ASSESSMENT OF THE PREVALENCE OF RISKY LIFESTYLE AND ITS ASSOCIATED FACTORS FOR METABOLIC SYNDROME AMONG ADULTS IN JIMMA TOWN, SOUTH WEST ETHIOPIA.

BY

JEMAL AHMED (BSc.)

THESIS SUBMITTED TO JIMMA UNIVERSITY; COLLEGE OF HEALTH SCIENCES, DEPARTMENT OF POPULATION AND FAMILY HEALTH: HUMAN NUTRITION UNIT, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF SCIENCES IN HUMAN NUTRITION (MSc.).

JIMMA, ETHIOPIA

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JIMMA, ETHIOIA,

JUNE, 2016

ABSTRACT

Background: Globally, chronic non-communicable diseases (NCDs) are the leading causes of disabilities and deaths. Recently, NCDs were given much attention as the diseases were noted not only to be limited to the developed countries. The growing middle class and ever changing lifestyle in developing countries have led to the rapid increase in the burden of NCD; the epidemiological trend has caught up with the Ethiopian. With the current increase in trend of the diseases among all the different social categories of people, attention has begun to rise about major risk factors for metabolic syndrome and NCDs. In the Jimma Town, risky lifestyle behaviors might be among cause of burden of NCDs. Little is known about the prevalence of the risky lifestyles coupled with little data available on the smoking, risky drinking, unhealthy diet, and low physical activity and other lifestyle associated factors in the Town.

Objectives: The general aim of this study was to assess the prevalence of risky lifestyles for metabolic syndrome. **Methods:** Community based cross-sectional study was conducted among 844 adults in Jimma Town, from March to May 2016. The study participants were selected from the target population using a multistage sampling technique. Data were collected using pre tested semi-structured questionnaire. The data were edited, coded and entered into Epidata 3.1 in double and exported, to SPSS for windows version 21.0 for cleaning and analyses. Prevalence of risky life styles for metabolic syndromes and associated factors were determined using frequencies, bivariate and multivariate logistic regression models. **Results and discussion**: The prevalence of tobacco uses, unhealthy diet, in adequate physical activity, sedentary behavior, risky drinking, unhealthy sleep, and chewing *khat* were, 23.4%, 66.7%, 29%, 46,3%, 18.7% ,40.1%, 48.5%, respectively. The prevalence of zero and all seven risky lifestyle score were 4.1%, 1%, respectively. The prevalence of simultaneous occurrence of two risk factors was 78.1%, whereas, the prevalence of high risky lifestyle score (as measured by the highest tertile of the score) was 31.7%. The results of multivariable logistic regression analyses showed that male, (AOR= 2.40 [95% CI: 1.338 to 3.597]), widowed (AOR= 0.21[95% CI: 0.051, 0.507]), age interval of 45-64 (AOR=1.74 [95% CI: 1.00 to 3.009]), student (AOR=2.85 [95%CI:1.478, 5.873]), having >4 children (AOR=0.17[95%CI: 0.06 ,0.55]), and living with family members (AOR=0.43 [95%CI:0.262, 0.765]) were independent predictors of high risk lifestyle score among adults of the town. **Conclusion:** The prevalence of high risky lifestyles for metabolic syndrome was considerably high in the study population. Our findings showed that 4 out of 5 adults had more than one risky score and one third had four or more risk factor score. The finding calls for a focused intervention through strengthening of both community and institution based behavior change communications to prevent the increase in metabolic syndrome and NCDs.

Acknowledgements

First, I would like to thank my almighty Allah for giving me the strength to complete my work.

Next, I would like to extend my deep gratitude to my advisors Prof. Tefera Belechew and Assistant prof. Aderajew Nigussie for their invaluable contributions, patience, guidance, and encouragement during this thesis work.

I am also grateful to Jimma University and department of population and family health for giving me a chance to conduct this research project.

It is a great honor to thank Jimma Town health bureaus, Kebeles, and Jimma Town community for their priceless support, assistance, and cooperation throughout this study.

My appreciation is also goes down to all my best friends for their continuous moral support, advice, assistance, and inspirations in all areas of this research thesis accomplishment.

Finally yet importantly, I would like to thank my mother for her limitless support to reach this level.

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LIST OF ACRONYMS/ABBREVIATIONS

WHO __World Health Organization

NCD__ Non-Communicable Disease

LCMs __ Low and Middle-Income Country

PA__ Physical Activity

SES__ Socio-Economic Status

MET__ Metabolic Equivalent Tasks

DALY__ Disability Adjusted Life Years

MVPH__ Moderate –Vigorous Physical Activity

JU__Jimma University

CHAPTER ONE: INTRODUCTION

1.1 Background:

The concept of lifestyle to refers to a general way of living based on interactions between living conditions and individual behaviors, as determined by sociocultural factors and personal attribute. Globally, the nation's important social and economic changes including the expansion of schooling, increases in income, industrialization and urbanization, shifts in the allocation of personal time, major technological innovations such as television, and automobiles, and the infusion of ideas about 'modernity' and patterns of consumption from elsewhere, determine the choices and shape the ultimate consequences of the lifestyle in later life (1,2).

Change occurs at different rates among geographical and/or cultural subgroups, however, because variation in cultural beliefs, norms, and social roles produces time lags in the adoption of new ideas, and in this case, new lifestyles. These ideational and socioeconomic changes are associated with an increase in lifestyle risk factors in populations that acquire the economic means to adopt new patterns of consumption. For example, as processed-foods, fat-rich diets, and more-sedentary lifestyles emerge and proliferate, there may be a fall in levels of physical activity and a rise in levels of overweight/obesity, risk factor for metabolic syndrome (3,4).

According to the Global Strategy adopted on diet, physical activity and health, not meeting the recommended individual dietary intake (achieving energy balance; limiting energy intake from total fats and shifting fat consumption away from saturated fats to unsaturated fat, increasing consumption of fruits, vegetables, and limiting salt consumption from all sources) and not meeting at least 30 minutes of regular, moderate-intensity physical activity on most days throughout a person's life have been responsible for the rapid rise of non-communicable diseases (5).

