዙርያ ማዕጥቕ፣ ጎሎ ፣ ቁመትን ክብደትን ዝኣምሰሉ ኣካላዊ ምርመራታትን ከምኡውን ባዩ ኬሚካላዊ ዓቕናትን እዩም :: ንምርመራ ዝኸውን ሕዲተይ ናሙና ደም ካብ ኣባብዕትኹም ክወሰድ እዩ:: እዚ መጠን ሽኮር ፣ መጠን ኮለስትሮልን ትራይ ግላይሰራይድን ኣብደምኩም ንምንጻር ዘኸእል እዩ :: ብምኻኑ ኣብላዕሊ ንዝተሓበሩ ሓሳባት ኣመልኪቱ ንዝካየድ መፅናዕቲ ሓበሬታ ንምርኻብ ናትኩም ተሳትፎ ኣዝዩ ኣገዳሲ እዩ:: ዝኾነ ይኹን እትህብዎ ሓበሬታ ብዝምልከት ምሽጥራዊነቱ ዝተሓለወ እንትኸውን ሽምኩም ምስውልቀ መረዳኢታኹም ተዛሚዱ ኣይዕራሕን። ግልሓዪ ንዘይኮነልኩም ሕቶታት ነቲ ቃለ መጠይቅ ዝገብረልኩም ሰብ ምሕታት ትኸእሉ ኢኹም:: ካብ እዋን ቃለ መጠይቅ ፣ ዓቕን ኣካላዊን ባዩ ኬሚካልን ምርመራታት ዝምልከት ቅርዥብልኩም እንተኾይኑ ዘይምስታፍ ወይድማ ኣመንጊኹም ምቁራዕ ትኸእሉ ኢኹም :: እዚ ከይዲ ምእካብ መረዳኢታ ካብ 25 -40 ደቂቓ ዝወስድ እዩ :: ኣብዚ መፅናዕቲ ምስታፍኩም ብውልቅኹም እትረኽብዎ ጥቕሚ የለን ይኹንምበር ካብዚ መፅናዕቲ ዝርከብ መረዳኢታ ብምጥቃም ኣንፈት ምክልኻል ሓደጋ ተቓላፊነት ዘይተመሓለፍቲ ሕማማት ብምንጻር ንህዝብናን ሃገርናን ኣዝዩ ጠቓሚ እዩ::

ናሙናደም እንትውሰድ ክስመዐኩም ካብዝኸእል ዉሱን ቃንዛ ወገኢ ካለእ ክበዕሐኩም ዝኸእል ፀገም ጥዕና የለን :: በዚይካ ውዕኢት ምርመራ ደም ካልኦት ዓቕናት ውዕኢቶም ክንገረኩም እዩ:: ምርመራ ኤች.ኣይ.ቪ ግና ኣይግበረልኩምን :: ዕላማ እዚ መፅናዕቲ ተረዲኡኩም ዶ? እዉ ኣይፋሉን

ኣብዚ ቃለ መጠይቅ ንምስታፍ ፈቓደኛ ዲኹም ? እዉ  ሉን   
ናይ ተሳታፊ ፊርማ \_\_\_\_\_.

መፍለጫ ቦታን ዕለትን (Location and Date)		መልስ (Response)	ክፍ
1	ቁፅረ መለሰይ ክላስተር/ማእኸል/ቁሽት	_ _ _	11
2	ሽም ክላስተር/ማእኸል/ቁሽት		12
3	መለሰይ ቁፅረ ሓታቲ	_ _ _	13
4	በዝሒ ግዘ ዑደት	1 2 3	14
5	ቅጥሩ ዝተመልከሉ እዋን	_ _ _   _ _ _   _ _ _ _  ዕለት                      ወርሒ                      ዓ ም	15
ቁፅረ መለሰይ ተሓታቲ/ት (Participant Id Number)       _ _ _ _   _ _ _ _   _ _ _ _			
ቅብራት ተሳታፊን ሽም ቋንቋ ቃለ መሕተትን (Consent, Interview Language and Name)		መልስ ተሓታቲ	ክፍ
6	ኣብ ላልሊ ዝተፀሓፈ ኣንቢብኩም ቅብራት ቃለ መሕተት ካብተሓታቲ ኣረጋግፁ	እወ 1 ኣይፋሉ 2    መልሱ ኣይፋሉ እንተኾይኑ ቃለ መሕተት ጠጠው ኣብል	15
7	እዚ ቃለ መሕተት በዮናይ ቋንቋ ተካይዶ?	ትግርኛ 1 ኣምሓርኛ 2 [ካሊእ ይገለፅ]___ 3	16
8	ቃለ መሕተት ዝተኻየደሉ ግዘ (ኣብ ውሽጢ 24 ሰዓት)	_ _ _   _ _ _  ሰዓት                      ደጃቻ	17
9	ሽም ኣባሉ		18
10	ሙሉእ ሽም(ምስ ኣቦ)		19
ጠቐምቲ ክኾኑ ዝክእሉ ተወሳኺ ሓበሬታታት (Additional Information that may be helpful)			
11	ቁፅረ ስልኪ ብቐረባ ተፀዋዒ/ዘመድ (እንተተኻኢሉ)		110

12	መንበሪ ገዛ ተሳታፊ ዝርከበሉ (GPS measurement)	Altitude _____metres above sea level Longitude _____Degrees East Latitude _____Degrees North	I11																		
<b>ቀንዲ: ሓበሬታ ስነ ህዝቢ (CORE: Demographic Information)</b>																					
<b>ሕቶታት</b>		<b>መልሲ ተሳታፊ</b>	<b>ኮድ</b>																		
13	ፆታ (ተባዕታይ/አንስታይ)	ተባዕታይ 1 አንስታይ 2	C1																		
14	ዝተወለድክሙሉ እዋን/ዘመን መዓዘ እዩ?  ኣይፈልግን 77 77 7777	<table border="0"> <tr> <td>□□□</td> <td>□□□</td> <td>□□□□□□</td> </tr> <tr> <td>ዕለት</td> <td>ወርሒ</td> <td>ዓ ም</td> </tr> <tr> <td colspan="3">ዝፍለጥ እንተኾይኑ ናብ ሕቶ C4 ሕለፍ</td> </tr> </table>	□□□	□□□	□□□□□□	ዕለት	ወርሒ	ዓ ም	ዝፍለጥ እንተኾይኑ ናብ ሕቶ C4 ሕለፍ			C2									
□□□	□□□	□□□□□□																			
ዕለት	ወርሒ	ዓ ም																			
ዝፍለጥ እንተኾይኑ ናብ ሕቶ C4 ሕለፍ																					
15	ዕድመኹም ክንደይ እዩ?	ብዓመት □□□	C3																		
16	ብሓፈሻ ኣብ ስሩዕ ቤት ትምህርቲ እናተምሃርኩም ክንደይ ዓመታት ኣሕለፍኩም (መንፈሳዊ/ዘይስሩዕ ቤት ትምህርቲ ዘይሓወሰ)?	ብዓመት □□□	C4																		
<b>መቐፀልታ: ሓበሬታ ስነ ህዝቢ (EXPANDED: Demographic Information)</b>																					
17	ክንደይ ክፍለ ተምሃርኩም ወዲእኹም?	<table border="0"> <tr> <td>ዘይተምሃረ</td> <td>1</td> </tr> <tr> <td>ምንባብን ምዕሓፍን</td> <td>2</td> </tr> <tr> <td>1ይ ሳይክል ወዲኡ</td> <td>3</td> </tr> <tr> <td>2ይ ሳይክል ወዲኡ</td> <td>4</td> </tr> <tr> <td>ሃይስኩል (10ይ ክፍለ) ወዲኡ</td> <td>5</td> </tr> <tr> <td>መሰናድኦ ትምህርቲ ወዲኡ</td> <td>6</td> </tr> <tr> <td>ኮለጅ/ዩኒቨርሲቲ ወዲኡ</td> <td>7</td> </tr> <tr> <td>ዲግሪ ድሕረ ምረቓ</td> <td>8</td> </tr> <tr> <td>ፈቓደኛ ኣይኮንኩን</td> <td>88</td> </tr> </table>	ዘይተምሃረ	1	ምንባብን ምዕሓፍን	2	1ይ ሳይክል ወዲኡ	3	2ይ ሳይክል ወዲኡ	4	ሃይስኩል (10ይ ክፍለ) ወዲኡ	5	መሰናድኦ ትምህርቲ ወዲኡ	6	ኮለጅ/ዩኒቨርሲቲ ወዲኡ	7	ዲግሪ ድሕረ ምረቓ	8	ፈቓደኛ ኣይኮንኩን	88	C5
ዘይተምሃረ	1																				
ምንባብን ምዕሓፍን	2																				
1ይ ሳይክል ወዲኡ	3																				
2ይ ሳይክል ወዲኡ	4																				
ሃይስኩል (10ይ ክፍለ) ወዲኡ	5																				
መሰናድኦ ትምህርቲ ወዲኡ	6																				
ኮለጅ/ዩኒቨርሲቲ ወዲኡ	7																				
ዲግሪ ድሕረ ምረቓ	8																				
ፈቓደኛ ኣይኮንኩን	88																				
18	ብሄረ ሰብኩም (ዝተወለድኩሙሉ ብሄረ ሰብ) እንታ እዩ?	ትግራይ 1 አምሓራ 2 [ካለእ ይገለፅ] _____ 3 ፈቓደኛ ኣይኮንኩን 88	C6																		
19	ኩነታት ሓዳር?	ዘይተመርፀዎ/ት 1	C7																		

		በዓል/ቲ ሓዳር 2 ተፈላልዮም ዝኾነሉ 3 ዝተፋተሉ/ት 4 መዋስብቲ ዝሞተቶ/ታ 5 6 ዘይስሩዕ ሓዳር / ሓቢርካ ምንባር 88 ፈቓደኛ ኣይኮንኩን	
20	እትኸተልዎ ሃይማኖታዊ እምነት እንታይ እዩ?	ኦርቶዶክስ 1 ካቶሊክ 2 እስልምና 3 ጳንጤ 4 ካሊእ 5 ፈቓደኛ ኣይኮንኩን 88	C8
21	ኣብዝሓለፈ 12 ኣዋርሕ ኣብዞም ዝስዕቡ ቀንዲ መተሓዳደሪ ስራሕኹም/ መነባብርኹም እንታይ ነይሩ? (ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)	ስራሕተኛ መንግስቲ 1 ስራሕተኛ ዘይመንግስታዊ ትካል 2 ብውልቀ ስራሕ ዝመሓደር 3 ተምሃራይ 4 ናይገዛ እመቤት (House wife) 5 ጡረተኛ 6 ሓረስታይ 7 ስራሕ ኣልቦ 8 ፈቓደኛ ኣይኮንኩን 88	C9
22	ኣብ ገዛኹም ንባዕልኹም ሓዊሱ ዕድሜኡም ኣብ 25 - 65 ዓመት ዝኾኖም ክንደይ ሰዓት ይነብሩ?	በዝሒ ሰዓት ብቐጠራ  _ _	C10
			C11a



	<p>እዋን እንት-ትጅምሩ ዕድመኹም ክንደይ ነይሩ?</p>	<p>እንተተፈሊጡናብ ሕቶ T5a ሕለፍ</p>		
		<p>ኣይፈልጥን 77</p>		
28	<p>መዓልታዊ ምትካኽ ሽጋራ ካብዝጀመርኩሙሉ እዋን ክሳብ ሐዚ ክንደይ ዓመታት ከምዝገበረ ትዝክርዎ ዶ?</p> <p>(ኣደ መልሲ ጥራሕ ፀሓፍ, ሰለስቲኦም ምምላስ ኣየድልን)</p> <p>ኣይፈልጥን 77</p>	<p>ብዓመት <input type="checkbox"/></p>	<p>መልሱ እንተተፈሊጡ ናብ ሕቶ T5a ሕለፍ</p>	T4a
		<p>ወይ ብወርሒ <input type="checkbox"/></p>	<p>መልሱ እንተተፈሊጡ ናብ ሕቶ T5a ሕለፍ</p>	T4b
		<p>ወይ ብሰሙን <input type="checkbox"/></p>		T4c
29	<p>ካብዞም ዝስዕቡ ዓይነታት ሽጋራ ብማእኸላይ መዓልታዊ ክንደይ ዘኣክል ተትክኹ?</p> <p>(ንኣድሕድ መልሲ ፀሓፍ፣ ምልክት ብምርኣይ ኣረጋግፅ)</p> <p>ኣይፈልጥን 77</p>	<p>ሽጋራ ውዕኢት ፋብሪካ <input type="checkbox"/></p>		T5a
		<p>ብኢድ ዝጥቕለል ሽጋራ <input type="checkbox"/></p>		T5b
		<p>ፒፓ <input type="checkbox"/></p>		T5c
		<p>Cigars, cheroots, cigarillos <input type="checkbox"/></p>		T5d
		<p>ካሊእ <input type="checkbox"/></p>	<p>እንተሃልዩ ናብ ሕቶ T5 ሕለፍ፣ እንተዘይ ሃልዩ ደማ ናብ T9 ሕለፍ</p>	T5e
		<p>ካሊእ (እንተሃልዩ ይገለፅ): _____ <input type="checkbox"/></p>	<p>እንተዘይሃልዩ ናብ ሕቶ T9 ሕለፍ</p>	T5other

ዝቕፀለ: ምትካኽ ሽጋራ (EXPANDED: Tobacco Use)			
ሕቶታት (Question)		መልሲ ተሳታፊ (Response)	ኮድ
30	አብዝሓለፉ እዋናት መዓልታዊ ሽጋራ ኣትኪኽኩም ትፈልጥ ዶ?	እወ 1  አይሓ 2 መልሱ ኣይሓ- እንተኾይኑ ናብ ሕቶ T9 ሕለፍ	T6
31	መዓልታዊ ምትካኽ ሽጋራ ኣብ ክንደይ ዓመትኩም(ዕድመኹም) ጠጠው ኣቢልኩምዎ?	ዕድመ (ብዓመት) <input type="text"/>  መልሱ እንተተፈሊጡ ናብ ሕቶ T9 ሕለፍ ኣይፈልጥን 77	T7
32	መዓልታዊ ምትካኽ ሽጋራ ጠጠው ኣብእተብሉ ክንደይ እዋን ገይሩ? (ሓደ መልሲ ጥራሕ ፀሓፍ ንሰለስተኛም ምምላስ ኣየድልን)  ኣይፈልጥን 77	ብዓመት <input type="text"/> እንተተፈሊጡ ናብ ሕቶ T9 ሕለፍ	T8a
		ወይ ብወርሒ <input type="text"/> እንተተፈሊጡ ናብ ሕቶ T9 ሕለፍ	T8b
		ወይ ድማ ብሰሙን <input type="text"/>	T8c
33	ኣብዚሓይ እዋን ዝኾነ ዓይነት ዘይተክኽ ሽጋራ ንኣብነት ዝሕየኽ ወይድማ ዝንሳዕ ሽጋራ ትጥቀም ዶ? (ምልክት ብምርኣይ ኣረጋግፅ) (ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)	እወ 1  አይሓ 2 ኣይሓ-እንተኾይኑ ናብ T12 ዘሊልኩም ሕተቱ	T9
34	ኣብዚሓይ እዋን ዝኾነ ዓይነት ዘይተክኽ ሽጋራ ንኣብነት ዝሕየኽ ወይ ድማ ዝንሳዕ ሽጋራ መዓልታዊ ትጥቀሙ ዶ?	እወ 1 2 ኣይሓ- እንተኾይኑ ኣይሓ- ናብ T12 ዘሊልኩም ሕተቱ	T10
35	ኣብዞም ዝስዕቡ ዓይነታት ሽጋራ ብማእኸላይ ኣብ መዓልቲ ክንደይ ግዘ ትጥቀሙ(ትወስዱ)? (ንሕድሕድ መልሲ ፀሓፍ፣ ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)	ብኣፍ ዝንሳዕ <input type="text"/>	T11a
		ብኣፍንጫ ዝንሳዕ <input type="text"/>	T11b
		ዝሕየኽ ሽጋራ <input type="text"/>	T11c

	ኣይፈልጥን 77	Betel, quid <input type="checkbox"/>	T11d
		ካሊኦ <input type="checkbox"/> እንተሃልዩ ናብ T11 ሕለፍ፣ እንተዘይሃልዩ ናብ T13 ዘሊልኩም ሕተቱ	T11e
		ካሊኦ (ይገለፅ) <input type="checkbox"/> ናብ T13 ዘሊልኩም ሕተቱ	T11other
36	ቅድም እንትብል ዝኾነ ዓይነት ዘይተክኸ ውፅኢት ሽጋራ ንኣብነት ዝሕየኸ ወይ ድማ ዝንሳዕ ሽጋራ መዓልታዊ ተጠቂምኩም ትፈልጥ ዶ?	እወ 1 ኣይፋሉ 2	T12
37	ኣብዝሓለፈ 7ተ መዓልቲታት (ሓደ ሰሙን) ዝኾነ ሰብ ንስኹም እናሃለኹም ኣብ መንበሪ ዝኾኹም ክንደይ እዋን ሽጋራ ኣትኪኹ ይፈልጥ?	በዝሒ መዓልቲ <input type="checkbox"/> ኣይፈልጥን 77	T13
38	ኣብዝሓለፈ 7ተ መዓልቲታት (ሓደ ሰሙን) ኣብ ስራሕ ቦታኹም (ኣብ ውሽጢ ክፍሊ) ብቐረባ ንስኹም እናሃለኹም ዝኾነ ሰብ ክንደይ እዋን ሽጋራ ኣትኪኹ ይፈልጥ?	በዝሒ መዓልቲ <input type="checkbox"/> ኣይፈልጥን ወይ ኣብ ፀቢብ ቦታ ኣይሰርሕን 77	T14

ቀንዲ: ምጥቃም ኣልኮላዊ መስተ (CORE: Alcohol Consumption)			
ምጥቃም ኣልኮላዊ መስተ ዝምልከት ሕቶታት			
	ሕቶታት (Question)	መልሲ ተሓታቲ (Response)	ኮድ
39	ኣብ መዋእልኩም ዝኾነ ዓይነት ኣልኮላዊ መስተ	እወ 1	A1a

	<p><u>ንኣብነት</u></p> <p>ቢራ፣ወይኒ ፣ ስዋ፣ ሚያስ፣ኣረቂ ወዘተ ስቲኹም ትፈልጡ ዶ?</p> <p>(ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)</p>	<p>ኣይፋሉ 2</p> <p>ኣይፋሉ እንተኾይኑ ናብ D1 ዘሊልኩም ሕተቱ</p>	
40	<p>ኣብዝሓለፈ 12 ኣዋርሕ ዝኾነ ዓይነት ኣልኮላዊ መስተ ስቲኹም ትፈልጡ ዶ?</p>	<p>እወ 1</p> <p>ኣይፋሉ 2</p> <p>ኣይፋሉ እንተኾይኑ ናብ D1 ዘሊልኩም ሕተቱ</p>	A1b
41	<p>ኣብዝሓለፈ 12 ኣዋርሕ እንተነኣሰ ሓደ ዓይነት ኣልኮላዊ መስተ ኣብ ክንደይ እዋን ትሰትዩ ነይርኩም?</p> <p>(ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)</p>	<p>መዓልታዊ 1</p> <p>5-6 መዓልቲ ኣብ ሰሙን 2</p> <p>1-4 መዓልቲ ኣብ ሰሙን 3</p> <p>1-3 መዓልቲ ኣብ ወርሒ 4</p> <p>ኣብወርሒ ትሕቲ ሓደ ግዜ 5</p>	A2
42	<p>ኣብዝሓለፈ 30 መዓልቲታት (ሓደ ወርሒ) ኣልኮላዊ መስተ ወሲድኩም ትፈልጡ ዶ?</p>	<p>እወ 1</p> <p>ኣይፋሉ 2</p> <p>ኣይፋሉ እንተኾይኑ ናብ D1 ዘሊልኩም ሕተቱ</p>	A3
43	<p>ኣብዝሓለፈ 30 መዓልቲታት (ሓደ ወርሒ) እንተነኣሰ ሓደ ዓይነት ኣልኮላዊ መስተ ክንደይ ግዜ ስቲኹም ትፈልጡ?</p>	<p>በዝሒ ግዜ <input type="checkbox"/></p> <p>ኣይፈልጥን 77</p>	A4
44	<p>ኣብዝሓለፈ 30 መዓልቲታት ኣልኮላዊ መስተ እንትትወስዱ ብማእኸላይ ብሓደ እዋን (ሓደ ግዜ መሸታ) ክንደይ ዘኣክል መጠን መስተ ስቲኹም ትፈልጡ?</p> <p>(ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)</p>	<p>በዝሒ <input type="checkbox"/></p> <p>ኣይፈልጥን 77</p>	A5
45	<p>ኣብ ዝሓለፈ 30 መዓልቲታት ብበዝሒ ኣልኮላዊ መስተ ዝሰተኹሙሉ ዕለት ዘኪርኩም ኹሉ ዓይነት መስተ ሓዊስካ/ደሚርካ ክንደይ ዝኣክል መጠን ስቲኹም?</p>	<p>ዝለዓለ መጠን ብቁዕሪ <input type="checkbox"/></p> <p>ኣይፈልጥን 77</p>	A6
46	<p>ኣብ ዝሓለፈ 30 መዓልቲታት ክንደይ ግዜ ካብ 5-6 ብመለክዒ ወይ ልዕሊኡ (ንተባዕትዮ) ካብ 4 -5 ብመለክዒ ወይ ልዕሊኡ (ንደቂኣንስትዮ) ብሓደ</p>	<p>በዝሒ ግዜ <input type="checkbox"/></p> <p>ኣይፈልጥን 77</p>	A7

	ግዘ ኣልኮላዊ መስተ ሰቲኹም ትፈልጡ?			
<b>ዝቐፀለ: ምጥቃም ኣልኮላዊ መስተ (EXPANDED: Alcohol Consumption)</b>				
47	ኣብ ዝሓለፈ 30 መዓልቲታት ኣልኮላዊ መስተ እንትትሰትዩ ክንደይ እዋን ምስምግቢ ወሲድኩምዎ? ቁርሲ ምብላፅ እንተይሓወስካ	ኩሉሻብ ምስ ምግቢ	1	A8
		ሓልሓሊፉ ምስ ምግቢ	2	
		ዉሱን እዋን ምስ ምግቢ	3	
		ኩሉሻብ በዘይ ምግቢ	4	
48	ኣብ ዝሓለፉ 7ተ መዓልቲታት በብመዓልቲ/መዓልታዊ ክንደይ ዝኣክል ኣልኮላዊ መስተ <b>ብመለክዒ</b> ሰቲኹም?  (ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)  ኣይፈልጥን 77	ሰኑይ	___	A9a
		ሰሉስ	___	A9b
		ረቡዕ	___	A9c
		ሓሙስ	___	A9d
		ዓርቢ	___	A9e
		ቀዳም	___	A9f
		ሰንበት	___	A9g

**ቀንዲ: ኣመጋግባ ምግቢ ( CORE: Diet)**

ዝቐፀሉ ሕቶታት ብዛዕባ ኩሉሻዕ እትምገብዎ ፍረምረን ኣሕምልቲን ዝምልከት እዩ። ኣብከባቢኹም ዝርከቡ ፍረምረን ኣሕምልቲን ምስሊ ዝሓዘ ካርዲ ስነ መዓዛ ከርእየኩም እዩ። ሕድሕድ ምስሊ ኣብሓደ ማእዲ ትምገብዎ መጠን ዘመላኸተ እዩ። ንሰኹም ናይ ዝሓለፈ ዓመት ብዝግባእ እትዝክርዎ ሰሙን መሰረት ገይርኩም ነዞም ሕቶታት መልሱ።

ሕቶታት (Question)	መልሲ ተሓታቲ (Response)	ኮድ
49 ኣብ ሰሙን ክንደይ መዓልቲ ፍረ ምረ ትበልዑ? (ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)	በዝሓ መዓልቲ ___ ኣይፈልጥን 77  ባዶ መዓልቲ እንተኸይኑ ናብ D3 ኺድ	D1

50	<p>አብዞም ዝተመገብኩሙሉም መዓልቲታት ብማእኸላይ ኣብ መዓልቲ ክንደይ ግዘ ፍሬ ምሬ ተመጊብኩም? (ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)</p>	<p>ኣብ ሓደ መዓልቲ ዝተመገብኩሙሉ በዝሒ ግዘ <input type="text"/></p> <p>ኣይፈልጥን 77</p>	D2
51	<p>ኣብ ሰሙን ክንደይ መዓልቲ ኣሕምልቲ ትበልዑ? (ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)</p>	<p>በዝሒ መዓልቲ <input type="text"/> ባዶ መዓልቲ እንተኾይኑ ናብ ኣይፈልጥን 77 D5 ኺደ</p>	D3
52	<p>አብዞም ዝተመገብኩሙሉም መዓልቲታት ኣብ መዓልቲ ክንደይ ግዘ ኣሕምልቲ ተመጊብኩም? (ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)</p>	<p>ዝተመገብኩሙሉ በዝሒ ግዘ <input type="text"/></p> <p>ኣይፈልጥን 77</p>	D4

**ዝቐፀለ : ስን መዓዛ (EXPANDED: Diet)**

53	<p>መብዛሕትኡ እዋን ኣብ ገዛኹም ምግብ ንምብሳል እትጥቀሙሉ ዓይነት ዘይቲ ወይ ቅብኣት እንታይ እዩ? (ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ) (ሓደ ጥራሕ ምሬፅ)</p>	<table border="0"> <tr> <td>ዘይቲውፅኢት ኣትክልቲ</td> <td>1</td> <td></td> </tr> <tr> <td>ስብሒ</td> <td>2</td> <td></td> </tr> <tr> <td>ጠስሚ</td> <td>3</td> <td></td> </tr> <tr> <td>ማርጋሪን</td> <td>4</td> <td></td> </tr> <tr> <td>ካሊኦ</td> <td>5</td> <td>ካሊኦ እንተሃልዩ ናብ ሕቶ D5 ሕለፍ</td> </tr> <tr> <td>ኣዘውቲሬ ዝጥቀሙ ነገር</td> <td></td> <td></td> </tr> <tr> <td>የለን</td> <td>6</td> <td></td> </tr> <tr> <td>ምንም ኣይጥቀምን</td> <td>7</td> <td></td> </tr> <tr> <td>ኣይፈልጥን</td> <td>77</td> <td></td> </tr> </table>	ዘይቲውፅኢት ኣትክልቲ	1		ስብሒ	2		ጠስሚ	3		ማርጋሪን	4		ካሊኦ	5	ካሊኦ እንተሃልዩ ናብ ሕቶ D5 ሕለፍ	ኣዘውቲሬ ዝጥቀሙ ነገር			የለን	6		ምንም ኣይጥቀምን	7		ኣይፈልጥን	77		D5
		ዘይቲውፅኢት ኣትክልቲ	1																											
ስብሒ	2																													
ጠስሚ	3																													
ማርጋሪን	4																													
ካሊኦ	5	ካሊኦ እንተሃልዩ ናብ ሕቶ D5 ሕለፍ																												
ኣዘውቲሬ ዝጥቀሙ ነገር																														
የለን	6																													
ምንም ኣይጥቀምን	7																													
ኣይፈልጥን	77																													
<p>ካሊኦ <input type="text"/></p>	D5other																													

54	<p>ኣብ ገዛኹም ዘይተዳለዎ ምግብ (ኣብ ገዛኹም ወፃኢ) ብማእኸላይ ኣብ ሰሙን ክንደይ ግዘ ትምገቡ? ብሓፈሻ ቁርሲ ምሳሕን ድራርን ዝሓወሰ</p>	<p>በዝሒ ግዘ <input type="text"/></p> <p>ኣይፈልጥን 77</p>	D6
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**ቀንዲ : ንጥፈታት ኣካላዊ ምንቅስቃስ (CORE: Physical Activity)**

ብምቕፃል ብዝግባእ እትገክርዎ ሓደ ሰሙን መሰረት ብምግባር ኣብቲ ሰሙን ዝተፈላለዩ ንጥፈታት ኣካላዊ ምንቅስቃስ እናገበርኩም ዘሕለፍክሙዎ እዋን ዝምልከት ክሓተኩም እየ። ንሱም ዋላ እኻ ንጡፍ ኣካላዊ ምንቅስቃስ ዝገብር ኣይኮንኩን ኢልኩም እንተሓሰብኩም ነቶም ሕቶታት ብዝግባእ ክትምልሱ ፈትኑ።

ፈለማ ስራሕ እናሰራሕኹም እተሕልፍዎ ግዘ ዘክሩ። እቲ ስራሕ ዝክፈለኩም ወይ ድማ ብነፃ እትሰርሕዎ ስራሕ ክኸውን ይክእል እዩ ንኣብነት ምንግብ መፃሕፍቲ/ስልጠና ፣ ናይ ገዛ ስራሕ፣ እክሊ ምዕፃድ/ምእካብ ፣ ማሕረስ ፣ ፃህያይ ፣ ዓሳ ምዝፋፍ ወይ ድማ ሃደን፣ ምትእልላሽ ስራሕ ዝሓወሰ ክኸውን ይክእል። ከምዚ ሕቶታት እንትትምልሱ ኣብግምት ክተእትውዎ ዝግባእ:

'ብጣዕሚ ብርቱዕ ንጥፈታት ኣካላዊ ምንቅስቃስ' ዝበሃሉ ከቢድ ጉልበት ዝሓቱ ንጥፈታት ኣካላዊ ምንቅስቃስ ኮይኖም ልዑል ትርጉም ልቢን ምስትንፋስን ከስዕቡ ዝክእሉ እዮም። 'ማእኸላይ ንጥፈታት ኣካላዊ ምንቅስቃስ' ዝበሃሉ ድማ መጠናዊ ጉልበት ዝሓቱ ንጥፈታት ኣካላዊ ምንቅስቃስ ኮይኖም ዉሱን/ማእኸላይ ትርጉም ልቢን ምስትንፋስን ከስዕቡ ዝክእሉ እዮም።

ሕቶታት (Question)	መልሲ ተሓታቲ (Response)	ኮድ
<b>ኩነታት ስራሕ (Work)</b>		

55	<p>ስራሕኹም ኣዝዩ ኣድካሚ ናይ ጉልበት ስራሕ ከም ወሰኽ ትርጉም ልቢን እስትንፋስን ዘስዕብ ድዩ?</p> <p><u>ንኣብነት</u> ከምከቢደ ሸኽሚ ምሽካም ፣ ክብደት ምልዓል ወይ 10 ደቂቓ ዘኣክል ብቐፃልነት ምኹዓት ማዕረ እዚ እም ዘድክም ኩነታት ኣለዎ ደ? (ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)</p>	<p>እወ 1</p> <p>ኣይፋሉ 2</p> <p>ኣይፋሉ እንተኸይኑ ናብ P 4 ኺድ</p>	P1
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56	አብሰሙን ክንደይ መዓልቲ ኣገዞ ኣድካሚ ናይ ጉልበት ስራሕ ከምስሩዕ ስራሕኹም ገደርኩም ትሰርሑ?	በዘሒ መዓልቲ <input type="checkbox"/>	P2
57	አብ መዓልቲ ንክንደይ ሰዓታት ኣገዞ ኣድካሚ ናይ ጉልበት ስራሕ ትሰርሑ?	<input type="checkbox"/> ሰዓታት <input type="checkbox"/> ደቂቓ	P3 (a-b)
58	ስራሕኹም ማእኸላይ ኣድካሚ ናይ ጉልበት ስራሕ ከምትርግታ ልቢን እስትንፋስን ዝውስኽ ድዩ? <b>ንኣብነት</b> ክንዲ ፍኹስ ዘበለ ክብደት ምሽካም ወይ ንዓሰርተ ደቂቓ ዘኣክል ዞግዞግታ ጉያ ማዕረ ኩነታት ድኻም ኣለዎ ዶ ? (ገላጺ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)	እወ 1 ኣይፋሎ 2 ኣይፋሎ እንተኾይኑ ናብ ሕቶ P 7ሕለፍ	P4
59	አብሰሙን ክንደይ መዓልቲ ማእኸላይ ዘድክም ናይ ጉልበት ስራሕ ከም ስሩዕ ስራሕኹም ገደርኩም ትሰርሑ ዶ?	በዘሒ መዓልቲ <input type="checkbox"/>	P5
60	አብ መዓልቲ ንክንደይ ሰዓታት ብማእኸላይ ዘድክም ናይ ጉልበት ስራሕ ትሰርሑ ?	<input type="checkbox"/> ሰዓታት <input type="checkbox"/> ደቂቓ	P6 (a-b)
<b>ካብ ቦታ ናብ ቦታ ዝግበር ጉዕዞ (Travel to and from places)</b>			
ዝስዕቡ ሕቶታት ቅድም እንክብል ዝተሓበሩ ኣብ ስራሕ ቦታ ዝገበርክምዎም ንጥፈታት ኣካላዊ ምንቅስቓስ ኣየሓውስን :: ሓዘ ክሓተኩም ዝደሊ ድማ ብዛዕባ ካብ ቦታ ናብ ቦታ እትገብርዎ ምንቅስቓስ ዝምልከት ኾይኑ <b>ንኣብነት</b> ካብ ናብ ስራሕ ቦታ ቤት ሹቅ ፣ ዕዳጋ፣ ቤት ፀሎት ዝሓወሰ እዩ ::			
61	ካብ ቦታ ናብ ቦታ ብእግርኹም ወይ ድማ	እወ 1	P7

	ብብሽክሊታ እንተነሳሰ 310 ደቂቅ በዘይምቁራፅ ትጉዓዙ ዶ?	አይፋሉ 2 አይፋሉ እንተኾይኑ ናብ P 10ኺድ	
62	ካብ ቦታ ናብ ቦታ ብእግርኹም ወይድማ ብሽክሊታ እንተነሳሰ 310 ደቂቅ በዘይምቁራፅ ካብ ሰሙን ክንደይ መዓልቲ ትጉዓዙ?	በዘሒ መዓልቲ <input type="checkbox"/>	P8
63	ካብ መዓልቲ ብእግርኹም ወይድማ ብብሽክሊታ ንክንዳይ ግዘ ዘኣክል ትጉዓዙ?	<input type="checkbox"/> : <input type="checkbox"/> ሰዓት ደቂቅ	P9 (a-b)
<b>ቀንዲ: ንጥፊታት ኣካላዊ ምንቅስቃስ</b>			
መዘናግዒ ንጥፊታት (Recreational activities)			
ዝቐፅሉ ሕቶታት ኣቅዲምኩም ዝጠቐስኩምም ስራሕ እንክይሓወሰ ዝግበር ጉዕዞ እዩ። ሓዚ ስፖርታዊ ምንቅስቃስ ናኣካላዊ ብቐፅሎ ከምኡውን መዘናግዒ ንጥፊታት ዝምልከት ሕቶታት ክሓተኩም እዩ።			
64	ልዑል ወሰኽ ትርግታ ልቢን ምትንፋስ ዘስዕብ ዝኾነ ዓይነት ኣዝዩ ኣድካሚ ስፖርታዊ ምንቅስቃስ፣ መመሓየሺ ኣካላዊ ብቐፅሎ ወይ ድማ መዘናግዒ ንጥፊታት እንተነሳሰ 310 ደቂቅ በዘይምቁራፅ ትሰርሑ ዶ? (ገላጺ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)	እወ 1  አፋሉ 2 አይፋሉ እንተኾይኑ ናብ P 13 ሕለፍ	P10
65	ኣዝዩ ዘድክም ስፖርታዊ ምንቅስቃስ፣ መመሓየሺ ብቐፅሎ ሰውነት ወይ ድማ ንጥፊታት መዘናግዒ ኣብሰሙን ንክንደይ መዓልቲ ትሰርሑ?	በዘሒ መዓልቲ <input type="checkbox"/>	P11

66	<p>አዝዩ ዘድክም ስፖርታዊ ምንቅስቃሴ ፣መመሐየሺ ብቕዓት ሰውነት ወይ ድማ ንጥፈታት መዘናግዲ ኣብ መዓልቲ ንክንዳይ ሰዓታት ትሰርሑ?</p>	<p>ሰዓት : ደቂቅ  □□□ : □□□ ሰዓት ደቂቅ</p>	P12 (a-b)
67	<p>ዉሱን ምውሳኽ ትርግታ ልቢ፣ ምትንፋስ ከምኡውን ማእኸላይ ድኻም ከምፅእ ዝክእል ዝኾነ ዓይነት ስፖርታዊ ምንቅስቃሴ ፣ መመሐየሺ ብቕዓት ሰውነት ወይ ድማ መዘናግዲ ንጥፈታት [ከም ምዝዋር ብሽክለታ፣ ሓመሳ፣ ሾሊቦል] እንተነኣስ ን10 ደቂቅ በዘይምቁራፅ ትሰርሑ ዶ? (ገላጺ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)</p>	<p>እወ 1  ኣፋሉ 2 ኣይፋሉ እንተኾይኑ ናብ P 16 ሕለፍ</p>	P13
68	<p>ማእኸላይ ድኻም ዘስዕብ ስፖርታዊ ምንቅስቃሴ ፣ መመሐየሺ ብቕዓት ሰውነት ወይ ድማ ንጥፈታት መዘናግዲ ኣብሰሙን ክንደይ መዓልቲ ትሰርሑ?</p>	<p>በዝሒ መዓልቲ □</p>	P14
69	<p>ማእኸላይ ድኻም ዘስዕብ ስፖርታዊ ምንቅስቃሴ ፣ መመሐየሺ ብቕዓት ሰውነት ወይ ድማ ንጥፈታት መዘናግዲ ኣብ መዓልቲ ንክንደይ ሰዓታት ትሰርሑ?</p>	<p>ሰዓት : ደቂቅ  □□□ : □□□ ሰዓት ደቂቅ</p>	P15 (a-b)

**ዝቐፀለ: ንጥፈታት ኣካላዊ ምንቅስቃሴ (EXPANDED: Physical Activity)**

**ምስ ርጉዕ ዕረፍቲ ኣካላት ዘድሀበ ባህሪያት (Sedentary behavior)**

ዝቕፀል ሕቶ ብዛዕባ ኣብ ስራሕ ቦታ ኮፍ ኢልኩም ወይ ድማ ተጋዲምኩም ዕረፍቲ ምውሳድ፣ ኣብ መንበሪ ዝህ ኮፍ ምባል፣ ኣብ ቦታ ናብ ቦታ ምንቅስቃሴ ፣ ምስ ኣዕርኽትኻ ወይ ድማ ኣብ ወምበር ኮፍ ኢልኻ ዝዘ ምሕላፍ፣ ብመኪና / ባቡር ምጉዳዝ ፣ ኮፍ ኢልኻ ምንባብ /ካርታ ምጭዋት/ተለብኻርን ምርኣይ ዝምልከት እዩ ። ኾይኑ ግና ደቂቅኩም እተሕልፎ ዝዘ ኣየሓውስን። (ገላጺ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)

70	ኩሉ ግዘ ኣብ መዓልቲ ኮፍ ኢልኩም ወይ ድማ ተጋዲምኩም ክንደይ እዋን ተሕልፉ?	ሰዓት : ደቂቅ <u>    </u> : <u>    </u> ሰዓት ደቂቅ	P16 (a-b)
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**ዝቕጠል: ምቕሓም ጫት (Expanded : Khat Chewing)**

**ዝቕጠሉ ሕቶታት ድማ ብዛዕባ ምቕሓም ጫት ዝምልክት እዩ። ጫት ዓይነት ተኽሊ እንትኸውን ብበዝሒ ኣብ ሰሜን ኣፍሪካ ዝባቕል እዩ። ናይዚ ተኽሊ ላንቃን ቆዕሊን ብምሕደኽ ኣእምሮ ንምንቕቓሕን ንምሕንጻን ይጠቅም**

ሕቶታት (Question)		መልሲ ተሓታቲ (Response)	Code
71	ጫት ቕሓምኩም ትፈልጡ ዶ? (ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ወይድማ መርኣይ ብምጥቃም ኣገናዝቡ)	እወ 1 ኣይፋሉ 2 ኣይፋሉ እንተኾይኑ ናብ MS1 ሕለፍ	k1a
72	ኣብ ዝሓለፈ 12 ኣዋርሕ ጫት ቕሓምኩም ትፈልጡ ዶ?	እወ 1 ኣይፋሉ 2 ኣይፋሉ እንተኾይኑ ናብ MS1 ሕለፍ	k1b
73	ኣብ ዝሓለፈ 12 ኣዋርሕ ኣብ ክንደይ እዋን ጫት ትቕሕሙ ነይርኩም? (መግረፂ መልሲ ኣንብቡሎም :: ክምኡውን ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)	መዓልታዊ 1 ሓደ ግዘ ኣብ ሰሙን 2 ሓደ ግዘ ኣብ ወርሒ 3 ብጣዕሚ ወሱን እዋናት 4	k2
74	ኣብ ዝሓለፈ 30 መዓልቲታት ጫት ቕሓምኩም ትፈልጡ ዶ?	እወ 1 ኣይፋሉ 2 ኣይፋሉ እንተኾይኑ ናብ MS1 ሕለፍ	K3
75	ኣብ ዝሓለፈ 30 መዓልቲታት ኣብ ክንደይ እዋን ጫት ትቕሕሙ ነይርኩም?	በዝሒ ግዘ <u>    </u> ኣይፈልጥን 77	K4
76	ኣብ ዝሓለፈ 30 መዓልቲታት ጫት ኣብዝቕሓምኩሙሎም እዋናት ጫትን ሽጋራን ብሓባር ክንደይ ግዘ ወሲድኩም ትፈልጡ?	ኩሉሻብ 1 ሓሊፉ ሓሊፉ 2 ብጣዕሚ ወሱን እዋን 3 ፈቒመ ኣይወሰድኩን 4	K5