More recently, a sedentary lifestyle sitting for more than seven hours during a typical 24-hour day—separate from whether a person is physically active, and having an unhealthy sleep pattern (less than seven hours or more than nine hours of sleep per day) have also been identified as modifiable risk factors for many non-communicable diseases (NCDs) (4). In addition, *Khat* (a plant native to the horn of Africa and the Arabian Peninsula) is one of a stimulant drugs, got from a tree called Catha edulis, which people consumed for its stimulating effects has been implicated as a risk factor for non-communicable diseases (6,7). The aforementioned epidemiologic transitions, which characterized by the proliferation of risky lifestyle behaviors might affect the lifestyle habits of adults in developing countries. In Ethiopia, where the urban population constitutes 24 % of the total population, previous studies have documented a high prevalence of NCDs risk factors (8).

1.2 Statement of the problem

Globally, non-communicable diseases (NCDs) are the leading cause of burden and deaths, in 2012 NCDs were responsible for 68% of the world's 56 million deaths. Recent estimates demonstrate that nearly 80% of NCDs deaths occur in low and middle income countries (LMIC) and about one third of NCD-related deaths take place before the age of 70 years (5,9). Many NCDs share common behavioral risk factors such as tobacco smoking, unhealthy diet, low physical activity and alcohol use (10). It is estimated that up to 80% of chronic diseases including; heart diseases, stroke and type II diabetes and over a third of cancers could be prevented by eliminating those shared risk factors (11).

Despite the widely documented consequences associated with unhealthy lifestyle behaviors, globally a substantial proportion of young and old adults engage in such unhealthy lifestyle practices. Tobacco use, which is the fourth most common risk factor for the diseases and the second major cause of death worldwide and currently responsible for the death of one in ten adults worldwide, recent estimate have showed the prevalence of daily tobacco use ranged from 46.9% in India to 7.7% in Ghana (10). In Sub-Saharan Africa, it is considered to be in stage one of the epidemic continuum with the estimated prevalence of 14% in males and 2% in females (12). The Ethiopian, also shares the burden of these epidemics with the prevalence of 4.1% current smokers (13).

Unhealthy dietary practice is also responsible for many premature or preventable deaths. For instance, it is approximated that 16 million (1.0% of disability) and 1.7 million (2.8%) of deaths worldwide are attributable to low fruit and vegetable consumption (3). Despite the advantages of fruit and vegetable intake in sufficient amounts are recognized, people in both developed and developing countries still have inadequate fruit and vegetable intake. Studies among adults have found a high prevalence of low fruit and vegetable consumption, e.g., in Belgium 91.2 % , Brazil 85.2 % , Chile 94.8 % , Germany 95 %, and Saudi Arabia 73.6 % (14). Whereas, the prevalence of low intake is 68.4% and 68.9% in South African and Ghana respectively (10).

Similarly, elevated salt intake has been associated with a number of NCDs (including hypertension, cardiovascular disease and stroke) (15). Recent data on salt intake show that populations around the world are consuming much more sodium than is physiologically necessary, in many cases, they are consuming much more than the current WHO recommendations for sodium consumption for adults, which is 2 g sodium/day (equivalent to 5 g salt/day) (15), with higher intakes in Asia (16). Though data on unhealthy diet prevalence within developing countries are sparse, due to the greater prevalence of inter-uterine growth restriction, as well as genetic factors, it is estimated that populations in sub-Saharan Africa are more vulnerable to the effects of a high sodium diet than other populations (18). Excessive alcohol consumption is also a well-recognized cause of morbidity and mortality, accounting

for an estimated 2.7 million deaths and 3.9 % of disability in 2010 (19). In sub-Saharan Africa, evidence indicated alcohol consumption is increasing at alarming rate (21). In Ethiopia, the current study showed prevalence of alcohol intake is 4.1 units per person (22).

Low physical activity (PA) is one of the most important modifiable risk factors causing global burden of chronic diseases (23). Insufficient levels of physical activity are prevalent, with almost two thirds of adults and 80% of young people not reaching them in recommended levels of PA in Europe (24). In addition, recent evidence also suggests the time spent in sedentary activities might be a risk factor for non-communicable diseases, independent of physical activity (25). Data on PA prevalence within developing countries are sparse, the existing prevalence rates in the studied African countries varied widely. The prevalence of low physical activity was reported to be 49.1%, and 44.7% in Mauritania, Comoros, respectively (26).

More recently, sleeping too little or too much has significant health consequences and sleep disorders are affecting more than 45% of the world's population (27). It is suggested that sleeping (< 7 hours or > 9 hours) per day has been identified as modifiable risk factors for many NCDs (28). Despite most researches on unhealthy sleep pattern has been conducted in western countries, concern is now beginning to focus on emerging countries (29). Study conducted in 8 developing countries have revealed that the prevalence of sleep problems in adults ranging from 3.9% in Indonesia and, Kenya to more than 40.0% in Bangladesh (30). In Ethiopia, evidence on the burden of sleep disorder is lacking. Another social custom that has been implicated as a risk factor for NCDs is chewing *khat* (31). Current reports indicate that over 20 million people in the Arabian Peninsula and East Africa chewed *khat* plant daily, while, 15.3% among Ethiopian adults (11).

Socio- demographic factors such as gender, marital, and education level, among others, have been shown to be associated with these risky lifestyle behaviors (3). Lifestyle risk factors might represent an un -recognized public health issue in many sub-Saharan Africa including Ethiopia, where epidemiological transition is likely to result in dietary and lifestyle changes and a large increase in the prevalence of NCDs (5).

In Ethiopia, WHO estimated in ,2011 that 34% of Ethiopian population is dying from NCDs, with a national cardiovascular disease prevalence of 15%, cancer and chronic obstructive pulmonary disease prevalence of 4% each, and diabetes mellitus prevalence of 2% (8). Despite the increasing rates of metabolic diseases in the Ethiopia, which are accompanied by a change in diet and lifestyles, there are very limited data on risky lifestyle behaviors, especially in study area. Therefore, the main objective of this study was to assess the prevalence of risky lifestyle for metabolic syndrome and associated factors among adults in Jimma Town, South West Ethiopia, 2016.