77	<p>ኣብ ዝሓለፈ 30 መዓልቲታት ጫት ድኩሪ ምቕሓምኩም ንድቃስ (ጨብሲ) ብዝብል ክንደይ እዋን ኣልኮላዊ መስተ ወሲድኩም ትፈልጡ?</p> <p>ኣይፈልጥን 77</p>	<p>ኩሎሻብ 1</p> <p>ሓሊፉ ሓሊፉ 2</p> <p>ብጣዕሚ ወሲን እዋን 3</p> <p>ፈፂመ ኣይወሰድኩን 4</p>	K6
78	<p>ኣብ ዝሓለፈ 30 መዓልቲታት ጫት እንትትቅሕሙ ክንደይ እዋን ምስሸሻ ወይ ድማ ክልኦት መነቓቓሒ ወሲድኩም ትፈልጡ?</p>	<p>ኩሎሻዕ 1</p> <p>ሓሊፉ ሓሊፉ 2</p> <p>ብጣዕሚ ወሲን እዋን 3</p>	K7
79	<p>ኣብ ዝሓለፈ 7ተ መዓልቲታት መዓልታዊ ጫት ትቕሕሙ ዶ ነይርኩም ?</p>	<p>ሰኑይ      እወ ___      ኣይፋሉ ___</p> <p>ሰሉስ      እወ ___      ኣይፋሉ ___</p> <p>ረቡዕ      እወ ___      ኣይፋሉ ___</p> <p>ሓሙስ    እወ ___      ኣይፋሉ ___</p> <p>ዓርቢ      እወ ___      ኣይፋሉ ___</p> <p>ቀዳም     እወ ___      ኣይፋሉ ___</p> <p>ሰንበት    እወ ___      ኣይፋሉ ___</p>	K8a-k8g

**Mental Stress (Optional) Using SRQ-20 questionnaire (ስነኣእምሮኣዊ ጭንቂ)**

	SRQ20	እወ	ኣይፋሉ	ኮድ
80	ብተደጋጋሚ ርእሲ ሕማም ኣለኩም ዶ?			MS1
81	ዘለኩም ሽውሃት ምግቢ ትሑት ድዩ?			MS2
82	ድቃስ የኣብዩኩም ዶ?			MS3

83	ብቸሊሉ ፍርሐ ይስመወኩም ደ?			MS4
84	ኢድኩም ይንቅጥቀጥ ደ?			MS5
85	ናይ ምጭናቕ ወይ ድማ ምንዳድ ስምዒት ይስመወኩም ደ?			MS6
86	ምግቢ ምሕቻቕ የዕግመልኩም ደ?			MS7
87	ንፁር ሓሳብ ንክትሓስቡ ትፀገሙ ደ? ወይ ድማ ሓሳብኩም ሰንፈላል ደ ይብል?			MS8
88	ሕጉስ ኣይኮንኩን ኢልኩም ደ ትሓስቡ?			MS9
89	ካብ መጠን ንላዕሊ ትብክዩ ደ?			MS10
90	ብሓፈሻ ዕለታዊ ተግባርኩም ዘየሕጉስ ኮይኑ ደ ትረክብዎ?			MS11
91	ውሳኔ ንመሃብ ትፀገሙ ደ			MS12
92	ናይ ስራሕ ውዕሎኹም ኣፀጋሚ ድዩ?			MS13
93	ንሂወትኩም ጠቐምቲ ዝኾኑ ነገራት ምስኣልኡት ሰባት ንክይትዛተዩ ትፀገሙ ደ?			MS14
94	ብዝኾኑ ነገራት ዘይምዕጋብ (ዘየሕጉስ) ኮይኑ ደ ይስመወኩም?			MS15
95	ንባዕልኹም ዘይረብሕ ሰብ ዝብል ስምዒት ይስመወኩም ደ?			MS16
96	ኣብ ሂወትኩም ተስፋ ምቕራዕ ይስመወኩም ደ?			MS17
97	በዘይምቕራዕ ድኻም ሰውነት ይስመወኩም ደ?			MS18
98	ክብድኹም ዘይስሩዕ ስሚዒት ይስመወኩም ደ?			MS19
99	ብቸሊሉ ድኻም ይስመወኩም ደ?			MS20

**ቐንዳ: ድሕረ ባይታ ልዑል ፀቕጢ ደም (CORE: History of Raised Blood Pressure)**

ስቶታት Question	መልሲ ተሓታቲ Response	ኮድ
100   መጠን ፀቕጢ ደምኩም ብሰብሞያ ጥዕና	እወ 1	H1

	(ሐኪም/ካልኦት) ተለኪዕኹም ትፈልጡ ደ?	አይፋሉ 2 አይፋሉ-እነተኾይኑ ናብ H6 ሕለፍ	
101	አብዝኾነ እዋን ልዑል ፀቕጢ ደም ከምዘለኩም ብሰብጥዎ ዋዕና (ሐኪም/ካልኦት) ተነገሩኩም ይፈልጥ ደ?	እወ 1 አይፋሉ 2 አይፋሉ-እነተኾይኑ ናብ H6 ሕለፍ	H2a
102	አብዝሓለፈ 12 አዋርሕ ልዑል ፀቕጢ ደም ከምዘለኩም ብሰብጥዎ ዋዕና (ሐኪም/ካልኦት) ተነገሩኩም ይፈልጥ ደ?	እወ 1 አይፋሉ 2	H2b
<b>ዝቐፀለ: ድሕረ ባይታ ልዑል ፀቕጢ ደም (EXPANDED: History of Raised Blood Pressure)</b>			
አብዚሓለፈ እዋን ልዑል ፀቕጢ ደም ንምቁፅባር ብሰብጥዎ ዋዕና (ሐኪም/ካልኦት) ዘድሊ ምኽሪ ወይድማ ክትትል ሕክምና ትረኽቡ ደ?			
103	አብዝሓለፈ 2ተ ሰሙን ዝወሰድክሙዎ አፋውስ እንተሃልዩ?	እወ 1 አይፋሉ 2	H3a
	ትወስድዎ ጨው ዓቕን ንምንካይ ግልጋሎት ምኽሪ ረኪብኩም ደ?	እወ 1 አይፋሉ 2	H3b
	ክብደትኩም ንምንካይ ዝተውሃበኩም ግልጋሎት ምኽሪ ወይድማ ሕክምና ኣሎ ደ?	እወ 1 አይፋሉ 2	H3c
	ምትካኽ ሽጋራ ጠጠው ንክትብሉ ዝተውሃበኩም ግልጋሎት ምኽሪ ወይ ድማ ሕክምና እንተሃልዩ?	እወ 1 አይፋሉ 2	H3d
	ንጥፈታት ኣካላዊ ምንቅስቃስ ንክትጅምሩ ወይ ድማ ኣጠናኺርኩም ንክትቅፅሉ ዝተውሃበኩም ግልጋሎት ምኽሪ?	እወ 1 አይፋሉ 2	H3e
	ልዑል ፀቕጢ ደም (ሃይፐርተንሽን) ዝምልከት ኣብ ባህላዊ ሕክምና ተሓኪምኩም ትፈልጡ ደ?	እወ 1 አይፋሉ 2	H4
105	አብዚሓለፈ እዋን ልዑል ፀቕጢ ደም	እወ 1	H5

	<p>ንምፍዋስ ትወስድዎ ዝኾነ ዓይነት ቆይታ ወይ ድማ ባህላዊ ኣፋውስ ኣሎ ዶ?</p>	<p>ኣይፋሉ 2</p>	
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ቐንዲ : ድሕረ ባይታ ሕማም ሽኩር (CORE: History of Diabetes)			
	ሕቶታት Question	መልሲ ተሓታቲ Response	ኮድ
106	<p>ኣብዝኾነ እዋን መጠን ሽኩር ኣብደምኩም ብሰብሞያ ጥዕና (ሓኪም/ካልኦት) ተዓቂንኩምዎ ትፈልጡ ዶ ?</p>	<p>እወ 1 ኣይፋሉ 2 ኣይፋሉ እነተኾይኑ ናብ M1 ሕለፍ</p>	H6
107	<p>ኣብዝኾነ እዋን ሰብሞያ ጥዕና (ሓኪም/ካልኦት) ልዑል መጠን ሽኩር ኣብደምኩም ከምዘሎ ነገረሙኹም ይፈልጡ ዶ ?</p>	<p>እወ 1 ኣይፋሉ 2 ኣይፋሉ እነተኾይኑ ናብ M1 ሕለፍ</p>	H7a
108	<p>ኣብዝሓለፈ 12 ኣዋርሕ ብሰብሞያ ጥዕና (ሓኪም/ካልኦት) ልዑል መጠን ሽኩር ኣለኩም ተባሂሉ ተነገሩኩም ይፈልጥ ዶ?</p>	<p>እወ 1 ኣይፋሉ 2</p>	H7b

ዝቐፀለ: ድሕረ ባይታ ሕማም ሽኩር (EXPANDED: History of Diabetes)			
109	<p>ኣብዚሓዚ እዋን ልዑል መጠን ሽኩር ንምቁፅፅር ካብዞም ዝስዕቡ ግልጋሎት ሕክምና ወይ ድማ ምኽሪ ብሰብሞያ ጥዕና (ሓኪም/ካልኦት) ይግበረልኩም ዶ?</p>		
	<p>ኢንሱሊን ትወስዱ ዶ?</p>	<p>እወ 1 ኣይፋሉ 2</p>	H8a
	<p>ኣብዝሓለፈ 2ተ ሰሙን ዝወሰድክምዎም ኣፋውስ (ክኒና) እንተሃልዩ?</p>	<p>እወ 1 ኣይፋሉ 2</p>	H8b
	<p>ብፋሉይ ዝተኣዘዘ ምግብ እንተሃልዩ?</p>	<p>እወ 1</p>	H8c

		ካይፋሉ 2	
	ክብደት ንምቕናስ ዝተውሃበኩም ግልጋሎት ምክሪ ወይ ድማ ሕክምና እንተሃልዩ?	እወ 1 ካይፋሉ 2	H8d
	ምትካኽ ሽጋራ ንምግዳፍ ዝተውሃበ ግልጋሎት ምክሪ ወይ ድማ ሕክምና እንተሃልዩ?	እወ 1 ካይፋሉ 2	H8e
	ንጥፈታት ካካላዊ ምንቅስቃስ ንምጀማር ወይ ድማ ብዝበለፀ ንምጥንኻር ዝተውሃበ ምክሪ እንተሃልዩ?	እወ 1 ካይፋሉ 2	H8f
110	ሕማም ሽኮር ንምቁፅፃር ካብ ባህላዊ ሕክምና ተሓኪምኩም ትፈልጡ ዩ?	እወ 1 ካይፋሉ 2	H9
111	ኣብዚሓይዚ እዋን ሕማም ሽኮር ንምፍቕር ትወስድዎ ዝኾነ ዓይነት ቆላመዕሊ ወይ ድማ ባህላዊ ኣፋውስ ኣሎ ዩ?	እወ 1 ካይፋሉ 2	H10

**ብርኪ 2 ኣካላዊ ዓቕን (Physical Measurements)**

**ቀንዲ: ዓቕን ቁመትን ክብደትን ዝምልከት CORE: Height and Weight**

ሕቶታት Question	መልሲ ተሓታቲ Response	ኮድ
112 መፍለይ ቁፅሪ ቃለ መሕተት ዘካየደ ዝሰልጠነ በዓልጥያ	_____	M1
113 መፍለይ መዕቀኒ ናውቲ ክብደትን ቁመትን	ቁመት _____ ክብደት _____	M2a M2b
114 ዓቕን ቁመት	ብሴንቲሜትር (ሴሜ) _____	M3
115 ዓቕን ክብደት መመዘኒ ብመሳርሒ 666.6 እንትልካዕ ክንደይ እዩ?	ብኪሎግራም (ኪግ) _____	M4
116 <u>ንደቂ ኣንስትዮ ዝምልከት:</u> ነበሰ ፀር ዲኺ?	1 እወ እወ እንተኾይኑ ናብ M8 ኺድ ካይፋሉ 2	M5

**ቀንዲ: ዙርያ ማዕጥቕ (CORE: Waist)**

117	መፍለጫ ናውቲ መዕቀኒ ዙርያ ማዕጥኛ	_____	M6
118	መጠን ዙርያ ማዕጥኛ	ብሴንቲሜትር (ሴሜ) _____	M7
<b>ቀንዲ: ፀቕጢ ደም (CORE: Blood Pressure)</b>			
119	መፍለጫ ቁፅሪ ቃለ መሳተጥ ዘካየደ ሰብ	_____	M8
120	መፍለጫ ቁፅሪ ናውቲ መዕቀኒ ፀቕጢ ደም	_____	M9
121	ዝተጠቐምካዮ ዓቕን መዕቀኒ ፀቕጢ ደም (Cuff size used)	ትሑት 1 ማእኸላይ 2 ዓብዪ 3	M10
122	ቀዳማይ ውዕኪት ዓቕን ፀቕጢ ደም	ሲስቶሊክ (mmHg) _____	M11a
		ዳይስቶሊክ (mmHg) _____	M11b
124	ካልካይ ውዕኪት ዓቕን ፀቕጢ ደም	ሲስቶሊክ (mmHg) _____	M12a
		ዳይስቶሊክ (mmHg) _____	M12b
125	ሳልሳይ ውዕኪት ዓቕን ፀቕጢ ደም	ሲስቶሊክ (mmHg) _____	M13a
		ዳይስቶሊክ (mmHg) _____	M13b
126	ኣብዝሓለፈ ክልተ ሰሙን ልዑል ፀቕጢ ደም ንምቁፅፃር ብሰብሞያ ጥዕና (ኣኪም/ካልኦት) ዝተኣበዙ ኣፋውስ ወሲድኩም ትፈልጡ ዶ?	እወ 1  ኣይፋሉ 2	M14

<b>ዝቐፀለ: ዓቕን ዙርያ ጎሎን ትርግታ ልቢን (EXPANDED: Hip Circumference and Heart Rate)</b>			
127	መጠን ዙርያ ጎሎ	ብሴንቲሜትር (ሴሜ) _____	M15
128	ትርግታ ልቢ		
	ቀዳማይ ውዕኪት ዓቕን ትርግታ ልቢ	በዝሒ ትርግታ ልቢ ኣብ ደቂቕ _____	M16a
	ካልካይ ውዕኪት ዓቕን ትርግታ ልቢ	በዝሒ ትርግታ ልቢ ኣብ ደቂቕ _____	M16b
	ሳልሳይ ውዕኪት ዓቕን ትርግታ ልቢ	በዝሒ ትርግታ ልቢ ኣብ ደቂቕ _____	M16c

**ብርኪ 3 : ባዮ ኬሚካላዊ መለክዒታት (Biochemical Measurements)**

**ቀንዲ: ውዕኢት ዓቕን ሽኮር ኣብ ደም (CORE: Blood Glucose)**

ሕቶታት (Question)		መልሲ ተሓታቲ (Response)	ኮድ
129	ኣብዝሓለፈ 12 ሰዓታት በዘይካ ማይ ዝኾነ ዝብላዕ ወይ ዝስተ ምግብ ወሲድኩም ዶ ነይርኩም?	እወ 1 ኣይፋሉ 2	B1
130	መፍለዩ ቁዕሪ በዓልጥያ /ቴክኒሻን	_____	B2
131	መፍለዩ ቁዕሪ ናውቲ መለክዒ / መመርመሪ	_____	B3
132	ናሙና ደም ዝተወሰደሉ ሰዓትን ደቂቕን (ኣብ ውሽጢ 24 ሰዓታት)	_____ : _____ ሰዓታት ደቂቕ	B4
133	ውዕኢት ምርመራ መጠን ሽኮር ኣብ ደም ቅድሚያ ምግብ ምብላዕኹም :: ብዝተጠቐምኩምዎ ዓይነት ምርመራ መሰረት ምረፁ: mmol/l or mg/dl	mmol/l _____ . _____	B5
		mg/dl _____ . _____	
134	ልዑል መጠን ሽኮር ኣብ ደም ንምቁዕፃር ብሰብ ጥያ ጥዕና (ሓኪም/ካልኦት) ዝተኣዘዘ ኢንሱሊን ወይ ድማ ካልኦት ኣፋውስ ሎሚ ወሲድኩም ዶ?	እወ 1 ኣይፋሉ 2	B6

**ቀንዲ: መጠን ስብሒ ኣብደም (CORE: Blood Lipids)**

135	መፍለዩ ቁዕሪ ናውቲ መለክዒ	_____	B7
136	ሓፈሻዊ መጠን ኮለስትሮል፣ ብዝተጠቐምኩምዎ ዓይነት ምርመራ መሰረት ምረፁ: mmol/l or mg/dl	mmol/l _____ . _____	B8
		mg/dl _____ . _____	
137	ኣብ ዝሓለፈ ክልተ ሰሙን ልዑል መጠን ኮለስትሮል ንምቕናስ ብሰብ ጥያ ጥዕና (ሓኪም/ካልኦት) ዝተኣዘዙ ኣፋውስ ወሲድኩም ትፈልጡ ዶ ?	እወ 1 ኣይፋሉ 2	B9

**ዝቐፀለ: ትራይ ግላይሰሮልን ኤች.ዲ.ኤል ኮለስትሮል (EXPANDED:Triglycerides and HDL Cholesterol)**

138	ትራይ ግላይሰራይድ(Triglycerides)	mmol/l _____ . _____	B10
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	ብዝተጠቐምኩምዎ ዓይነት ምርመራ መሰረት ምረፁ: mmol/l or mg/dl	mg/dl <u>    </u> <u>    </u> <u>    </u> <u>    </u> . <u>    </u>	
139	ኤች.ዲ.ኤል ኮሌስትሮል (HDL Cholesterol)	mmol/l <u>    </u> . <u>    </u> <u>    </u> <u>    </u>	B11
	ብዝተጠቐምኩምዎ ዓይነት ምርመራ መሰረት ምረፁ: mmol/l or mg/dl	mg/dl <u>    </u> <u>    </u> <u>    </u> <u>    </u> . <u>    </u>	

**ቃለ መጠይቅ ላይ ላለው ፍልጠት፣ አመለካከትን ባህሪን ንዘይተመሓለፍቲ ሕማማት**

**(Questionnaire on KNOWLEDGE, ATTITUDES AND BEHAVIOURS SURVEY ON NON-COMMUNICABLE DISEASES)**

1. ሓፈሻዊ ፍልጠትን አመለካከትን ዝምልከት ንዘይተመሓለፍቲ ሕማማት (General Knowledge and Attitudes related to Non-Communicable Diseases (GK))												
ሕቶታት (Question)	መልሲ. (Response)			QN								
ብምቕጻል ኣብ ጥዕና ዘድሀቡ ሕቶታት ከሓተኩም እየ ብፍላይ ድማ ዘይተመሓለፍቲ ሕማማት ተባሂሎም ዝፍለጡ ሕማማት ትኹረት ዝገበረ እዩ። በዚ መሰረት ንስኹም ነዘም ዝስዕቡ ሕቶታት ሓቂ ወይ ጌጋ ወይ ድማ ኣይፈልጡን እናበልኩም መልሱለይ ።												
1	ዘይተመሓለፍቲ ሕማም ማለት ካብ ሰብ ናብ ሰብ ዘይመሓለፍ ሕማም ማለት እዩ?	ሓቂ 1 ጌጋ 2 ኣይፈልጡን 3			GK1K							
ዘይተመሓለፍቲ ሕማማት ማለት ናይ ሕማም ልቢ ፣ ሕማም ሽኮርን ካንሰርን ዝኣምሰሉ ሕማማት ሓባራዊ መፀውዒ እዩ። እዞም ሕማማት እዚኦም ካብሰብ ናብ ሰብ ዝመሓለፉ ኣይኮኑን ይኹን እምበር ብዝተፈላለዩ ምክንያታት ኣብነዊሕ እዮን ክረኣዩ ዝክእሉ እዮም። ስለዝኾነ ነዘም ዝስዕቡ ሕቶታት ብዝግባእ ተረዲእኹም ኣዝዩ ይሰማማዕ፣ ኣይሰማማዕን ፣ ይሰማማዕ ወይ ድማ ኣዝዩ ኣይሰማማዕን ብምባል መልሱ ሃቡሉ።												
2	ሓደጋ ዘይተመሓለፍቲ ሕማማት ካብ ተመሓለፍቲ ሕማማት ዝተሓተ እዩ	<table border="1"> <tr> <td>ኣዝዩ ኣይሰማማዕን</td> <td>ኣይሰማማዕን</td> <td>ይሰማማዕ</td> <td>ኣዝዩ ይሰማማዕ</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	ኣዝዩ ኣይሰማማዕን	ኣይሰማማዕን	ይሰማማዕ	ኣዝዩ ይሰማማዕ	1	2	3	4	GK2A	
ኣዝዩ ኣይሰማማዕን	ኣይሰማማዕን	ይሰማማዕ	ኣዝዩ ይሰማማዕ									
1	2	3	4									
3	ዘይተመሓለፍቲ ሕማማት ኣብ ኢትዮጵያ ወይ ካልኣይን ዝረኣዩ ሕማማት እዮም	<table border="1"> <tr> <td>ኣዝዩ ኣይሰማማዕን</td> <td>ኣይሰማማዕን</td> <td>ይሰማማዕ</td> <td>ኣዝዩ ይሰማማዕ</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	ኣዝዩ ኣይሰማማዕን	ኣይሰማማዕን	ይሰማማዕ	ኣዝዩ ይሰማማዕ	1	2	3	4	GK3A	
ኣዝዩ ኣይሰማማዕን	ኣይሰማማዕን	ይሰማማዕ	ኣዝዩ ይሰማማዕ									
1	2	3	4									