CHAPTER TWO: LITERATURE REVIEW

Non-communicable has been rising dramatically over recent decades and has become a major public health challenge worldwide. Risky lifestyle behaviors are the modifiable risk factors for the development of the leading chronic diseases (35). In particular, cigarette smoking, excessive drinking, physical inactivity, and inadequate daily consumption of fruits and vegetables and other factors are common modifiable unhealthy lifestyle behaviors that contribute to the development of many chronic diseases or conditions, such as heart attack, angina or coronary heart disease, stroke, and type II diabetes in the adult populations (10).

2.1 Tobacco smoking.

Enormous literatures have been documented on risky lifestyles related information focusing on their prevalence. Smoking, which is believed to be the number one major single known cause of non-communicable diseases, is widespread around the world. Evidences from different studies have showed, the prevalence of tobacco use varies from country to country. The highest prevalence of tobacco consumption has previously been found in high-income western European countries, with a 37% and 25% prevalence of men and women (12).

The recent study conducted among adults 30 to 60 years old in Tehran revealed that, an estimated 37.4% had smoked more than 100 cigarettes in their life time, continuing daily or smoking occasionally and 62.6% had not (36). While, cross-sectional study conducted among Chinese adults revealed that, an estimated 67.3 % of subjects smoked cigarettes during the past month, of which, 16.4 % smoked at least 20 cigarettes per day. Whereas, the proportion of subjects who smoked during the past month was relatively bigger among subjects aged 45 years or younger than those aged 45 years and older and the proportion for subjects aged 50 years or above was the lowest (37).

Whereas, cross-sectional study done in six low and middle income countries revealed that the prevalence of daily tobacco use was ranged from 7.7% in Ghana to 46.9% in India (10). Studies represented 13 countries among nationally representative adult populations in sub-Saharan African countries have showed that current smoking prevalence varied widely ranging from 1.8% in Zambia to 25.8% in Sierra Leone (12).

According to cross-sectional study conducted in Ethiopian adults, the overall prevalence of tobacco use was 4.1 %. With the highest prevalence 16.9 % in Gambella and the lowest 0.8 % in Tigray Regions were reported (13). In the same way, a community based cross-sectional study conducted among 548 individuals from a random sample of households in eastern Ethiopia indicated 28% of the

respondents were current smokers (38). A cross-sectional study findings reported from Addis Ababa, indicate that 13 % of men and less than 1% of women reported current cigarette smoking (39). Meanwhile, a cross-sectional study findings reported from Butajira area have revealed the prevalence smoking, 15.4% of men and 0.2% of women had ever smoked, and 11.8% and 0.2% respectively (40).

2.2 Dietary practices.

Concerning unhealthy diet, higher consumption of fruits and vegetables is associated with lower risk of obesity while greater soft drink and fast food consumption is associated with higher risk of obesity. Evidence from a cross-sectional study conducted amongst Portugal adult revealed that all women and almost all men 99.7% consumed vegetables on a daily basis. This report included that the proportion of daily consumers of fruit was 99.5% in women and 99.8% in men (41).

A cross-sectional study done in Tinkanya, Sindhuli reported that total sufficient fruits and vegetables consumption ≥5 servings/day was lacking in 96.6% of respondents with mean number of days of fruits and vegetables consumed per week were 2.4 and 4.3 days respectively (42). Similarly ,study findings reported from Turkey showed that 9.1% of the subjects consumed adequate ≥ 3 times a day vegetable and fruit, 77.7% of them 1-2 times a day, and 13.2% not every day, and thus that 90.9% of them did not consume sufficient vegetable and fruit (43).

Current findings from low and middle income countries have showed the prevalence of inadequate fruit and vegetable intake among India's older population were relatively higher; while China had the lowest prevalence at 35.6% (10). Study reported from South Africa have also revealed that more than two-thirds of the sample 68.5% took insufficient fruits and vegetables, with more females 70% (44). Further, a systematic review on environmental determinants of F&V consumption among adults, married individuals and those with lower household incomes had a consistently lower consumption of these foods. Additionally, Smoking and physical inactivity was also shown to be inversely associated with F&V intake (41).

Although studies regarding fruit and vegetable is uncommon in sub-Saharan countries including Ethiopia, the most recent report from Kenya shows that nearly half 48.6% of the respondents eat fruit for not more than 3 days a week. Only 33.2% of the study population reported that they eat fruit 7 days a week. About 65% of them reported that they eat vegetables throughout the week (45).

With regard to Salt consumption; Excess sodium intake raises blood pressure, a major risk factor for cardiovascular disease and increases risk of stomach cancer, a leading fatal cancer globally. In 2010, global mean sodium intake was 3.95 g/day. This was nearly twice the WHO recommended limit of 2

g/day and equivalent to 10.06 g/day of salt. Intake in men was ~10% higher than in women. It also included the highest intakes in East Asia, Central Asia and Eastern Europe mean >4.2 g/day and in Central Europe and Middle East/ North Africa (3.9–4.2 g/day) (46). Another cross-sectional study performed among adults as a part of the Japanese people indicates the mean salt intake was 10.4 ± 3.2 g/day, two thirds take excessive salt (47).

Australian national survey showed that the frequency use of salt at the table and in the cooking such that 35% in 2011 and 36% in 2014 reporting adding salt sometimes or often/always at the table, and 44% in 2011 and 47% in 2014 reporting adding salt sometimes or often/always during cooking (48). Likewise, cross-sectional study findings reported from Beijing revealed the daily dietary salt intake was 8.3 g/person. Whereas, the average amount of salt added during cooking was 4.1 g/person/day (17).

A community-based cross-sectional study conducted in Bahir Dar city, North Ethiopia the findings of the study showed that, 59.4% respondents did not consume fruit at all and only 35.1% and 5.5% were consuming one to two and three or more servings of fruit per week, respectively. Regarding vegetable consumption, 20.9% of the respondents did not consume vegetable at all in their usual diet. Regarding sweet food consumption, 38.2%, and 19.1% of the participants consumed sweet food 1 to 3 times and 3 or more times per week, respectively. About 59.9% and 7.4% of study participants reported that they consumed meat-containing foods 2 and 3 times per week, respectively. Moreover, more than 10% of respondents declared that they added salt to their food in addition to the normal amount that was added to the food during cooking (49) .