4	ካብዞም ዝስዕቡ ሕማማት ንባዕልኹም ኣብዚሓዚ እዋን ኣለኩም ወይድማ ኣብሕሉፍ ነይሩኩም ተባሂሉ ተነገሩኩም ይፈልጥ ዶ?	ልዑል ፀቕጢ ደም	1	እወ	1	ኣይፋሉ	2	GK4
		ሕማም ሽኮር	2	እወ	1	ኣይፋሉ	2	
		ልቢ ድኻም ወይ ስትሮክ	3	እወ	1	ኣይፋሉ	2	
		ካንሰር ጡብ	4	እወ	1	ኣይፋሉ	2	
		ካንሰር ቦሪ ማህፀን	5	እወ	1	ኣይፋሉ	2	
(ቱቂ 4ን 5ን ንደቂ ኣንስትዮ ጥራሕ ዝምልከት እዩ) ተሓታቲ መልሲ ንመሃብ ርግፀኛ እንተዘይኮይኑ ደገምኩም ሕተትዎ :: ብምቕፃል እንተዘይተረዳእዎ “ኣይፋሉ” ኢልኩም መልስዎ ::								
ብምቕፃል ብዛዕባ ሽጋራን ምትካኽን ዝምልከት ሕተታት ክሓተኩም እዩ.								
5	ብዛዕባ ምትካኽ ሽጋራ ዝምልከት ካብዞም ዝስዕቡ ንኣኹም ዝምልከት እንተሃልዩ ንገሩኒ.	ፈጊመ ኣትኪኽ ኣይፈልጥን	1	GK5P				
		ቅድም እንትብል የትክኽ ነይረ	2					
		ሓዚውን የትክኽ እዩ ግና መዓልታዊ ኣይኮነን	3					
		ሓዚውን መዓልታዊ የትክኽ እዩ	4					

3. ፍልጠት፣ ኣመለካኽታን ተግባርን ባህሪታት-ሓደጋ ተቐላፅነት ንዘይተመሓለፍቲ ሕማማት (KAP on NCD Behavioural Risk Factors (RF))							
ምጥቃም ሽጋራ (TOBACCO USE)							QN
6	ምትካኽ ሽጋራ ንጥዕናኹም ክጎድኣኩም ይኽእል ዶ?	እወ	1	RF1K			
		ኣይፋሉ	2 (ዝቕፅሉ 5 ሕተታት ዝለሎም)				
		ኣይፈልጥን	3 (ዝቕፅሉ 5 ሕተታት ዝለሎም)				
7	ምትካኽ ሽጋራ ኣብጥዕናኹም ጉድኣት ከብፀሕ እንተኾይኑ ክንደይ ዝኣክል በዝሒ ሽጋራ እንተተኪኽኩም እዩ? (ኣንብቡሎም)	ዝኾነ መጠን ሽጋራ ምትካኽ ንጥዕና ጉድኣት ኣለዎ	1	RF2A			
		እንተነኣሰ ኣብሰሙን ሓደ ግዜ እንተተኪኽኩ	2				
		መዓልታዊ እንተተኪኽኩ ጥራሕ ፀገም ጥዕና የስዕበልካ	3				
		ሓደ ባኮን ካብሉን ኣላዕሊን ሽጋራ ኣብ መዓልቲ እንተተኪኽኩ ጥራሕ ፀገም ጥዕና የስዕበልካ	4				
8	ምትካኽ ሽጋራ ሳምባኹም ክጎድኣኩም ይኽእል ዶ?	እወ	1	RF3K			
		ኣይፋሉ	2 (ዝቕፅል ዘሊልኩም ሕተቱ)				
		ኣይፈልጥን	3 (ዝቕፅል ዘሊልኩም ሕተቱ)				
9	መልሱ እወ እንተኾይኑ: “ጉድኣቱ ዉሱን ድዩ ወይ ከዓ ኣዝዩ ጉድኣት የብፀሕ ትብሉ?”	ጉድኣት ከብፀሕ	1	RF4A			
		ኣዝዩ ጉድኣት ከብፀሕ	2				
10	ምትካኽ ሽጋራ ንልብኹም ጉድኣት ከብፀሐልኩም ይኽእል ዶ?	እወ	1	RF5K			
		ኣይፋሉ	2 (ዝቕፅል ዘሊልኩም ሕተቱ)				
		ኣይፈልጥን	3 (ዝቕፅል ዘሊልኩም ሕተቱ)				
11	መልሱ እወ እንተኾይኑ: ዘስዕቦ “ጉድኣት ዉሱን ድዩ ወይ ከዓ ኣዝዩ ጉድኣት የብፀሕ ትብሉ?”	ጉድኣት ከብፀሕ	1	RF6A			
		ኣዝዩ ጉድኣት ከብፀሕ	2				

→→→ብምቕፃል ምስዘየትክኹ ሰባት ተሓዊስካ ሽጋራ ምትካኽ (a question about smoking near other people)

12	ሽጋራ ዘየትክኹ ሰባት ኣብጎናም ካልኦት ሰባት እናትክኹ ብኣባር ኮፍብምባሎም ጥዕነኦም ዝገብሩ ዶ ይመስለኩም?	<p style="text-align: right;">እው 1 ኣይፋሉ 2 ኣይፈልጥን 3</p>	RF7K
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*ኣብመንበሪ ገዛ ኾይንካ ሲጋራ ምትካኽ ዝምልከት እንታይ ይመስለኩም? (How about smoking at home)*

13	ኣብ መንበሪ ገዛኹም ሰባት ሽጋራ እንተትክኹም ቅሬታ ዶ ይስመዐኩም?	<p style="text-align: right;">ቅር ኣይብለኒን 1 ቅርይብለኒ እዩ ኾይኑግና ይፈቓደሎም እየ 2 ሽጋራ ከትክኹ ኣይፈቅድን 3</p>	RF8A
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*ኣብስራሕ ቦታ ኾይንካ ምትካኽ ሽጋራ? (What about work?)*

14	ኣብ ምትካኽ ሽጋራ ነፃ ዝኾነ ስራሕ ቦታ ምርካብ ክንደይ ዝኣክል ይጠቓመኒ ትብሉ?	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>ፈፂሙ ኣይጠቓምን</td> <td>ብወሉን ጠቓሚ እዩ</td> <td>ጠቓሚ እዩ</td> <td>ብጣዕሚ ጠቓሚ እዩ</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	ፈፂሙ ኣይጠቓምን	ብወሉን ጠቓሚ እዩ	ጠቓሚ እዩ	ብጣዕሚ ጠቓሚ እዩ	1	2	3	4	RF9A
ፈፂሙ ኣይጠቓምን	ብወሉን ጠቓሚ እዩ	ጠቓሚ እዩ	ብጣዕሚ ጠቓሚ እዩ								
1	2	3	4								

15	ምትካኽ ሽጋራ ዘስዕድም ፀገማት ጥዕና ዝምልከት ሰብ ሞያ ጥዕና ነገረሙኹም ይፈልጡ ዶ?	<p style="text-align: right;">እው 1 ኣይፋሉ 2</p>	RF10P
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**ምጥቃም ኣልኮላዊ መስተ (ALCOHOL USE)**

ዝስዕቡ ሕቶታት ድማ ብዛዕባ ኣልኮላዊ መስተ ኾይኑ ንሳቶም እውን ቢራ፣ሚያስ፣፣ብጥ፣፣ኣረቂ፣፣ቮድካ፣፣ወይኒ፣፣ዊስኪ ዘጠቓለለ እዩ

16	ብኣፈሻ ኢትዮጵያዊያን ኣልኮላዊ መስተ እንትሰትዩ ብኣደ ጊዜ ብበዝሒ ናይምስታይ ተርእዮ ኣለዎም (ደጊምኩም ኣንብቡሎም)	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>ኣዝዩ ይስማዕማዕ</td> <td>ይስማዕማዕ</td> <td>ኣይስማዕማዕን</td> <td>ኣዝዩ ኣይስማዕማዕን</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	ኣዝዩ ይስማዕማዕ	ይስማዕማዕ	ኣይስማዕማዕን	ኣዝዩ ኣይስማዕማዕን	1	2	3	4	RF11A
ኣዝዩ ይስማዕማዕ	ይስማዕማዕ	ኣይስማዕማዕን	ኣዝዩ ኣይስማዕማዕን								
1	2	3	4								

17	ኢትዮጵያዊያን ዝለዓለ ዓቕን ኣልኮላዊ መስተ ዝስትዩሉ ኣጋጣሚ ኣብዘም ዝስዕቡ ኩነታት ኣየናይ እዩ ትብሉ?	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>ክብረ በዓላት</td> <td>እው 1</td> <td>ኣይፋሉ 2</td> </tr> <tr> <td>ባህሊን ልምዲን</td> <td>እው 1</td> <td>ኣይፋሉ 2</td> </tr> <tr> <td>ምስ ኣዕርኽትኻ/ቤተሰብኻ ምስታይ</td> <td>እው 1</td> <td>ኣይፋሉ 2</td> </tr> <tr> <td>ገንዘባዊ እቶትካ ድሕሪ ምቕባል</td> <td>እው 1</td> <td>ኣይፋሉ 2</td> </tr> <tr> <td>ንምስታይ ፍሉይ ምኽንያት የብሉን</td> <td>እው 1</td> <td>ኣይፋሉ 2</td> </tr> </table>	ክብረ በዓላት	እው 1	ኣይፋሉ 2	ባህሊን ልምዲን	እው 1	ኣይፋሉ 2	ምስ ኣዕርኽትኻ/ቤተሰብኻ ምስታይ	እው 1	ኣይፋሉ 2	ገንዘባዊ እቶትካ ድሕሪ ምቕባል	እው 1	ኣይፋሉ 2	ንምስታይ ፍሉይ ምኽንያት የብሉን	እው 1	ኣይፋሉ 2	RF12P
ክብረ በዓላት	እው 1	ኣይፋሉ 2																
ባህሊን ልምዲን	እው 1	ኣይፋሉ 2																
ምስ ኣዕርኽትኻ/ቤተሰብኻ ምስታይ	እው 1	ኣይፋሉ 2																
ገንዘባዊ እቶትካ ድሕሪ ምቕባል	እው 1	ኣይፋሉ 2																
ንምስታይ ፍሉይ ምኽንያት የብሉን	እው 1	ኣይፋሉ 2																

*ሓዚድማ ኣብ ባዕልኹም ምጥቃም ኣልኮላዊ መስተ ዝምልከት እዩ (And now regarding your own drinking.)*

18	ዝቸኑ ኣልኮላዊ መስተ ሰቲኹም ትፈልጡ ዶ?	እወ 1 ኣይፋሉ 2 (ዝቸኑዎልዎ ዘለዎም ሕተቱ 4 →)	RF13P
19	ሰባት ኣልኮላዊ መስተ ዝሰትዩሉ 5 ዝተለመዱ ምኽንያታት ክንብብልኩም እየ። ንሰቲኹም ድማ ነቶም ምኽንያታት ካብ ዝግበዩ ናብ ዝተሓተ ስርርዕ ኣቕምጡሎም?	ዘጋጠሞም ፀገማት ንምርሳዕ 1 ___ ንምዝንናይ 2 ___ ንምሕዳስ 3 ___ ምስ መሓዘትካ ንምስታይ 4 ___ ምሕቓቕ ምግብ ንምቅልጣፍ 5 ___ ናይ ከብዲ ዕግዕተኛ ሓሳኹ ንምፍቀስ/ንምሕካም 6 ___	RF14P

ብምቕጻል ብዛዕባ ሓልሓሊፉ (ኣብ ዉሱን መጻልቲታት) ዝውሰድ ኣልኮላዊ መስተ ዝምልከት ክሓተኩም እየ.

20	ኣብ ዝሓለፈ ወርሒ ካብ ሰባት ንጉሆ ክሳብ ፍርቂ መጻልቲ ኣብዘሎ እዋን ኣልኮላዊ መስተ ሰቲኹም ትፈልጡ ዶ ?	እወ 1 ኣይፋሉ 2	RF15P
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ዝቸኑዎል ሕቶ ውልቀ ተግባራት ዝምልከት ኾይኑ ንኹሉ ሰብ ዝቐርብ ሕቶ እየ። ስለዝቸኑ ምንም ቅርክብልኩም ኣይግባእን. (The next question is a little bit personal, but we ask everyone. Don't feel embarrassed)

21	ንባዕልኹም እትሰትይዎ መጠን ኣልኮላዊ መስተ ክቕንስ ይግባእ ኢልኩም ሓሲብኩም ትፈልጡ ዶ ?	እወ 1 ኣይፋሉ 2	RF16P
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ዝስዕበ ሕቶ ብዛዕባ ምዝቐር ወይድማ ምኽክርካር መኪና እየ.

22	መኪና ትዝውሩ ዶ?	እወ 1 ኣይፋሉ 2 (ዝቸኑዎል ዘለዎም ሕተቱ)	RF17P
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23	ልዑል መጠን ኣልኮላዊ መስተ ሰቲኹም መኪና ዘቐርኩም ትፈልጡ ዶ?	እወ 1 ኣይፋሉ 2	RF18P
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→→→ ኣብመወዳእታ

24	ኣልኮላዊ መስተ ዘስዕቦም ፀገማት ጥዕና ዝምልከት ሰብ ሞያ ጥዕና ምኽሪ ሂሰመኹም ይፈልጡ ዶ?	እወ 1 ኣይፋሉ 2	RF19P
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**ምግብ/ኣመጋግባ ዝምልከት (Diet)**  
ትኩረትና ብምቕያር ብዛዕባ ንጥዕና ኣገደስቲ ዝቸኑ ኣመጋግባ/ስነ መጻዕ ዝምልከት ክንዘራረብ ኢና (let's talk about a healthy diet)

25	ብሓፈሻ ንሰባት ፍረምረን ኣሕምልቲን መጻልታዊ ምምጋብ ክንደይ ዝኣክል ጠቓሚ እየ ትብሉ?	<table border="1"> <tr> <td>ጥቕሚ የብሉን</td> <td>ዉሱን ጥቕሚ</td> <td>ጠቓሚ እየ</td> <td>ኣዝዩ ጠቓሚ እየ</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	ጥቕሚ የብሉን	ዉሱን ጥቕሚ	ጠቓሚ እየ	ኣዝዩ ጠቓሚ እየ	1	2	3	4	RF20A
ጥቕሚ የብሉን	ዉሱን ጥቕሚ	ጠቓሚ እየ	ኣዝዩ ጠቓሚ እየ								
1	2	3	4								

ሓዚ ድማ ብዛዕባ እትምገብዎ ምግብ ክሓተኩም እየ (I would like to ask you about your diet)

26	ንባዕልኹም መጻልታዊ (ብብመጻልቲ) ፍረ ምረ ምምጋብ ክንደይ ዝኣክል ይጠቓመኒ ትብሉ?	<table border="1"> <tr> <td>ጥቕሚ የብሉን</td> <td>ዉሱን ጥቕሚ ኣለዎ</td> <td>ጠቓሚ እየ</td> <td>ኣዝዩ ጠቓሚ እየ</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	ጥቕሚ የብሉን	ዉሱን ጥቕሚ ኣለዎ	ጠቓሚ እየ	ኣዝዩ ጠቓሚ እየ	1	2	3	4	RF21A
ጥቕሚ የብሉን	ዉሱን ጥቕሚ ኣለዎ	ጠቓሚ እየ	ኣዝዩ ጠቓሚ እየ								
1	2	3	4								

ዝቸኑዎል ሕቶታት ድማ ብዛዕባ ሓምለዎትን ሕብራዊን ኣሕምልቲ ዝምልከት እየ። ካብዙይ ወጻኢ ከም ድንሽ ፣ እኽል ወይ ፍዝ ኣየሓውስን ።

27	ንባዕልኹም መዓልታዊ ኣሕምልቲ ምምጋብ ክንደይ ዝኣክል ይጠቕመኒ ትብሉ?	<table border="1"> <tr> <td>ጥቕሚ የብሉን</td> <td>ወሱን ጥቕሚ ኣለዎ</td> <td>ጠቓሚ እዩ</td> <td>ኣገዩ ጠቓሚ እዩ</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	ጥቕሚ የብሉን	ወሱን ጥቕሚ ኣለዎ	ጠቓሚ እዩ	ኣገዩ ጠቓሚ እዩ	1	2	3	4	RF22A
ጥቕሚ የብሉን	ወሱን ጥቕሚ ኣለዎ	ጠቓሚ እዩ	ኣገዩ ጠቓሚ እዩ								
1	2	3	4								
<p>ሐዘ ድማ ብሓፈሻ ብዛዕባ ምግብ (ኢትዮጵያዊያን) ዝምልከት እዩ። መብዛሕተኣም (ኢትዮጵያዊያን) ፍረምረን ኣትክልቲን ኣይምገቡን.</p>											
28	<p>ኢትዮጵያዊያን ብበዘሒ ፍረምረን ኣሕምልቲን ዘይምገቡሉ ምክንያት እንታይ ይመስለኩም?</p> <p>(ዘይተገደበ ቃለ መሕተት (Open ended) "ካሊ እኹን ጥራሕ" እናበልኩም ተወሳኺ ሓሳብ ተቐበሉ)</p>	<p>ግጥኡ ክባር ስለዘገኘ 1  ጥራሕ ቀረብ 2  ዘይምረዕ ጣዕሚ ስለዘለዎ 3  ትሑት ፍልጠት 4  ባህሊን/ልምዲ ኣመጋግባ 5  ኣብፋብሪካ ዝተሰርሑን ካብ ወፃኢ ዝዕደጉን ምግብ ብዝበለፀ ጠቓሚ ስለዘገኘ 6  ፍረምረን ኣሕምልቲን ትሑት ትሕዝቶ ስነ መዓዛ ስለዘለዎም 7  ካሊ(ይገለፀ) 8</p>	RF23P								
<p>ብምቕፃል ብዛዕባ እትምገብዎ ናይ እንሰሳት ስጋ ዝምልከት ከሓተኩም ይደሊ እዩ ። ንሱውን ስጋ ፣ጠሰሚ ፣ፀባን ካልኣት ውዕኢት ፀባን ዘጠቓለለ እዩ ።</p>											
29	ብሓፈሻ ኢትዮጵያዊያን ብዘለዓለ መጠን ተጠቀምቲ ስጋ ወይግማ ብሩንዶ ስጋ ዶ ይመስለኩም?	<p>እው 1  ኣይፋሉ 2 (ዝቕዕል ዘሊልኩም ሕተቱ)</p>	RF24A								
30	ዘይበሰለ ስጋ ወይድማ ብሩንዶ ስጋ ንክትብልዎ ዝገብረኩም ካብዞም ዝስዕቡ ወይድማ ካልኣት ቀንዲ ምክንያታት እንታይ እዩ? (ኣንብቡሎም)	<p>ከምባህሊ/ብልምዲ 1  ጥዑም ስለዘገኘ 2  ንጥዕና ተመራፃይ ስለዘገኘ 3  ዝለዓለ ትሕዝቶ ስነ መዓዛ ስለዘለዎ 4  ካሊ (ይገለፀ) 5</p>	RF25P								
31	ጥረ/ ብሩንዶ ስጋ በሊዕኹም ትፈልጡ ዶ?	<p>እው 1  ኣይፋሉ 2 (ዝቕዕል ዘሊልኩም ሕተቱ)</p>									
32	ኣብዝሓለፈ ሓደ ወርሒ ጥረ / ዘይበሰለ ስጋ በሊዕኹም ትፈልጡ ዶ?	<p>እው 1  ኣይፋሉ 2 (ዝቕዕል ዘሊልኩም ሕተቱ)</p>									
33	ንሕቶ 32 መልስኹም እው እንተኾይኑ ክንደይ እዩን ዘይበሰለ/ብሩንዶ ስጋ ትበልዎ?	<p>ኩልሻዕ 1  ሓሊፉ ሓሊፉ 2  ብጣዕሚ ወሱን እዩን 3  ፈፂመ ኣይምገብን 4</p>									
<p>ምጥቃም ጨው ኣብ ምግብኹም ዝምልከት ሕቶታት</p>											
31	ብዛዕባ ናብ ምግብኹም ዝኣቱ መጠን (ዓቕን) ጨው ኣሕሲብኩም ይፈልጥ ዶ?	<p>እው 1  ኣይፋሉ 2</p>	RF26A								
32	ኣብ መዓልታዊ ምግብ ኢትዮጵያዊያን ዝለዓለ መጠን (ዓቕን) ጨው ንክህሉ ኣስተዋዕኦ ዘለዎም ካብዞም ዝስዕቡ ኣየኖም እዩም ትብሉ? (ንኹሎም ኣንብቡሎም)	<p>ብውልቀ ናብ ምግብን መስተን (ከምቡና) ዘኣቱ መጠን ጨው 1  ካብ ዘይበሰሉ ምግብታት ንኣብነት ፀባ ፣ ስጋን ኣሕምልቲን ዝርከብ መጠን ጨው 2  ካብ ውዕኢት ፋብሪካ ዝኾኑ ምግብታት ንኣብነት ዳዕ ፣ ብስኩት ዝርከብ መጠን ጨው 3</p>	RF27K								
33	ንባዕልኹም ምግብ እንትተብሰሉ ወይ ድማ እንትትበልዎ ክንደይ ግዘ ጨው ትውስኹ?	<table border="1"> <tr> <td>ፈፂመ ኣይጥቀምን</td> <td>ሓልሓሊፉ</td> <td>ብኣብዘሓ</td> <td>ኩልሻዕ</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	ፈፂመ ኣይጥቀምን	ሓልሓሊፉ	ብኣብዘሓ	ኩልሻዕ	1	2	3	4	RF28P
ፈፂመ ኣይጥቀምን	ሓልሓሊፉ	ብኣብዘሓ	ኩልሻዕ								
1	2	3	4								

34	ካብ ገዛኹም ወፃኢ ብካልኦት ሰባት ዝተዳለወ ምግብ እንት-ትምገቡ ጨው ዝበዘሉ፣ ብመጠኑ ዘለዎ ወይ ድማ ወ.ሉድ ጨው ዘለዎ ምግብ ክትምገቡ ትመርፀ? እዙይ ኣብ ቤት ምግብ ወይ ድማ እንዳ ኣዕርኽትኹም ዝሓውስ እዩ።	<p style="text-align: right;">ጨው ዝበዘሉ 1 ብመጠኑ ዘለዎ 2 ወ.ሉድ ጨው ዘለዎ 3</p>	RF29A																								
35	ብምቕፃል 5ተ ዓይነታት ምግብ ክንበብልኩም እዩ። ንስኹም ድማ ትሕዝቶ ጨው ናይዞም ምግብ ዝለዓለ፣ ማእኸላይ ወይ ድማ ትሑት ኢልኩም ንገሩኒ።	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>ዓይነት ምግብ</th> <th>ትሑት</th> <th>ማእኸላይ ትሕዝቶ</th> <th>ዝለዓለ ትሕዝቶ</th> </tr> </thead> <tbody> <tr> <td>እንጀራ</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>ባሂ</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>ጥብሲ ድንሽ</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>ዝተዓሸጉ ኣሕምልቲ</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>ሰጎ</td> <td>1</td> <td>2</td> <td>3</td> </tr> </tbody> </table>	ዓይነት ምግብ	ትሑት	ማእኸላይ ትሕዝቶ	ዝለዓለ ትሕዝቶ	እንጀራ	1	2	3	ባሂ	1	2	3	ጥብሲ ድንሽ	1	2	3	ዝተዓሸጉ ኣሕምልቲ	1	2	3	ሰጎ	1	2	3	RF30K
ዓይነት ምግብ	ትሑት	ማእኸላይ ትሕዝቶ	ዝለዓለ ትሕዝቶ																								
እንጀራ	1	2	3																								
ባሂ	1	2	3																								
ጥብሲ ድንሽ	1	2	3																								
ዝተዓሸጉ ኣሕምልቲ	1	2	3																								
ሰጎ	1	2	3																								
36	ሐዚ ብዛዕባ ኢትዮጵያዊያን ቡና ኣብምጥቃም ዘለዎም ልምዲ ዝምልከት ሕቶ እዩ። ንስኹም ቡና እንትተፍልሑ /እንትትሰትዩ ኩሎኸብ ጨው ትውስኹሉ ዶ?	<p style="text-align: right;">እወ 1 ኣይፋሉ 2 (ዝቕፅል ዘለልኩም ሕተቱ)</p>	RF31P																								
37	ብግምት ኣብመዓልቲ ክንደይ ኩባያ ቡና/ ሻሂ ትሰትዩ ?	<p style="text-align: right;">ትሑቲ 1 _____ ኣብመዓልቲ 1</p>	RF32P																								
38	ብሓፈሻ ኢትዮጵያዊያን ልዑል ዓቕን ጨው ተጠቀምቲ እዮም ኢልኩም ዶ ትግምቱ ?	<p style="text-align: right;">እወ 1 ኣይፋሉ 2</p>	RF33A																								
<b>ብምቕፃል ሃይማኖታዊ ፆም ዝምልከት ክሓተኩም እዩ</b>																											
39	ሃይማኖታዊ ፆም ምዕዋም ዘይተመሓለለፍቲ ሕማማት ንምክልኻል ኣስተዋዕኦ ኣለዎ ኢልኩም ዶ ተሓስቡ?	<p style="text-align: right;">እወ 1 ኣይፋሉ 2 ኣይፈልጥን 3</p>	RF34A																								
40	ሃይማኖታዊ ፆም ንጥዕና ጠቓሚ እዩ	<p style="text-align: right;">እወ 1 ኣይፋሉ 2 ኣይፈልጥን 3</p>	RF35K																								
41	ንሕቶ ቁፅሪ 40 መልሲኹም እወ እንተኾይኑ ሃይማኖታዊ ፆም ንጥዕና ብኸመይ ጠቓሚ ይኸውን ትብሉ?	<p style="text-align: right;">ክብደት ስለዝቐንስ 1 ጥዕናዊ ስምዒትን ጥንካረን ስለዝበመዐና 2 ካሊእ (ይጠቐስ ) 3 ኣይፈልጥን 88</p>	RF36K																								
42	ንሕቶ ቁፅሪ 40 መልሲኹም ኣይፋሉ እንተኾይኑ ምክንያትኩም ክትነግሩኒ ዶ ትክእሉ?	<p style="text-align: right;">ፆም ንሃይማኖታዊ ጥንካረ ጥራሕ ዝሕገዝ እዩ 1 ፆም ንኣክላዊ ጥዕና ብዙሕ ኣስተዋዕኦ የብሉን 2 ካሊእ (ይጠቐስ ) 3 ኣይፈልጥን 88</p>	RF37K																								

43	ሃይማኖታዊ የም ፀዊምኩም ዶ ትፈልጡ?	እው 1 አይፋሉ (መልሱ አይፋሉ እንተኾይኑ ናብ ሕቶ አካላዊ ምንቅስቃሴ ሕለፉ ) 2	RF38P
44	አብዝሓለፉ 12 አዋርሕ ሃይማኖታዊ የም ፀዊምኩም ዶ ትፈልጡ?	እው 1 አይፋሉ (መልሱ አይፋሉ እንተኾይኑ ናብ ሕቶ አካላዊ ምንቅስቃሴ ሕለፉ ) 2	RF39P
45	ንሕቶ ቁፅሪ 44 መልሲኹም እወ እንተኾይኑ እንታይ ዓይነት የም ፀዊምኩም ነይርኩም?	ወ-ፅኢት እንስሳት ዘይምምጋብ ጥራሕ 1 ወ-ፅኢት እንስሳት ዘይምምጋብን ዝኾነ ክሳብ ፈረቓ መዓልቲ ዝኾነ ዓይነት ምግቢ ዘይምምጋብ 2 ወ-ፅኢት እንስሳት ዘይምምጋብን ክሳብ ኣጋምሸት ዝኾነ ዓይነት ምግቢ ዘይምምጋብ 3 ወ-ፅኢት እንስሳት ዘይምምጋብን ክሳብ ሰዓት 12 ምሸት ዝኾነ ዓይነት ምግቢ ዘይምምጋብ 4 ዝኾነ ዓይነት ምግቢ ክሳብ ሰዓት 12 ምሸት ዘይምምጋብ ይኹንምበር ድሕሪኡ ወ-ፅኢት እንስሳት ኮነ ኣትክልቲ ምምጋብ 5  ካሊእ (ይገለፅ)_____ 6	RF40P
<b>አካላዊ ምንቅስቃሴ (Exercise)</b> <i>ሓዘ አካላዊ ምንቅስቃሴን ጥዕናን ዝምልከት ክንዘራረብ ኢና</i>			
46	ብናትኩም እምነት ሓደ ሰብ ጥዕንኡ ዝተሓለወ ንክኸውን ክንደይ ግዜ ንጥፈታት አካላዊ ምንቅስቃሴ ክሰርሕ ኣለዎ ትብሉ?	ወርሓዊ 1 ክልተ ግዜ ኣብ ወርሒ 2 ሓደ ግዜ ኣብ ሰሙን 3 ካብ 1-4 ግዜ ኣብ ሰሙን 4 ኣብ ሰሙን 5 ግዜን ካብኡ ንላዕሊን 5	RF34K
<i>ከም ሓበሬታ ሰብ ሞያ ሓደ ሰብ ጥዕንኡ ዝተሓለወ ንክኸውን እንተነኣሰ ኣብ ሰሙን 5 ግዜ ን10 ደቂቓ ንጥፈታት አካላዊ ምንቅስቃሴ ክገብር ይግባእ። ይኹንእምበር ኣብዘሓ ኢትዮጵያዊያን እዙይ ኣይትግብሩዎን።</i>			
47	ብወገንኩም ኣብዘሓ ኢትዮጵያዊያን ከምቲዝትሓበረ ንጥፈታት አካላዊ ምንቅስቃሴ ዘይሰርሑሉ ምክንያት እንታይ እዩ ትብሉ? ካብዘም ዝስዕቡ ሓደ ምረፀ	ሕፅረት ግዜ 1 ክባር ስለዝኾነ 2 አፍልጦ ዘይምህላው 3 ድሌት ዘይምህላው 4 ኣድላይ ኣይኮነን ኢሉም ስለዝሓሰቡ 5 ካሊእ/ይጠቐስ_____ 6	RF35P
<b>ምእላይ ጭንቀት ዝምልከት (Stress Management)</b> <i>ብምቕፃል ምእላይ ጭንቀት ዝምልከት ሕቶታት ከሕተኩም እዩ</i>			
48	ካብ መዓልቲ ናብ መዓልቲ ክንደይ ዝአክል ጭንቀት ይስመዐኩም?	ኩልሻብ 1 መብዛሕትኡ እዋን 2 ሓልሓሊፉ 3 ምንም ኣይስመዐኒን 4 (ዝቕፅል ዘለልኩም ሕተቱ)	RF36A

49	ኣብዚህ ዓመት እዮን ኣብ ሂወትኩም ምክንያት ጭንቀት ዝኸኸሎ ስንታይ እዩ? (ኣብዞም ዝተዘርዘሩ ምረፁ)	ከነታት ስድራ 1 ማሕበራዊ ርክብ 2 ትምህርቲ 3 ከነታት ስራሕ/ስእነት ስራሕ 4 ስእነት ገንዘብ 5 ፀገም ጥዕና 6 ካሊእ(ይገለፅ) 7	RF37A							
50	ብሓፈሻ ንዝኾነ ሰብ ከነታት ጭንቀት ከውግዱ ዝኸእሉ ነገራት እንተሃልዮም ዘርዘሩይ? (ባዕሎም ጥራሕ ክምልሱ ግበሩ)	ንጥፈታት ኣካላዊ ምንቅስቃስ 1 ምስ ኣዕርኽትኻ ወይ ስድራኻ ምዕላል 2 ምግብ ምብላዕ 3 ምስ ሰብ ጥያ ጥዕና ምዝታይ 4 ወሱን ኣልኮላዊ መስተ ምስታይ 5 ኣይፈልጥን 6 ካሊእ (ይገለፅ) 7	RF38A							
<b>ልዑል ፀቕጢ ደም (High Blood Pressure)</b> <i>ሓዚ ድማ ልዑል ፀቕጢ ደም ዝምልከት ክንዘራረብ ኢና</i>										
51	ብዛዕባ ፀቕጢ ደም ("blood pressure") ክንደይ ዝኣክል ኣፍልጦ ኣለኩም? <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>ምንም ኣፍልጦ የብሉይን</td> <td>ነቲ መፀውዒ ቃል ጥራሕ ይፈልጥ</td> <td>ብዛዕባኡ ወሱን ኣፍልጦ ኣለኒ</td> <td>እኹል ኣፍልጦ ኣለኒ</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> </tr> </table>	ምንም ኣፍልጦ የብሉይን	ነቲ መፀውዒ ቃል ጥራሕ ይፈልጥ	ብዛዕባኡ ወሱን ኣፍልጦ ኣለኒ	እኹል ኣፍልጦ ኣለኒ	1	2	3	4	RF39K
ምንም ኣፍልጦ የብሉይን	ነቲ መፀውዒ ቃል ጥራሕ ይፈልጥ	ብዛዕባኡ ወሱን ኣፍልጦ ኣለኒ	እኹል ኣፍልጦ ኣለኒ							
1	2	3	4							
ልዑል ፀቕጢ ደም ማለት ኣብ ሰራውር ደም ዝህሉ ዘይተስተኻኸለ ድፍኢት ዑደት ደም ማለት እዩ። እዙይ ብሓኪም ወይ ድማ ካልእት ሰብ ጥያ ጥዕና ዝፀቀን እዩ።										
52	ኢትዮጵያዊያን መጠን ፀቕጢ ደምም ብብግዚኡ እንተተለኪኡም ጠቓሚ እዩ ኢልኩም ደ ትሓስቡ?	እወ 1 ኣይፋሉ 2	RF40A							
53	ኢትዮጵያዊያን ብግምት ብብኸንደይ እዮን መጠን ፀቕጢ ደምም ክልክዑ ይግባእ ትብሉ? (ኣብዞም ዝስዕቡ ሓደ ምረፁ)	ብብግዚኡ ምልካዕ ኣድላዩ ኣይኮነን 1 ሓደ ግዜ ኣብ 5 ዓመት 2 ሓደ ግዜ ኣብ 2 ዓመት 3 ሓደ ግዜ ኣብ 1 ዓመት 4 ሓደ ግዜን ካብኡ ንላዕሊን ኣብ 1 ዓመት 5	RF41K							
<i>ይኹን እምበር መብዛሕተኡም ኢትዮጵያዊያን ፀቕጢ ደምም ብብእዮኑ ኣይልክዑን</i>										
54	ኢትዮጵያዊያን ፀቕጢ ደምም ብብእዮኑ ዘይልክዑሉ ቀንዲ ምክንያት እንታይ እዩ ትብሉ? (ኣብዞም ዝስዕቡ ሓደ ምረፁ)	ሕዕረት ግዘ 1 ግልጋሎት ኣበይ ከምዝርከብ ዘይምፍላጥ 2 ይጠቓም እዩ ኢልካ ዘይምሕሳብ 3 ብኸመይ ከምዝልካዕ ዘይምፍላጥ 4 ኣፍልጦ ዘይምህላው 5 ካሊእ (ይገለፅ) 6	RF42A/P							
<i>መልሱ እንተዘይፈለጥኩምዎ ምንም ማለት ኣይኮነን :: (It is ok if you do not know the answer but )</i>										
55	ጨው ዝበዘሉ ምግብ ምምጋብ ከነታይ ፀቕጢ ደም ክልውጦ ይኸእል ዶ?	እወ 1 ኣይፋሉ 2 (ዝቕፅል ዘለልኩም ሕተቱ) ኣይፈልጥን 3 (ዝቕፅል ዘለልኩም ሕተቱ)	RF43K							
56	ጨው ዝበዘሉ ምግብ ምምጋብ ከነታይ ፀቕጢ ደም ብኸመይ ክልውጦ ይኸእል? ፀቕጢ ደም ክውስኽ ወይስ ክትሕት ይገብር ትብሉ?	ክውስኽ ይገብር 1 ክትሕት ይገብር 2	RF44K							

57	ልዑል ፀቕጢ ደም ፀገም ጥዕና ከስዕብ ይኸኛል ደ?	እወ 1 ካይፋሉ 2 (ዝቕዕል ዘሊልኩም ሕተቱ) ካይፈልጥን 3 (ዝቕዕል ዘሊልኩም ሕተቱ)				RF45K	
58	ልዑል ፀቕጢ ደም እንተሃልዩ እዞም ዝስዕቡ ካላት ሰውነት ክጎድኡ ይኸኛል ደ?	ካላት ሰውነት	እወ	ካይፋሉ	ካይፈልጥን	RF46K	
		ንሓንጎል	1	2	3		
		ንኩላሊት	1	2	3		
		ንልቢ	1	2	3		
ካብመወዳእታ ቅድሚ ናብካሊእ ምቕጻልና ልዑል ፀቕጢ ደም ክቕንሱ ዝኸኛሉ ሜላታት ዝምልከት ክሓተኩም እዩ.							
59	ብምቕጻል ልዑል ፀቕጢ ደም ንምቁዕጻር ዘኸኛሉ 4 ፈውሲታት ወይ ድማ ንጥፈታት (activities) ክንበበልኩም እዩ። ንስኹም ልዑል ፀቕጢ ደም ንምቕናስ ውዕኪታዊ ካይኮነን ፣ ውዕኪታዊ እዩ ወይ ድማ ብጣዕሚ ውዕኪታዊ እዩ እናበልኩም ብደረጃ ካቕምጥዎም።	ውዕኪታዊ ካይኮነን	ውዕኪታዊ እዩ	ብጣዕሚ ውዕኪታዊ እዩ	RF47A		
		ካፋውስ	1	2		3	
		ክብደት ምቕናስ	1	2		3	
		ምግቢ ምቕጻር	1	2		3	
		ካላዊ እንቅስቃሴ	1	2		3	
<b>ክብደት ሰውነት (Weight)</b> ሐዚ ብዛዕባ ክብደት ሰውነት ዝምልከት ክንዘራረብ ኢና							
60	ካብዝሓለፈ 6 ወርሒ ክብደትኩም ባዕልኹም ተመዘኑኩም ትፈልጡ ደ?	እወ 1 ካይፋሉ 2				RF48P	
61	ዓቕን ክብደት ሰውነትኩም ካብምንታይ ደረጃ ኣለኹ ትብሉ?	ትሕቲ ክብደት 1 ትኸክለኛ ክብደት 2 ልዑል ክብደት 3 ኣዝዩ ልዑል ክብደት 4				RF49A	
62	ትኸክለኛ ክብደት ሰውነት ምህላው ንጥዕና ክንደይ ዝኣክል ጠቓሚ እዩ ትብሉ?	ምንም ካይጠቅምን	ዉሱን ጥቕሚ ኣለዎ	ጠቓሚ እዩ	ኣዝዩ ጠቓሚ እዩ	RF50A	
		1	3	4	5		
<b>መጠቓለሊ ሓደጋ ተቓላፊነት ንዘይተመሓለፍቲ ሕግማት (Summary of RF)</b> ክሳብ ሐዚ ብዛዕባ ምግቢ ፣ ንጥፈታት ካላዊ እንቅስቃሴ ፣ ምትካኽ ሽጋራን ካልኦትን ብስፍሓት ተዘራረብና ኢና.							
63	ቀዲሱም ዝተሓበሩ ተግባራት ኣብ ጥዕናኹም ዘስዕብዎ መጠን ጉድኣት መሰረት ብምግባር ሕድሕዲኡም ከምዝስዕብ ደረጃ ስርርዕ ኣውዕኡሉም? <b>በዚ ዝስዕብ መሰረት ስርዕዎም፡-</b> “ጉድኣት የብሉን ፣ ዉሱን ጉድኣት ኣለዎ ፣ ጉድኣት ኣለዎ ወይ ድማ ኣዝዩ ጉድኣት ኣለዎ” ብዝብል ካቕምጡ.  (ባዕሉም ጥራሕ ክምልሱ ግበሩ ፣ ኸይኑ ግና ነቶም ሕቶታት ደገምኩም ክተንብቡሉም ትኸኛሉ ኢኹም)	ተግባራት	ካብጥዕና ዘስዕብዎ መጠን ጉድኣት				RF51A
		መዓልታዊ ኣልኮላዊ መስተ ምስታይ	ምንም ጉድኣት የብሉን	ዉሱን ጉድኣት ኣለዎ	ጉድኣት ኣለዎ	ኣዝዩ ጉድኣት ኣለዎ	
		ጨው ዝበዝሐ ምግቢ ምምጋብ	0	1	3	4	
		ምትካኽ ሽጋራ	0	1	3	4	
		ምምዛን ክብደት ሰውነት	0	1	3	4	
		ዘይእኹል	0	1	3	4	

		መጠን ፍረምረን አሕምልቲን ምምጋብ				
		ንጥፈታት አካላዊ ምንቅስቃሴ ዘይምስራሕ	0	1	3	4

**4. ፍልጠት ፣ዝንባላን ተግባርን ንሕማም ልቢን ሰራውር ደምን ዝምልከት (KAP Related to Cardiovascular Diseases)**

ሕቶታት		መልሲ				ኮድ
<i>ብዛዕባ ሕማም ልቢን ሰራውር ደምን ዝምልከት ውሱን ሕቶታት ክሓተኩም እዩ.</i>						
64	ብዛዕባ ሕማም ልቢ ክንደይ ዝኣክል ኣፍልጦ ኣለኩም ?	ምንም ኣፍልጦ የብለይን	እንትብሃል ይሰምዕ ይኹን እምበር ካብዙይ ዝሓለፍ ፍልጠት የብለይን	ብዛዕባ ሕማም ልቢ ውሱን ፍልጠት ኣለኒ	ብዛዕባ ሕማም ልቢ እኹል ፍልጠት ኣለኒ	CD1K
		1	2	3	4	
65	ብዛዕባ ሕማም ስትሮክ ("stroke") ዝምልከት ክንደይ ዝኣክል ኣፍልጦ ኣለኩም?	ምንም ኣፍልጦ የብለይ	እንትብሃል ይሰምዕ ይኹን እምበር ካብዙይ ዝሓለፍ ፍልጠት የብለይን	ብዛዕባ ሕማም ስትሮክ "stroke" ውሱን ፍልጠት ኣለኒ	ብዛዕባ ሕማም ስትሮክ "stroke" እኹል ፍልጠት ኣለኒ	CD2K
		1	2	3	4	
<p><i>ሕማም ልቢን ሰራውር ደምን ማለት መፀውዒ እኩብ ሕማማት ኾይኑ ንልቢ ፣ሓንጎልን ሰራውር ደምን ዝጎድእ ሕማም እዩ። ክፍሊ ኣካል ልቢ ስራሕቱ ጠጠው እንተብሉ ደውታ ስራሕ ልቢ "heart attacks" እንትብሃል ክፍሊ ሓንጎል እንተተጎዲኡ ድማ ስትሮክ "strokes" ዝበሃልኩነታት ይፍጠር</i></p>						
66	ኣብዚሓዚ እዋን ብሓፈሻ ኩነታት ሕማም ልቢ ኣብ ኢትዮጵያዊያን እናወሰኸ ድዩ ወይስ እናቐነሰ ይርከብ ትብሉ?	<p style="text-align: right;">ወሲኹ 1 ቐነሱ 2 ኣይፈልጥን 3</p>				CD3K
67	ንባዕልኹም ሕማም ልቢን ሰራውር ደምን ንኸይሕዘኩም ትግደሱ/ትጭነቹ ዶ?	ፈጣሪ ኣየሕሰበኒን	እው ብመጠኑ የሕሰበኒ	እው ኣገዩ የሕሰበኒ		CD4A
		1	2	3		
<i>ብምቕጻል ዝኸነ ሰብ ኣብ መዓልታዊ ሂወቱ ክትግብርም ዝኸእል ነገራት በዙይ ምክንያት ድማ ሕማም ልቢ ናይ ምትሓዝ ኣጋጣሚ ዝጎበዖሉ ኩነታት ከምዘፍጠር ዝምልከት ሕቶታት ክሓተኩም እዩ.</i>						