2.3 Alcohol consumption.

Study conducted in Germany adults has showed that a third of the population sample 33.3%, reported that they infrequently or never drink alcohol. The proportion of men 18.6% is higher than that of women 4.1%. A very high level of consumption is reached at 80 grams/day, an amount reported by 1.4% of subjects while the often described critical level of more than 20 grams/ day in women is reached by 9.3% of female subjects and a level of more than 40 grams/day in men is reached by 13.2% of male subjects (50).

A cross sectional survey done in Thailand has indicated that the prevalence of the overall 65 % of the cohort occasional or regular drinkers. This included 78 % of males and 53 % of females. 26% of the cohort had never drank alcohol, this being much more common for women 43 % than men 13 % while 9 % were ex-drinkers (51). In the same way, recent cross-sectional study carried out among adults in

Nyanza Province, Western Kenya, 14.5 % of men and 6.8 % of women reported lifetime drinking, and slightly lower proportions reported current alcohol consumption 13.1 % of men and 4.8 % of women. Hazardous drinking was reported by 9.5 % of men and 2.9 % of women (21).

Besides this, a community-based cross-sectional study conducted in Bahir Dar, 59.4% and 73.9% drank alcohol in the last 1-month and 12 months, respectively. Out of the respondents who took alcohol in the last 1 month, 68.1% , 28.9%, and 3.0% of them reported that they were taking alcohol less than 3 days, 3–5 days, and more than 5 days per week, respectively (49).

Study findings reported among adults in Addis Ababa. 69% of men and 57% of women reported current alcohol drinkers. A lower proportion 8.6% of men reported daily alcohol use; most reported drinking less frequently. Most women 96% reported drinking alcohol less than once per week. Infrequent heavy alcohol intake was estimated at 8.0%; frequent heavy alcohol intake was 2.4% among men. Overall prevalence of "binge drinking" was 10% among men and 1% among women (39).

2.4 Physical activity.

Many previous studies have demonstrated that physical activity is associated with reduced risk of the metabolic syndrome, and physical inactivity may be an important modifiable risk factor in the etiology of the metabolic syndrome. While the metabolic syndrome has increased in the past few decades, the amount of physical activity energy expenditure has declined during this time, for many (mainly developing) countries, limited prevalence data have ever been published.

In 2005, ≈24% of US adults reported no leisure-time physical activity, 14 and only 31% met the Physical Activity Guidelines for Americans (moderate-intensity activity for ≥30 min/d for ≥5 d/wk) (52). On the other hand, a large cross-sectional study conducted in 52 countries, showed country prevalence of physical inactivity ranged from 1.6% (Comoros) to 51.7% (Mauritania) for men and from 3.8% (Comoros) to 71.2% (Mauritania) for women. Overall, about 15% of men and 20% of women from the 51 countries, most of which are developing countries, are at risk for chronic diseases due to physical inactivity (23).

A cross-sectional survey conducted in metropolitan Maiduguri, Nigeria revealed that the prevalence of physical activity was 68.6%, and about 31.4% were physically inactive. While, the highest prevalence rates were among participants who were divorced/ separated 80.4%, those with less than a secondary education 76.6%, and those with the lowest income 72.6%. Whereas, the proportion of active men decreased from 75.6% in the youngest group to 53.6% in the oldest group (26).

Recent findings reported from Kenya revealed, 20 and 40% of the respondents, their work involved vigorous-intensity physical activity and moderate-intensity physical activity, respectively. The report also included, work of 11% respondents involved both vigorous- and moderate-intensity physical activity. Almost all participants did walking or cycling, and about 55% did it throughout the week. Less than 5% of the study population reported involvement in sport-related physical activity. Analysis of the contribution of the different forms of physical activity to the total physical activity time in the total study population shows that about 70% of the physical activity came from work-related activities and 27.6% from walking or cycling (45).

Community-based cross-sectional study conducted in people living in North West Ethiopia, found that 13.1% of the respondents' occupations involved vigorous physical activity, 84.3% were doing vigorous physical activity more than 4 days per week, and 86.5% of them spent over 5 hours per day doing occupations involving vigorous physical activities. Whereas, 70.1% of respondents' occupations involved moderate physical activity, and 64.7% of them were doing moderate physical activity more than 4 days per week. A 44.2% of respondents cycled or walked continuously for at least 10 minutes for less than 4 days per week, and 58.3% of them cycled or walked for more than 5 hours per day. About 4.9% of the study participants reported were doing sports involving vigorous physical activity, and 24 % of them did so for less than 3 days per week (49).

2.5 Sedentary behavior or prolonged sitting time.

Sedentary behavior, which is distinctly different from physical inactivity, is defined as activities that are done sitting or in reclining posture that expend less than 1.5 times the basal metabolic rate. In recent years, there has been a growing interest in sedentary behavior (i.e., too much sitting, which is distinctive from being inactive) and health outcomes. Increasing epidemiological evidence suggests that sedentary behavior is a risk factor for metabolic syndrome, type 2 diabetes, cardiovascular disease, some cancers, and cardiovascular and all-cause mortality (53).

The number of sedentary jobs has been steadily increasing over the past 50 years, as has time spent in inactive transport modes, watching TV and using a computer. A recent study showed that in 2006, Australian adults spent 90% of leisure time sedentary, and 53% of that time was spent on screen-based activities (i.e., watching TV and using the computer) (54).

2.6 Sleep duration.

Sleep is another emerging health behavior. Recent systematic reviews and meta-analyses found that both excessively short and long sleep durations were predictors of mortality in prospective population

studies. Prospective data from the US, Europe and Asia indicate that short sleep (< 7 hours sleep a night) could contribute to chronic health conditions such as diabetes, cardiovascular disease and obesity (2).