68	<p>ብምቕጻል 5 ተግባራት ሓደ ብሓደ ከንብበልኩም እየ። ንስኩም ድማ እዞም ተግባራት እዚኦም ሕማም ልቢን ሰራውር ደምን ናይ ምምጻእ ተኸእሎ ኣለዎም ወይ ድማ የብሎምን ኢልኩም መልሱለይ። ርግፀኛ እንተዘይኮይንኩም ኣይትጨነቁሉ።</p>				CD5K	
			እወ	ኣይፋሉ		እርግፀኛ ኣይኮንኩን
		ምትካኽ ሽጋራ	1	2		3
		ጭንቀት	1	2		3
		ልዑል ክብደት	1	2		3
እርጋን	1	2	3			

ብምቕጻል ነዞም ሕቶታት ሓቂ ፣ ጊጋ ወይ ድማ ኣይ ፈልጥን ኢልኩም መልሱለይ

69	ልዑል ፀቕጢ ደም ዘለዎም ሰባት ካብ ካልኦት ሰባት ዝላዓለ ንስትሮክ (stroke) ዝተቐልዑ እዮም።			ሓቂ 1 ጌጋ 2 ኣይፈልጥን 3	CD6K
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ኣብ መወዳእታ:

70	ሕማም ልቢን ሰራውር ደምን ምክልኻል ይክኣል እዩ ንዝብል ሓሳብ ትሰማምዑሉ ዶ?	እወ ይሰማማዕ	ኣፍልጦ የብለይን	ኣይሰማማዕን		CD7K
		1	2	3		

**5. ፍልጠት ፣ዝንባለን ተግባርን ንኣንሰር ጡብን በሪ ማህፀንን ዝምልከት (Kap related Breast and cervical cancer (BCC) )**

ሕቶ መልሲ

እዞም ዝቕፅሉ ሕቶታት ንደቂ ኣንስትዮ ጥራሕ ዝምልከቱ እዮም።  
(ዕድመ እዛንጻል ኣንስተይቲ ትሕቲ 30 ዓመት እንተኾይኑ ናብ መወዳእታ ክፋል እዚ ቃለ መስተት ሕለፍ)  
እዞም ሕቶታት ኣብ ሕማም ኣንሰር ትኹረት ዝገበሩ እንትኾኑ ንፈለማ ኣንሰር ጡብ ዝምልከት ክንዘራረብ.

**ኣንሰር ጡብ (Breast cancer)**

71	ብዛዕባ ሕማም ኣንሰር ጡብ ዝምልከት ክንደይ ዝኣክል ኣፍልጦ ኣለኩም?	ምንም ኣፍልጦ የብለይን	እንትባሃል ይሰምዕ ካሊኡ ኣፍልጦ የብለይን	ዉሱን ኣፍልጦ ኣለኒ	እኹል ኣፍልጦ ኣለኒ	BCC1K
		1	2	3	4	

72	ንባዕልኹም ወይ ድማ ስድራኹም ብሕማም ኣንሰር ጡብ ከይትጥቅዑ ትጭነቹ ዶ? (መልሱ እወ እንተኾይኑ, እዞም ዝሰዕሱ ሕቶታት ሕተቱ “ብዛዕባኩ ክንደይ ዝኣክል ትጭነቹ? ሓልሓሊፉ ወይ ድማ ብኣብዘሓ?”)				BCC2A
		ፈጻመ ኣይጭነቹን	እወ ሓልሓሊፉ	እወ ኩሉሻብ	
		1	2	3	

ብምቕጻል ክልተ ሕቶታት ክሓተኩም እየ። ንስኩም ድማ ሓቂ ፣ ጊጋ ወይ ድማ ኣይ ፈልጥን ኢልኩም መልሱለይ.

73	እዋናዊ ነፀርታ ንሕማም ካንሰር ጡብ ምግባር ካብቲ ሕማም ንምድሓን ዝለዓለ ዕድል ምፍጣር ማለት እዩ።		ሓቂ 1 ጌጋ 2 ኣይፈልጥን 3	BCC3K		
74	ደቂ ኣንስትዮ ዓርሰ ምርመራ ጡብ ብምግባር ናይ መጀመርታ ምልክታት ሕማም ካንሰር ጡብ እዋናዊ ነፀርታ ከካይዳ ይኸእላ እየን።		ሓቂ 1 ጌጋ 2 ኣይፈልጥን 3	BCC4K		
ዓርሰ ምርመራ ጡብ ምግባር ማለት ደቂ ኣንስትዮ ናብ ሓኪም እንተይከዳ ናይ ባዕለን ጡብ ባዕለን ምርመራ ብምግባር ምልክታት ሕማም ካንሰር ጡብ ዝንፅራሱ ሜላ እዩ ።						
75	ምልክታት ካንሰር ጡብ ወይ ድማ ካልኣት ሕማማት ንምልላይ ዓርሰ ምርመራ ጡብ ከመይ ክምዝካየድ ትፈልጣ ዶ?  (ንደቂ ኣንስትዮ ጥራሕ ዝምልከት እዩ)		እወ 1 ኣይፋሉ 2	BCC5K		
ብዛዕባ ምርመራ ጡብ ዝምልከት። ዝም ዝስዕቡ ሕቶታት እወ ወይ ድማ ኣይፋሉ ኢልኩም መልሱ.						
76	ኣብዝሓለፈ 3 ዓመታት፡  (ንደቂ ኣንስትዮ ጥራሕ ዝምልከት እዩ ርግዐኛ እንተዘይኮይንክን ኣይፋሉ ኢልክን መልሳ)	ዓርሰ ምርመራ ጡብ ገይርክን ትፈልጣ ዶ? ወይ ድማ፡- ብሰብ ሞያ ጥዕና ኣካላዊ ምርመራ ጡብ ተገይሩልክን ይፈልጥ ዶ?	እወ 1  እወ 1	ኣይፋሉ 2  ኣይፋሉ 2	BCC6P	
<b>ሕማም ካንሰር በሪ ማህፀን (Cervical Cancer)</b>						
ቀዒሎ ብዛዕባ ካንሰር ተወሰኽቲ ሕቶታት ክሓተኩም እዩ።						
77	ብዛዕባ ሕማም ካንሰር በሪ ማህፀ ክንደይ ዝኣክል ኣፍልጦ ኣለኩም?	ምንም ፍልጠት የብለይን	እንትብሃል ይሰምዕ ካሊኦ ፍልጠት የብለይን.	ወሱን ፍልጠት ኣለኒ	እኹል ፍልጠት ኣለኒ.	BCC7K
		1	2	3	4	
ሕማም ካንሰር በሪ ማህፀ ንደቂ ኣንስትዮ ዘጥቅዕ ሕማም እንትኸውን ብፍላይ ድማ በሪ ማህፀን ተባሂሎ ዝዕዋዕ ክፋል ማህፀን ደቂ ኣንስትዮ ዘጥቅዕ ዘይልሙድ ሕብጠት ወይድማ ሕማም ካንሰር በሪ ማህፀን ይብሃል። ነዚ ሕማም ንምንጻር ሓኪማት ፓፕ ስሚር (pap smear) ዝብሃል ሜላ ምርመራ ይጥቀሙ።						
78	ኢትዮጵያዊያን ደቂ ኣንስትዮ በብኸንደይ እዋን ፓፕ ስሚር ከስራሓ ከምዝግባኡ/ከምዝእዘዘለን ትፈልጣ ዶ?		ዓመታዊ 1 ሓደ ግዜ ኣብ 3 ዓመት 2 ሓደ ግዜ ኣብ 5 ዓመት 3 ኣይፈልጥን 4	BCC8K		

79	አብዝሓለፈ 3 ዓመታት ምርመራ ፓፕ ስሚር አስሪሕኝን ትፈልግ ደ?	አይፋሉ እው (ዝቕፅል ዘሊልኩም ሕተቱ)	1 3	BCC9P						
80	ፓፕ ስሚር አስሪሕኝን ዘይትፈልግ እንተኾይንክን ክተሰራሓ ዘይክኣልክናሉ ቀንዲ ምኽንያት እንታይ እዩ ? (ሓደ መልሲ ጥራሕ ምረግ):	ሕፅረት ግዘ ዘድሊ ምኻኑ ኣፈልጥን ነይረ ክባር ስለዝኾነ ግልጋሎት ኣበይ ከምዝርከብ ኣይፈልጥን ስለዝሓፍር/ ዝሽቐረር 5 ካሊኢ(ይገለፅ)	1 2 3 4 6	BCC10P						
81	ንሕቶ ቁፅሪ 79 መልስኽን እው እንተኾይኑ ካንሰር በሪ ማህፀ ከምዝልክን ወይድማ ከምዝጀመረክን ተነገሩክን ይፈልጥ ደ ?	እው አይፋሉ	1 2							
82	ንባዕልኹም ወይ ድማ ቤተ ሰብኩም ብሕማም ካንሰር በሪ ማህፀ ከይትጥቅዑ ትጭነቐ ደ ? (መልሲ እው እንተኾይኑ እዞም ዝስዕቡ ሕቶታት ሕተቱ “ብሳብሕ ክንደይ ዝኣክል ትጭነቐ? ሓልሓሊፉ ወይ ድማ ብኣብዘሓ?”)	<table border="1"> <tr> <td>ፈጊመ አይጭነቕን</td> <td>እው ሓልሓሊፉ</td> <td>እው ብኣብዘሓ</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> </tr> </table>	ፈጊመ አይጭነቕን	እው ሓልሓሊፉ	እው ብኣብዘሓ	1	2	3		BCC11A
ፈጊመ አይጭነቕን	እው ሓልሓሊፉ	እው ብኣብዘሓ								
1	2	3								
83	ትሕቲ 14 ዓመት ዝዕድሚኣ ኣንስተይቲ ውላድ ኣላትኩም ደ?	እው አይፋሉ	1 2 (ዝቕፅል ዘሊልኩም ሕተቱ)	BCC12						
<i>ብምቕጻል ዝተፈለለዩ ሕማማት ክከላኸሉ ዝኽእሉ ንህፃውንቲ ዝወሃቡ ክትባታት ዝምልከት ሕቶታት ክሓተክን እዩ</i>										
84	ሕማም ካንሰር በሪ ማህፀን ብኸትባት ምክልኻል ከምዝከኣል ትፈልግ ደ?	እው ይከኣል አይከኣልን አይፈልጥን	1 2 3	BCC13K						
<i>ብምቕጻል ታሪኽ ሃታዊ ርክብ ምጥቃም መከላኸሊ ጥንሲን ከምኡውን በዝሓ ዝወለድክን እም ቆልዑትን ዝምክለኩት ሕቶታት ክሓተክን እዩ</i>										
85	ንፈለማ እዋን ሃታዊ ርክብ እንትትፍፅማ ዕድመኽን ክንደይ ነይሩ? (ንዝተመርዐዎ ጥራሕ ዝሕተት )	-----ዓመት አይፈልጥን		CCC12P						
86	ናይ ወርሒ ኣበባ (ወርሓዊ ፅግዖት) ንፈለማ እዋን ኣብክንደይ ዓመትክን ተራእዩክን ?	-----ዓመት አይፈልጥን		CCC13P						
87	ኣብ ዕድመኽን ምስክንደይ ሰብሕት ሓዳር ፈቲኝክን ? (ንዘይተመርዐዎት = 0 )	----- ግዘ ዘይተመርዐዎት = 0		CCC14P						
88	ክሳብ ሓዘ ክንደይ ቆልዑት ከምዝወለድክን ክትነግራኒ ደ ትኽእለ ?	----- አይፈልጥን		CCC15P						
89	ናይ መወዳእታ ውልደኽን (ወድኽን ወይድማ ንልክን) ኣበይ ወሊድክን ?	1. 2. 3. 4. 5.	ኣብ ገዛ ኣብ ኬላ ጥዕና ኣብ ጣብያ ጥዕና ኣብ ሆስፒታል ካሊኢ ይገለፅ	CCC16P						
90	ምንጻል ጥንሲ ኣጋጢሙክን ይፈልጥ ደ ?	1. 2.	እው አይፋሉን	CCC17P						

91	ንሕቶ 83 መልስክን እወ እንተኾይኑ ክንደይ ጊዜ ኣጋጢሙክን?	----- ግዘ ኣይፈልጥን	CCC18P
92	ናይ መጀመርታ ዝወለድክንኦ ቆልዓ (በኹሪ) ክንደይ ዓመት ገይሩ ?	----- ዓመት	CCC19P
93	ናይ መወዳእታ ዝወለድክንኦ ቆልዓ ክንደይ ዓመት ገይሩ ?	----- ዓመት	CCC20P
94	ባዕልክን ወይድማ በዓል ገዢን ጥንሲ ንምክልኻል እንታይ ዓይነት ሜላ ትጥቀሙ ? (ብዙሕ መልሲ ክህሉ ይኽእል እዩ)	1. ኣይንጥቀምን 2. መዓልቲ 3. ብምቐጥር 4. ብኣፍ ዝወሓጥ 5. ክኒን 6. ብመርፊእ 7. ዝውጋእ 8. ኣብ ማህፀን 9. ዝቐመጥ ሉፕ 10. ኣብ ኩርናዕ 11. ዝቐበር 12. ኮንዶም 13. ማህፀን 14. ምዕፃው/ቴብሊጋሽን 15. ካሊእ ይገለፅ	CCC21P
ወሊድ መከላኸሊ ክኒና ወይድማ መርፊእ ዝወስዳ ኣዴታት ዝሕተት (To be used for women using oral contraceptives or injectable only)			
95	ኣብ ክንደይ ዓመትክን ንፈለማ እዋን ወሊድ መከላኸሊ ምጥቃም ጀሚርክን ?	----- ዓመት	CCC22P
96	ኣብ ክንደይ ዓመትክን ወሊድ መከላኸሊ ምጥቃም ጠጠው ኣቢልክን ? (ሐዘ ኣብምጥቃም ዝርከባ እንተኾይኑን እቲ ዳታ ዝትመልከሉ እዋን ፀሓፉ)	----- ዓመት	CCC23P
97	ሐዘ ኹ ዝኾነ ዓይነት ሜላ መከላኸሊ ጥንሲ ትጥቀማ ዶ ?	እወ 1 ኣይፋሉ 2	CCC24P
98	ተገሪዝክን ዶ ነይርክን ?	እወ 1 ኣይፋሉ 2	CCC25P
99	ንሕቶ 91 መልስክን እወ እንተኾይኑ ኣብክንደይ ዓመትክን ተገሪዝክን?	----- ዓመት	CCC26P
100	በዓል ገዢን ካሊእ ሰበይቲ (በዓልቲሓዳር) ኣላቶም ዶ ?	እወ 1 ኣይፋሉ 2	CCC27P
101	ንሕቶ 93 መልስክን እወ እንተኾይኑ ክንደይ ኣንስቲ ኣለወኡም?	-----	CCC28P
102	ያታዊ ርክብ ምግባር ጠጠው ካብተብላ ክንደይ እዋን ኮይኑክን ?	1. ሎሚ 2. ትማሊ 3. ነዊሕ እወን ገይሩ	CCC29P
103	ብያታዊ ርክብ ዝመሓለሉሉ ሕማማት ሓሚምክን ዶ ትፈልጣ ?	እወ 1 ኣይፋሉ 2	CCC30P

**6. ፍልጠት ፣ ዝንባላን ተግባራትን ን2ይ ዓይነት ሕማም ሽኩር ዝምልከት (KAP Related to Diabetes Mellitus type 2)**

ሕቶ	መልሲ
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ካብዙይ ብምቕጻል ብዛዕባ ሕማም ሽኮር ዝምልከት ኣገደስቲ ሕቶታት ክቕርብልኩም እዩ።

104	ብዛዕባ ሕማም ሽኮር ክንደይ ዝኣክል ኣፍልጦ ኣለኩም?	ምንም	እንትብሃል	ወሱን	እኹል	D1K
		ፍልጠት የብለይን	ይሰምዕ ካለኹ ፍልጠት የብለይን.	ፍልጠት ኣለኒ	ፍልጠት ኣለኒ.	
		1	2	3	4	

ሕማም ሽኮር (diabetes) ዝምልከት.

105	<p>ካም ዝስዕቡ ብዛዕባ ሕማም ሽኮር (diabetes) ዝምልከቲ ሕቶታት ሓቂ፣ ኔጋ ወይ ድማ ኣይፈልጥን ኢልኩም መልሱ።</p> <p>(ነቶም ሕቶታት ከምኣድላይነቱ ደጊምኩም ኣንብቡሎም)</p>	ሕማም ሽኮር (diabetes) ዝብሃል ኣብ ደም ዝርከብ ሽኮር ካብመጠን ንላዕሊ እንተብዘሊኩ እዩ	ሓቂ	ኔጋ	ኣይፈልጥን	D2K
		-----	1	2	3	
		ሕማም ሽኮር (diabetes) ምድንዛዝ ኣብዓዕቲ እግሪ ከምዕእ ኣይክእልን	1	2	3	
		-----				
		ሕማም ሽኮር (diabetes) እናሃለወካ ስሩዕ ሂወት ምንባር ይከኣል እዩ	1	2	3	
		-----				
		ሕማም ሽኮር (diabetes) ኣብ ልቢ ምንም ዓይነት ጉድኣት ከስዕብ ኣይክእልን	1	2	3	
		-----				
		ሕማም ሽኮር (diabetes) ዓይነ ስወርነት ከስዕብ ኣይክእል እዩ	1	2	3	
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ሕማም ሽኮር (diabetes) ምክልኻል ኣይከኣልን	1	2	3			
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ዝኾነ ሰብ ምልክት ሕማም እንተይተርከዮ ሕማም ሽኮር (diabetes) ክህልዎ ይክእል እዩ	1	2	3			
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ሕማም ሽኮር (diabetes) ዝምልከት ፡ ሰባት ኣብ መዓልታዊ ሂወቶም ዝፍፅምዎም ንሳቶም ድማ ሕማም ሽኮር ናይ ምትሓዝ ዕድሎም ክብ ዘብሉ ተግባራት ብዙሓት እዮም ፡፡ ብኣንጻሩ ድማ ሕማም ሽኮር (diabetes) ናይምትሓዝ ዕድል ክቕንሱ ዝክእሉ ደቂ ሰባት ኣብ መዓልታዊ ሂወቶም ክፍፅምዎም ዝግባእ ብዙሓት ተግባራት ኣለዉ።

106	<p>ሰባት ብሕማም ሽኮር (diabetes) ንክይጥቅዑ ክፍፅዎም ዝግባእ ተግባራት እንታይ እዮም ትብሉ? መልሱ ኣይፋሉ እንተኾይኑ, እዚ ዝስዕብ ሕቶ ሕተቲ, “ኣፍልጦ ስለዘይብልኩም ድዩ ውይ ክፍፅዎም ዝግባእ ተግባራት ስለዘየለ እዩ?”</p>	<p>ምምሕያሽ ኣመጋግባ 1  ኣፋውስ ምውሳድ 2  ልዑል ንጥፊታት ኣካላዊ ምንቅስቃስ ምስራሕ 3  ክብደት ምቕናስ 4  ምትካኽ ሽጋራ ጠጠው ምባል 5  ኣይፈልጥን 6  ሰባት ክፍፅዎም ዝግባእ ምንም ተግባራት የለን 7  ካሊእ (ይገለፅ) _____ 8</p>	D3K
107	<p>ሕማም ሽኮር (diabetes) ከመይ ክትከላኸሉ ከምትክእሉ ሰብ ሞያ ጥዕና ምክሪ ሂሰኹም ዶ. ይፈልጡ?</p>	<p>ኣይፋሉ 1  እወ 2  ኣይፈልጥን/ኣይዝክርን 3</p>	D4P
<p>እዚ እም ኩሎም ሕማም ሽኮር ዝምልከት እዩ (That is all on diabetes).</p>			