These findings are concerning because short sleep is increasingly common and is currently reported by approximately 30% of US adults. Long sleep (> 9 hours sleep a night) has also been associated with increased morbidity and mortality in adult populations. Short and long sleep were reported by 16.6% and 13.9% of participants respectively. Short sleep was associated with long working hours and obesity; long sleep was associated with recent treatment for cancer and heart attack/angina.

An analyzed cross-sectional study in a community health survey conducted in Korea has revealed that 37.2% of the subjects had short sleep and 4.0% had long sleep. 36.4% of male subjects had short sleep, and 2.9% had long sleep. While, 27.9% of the female subjects had short sleep and 5.1% had long sleep. As age increased, the prevalence of both short sleep and long sleep tended to increase. Currently without a spouse, 33.8% had short sleep, and 5.7% had long sleep. Likewise, 39.0% of the subjects currently with a spouse had short sleep, and 3.1% had long sleep (55).

In addition, according to Singapore Chinese Health Study, which collected information regarding sleep duration .Among adults sleeping 6–8 h, most participants 55.6% remained 6–8 hours sleeper, while 8.4% became short < 6 h and 36.0% became long > 8 hours sleepers. In addition, greater educational attainment and weekly physical activity were both associated with reduced odds of becoming a long sleeper (56). Similarly, in cross-sectional studies, reduced sleep duration was associated with inadequate dietary intake, such as a high intake of snacks and low intake of vegetables, as well as undesirable eating habits, including skipping breakfast and irregular eating (57).

Likewise, population-based prospective study's findings Chinese living in Shanghai, China. The most frequent sleep duration was 8 hours among both women and men. Sleep duration decreased with age. For both sexes, those who had shorter and longer sleep durations were less educated, less likely to drink tea, and more likely to drink alcohol; in addition, they were more likely to have had a nightshift job, to have low income. Among women, exercise rates were inversely associated with sleep duration. Among men, exercise rates were comparable across all sleep duration groups (58).

Another cross-sectional study conducted in the Shanghai Women's Health Study have showed that the average sleep duration was 7.0 hours. Approximately 80% of study participants reported daily sleep duration between 6 and 8 hours, 11.5% reported short sleep duration, and 8.7% reported long sleep duration (59).

Data on conditions of sleep and sleep problems in low income countries is scarce, chronic conditions and sleep problems among adults aged 50 years or over in nine countries. Importantly, there was a striking variation in the prevalence of people reporting severe/extreme nocturnal sleep problems across the 8 populations, ranging from 3.9% to 43.9%. However, there was a consistent higher prevalence of self-reported sleep problems in women than men across the 8 sites. Overall, 16.6% of participates reported nocturnal sleep problems (60).

2.7 Khat Chewing

Concerning khat chewing, cross-sectional study conducted among Jizani population, kingdom of Saudi Arabia observed, the prevalence of ever khat chewing, 33.2% and was significantly higher for males 42.2% than for females 11.3%. Current khat chewers accounted for 28.7% of the respondents and of males, 36.9% of were current khat chewers, which is higher than the 8.7% of females who were current khat chewer. While, 14.7% of males shared khat with their friends, compared with 24.8% of females. Age, educational level, marital status and working status, were all found to be highly associated with participants' *khat* use (31).

The national level cross-sectional study among adults in Ethiopia reported that the overall prevalence of khat chewing in the 30 days preceding the survey was 15.3%. Regional variability was observed regarding khat chewing in Ethiopia. For instance, *khat* chewing was highly prevalent in Harari regional state where above half of the population chew *khat* 53.2%. The prevalence in Dire Dawa was the second highest 44.9% followed by Oromiya 26.4% regional state. The prevalence of *khat* chewing among adult men was higher 22.6% as compared to females 9.1%. Those individuals who had occupation in sales, agriculture, service sector, skilled and unskilled manual workers more likely to chew *khat*, respectively, as compared to those who have no occupation (8).

Study conducted in Addis Ababa, revealed that 18 % of men and 2% of women reported current *khat* chewing. Approximately, 16% of the men chewed *khat* 1 or more days every week; 5% chewed *khat* daily. Among participants who did not currently chew, 12% of men and 2% of women reported having chewed *khat* in the past. This behavior was most common among younger adults and decreased with age. Likewise, 40.5% of men who reported regular khat chewing also reported current smoking 23.6% , and 21% of them reported binge drinking (39).

More recent study findings reported from Butajira indicate that, 50.3% were *Khat* chewers and 49.7% were non-chewers. Majority, 237 (70.9%), of chewers chew Khat four days a week. The mean duration of chewing in a day was 2.4 hours. About 51.8% of the *Khat* chewers chewed *Khat* for a duration of 3

hours at a time. The proportion of smokers was significantly higher among *Khat* chewers (10.8%) than non-chewers (4.8%). While, alcohol drinking was significantly more common among non-chewers 30.9% than *Khat* chewers 7.8% (61).

Study conducted among adults aged 18 and above years in Jimma town was showed, 40.5% of men who reported regular *khat* chewing also reported current smoking, and 21% of them reported binge drinking. A 68 % of subjects reported current *khat* chewing, whereas, 33.9% of the subjects chewed *khat* every days, 63 21.8% chewed *khat* 2- 3 days per week (62).

2.8 Clustering patterns of risky lifestyles for metabolic syndrome.

Unhealthy lifestyle behaviors, such as smoking and physical inactivity, are responsible for a large proportion of disease burden and premature deaths worldwide. Globally, the eight risk factors with the highest shares on attributable burden of disease are; tobacco smoking, alcohol use, physical inactivity, unhealthy diet, unhealthy sleep duration and other behaviors. Unhealthy behaviors are often clustered, and it has been shown that mortality increases with an accumulation of unfavorable lifestyle factors (69). Risk factor prevalence and the burden of chronic disease vary greatly across different regions of the world (68).

Most studies focus on one individual risk behavior, comparatively less is known about the prevalence, correlates, and clustering of multiple risk behaviors. For example, in 2007–2010, 36% of the Chinese adult population were found to have three or more chronic disease risk factors, compared to 45% for India, 56% for Russia and 69% for South Africa (69).