**ቃለመሕተት ኣብ ግንዛብ መጠንን ቅርፂ ሰውነትን (Questionnaire on Perception of Body size & Shape)**

4. ግንዛብ ኣብ መጠንን ቅርፂ ሰውነትን. (Perceptions of the interviewee on body size and shape)			
ግንዛብ (PERCEPTIONS)		መልሲ (Response)	QN
1	<p>ልዑል ክብደት ወይ ኣዝዩ ልዑል ክብደት (obesity) ምልክት ፅቡቅ ጥዕና እዩ</p>	<p>1. እወ  2. ኣይፋሉ  3. ኣይፈልጥን</p>	P1
2	<p>ዝኾነ ሰብ ልዑል ክብደት ወይ ኣዝዩ ልዑል ክብደት (obesity) እንተሃልዩዎ ሃፍታም እዩ ኢልካ ምግማት ይክኣል እዩ?</p>	<p>1. እወ  2. ኣይፋሉ  3. ኣይፈልጥን</p>	P2
3	<p>ልዑል ክብደት ወይ ኣዝዩ ልዑል ክብደት (obesity) ምልክት ፅባቕ እዩ</p>	<p>1. እወ  2. ኣይፋሉ  3. ኣይፈልጥን</p>	P3
4	<p>ንተራ ቕፅፅ 3 ዝሃብኩምዎ መልሲ ኣይፋሉ ዝብል እንተኾይኑ ምክንያትኩም እንታይ እዩ?</p>	<p>1. መፅልኢ ስለዝኾነ  2. ዘሕፍር ስለዝኾነ  3. ፍርሒ  4. ካሊእ (ይገለፅ) _____</p>	P4
5	<p>ቅጥነት ሰውነት ምልክት ሕማም ወይ ድማ ጥዕና ዘይምርካብ እዩ</p>	<p>1. እወ  2. ኣይፋሉ  3. ኣይፈልጥን</p>	P5
6	<p>ናይ መዋስብትኹም መጠን ሰውነት ከመይ እንተዝኸውን ትመርፁ?</p>	<p>1. ኣዝዩ ልዑል ክብደት  2. ልዑል ክብደት  3. ቅቡል መጠን Normal  4. ትሑት ክብደት  5. ኣይፈልጥን</p>	P6

7	ናይ ባዕልኹም መጠን ሰውነት ከመይ ትገልፅዎ?	<ol style="list-style-type: none"> <li>1. አዝዩልዑል ክብደት</li> <li>2. ልዑል ክብደት</li> <li>3. ቅቡል መጠን Normal</li> <li>4. ትሑት ክብደት</li> <li>5. አይፈልጥን</li> </ol>	P7
8	ሐዘ ዘለኩም መጠንን ቅርፂ ሰውነትን (size and shape) ከመይ ተስተማቕርዎ?	<ol style="list-style-type: none"> <li>1. ይፈትዎ/ደስ ይብለኒ</li> <li>2. ይፀልክ</li> <li>3. አይፈልጥን</li> </ol>	P8
9	ብዛዕባ ዘለኩም መጠንን ቅርፂ ሰውነትን (size and shape) ዝምልከት ሰባት ዝሃቡኹም ርኢቶ ኣሎ ዶ?	<ol style="list-style-type: none"> <li>1. እወ</li> <li>2. ኣይፋሎ</li> <li>3. አይፈልጥን</li> </ol>	P8
10	ንተራ ቕፅፅ 9 ዝሃብኩም መልሲ እወ ዝብል እንተኾይኑ ርኢቶኦም እንታይ ዝብል ነይሩ?	<ol style="list-style-type: none"> <li>1. አዝዩልዑል ክብደት ኣለኩም</li> <li>2. ልዑል ክብደት ኣለኩም</li> <li>3. ቅቡል መጠን/Normal</li> <li>4. ትሑት ክብደት</li> <li>5. አይፈልጥን</li> </ol>	P10
11	ልዑል ክብደት ወይ ኣዝዩ ልዑል ክብደት (obesity) ዘለኩም ምኻኑ እንተተረዲእኩም ወይ ድማ እንተተነገሩኩም እንታይ ስጉምቲ ምወሰድኩም?	<ol style="list-style-type: none"> <li>1. ክብደተይ ንክይቅንስ ባዕሪ ይገበር</li> <li>2. ናብ ሓኪም ብምኻድ ምኽሪ ወይ ድማ ሕክምና ይወስድ</li> <li>3. ንጥፈታት ኣካላዊ ምንቅስቃስ ይሰርሕ</li> <li>4. ኣመጋግባይ ይቕይር</li> <li>5. ካሊእ (ይገለፅ _____)</li> </ol>	P11
12	ልዑል ክብደት ወይ ኣዝዩ ልዑል ክብደት (obesity) ዘምፀኡ ሳዕቤን ኣሎ ዶ?	<ol style="list-style-type: none"> <li>1. እወ</li> <li>2. ኣይፋሎ</li> <li>3. አይፈልጥን</li> </ol>	P12
13	ንተራ ቕፅፅ 13 መልስኹም እወ ዝብል እንተኾይኑ ካብቶም ሳዕቤናት ዉስናት ጥቕሱ ኣይ?	<p style="text-align: center;"><u>እወ</u></p> <p><u>ኣይፋሎ:</u></p> <ol style="list-style-type: none"> <li>A. ሕማም ሽኮር</li> <li>B. ልዑል ፀቕጢ ደም</li> <li>C. ሕማም ልቢ</li> <li>D. ካንሰር</li> <li>E. ካሊእ (ይጠቐስ _____)</li> </ol>	P13
14	ከም ጥረ ስጋ ፣ ስጋ ብዕራይን ካልኦት ውፅኢት እንስሳት ዝኣምሰሉ ብተደጋጋሚ ምምጋብ መጠንን ቅርፂ ሰውነትን ኣብምስትኻኻል ልዑል ተራ ኣለዎ	<ol style="list-style-type: none"> <li>1. እወ</li> <li>2. ኣይፋሎ</li> <li>3. አይፈልጥን</li> </ol>	P14
15	ኣሕምልቲን ፍራምረን ብተደጋጋሚ ምምጋብ ዘይምዕሩይ ቅርፂን መጠንን ሰውነት ክህልወና ይገብር እዩ	<ol style="list-style-type: none"> <li>1. እወ</li> <li>2. ኣይፋሎ</li> <li>3. አይፈልጥን</li> </ol>	P15

ንምስታፍኩም ኣዝዩ የምስግነኩም

ቃለ መጠይቅ - II

ኬዝ ኮንትሮል መፅናዕት ዘይተመሓለፍቲ ሕማማት

ዩኒቨርሲቲ ደቡብ ኣፍሪካ

ክፍሊ ትምህርቲ ጥዕና

ቃለ መጠይቅ ኣብ መፅናዕታዊ ርእሲ ኢ 'ፒደሚዮሎጂ ንምክልኻል ዝክኣል ሓደጋ ተቓላፊነት ዘይተመሓለፍቲ ሕማማት ኣብ ዓበይቲ ኣብ ትግራይ ሰሜን ኢትዮጵያ

ጥዲና ይሃበለይ !

ኣነ ሽመይ \_\_\_\_\_ ይበሃል :: ኣነ ኣብ ዩኒቨርስቲ ደቡብ ኣፍሪካ ናይ ዶክተራት ተምሃራይ ዝኾኑ ኣይተ ኣለማዮህ በቀለ መንገሻ ዘካይድዎ መፅናዕቲ ኣባል መፅናዕታዊ ጉጅለ እየ:: ኣነ ዝርገሐ ሓደጋ ተቓላፊነት ምክልኻል ዝክኣል ዘይተመሓለፍቲ ሕማማት ኣብ ዓበይቲ ብዝብል ርእሲ ዝተዳለወ ኣብ-ትግራይ ዝካየድ መፅናዕቲ (Epidemiology of preventable Risk factors for Non-Communicable Disease among the Adult population in Tigray, Northern Ethiopia) መረዳኢታ ኣብምትእኻኻብ ይርከብ :: እዚ መፅናዕቲ እዚ ዝርገሐ ሓደጋታት ተቓላፊነት ዘይተመሓለፍቲ ሕማማት ኣብ ምንጻር ዕዙዝ ኣበርክቶ ከምዝህልዎ ይእመን :: ብተወሳኺ'ውን ሕ/ሰብ ኣብ ሓደጋ ተቓላፊነት ዘይተመሓለፍቲ ሕማማት ዘለዎ ኣፍልጦ ፣ግንዛብ ፣ ዝንባለን ባህርያትን ዳህሳስ ክካየድ እዩ::

እዚ ቃለ መጠይቅ ክልተ ትሕዝቶ ዘለዎ እንትኸውን ንሳቶም እዉን ብኣካል/ፊት ንፊት ዝካየድ ቃለ መጠይቅ ከም ዓቕን ፀቕጢ ደም ፣ ትርግታ ልቢ፣ ዙርያ ማዕጥቕ ፣ ጎሎ ፣ ቁመትን ክብደትን ዝኣምሰሉ ኣካላዊ ምርመራታትን ከምኡውን ባዮ ኬሚካላዊ ዓቕናትን እዮም :: ንምርመራ ዝኸውን ሕዲተይ ናሙና ደም ካብ ኣዳብራትኹም ክወሰድ እዩ:: እዚ መጠን ሽኮር ፣ መጠን ኮለስትሮልን ትራይ ግላይሰራይድን ኣብደምኩም ንምንጻር ዘኸእል እዩ :: ብምኻኑ ኣብላዕሊ ንዝተሓበሩ ሓሳባት ኣመልኪቱ ንዝካየድ መፅናዕቲ ሓበሬታ ንምርካብ ናትኩም ተሳትፎ ኣዝዩ ኣገዳሲ እዩ:: ዝኾነ ይኹን እትህብዎ ሓበሬታ ብዝምልከት ምሽጥራዊነቱ ዝተሓለወ እንትኸውን ሽምኩም ምስውልቀ መረዳኢታኹም ተዛሚዱ ኣይፀራሕን፡፡ ግልሓዒ ንዘይኮነልኩም ሕቶታት ነቲ ቃለ መጠይቅ ዝገብረልኩም ሰብ ምሕታት ትኸእሉ ኢኹም:: ኣብ እዋን ቃለ መጠይቅ ናቕን ኣካላዊን ባዮ ኬሚካልን ምርመራታት ዝምልከት ቅርዝብለኩም እንተኾይኑ ዘይምስታፍ ወይድማ ኣመንጊኹም ምቁራፅ ትኸእሉ ኢኹም :: እዚ ከይዲ ምእካብ መረዳኢታ ካብ 25-40 ደቐቓ ዝወስድ እዩ :: ኣብዚ መፅናዕቲ ምስታፍኩም ብውልቅኹም እትረኽቡዎ ጥቕሚ የለን ይኹንምበር ካብዚ መፅናዕቲ ዝርከብ መረዳኢታ ብምጥቃም ኣንፈት ምክልኻል ሓደጋ ተቓላፊነት ዘይተመሓለፍቲ ሕማማት ብምንጻር ንህዝብናን ሃገርናን ኣዝዩ ጠቓሚ እዩ::

ናሙናደም እንትውሰድ ክስመዐኩም ካብዝኸእል ዉሱን ቃንዛ ወፃኢ ካለኦ ክበፀሐኩም ዝኸእል ፀገም ጥዕና የለን :: በዘይካ ውፅኢት ምርመራ ደም ካልኦት ዓቕናት ውፅኢቶም ክንገረኩም እዩ:: ምርመራ ኤች.ኣይ.ቪ ግና ኣይግበረልኩምን :: ዕላማ እዚ መፅናዕቲ ተረዲኡኩም ዶ? እዉ  ኣይፋሉን

ኣብዚ ቃለ መጠይቅ ንምስታፍ ፈቓደኛ ዲኹም ? እዉ  ኡን   
ናይ ተሳታፊ ፊርማ \_\_\_\_\_.

**ክፍሉ ሐደ:**

**ባህሪያት ሶሲዮ ዲሞግራፊ (Part one: Socio-demographic Characteristics)**

ናቁጣን ዕለት ( Location and Date)		መልሱ (Response)	ኮድ
1	መለለይ ቁፅር ክላስተር/ማእኸል/ቁሾት	_____	11
2	ሽም ክላስተር/ማእኸል/ቁሾት		12
3	መለለይ ቁፅር ሓታቲ	_____	13
4	በዝሐ ግዜ ዑደት	1 2 3	14
5	እዚ ቅጥዒ ዝተመልዐሉ እዋን	_____    _____    _____ ዕለት                      ወርሒ                      ዓ ም	15
መለለይ ቁፅር ተሓታቲ/ት (Participant Id Number)		_____	
ቅቡልነት ተሳታፊን ሽም ቋንቋ ቃለ መስተትን (Consent, Interview Language and Name)		መልሱ ተሓታቲ (Response)	ኮድ
6	ኣብ ላልሊ ዝተፀሓፈ ኣንቢብኩም ቅቡልነት ቃለ መስተት ካብተሓታቲ ኣረጋግፁ	እወ 1 ኣይፋሉ 2    መልሱ ኣይፋሉ እንተኸይኑ ወድእ	15
7	እዚ ቃለ መስተት በዮናይ ቋንቋ ተካይድዎ?	ትግርኛ 1 ኣምሓርኛ 2 [ካሊኦ ይገለፅ] 3	16
8	ቃለ መስተት ዝተካየደሉ እዋን (24 ሰዓታት ይጠቐስ)	_____    _____ ሰዓት                      ደቂቃ	
9	ሽም ኣባሒጎ		
10	ሙሉኡ ሽም		
ጠቐምቲ ዝኾኑ ተወሰኺ ሓበሬታ (Additional Information that may be helpful)			

11	ቁዕሪ ስልክ ብቻረባ ተፀዋራ/ዘመድ (እንተተካሉ)		I10																											
12	መንበሪ ገዛ ተሳታፊ ገርከቦሉ (GPS measurement)	<p>ብራሽ</p> <p>(Altitude) _____ ሜትር</p> <p>Longitude _____ Degrees East</p> <p>Latitude _____ Degrees North</p>																												
<b>ቀንዲ: ሓበሬታ ስነ ህዝቢ (Core: Demographic Information)</b>																														
<b>ሕቶታት</b>		<b>መልሲ ተሓታቲ</b>	<b>ኮድ</b>																											
12	ፆታ (ተባዕታይ / አንስታይ)	ተባዕታይ 1 አንስታይ 2	C1																											
13	ዝተወለድክሙሉ እዋን/ዘመን መሓዝ እዩ? ኣይፈልጥን 77	<p>_____</p> <p>ዕለት      ወርሒ      ዓ ም</p> <p>ዝፍለጥ እንተኾይኑ , ናብ C4 ሕለፍ</p>																												
14	ዕድመኹም ክንደይ እዩ?	ብዓመት _____	C3																											
15	ብሓፈሻ ኣብ ስሩዕ ቤት ትምህርቲ እናተምሃርኩም ክንደይ ዓመታት ኣሕለፍኩም (መንፈሳዊ/ዘይስሩዕ ቤት ትምህርቲ ዘይሓወስ)?	ብዓመት _____	C4																											
16	ክንደይ ክፍሊ ተምሃርኩም ወዲእኹም?	<table border="0"> <tr> <td>ዘይተምሃረ</td> <td>1</td> <td>1</td> </tr> <tr> <td>ምንባብን ምዕሓፍን</td> <td>2</td> <td></td> </tr> <tr> <td>1ይ ሳይክል ወዲኡ</td> <td>3</td> <td></td> </tr> <tr> <td>2ይ ሳይክል ወዲኡ</td> <td>4</td> <td></td> </tr> <tr> <td>ሃይስኩል(10ይ ክፍሊ) ወዲኡ</td> <td></td> <td>5</td> </tr> <tr> <td>መሰናድኦ ትምህርቲ ወዲኡ</td> <td>6</td> <td></td> </tr> <tr> <td>ኮለጅ/ዩኒቨርስቲ ወዲኡ</td> <td>7</td> <td></td> </tr> <tr> <td>ዲግሪ ድሕረ ምረቓ</td> <td>8</td> <td></td> </tr> <tr> <td>ፈቓደኛ ኣይኮንኩን</td> <td>88</td> <td></td> </tr> </table>	ዘይተምሃረ	1	1	ምንባብን ምዕሓፍን	2		1ይ ሳይክል ወዲኡ	3		2ይ ሳይክል ወዲኡ	4		ሃይስኩል(10ይ ክፍሊ) ወዲኡ		5	መሰናድኦ ትምህርቲ ወዲኡ	6		ኮለጅ/ዩኒቨርስቲ ወዲኡ	7		ዲግሪ ድሕረ ምረቓ	8		ፈቓደኛ ኣይኮንኩን	88		C5
ዘይተምሃረ	1	1																												
ምንባብን ምዕሓፍን	2																													
1ይ ሳይክል ወዲኡ	3																													
2ይ ሳይክል ወዲኡ	4																													
ሃይስኩል(10ይ ክፍሊ) ወዲኡ		5																												
መሰናድኦ ትምህርቲ ወዲኡ	6																													
ኮለጅ/ዩኒቨርስቲ ወዲኡ	7																													
ዲግሪ ድሕረ ምረቓ	8																													
ፈቓደኛ ኣይኮንኩን	88																													

17	እትክተልዎ ሃይማኖታዊ እምነት እንታይ እዩ?	ኦርቶዶክስ 1 ካቶሊክ 2 እስልምና 3 ጳንጤ 4 ካሊእ 5 ፈቃደኛ ካይኮንኩን 88	C6
18	ብሄረ ሰብኩም (ዝተወለድኩሙሉ ብሄረ ሰብ) እንታ እዩ?	ትግራይ 1 ኣምሓራ 2 ካሊእ ይገለፅ _____ 3 ፈቃደኛ ካይኮንኩን 88 88	C7
19	ከንታት ሓዳር?	ዘይተመርፀዎ/ት 1 በዓል/ቲ ሓዳር 2 ተፈላልዮም ዝነበሩ 3 ዝተፋተሐ/ት 4 መዋሰብቲ ዝሞተቶ/ታ 5 ዘይስሩፅ ሓዳር/ ሓቢርካ ምንባር 6 ፈቃደኛ ካይኮንኩን 88	C8
20	ኣብዝሓለፈ 12 ወርሒ ካብዞም ዝስዕቡ ቀንዲ መተሓዳደሪ ስራሕኹም እንታይ ነይሩ? (ገላፂ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)	ስራሕተኛ መንግስቲ 1 ስራሕተኛ ዘይመንግስታዊ ትካ2 ብውልቀ ስራሕ ዝመሓደር 3 ተምሃራይ 4 ናይ ገዛ ስራሕቲ (Housewife) 5 ጡረተኛ 6 ሓረስታይ 7 ስራሕ ኣልቦ 8 ፈቃደኛ ካይኮንኩን 88	

21	ኣብ ገዢኹም ንባዕልኹም ሓዊሱ ካብ 25-65 ዓመት ዝዕድሚኡም ክንደይ ሰባት ይነበሩ?	በዘሒ ሰባት ብቐፅሪ <input type="text"/>	C9
<b>መቐፀልታ: ሓበሬታ ስነ ህዝቢ (EXPANDED: Demographic Information, Continued)</b>			
	<b>ሕቶታት</b>	<b>መልሲ ተሓታቲ</b>	<b>ኮድ</b>
22	ኣብ ዝሓለፈ ዓመት ብማእኸላይ ዝረኸብኩምዎ እቶት ብቐርሺ ሓሲብኩም ክትነግሩኒ ትኽእሉ ዩ? (ሓደ መልሲ ጥራሕ ፀሓፍ/ሰለስቲኡ ምምላእ ኣየድልን)	ሰሙናዊ <input type="text"/> ናብ T1 ሕለፍ:	C10a
		ወይ ወርሓዊ <input type="text"/> ናብ T1 ሕለፍ:	C10b
		ወይ ዓመታዊ <input type="text"/> ናብ T1 ሕለፍ:	C10c
		ፈቓደኛ ኣይኮንኩን 88	C10d
23	ትኽክለኛ መጠን ዓመታዊ እቶትኩም ክትፈልጥዎ እንተዘይ ክኢልኩም ካብዞም ዝስዕቡ መማረቂታት ክትግምቱ ትኽእሉ ዩ? (እቶም መማረቂታት ኣብቡሎም)	≤ ኩንታል (Q) 1 1 ልዕሊ Q 1, ≤ Q 2 2 ልዕሊ Q 2, ≤ Q 3 3 ልዕሊ Q 3, ≤ Q 4 4 ልዕሊ Q 4 5 ኣይፈልጥን 77 ፈቓደኛ ኣይኮንኩን 88	C11

<b>ክፍሊ ክልተ:</b>			
<b>ሓደገኛ ባህሪታት ንሕማም ልዑል ፀቕጢ ደም (Part II. Risk Behaviours for Hypertension)</b>			
<b>ሕቶታት</b>	<b>መልሲ ተሓታቲ</b>	<b>CODE</b>	
24	ሽጋራ ኣትኪኸኩም ትፈልጡ ዩ?	1. እወ 2. ኣይፋሉ 3. ኣይፈልጥን	CCR1
25	ሐዘ ኸ ሽጋራ ተትክኹ ዩ?	1. እወ 2. ኣይፋሉ 3. ኣይፈልጥን	CCR2
26	ንሕቶ ቁፅሪ 25 መልሲኹም እወ እንተኾይኑ ኣብ መዓልቲ ክንደይ ዝኣክል በዘሒ ሽጋራ ተትክኹ?	<input type="text"/>	CCR3
27	ንኸንደይ ዓመታት ሽጋራ ኣትኪኸኩም?	<input type="text"/>	CCR4