Regarding the combination of simultaneous risk factors for CNCD, previous study in Southern Brazil showed at least two factors were present in 59.4% of the respondents, and the most frequent pattern was the simultaneity of inadequate diet and physical inactivity (30.6%). Another study findings reported from Australia, showed a 41% reported no risk behaviors, 37% reported one risk behavior, and 17%, 5%, 0.8%, and 0.08%, respectively, reported two, three, four, and five risk behaviors (63).

From America regardless of status of CVDs or diabetes, the associations (PRs) were increased with a greater number of healthy behaviors for both linear and quadratic trends). The prevalence of having all four healthy behaviors was 6.5% among adults overall, 3.5% among adults with CVDs, and 3.8% among adults with diabetes. Nevertheless, the distribution of clustering combinations of these healthy behaviors was similar among adults regardless of status of CVDs or diabetes (64) .

Although adults with CVDs or diabetes appeared to have a higher prevalence of clustering of certain healthy behaviors (e.g. not currently smoking and consuming fruits and vegetables ≥5 times/day) than those of the general adult population, they have a lower prevalence of all four healthy behaviors. In

Australia (2007–2008), it was found that 64% of adults had at least three chronic disease risk factors, with males, those in older age, those with disadvantaged socio- economic status, and those living in rural areas having the greatest proportion (4).

2.9 Factors associated with risky lifestyles for metabolic syndrome.

Despite the widely documented consequences associated with unhealthy lifestyle behaviors, globally a substantial proportion of young and older adults, engage in such unhealthy lifestyle practices. A study showed that current heavy smokers consumed significantly less vegetables, fruits, milk and other dairy products, spent significantly more time watching television, slept and exercised less, and got drunk or engaged in binge drinking more frequently compared to never smokers (47).

Similarly, a previous findings in six low and middle income countries showed that smoking was significantly associated with level of education, marital status, ethnicity, age group, and residential area (10). According to current study among American adults, chronic disease risk factors and features of unhealthy lifestyle were generally more prevalent among abstainers than drinkers, but these differences were generally attenuated or eliminated by additional adjustment for race and education. For low fruit and vegetable intake, and divorced marital status (65).

Krueger and Friedman recently examined sleep patterns in a nationally representative survey of 110,441 US adults. Short and long sleep were reported by 28.3% and 8.5% of respondents respectively, and were associated with low education levels, low income, alcohol consumption, and chronic health conditions such as cardiovascular disease and diabetes. Short sleep was also associated with being single and long working hours, whilst long sleep was also associated with low physical activity levels, and ethnicity (66).

Non-communicable has been rising dramatically over recent decades and has become a major public health challenge worldwide. Risky lifestyle behaviors are the modifiable risk factors for the development of the leading chronic diseases, including cardiovascular diseases (CVDs) and type 2 diabetes (40). Socio- demographic factors such as gender, marriage, and educational level, among others, have been shown to be associated with these risky lifestyle behaviors (3).

2.10 Conceptual frame work.

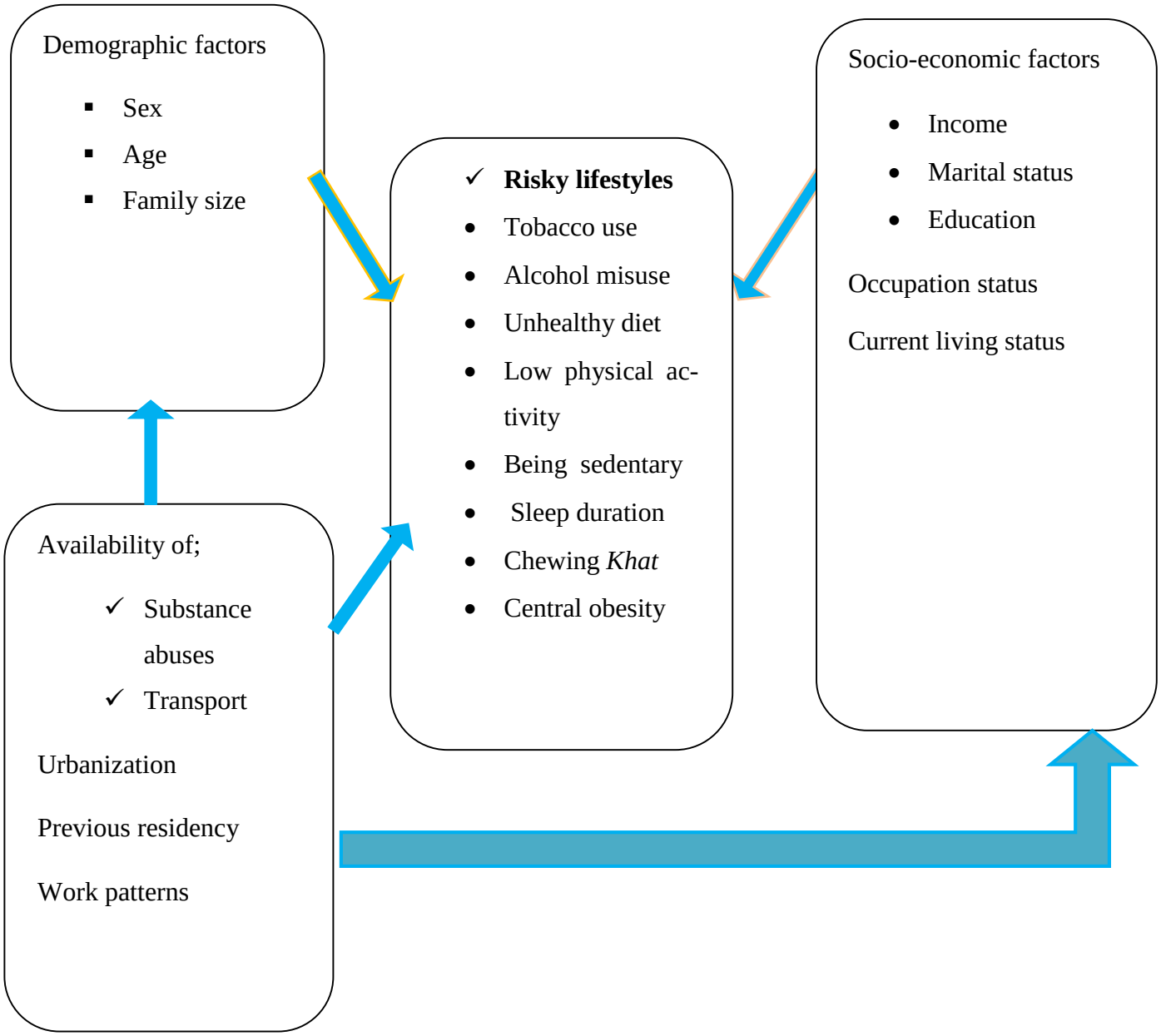

Figure 1: The conceptual framework of prevalence and associated factors of risky lifestyles (**synthesized by the author based on literature**).