28	ኣልኮላዊ መስተ ሰቲኹም ትፈልጡ ዶ?	1. እወ 2. ኣይፋሉ 3. ኣይፈልጥን	CCR5																											
29	ኣብዚሓይዚ እዋን ኣልኮላዊ መስተ ትሰትዩ ዲኹም?	1. እወ 2. ኣይፋሉ 3. ኣይፈልጥን	CCR6																											
30	ኣልኮላዊ መስተ መዓልታዊ ትሰትዩ ዶ?	1. እወ 2. ኣይፋሉ 3. ኣይፈልጥን	CCR7																											
31	ብኣብዚሓይዚ እዋን እትሰትይዎ ኣልኮላዊ መስተ እንታይ ዓይነት እዩ? (ካብዞም ዝስዕቡ ዝምልከተኩም እንተሃልዩ ህምልክት ግበሩ)	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 15%; text-align: center;"><u>እወ</u></th> <th style="width: 15%; text-align: center;"><u>ኣይፋሉ</u></th> </tr> </thead> <tbody> <tr><td>1. ቢራ</td><td style="text-align: center;">_____</td><td style="text-align: center;">_____</td></tr> <tr><td>2. ስዋ</td><td style="text-align: center;">_____</td><td style="text-align: center;">_____</td></tr> <tr><td>3. ሚያስ</td><td style="text-align: center;">_____</td><td style="text-align: center;">_____</td></tr> <tr><td>4. ቮድካ</td><td style="text-align: center;">_____</td><td style="text-align: center;">_____</td></tr> <tr><td>5. ወይኒ</td><td style="text-align: center;">_____</td><td style="text-align: center;">_____</td></tr> <tr><td>6. ኣረቂ</td><td style="text-align: center;">_____</td><td style="text-align: center;">_____</td></tr> <tr><td>7. ዊስኪ</td><td style="text-align: center;">_____</td><td style="text-align: center;">_____</td></tr> <tr><td>8. ካሊኒ, ይገለፅ</td><td style="text-align: center;">_____</td><td style="text-align: center;">_____</td></tr> </tbody> </table>		<u>እወ</u>	<u>ኣይፋሉ</u>	1. ቢራ	_____	_____	2. ስዋ	_____	_____	3. ሚያስ	_____	_____	4. ቮድካ	_____	_____	5. ወይኒ	_____	_____	6. ኣረቂ	_____	_____	7. ዊስኪ	_____	_____	8. ካሊኒ, ይገለፅ	_____	_____	CCR8
	<u>እወ</u>	<u>ኣይፋሉ</u>																												
1. ቢራ	_____	_____																												
2. ስዋ	_____	_____																												
3. ሚያስ	_____	_____																												
4. ቮድካ	_____	_____																												
5. ወይኒ	_____	_____																												
6. ኣረቂ	_____	_____																												
7. ዊስኪ	_____	_____																												
8. ካሊኒ, ይገለፅ	_____	_____																												
32	መዓልታዊ እትሰትይዎ መጠን ኣልኮላዊ መስተ ክንደይ ይኸውን? (ዓይነትን መስተን መዓልታዊ እትሰትይዎ መጠን ኣልኮልን ጥቐሱ)	_ _	CCR9																											
33	ንክንደይ ዓመታት ኣልኮላዊ መስተ ሰቲኹም?	በዝሒ ዓመት  _ _ _	CCR10																											
34	ጫት ቕሒምኩም ትፈልጡ ዶ?	1. እወ 2. ኣይፋሉ 3. ኣይፈልጥን	CCR11																											
35	ኣብዚሓይዚ እዋን ጫት ትቕሕሙ ዲኹም?	1. እወ 2. ኣይፋሉ 3. ኣይፈልጥን	CCR12																											
36	ኣብክንደይ እዋን ጫት ትቕሕሙ?	1. መዓልታዊ 2. ሓደ ግዜ ኣብ ሰሙን 3. ሓሊፉ ሓሊፉ 4. ኣይፈልጥን 88. ፈቓደኛ ኣይኮንኩን	CCR13																											
37	ንክንደይ ዓመታት ዝኣክል ጫት ቕሒምኩም?	በዝሒ ዓመት  _ _ _	CCR14																											
38	ክንደይ እዋን ኣብ መዓልታዊ ምግብኹም ጨው ትጥቀሙ?	1. ኩሉ ግዜ 2. ዉሱን እዋናት 3. ሓሊፉ ሓሊፉ 3. None	CCR15																											
39	መዓልታዊ እትምገብዎ ምግብ እንታይ ዓይነት እዩ?	1. ስጋ/ስብሒ ወይድማ ዝኾነ ውፅኢት እንስሳት 2. ኹሉ ዓይነት (ሕውስዋስ) 3. ኣትክልቲ ጥራሕ	CCR16																											

40	<p>ስራሕኹም ኣዝዩ ኣድካሚ ናይ ጉልበት ስራሕ ከም ወሰኽ ትርግታ ልቢን እስትንፋስን ዘስዕብ ድዩ?</p> <p><b>ንኣብነት</b> ከምከቢደ ሸኽሚ ምሽካም ፣ክብደት ምልዓል ወይ 10 ደቂቓ ዘኣክል ብቐጻልነት ምሹዓት ማዕረ እዚኦም ዘድክም ኩነታት ኣለዎ ዶ? (ገላጺ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)</p>	<p>እወ 1</p> <p>ኣይፋሉ 2 ኣይፋሉ እንተኾይኑ ናብ P 4 ኺድ</p>	P1
41	<p>ኣብሰሙን ክንደይ መዓልቲ ኣዝዩ ኣድካሚ ናይ ጉልበት ስራሕ ከምስራቕ ስራሕኹም ገይርኩም ትሰርሑ?</p>	<p>በዝሒ መዓልቲ <input type="checkbox"/></p>	P2
42	<p>ኣብ መዓልቲ ክንንደይ ሰዓታት ኣዝዩ ኣድካሚ ናይ ጉልበት ስራሕ ትሰርሑ?</p>	<p><input type="checkbox"/> ሰዓታት <input type="checkbox"/> ደቂቓ</p>	P3 (a-b)
43	<p>ስራሕኹም ማእኸላይ ኣድካሚ ናይ ጉልበት ስራሕ ከምትርግታ ልቢን እስትንፋስን ዝውስኽ ድዩ?</p> <p><b>ንኣብነት</b> ክንዲ ፍኹስ ዘበለ ክብደት ምሽካም ወይ ንዓሰርተ ደቂቓ ዘኣክል ዞግዞግታ ጉያ ማዕረ ኩነታት ድኻም ኣለዎ ዶ ? (ገላጺ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)</p>	<p>እወ 1</p> <p>ኣይፋሉ 2 ኣይፋሉ እንተኾይኑ ናብ ሕቶ P 7 ሕለፍ</p>	P4
44	<p>ኣብሰሙን ክንደይ መዓልቲ ማእኸላይ ዘድክም ናይ ጉልበት ስራሕ ከም ስራቕ ስራሕኹም ገይርኩም ትሰርሑ ዶ?</p>	<p>በዝሒ መዓልቲ <input type="checkbox"/></p>	P5



51	<p>አዝዩ ዘድክም ስፖርታዊ ምንቅስቃሴ ፣ መመላዎሽ፣ ብቕዓት ሰውነት ወይ ድማ ንጥፊታት መዘናግዒ ኣብ መዓልቲ ንክንዳይ ሰዓታት ትሰርሑ?</p>	<p>ሰዓት : ደቂቓ <input type="text"/> : <input type="text"/>  <input type="text"/> ሰዓት ደቂቓ</p>	P12 (a-b)
52	<p>ዉሱን ምውሳኽ ትርግታ ልቢ፣ ምትንፋስ ከምኡውን ማእኸላይ ድኻም ከምዕእ ዝክእል ዝኾነ ዓይነት ስፖርታዊ ምንቅስቃሴ ፣ መመላዎሽ፣ ብቕዓት ሰውነት ወይ ድማ መዘናግዒ ንጥፊታት [ከም ምዝዋር ብሽክሊታ፣ ሓመሳ ፣ ቮሊቦል] እንተነኣሰ ን10 ደቂቓ በዘይምቁራዕ ትሰርሑ ዶ? (ገላዒ መርኣይ ምስሊ ዝሓዘ ካርዲ ብምጥቃም ኣገናዝቡ)</p>	<p>እወ 1</p> <p>ኣፋሉ 2  ኣይፋሉ  እንተኾይኑ ናብ P 16 ሕሰፍ</p>	P13
53	<p>ማእኸላይ ድኻም ዘስዕብ ስፖርታዊ ምንቅስቃሴ ፣ መመላዎሽ፣ ብቕዓት ሰውነት ወይ ድማ ንጥፊታት መዘናግዒ ኣብሰሙን ክንደይ መዓልቲ ትሰርሑ?</p>	<p>በዝሒ መዓልቲ <input type="text"/></p>	P14
54	<p>ማእኸላይ ድኻም ዘስዕብ ስፖርታዊ ምንቅስቃሴ ፣ መመላዎሽ፣ ብቕዓት ሰውነት ወይ ድማ ንጥፊታት መዘናግዒ ኣብ መዓልቲ ንክንደይ ሰዓታት ትሰርሑ?</p>	<p>ሰዓት : ደቂቓ <input type="text"/> : <input type="text"/>  <input type="text"/> ሰዓት ደቂቓ</p>	P15 (a-b)
55	<p>ኩሉ ግዜ ኣብ መዓልቲ ኮፍ ኢልኩም ወይ ድማ ተጋዲምኩም ክንደይ እዋን ተሕልፉ?</p>	<p><input type="text"/> <input type="text"/>  ሰዓት ደቂቓ :</p>	P16 (a-b)
56	<p>ዓቕን ቁመት</p>	<p>ብሴንቲ ሜትር (cm) <input type="text"/> . <input type="text"/></p>	M3
57	<p>ዓቕን ክብደት መመዘኒ ብመሳርሒ 666.6 እንትልካዕ ክንደይ እዩ?</p>	<p>ብኪሎ ግራም (kg) <input type="text"/> . <input type="text"/></p>	M4

		No 2	
58	መጠን ዙርያ ማዕተኛ	ብሴንቲሜትር (ሴሜ)      _____ . _____	M7
59	መጠን ዙርያ ጎሎ	ብሴንቲሜትር (ሴሜ)      _____ . _____	

**ቃለመሕተት ኣብ ግንዛብ መጠንን ቅርፂ ሰውነትን (Questionnaire on Perception of Body size & Shape)**

4. ግንዛብ ኣብ መጠንን ቅርፂ ሰውነትን. (Perceptions of the interviewee on body size and shape)			
ግንዛብ (PERCEPTIONS)		መልሲ (Response)	QN
1	ልዑል ክብደት ወይ ኣዝዩ ልዑል ክብደት(obesity) ምልክት ዕቡቅ ጥዕና እዩ	1.እወ 2. ኣይፋሉ 3. ኣይፈልጥን	P1
2	ዝኾነ ሰብ ልዑል ክብደት ወይ ኣዝዩ ልዑል ክብደት(obesity) እንተሃልዩዎ ሃፍታም እዩ ኢልካ ምግማት ይከኣል እዩ?	1.እወ 2. ኣይፋሉ 3. ኣይፈልጥን	P2
3	ልዑል ክብደት ወይ ኣዝዩ ልዑል ክብደት(obesity) ምልክት ዕባቕ እዩ	1.እወ 2. ኣይፋሉ 3. ኣይፈልጥን	P3
4	ንተራ ቕዕሪ 3 ዝሃብኩምዎ መልሲ ኣይፋሉ ዝብል እንተኾይኑ ምክንያትኩም እንታይ እዩ?	5. መዕልኢ ስለዝኾነ 6. ዘሕፍር ስለዝኾነ 7. ፍርሒ 8. ካሊእ (ይገለፅ_____)	P4
5	ቅጥነት ሰውነት ምልክት ሕግም ወይ ድማ ጥዕና ዘይምርካብ እዩ	1.እወ 2. ኣይፋሉ 3. ኣይፈልጥን	P5
6	ናይ መዋስብትኹም መጠን ሰውነት ከመይ እንተዝኾውን ትመርፀ?	6. ኣዝዩልዑል ክብደት 7. ልዑል ክብደት 8. ቅቡል መጠን Normal 9. ትሑት ክብደት 10. ኣይፈልጥን	P6
7	ናይ ባዕልኹም መጠን ሰውነት ከመይ ትገልፅዎ?	6. ኣዝዩልዑል ክብደት 7. ልዑል ክብደት 8. ቅቡል መጠን Normal 9. ትሑት ክብደት 10. ኣይፈልጥን	P7

8	ሐዘ ዘለኩም መጠንን ቅርፂ ሰውነትን (size and shape) ከመይ ተስተማቅርዎ?	4. ይፈትዎ/ደስ ይብላኒ 5. ይፀልክ 6. አይፈልጥን	P8
9	ብዛዕባ ዘለኩም መጠንን ቅርፂ ሰውነትን (size and shape) ዝምልከት ሰባት ዝሃቡኹም ርኢቶ ኣሎ ዶ?	1.እወ 2. ኣይፋሉ 3. አይፈልጥን	P8
10	ንተራ ቕዕሪ 9 ዝሃብኩም መልሲ እወ ዝብል እንተኾይኑ ርኢቶኦም እንታይ ዝብል ነይሩ?	6. ኣዝዩልዑል ክብደት ኣለኩም 7. ልዑል ክብደት ኣለኩም 8. ቅቡል መጠን/Normal 9. ትሑት ክብደት 10. አይፈልጥን	P10
11	ልዑል ክብደት ወይ ኣዝዩ ልዑል ክብደት(obesity) ዘለኩም ምኻኑ እንተተረዲእኩም ወይ ድማ እንተተነገሩኩም እንታይ ስጉምቲ ምወሰድኩም?	6. ክብደተይ ንክይቅንስ ግዕሪ ይገበር 7. ናብ ሓኪም ብምኻድ ምኽሪ ወይ ድማ ሕክምና ይወስድ 8. ንጥፊታት ኣካላዊ ምንቅስቃስ ይሰርሕ 9. ኣመጋግባይ ይቕይር 10. ካሊእ(ይገለፅ_____)	P11
12	ልዑል ክብደት ወይ ኣዝዩ ልዑል ክብደት(obesity) ዘምፀኡ ሳዕቤን ኣሎ ዶ?	1.እወ 2. ኣይፋሉ 3. አይፈልጥን	P12
13	ንተራ ቕዕሪ 13 መልስኹም እወ ዝብል እንተኾይኑ ካብቶም ሳዕቤናት ዉሱናት ጥቕሱላይ?	<u>እወ</u> <u>ኣይፋሉ</u> F. ሕማም ሽኮር G. ልዑል ፀቕጢ ደም H. ሕማም ልቢ I. ካንሰር J. ካሊእ (ይጠቕስ_____)	P13
14	ከም ጥረ ስጋ ፣ ስጋ ብዕራይን ካልኦት ውዕኢት እንስሳት ዝኣምሰሉ ብተደጋጋሚ ምምጋብ መጠንን ቅርፂ ሰውነትና ኣብምስትኻኻል ልዑል ተራ ኣለዎ	1.እወ 2. ኣይፋሉ 3. አይፈልጥን	P14
15	ኣሕምልቲን ፍራምጊን ብተደጋጋሚ ምምጋብ ዘይምዕሩይ ቅርፂን መጠንን ሰውነት ክህልወና ይገብር እዩ	1.እወ 2. ኣይፋሉ 3. አይፈልጥን	P15

**ሓደጋ ልዑል ፀቕጢ ደም ብምኽንያት ስነአእምሮአዊ ጭንቁ**  
(Mental Stress (risk factors) for Hypertension)

SRQ20	እወ	ኣይፋሉ	ኮድ
1 ብተደጋጋሚ ርኢሲ ሕማም ኣለኩም ዶ?			MS1
2 ዘለኩም ሽውሃት ምግቢ ትሑት ድዩ?			MS2

3	ድቃስ የአብዮትም ደ?			MS3
4	ብቸሊሉ ፍርሐ ይስመወኩም ደ?			MS4
5	ኢድኩም ይንቅጥቀጥ ደ?			MS5
6	ናይ ምጭናቸ ወይ ድማ ምንዳድ ስምዒት ይስመወኩም ደ?			MS6
7	ምግቢ ምሕቻቸ የፅግመልኩም ደ?			MS7
8	ንፁር ሓሳብ ንክትሓስቡ ትፅገሙ ደ? ወይ ድማ ሓሳብኩም ስንፈላል ደ ይብል?			MS8
9	ሕገስ አይኮንኩን ኢልኩም ደ ትሓስቡ?			MS9
10	ካብ መጠን ንላዕሊ ትብክዩ ደ?			MS10
11	ብሓፈሻ ዕለታዊ ተግባርኩም ዘየሕገስ ኮይኑ ደ ትረክብዎ?			MS11
12	ውሳኔ ንመሃብ ትፅገሙ ደ?			MS12
13	ናይ ስራሕ ውዕሎኹም አፀጋሚ ድዩ?			MS13
14	ንሂወትኩም ጠቐምቲ ዝኾኑ ነገራት ምስካልኦት ሰባት ንክይትብተዩ ትፅገሙ ደ?			MS14
15	ብዝኾኑ ነገራት ዘይምዕጋብ (ዘየሕገስ) ኮይኑ ደ ይስመወኩም?			MS15
16	ንባዕልኹም ዘይረብሕ ሰብ ዝብል ስምዒት ይስመወኩም ደ?			MS16
17	ኣብ ሂወትኩም ተስፋ ምቕራፅ ይስመወኩም ደ?			MS17
18	በዘይምቁራፅ ድኻም ሰውነት ይስመወኩም ደ?			MS18
19	ከብድኹም ዘይስሩፅ ስሚዒት ይስመወኩም ደ?			MS19
20	ብቸሊሉ ድኻም ይስመወኩም ደ?			MS20

ንምስታፍኩም ኣዝዩ የምስግነኩም

# CARRICULUM VITAE

Alemayehu Bekele Mengesha

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## **I. Educational Background**

- 2012 up until now- PhD student at the University of South Africa
  - 2005-2007 MPH in Epidemiology from Addis Ababa University
  - 2000-2003 Bachelor of Science (BSc) in Public Health from Jimma University
  - 1993-1995 G Diploma in Comprehensive Nursing from Gondar University
- 

## **II. Work Experience**

a. **April 2011 to present** –Projects Coordinator, EPHA.

- A trainer and mentor for Applied Epidemiology students and other public health trainees in Ethiopia.
  - Train undergraduate level trainees on public health courses
  - Develop training materials on Epidemiology, Reproductive Health, Human Nutrition and Biostatistics.
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## **III. Training and Workshop Attended**

- ATLAS.ti for Qualitative Data Analysis training
  - Stata statistical software training
  - Technical update training on Spectrum Suite Models
  - Training on ARC-GIS
  - Training on research Methodology and Health Ethics
- 

## **IV. Research undertakings.**

**I have worked as a principal and co-investigator on the following research outputs:**

- **Alemayehu Bekele**, Demeke Assefa, (2005). Assessment of Quality of Care of Integrated Mangement of Child Hood and Neonatal illnesses service provision in Health Institutions in Southern Ethiopia
- **Alemayehu Bekele**, Ahmed Ali, (2008). Effectiveness of IEC Interventions in improving awareness and reducing HIV related stigma among high school Adolescents in Hawassa, Ethiopian Journal of Health Development.

- Melesse Getachew, **Alemayehu Bekele**, (2010). Disclosure status of HIV positive Mothers on antiretroviral Therapy at Debrebrehan Hospital, Central Ethiopia
- Melaku Getachew, **Alemayehu Bekele**, (2010). Magnitude of Death and its predictors among patients on ART at Kemissie Health center Northern Ethiopia,
- Mehari Desalegn, **Alemayehu Bekele**, (2010). Magnitude and reasons of lost to follow up among pre-ART clients at Wukro Hospital, Northern Ethiopia
- Yihunie Lakew, **Alemayehu Bekele** (2014). Status and determinants of Immunization in Ethiopia
- Abyot Bekele Woyessa, Adamu Addisie, **Alemayehu Bekele**, Gole Ejeta, Haftom Taame, Zegeye Hailemariam, Peter Wasawa, Daddi Jima (2012). Non-Communicable Disease Prevention and Control Policies, Legislations and Enforcement in Ethiopia, 2012
- **Alemayhu Bekele**, Yihunie Lakew, (2014).Projecting Ethiopian Demographics from 2012–2050 using the Spectrum Suite of Model:DemProj

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## V. References

- a. Professor Susan Benedict: Assistant Dean and Department Chair: Acute and Continuing Care Professor and Director of Global Health, Co-director Campus-wide Program in Interprofessional Ethics, University of Texas.  
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### Declaration

I solemnly declare that all the above information is correct to the best of my knowledge and belief.



Signature\_\_\_\_\_

Date: June 10, 2015