2.11 Significant of the study:

Chronic non-communicable diseases are the leading causes of disabilities and deaths worldwide. Recently, non-communicable diseases were given much attention as the diseases were noted not only to be limited to the wealthy people but also to the people from the third world countries. The growing middle class and ever changing lifestyle in developing countries have led to the rapid increase in the burden of NCD; the epidemiological trend has caught up with Ethiopia. With the current increase in trend of the diseases among all the different social categories of people, attention has begun to rise about major determinants of the diseases and risk factors for NCDs.

In the Jimma Town, risky lifestyle behaviors for metabolic syndrome might be among cause of burden of NCDs. This and others necessitate this study into assessing the prevalence, clustering pattern, and associated factors of the risky lifestyle for metabolic syndrome such that tentative interventions can be put in place at a minimum cost before the situation gets out of control. In order to take effective prevention measures, identification of the risk factors is an essential prerequisite. Little is known about the prevalence of the risk factor coupled with little data available on the dietary habits, physical activity and other life-style associated factors in the Town.

It is with these concerns, that an assessment of risky lifestyle behaviors was the focus of this study and had been given priority attention in the Town. The WHO STEPs Approach on NCDs risk factor surveillance was considered an efficient tool to be used for assessing the risk factor situation in the Town. In view of the burden of NCDs highlighted above, there is the need to have systematic data to determine the magnitude of the problem of risky lifestyle behaviors so as to influence policy and resource allocation between prevention and care, this has been one of the core relevance of the study. Furthermore, understanding the clustering patterns of these risk factors on an individual may be informative for policy making and resource allocation in the context of primary prevention.

CHAPTER THREE: OBJECTIVES

3.1 General objectives:

- ✓ To assess the prevalence of risky lifestyles for metabolic syndrome and its associated factors among adults in Jimma Town, Southwest Ethiopia, 2016.

3.2 Specific objectives are to:

- ✓ Assess the prevalence of risky lifestyle factors for metabolic syndrome among adults in Jimma town, Southwest Ethiopia, 2016
- ✓ Assess the clustering patterns of risky lifestyle of metabolic syndrome among adults in Jimma Town, Southwest Ethiopia, 2016.
- ✓ Identify factors associated with risky lifestyle for metabolic syndrome among adults in Jimma town, Southwest Ethiopia, 2016.

CHAPTER FOUR: METHOD AND MATERIALS

4.1 Study area:

The study will be conducted among adults living in Jimma Town, South west Ethiopia. Jimma is one of the oldest cities in Ethiopia. It is about 185 years old. This town is located at 354 km South West of Addis Ababa, the capital city of Ethiopia. The geographical coordinates of the town are approximately 70º and 40º N latitude and 36º 50º E longitude. The town has also an altitude of 1750-2000 meters above sea level, with temperature range of 20-30 ºC and average annual rainfall of 800-2500 mm . According to the national census of 2007, the projected total population of the town is 174, 396 (86, 32 6 males and 88,070 females). There are 36,333 total households. Annual growth rate is 4.6 (67). Currently the area of the city is 100.2 km^2.

Jimma is known to be the origin of coffee Arabica in the world. Currently, the town is one of the most rapidly developing towns in the country, with dramatic social and economic changes, including rapid urbanization over the past 2 decades. Through cooperation, World Bank, Regional government, city administration & the residents the expansion and upgrading of infrastructure is going on. This town is also the home of many industries and center of multi-business in the south west of the country. It has also 5 major public health institutions (3 health centers and 2 hospitals) and 18 private clinics 6 higher and 12 medium clinics in the town.

4.2 Study Design and period:

A community based cross-sectional conducted from February to April 2016.

4.3 Population:

4.3.1 Source population:

All adults residing in the Town for more than 6 months at the time of the study was source population.

4.3.2 Study population:

All randomly sampled adults residing in the Town at the time of the study was study population.

4.4. Eligibility criteria:

4.4.1. Inclusion criteria:

All adults aged 18-65 years residing in Jimma Town were included.

4.4.2 Exclusion criteria:

All critically ill or with hearing problem adults at the time of the study was excluded.

4.5 Sample size determination and sampling procedure.

4.5.1 Sample size determination:

Sample size was determined using single population proportion formula by considering prevalence of all risky behaviors. Since, the previous study done on the subject among adults in Ethiopia was hardly found, the best estimate of expected population proportion for risky behavior was considered as **50%** to get maximum sample size**.**

$$ni = \frac{\left(z\propto/_2\right)^2 * p(1-p)}{d^2}$$

Where, *ni* =initial sample size

a= confidence interval (95%)

p= proportion of risky behavior; 50%=0.5

d= is the margin of sampling error tolerated (5%)=0.05

$$ni = \frac{(1.96)^2 * 0.5(1-0.5)}{0.05^2} = \frac{3.8416 * 0.25}{0.0025}$$

$$ni \approx 384$$

For this study, the minimum sample size of **384** was required. Total number of population of Jimma town is **174396,** which is greater than 10,000. For possible non-response rate, 10% of the final sample size was added. Thus, the total sample size was ni + 10% ni = 384 + 38=**422**. Since, multistage stage sampling technique was conducted, it was suggested that final sample size should be twice as large as the size of the minimum sample size to account for the design effect. In addition, a 5% margin of error and a 95% confidence level was considered. Based on these assumptions, the final sample size with design effect of 2 and an additional 10% for nonresponse rate was determined to be 422 ×2 = **844** people.

4.3.2 Sampling procedure:

Jimma town has three sub-cities containing 17 administrative units or kebeles; from each sub-cities 2 kebeles **(total 6**) was randomly selected for this study to get the representative sample. Then, from each kebele number of total and household population was obtained. The study participants were selected from the source population through a multistage sampling technique and probability proportionate to size of the households from each selected kebeles.

Next, the calculated sample size of 844 distributed among each selected kebele proportionally to the size of the population in each kebele. After determining the number of individuals to be studied in each kebele, the sample size in each kebele was divided by the number of households in the kebele to determine the proportion of individuals to be studied in each selected kebele. After getting the sampling fraction in the selected kebeles, a simple random method was used among the first "K" units of the households. Then, every Kth units of households was visited systematically to choose one adult aged between 18 and 65 years old for interview from the selected households in all selected kebeles. When more than one eligible was found in the selected HH, one persons aged 18_ 65 years present in the house was selected randomly (**Fig 2**.).

$$nc = \frac{n * Nx}{N}$$

Where; n = total sample size

nc = sample size in stratum x

N = number of source population

Nx = population size in stratum x = number of stratum (Kebeles x=1, 2, 3, 4, 5 and 6).

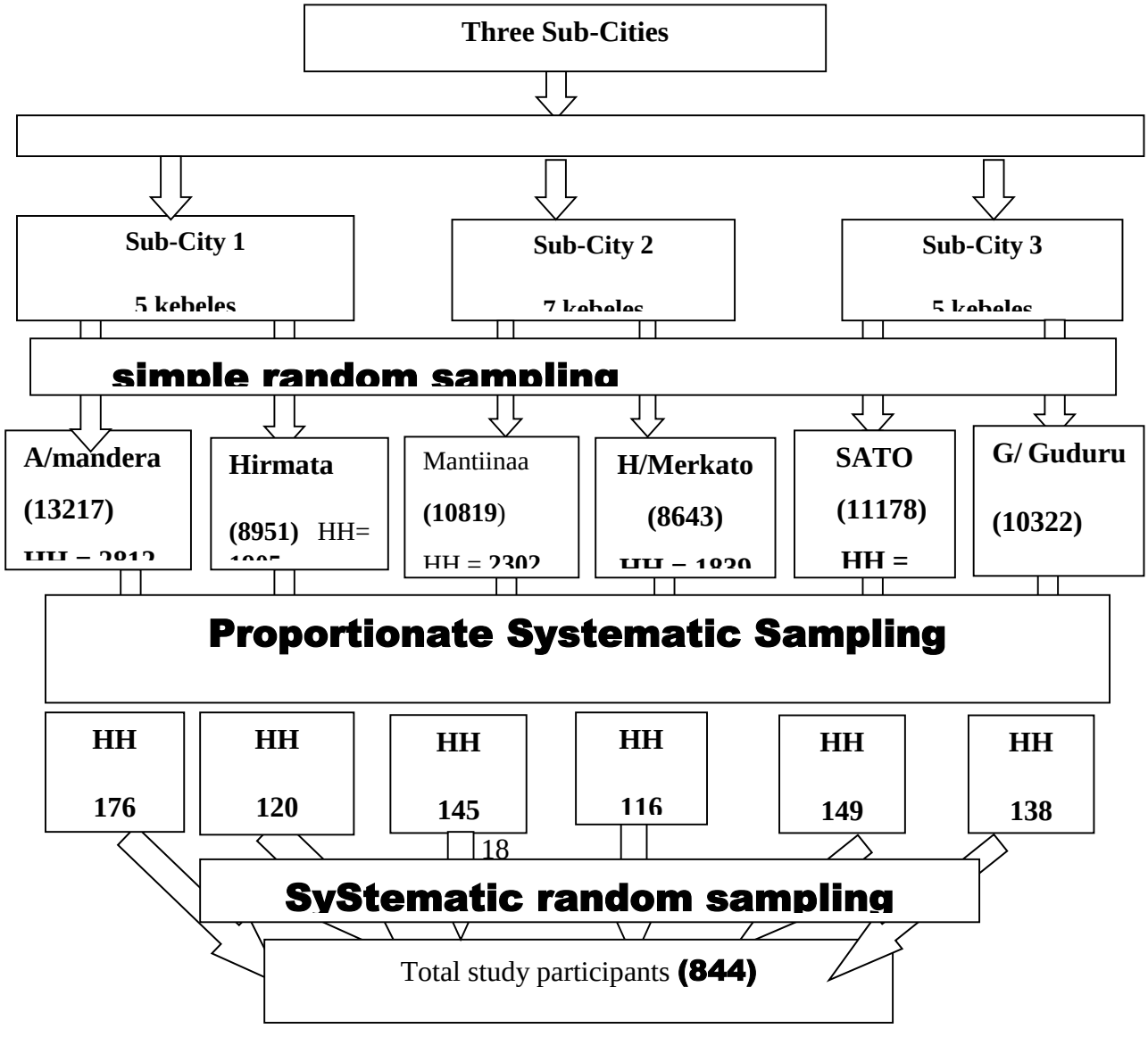

Figure 2: The schematic presentation of the sampling procedure used to select study participants in Jimma Town, Southwest Ethiopia, 2016.

4.6 Study Variables:

4.6.1 Dependent variables:

The dependent variable of the study was high risk lifestyle for metabolic syndrome (score of tobacco use, risky drinking, unhealthy diet, low physical activity, being sedentary, unhealthy sleep duration, chewing Khat).

4.6.2 Independent variables:

The independent variables of the study are; sex, age, marital status, ethnicity, religion, educational, occupation, wealth status, family size, residency, time of work, current living condition.

4.7 Data collection tools and procedure:

A semi-structured interview administered questionnaire, which include all the relevant information to meet the objectives of the study was used to collect the participants' socio-demographic information (i.e. sex, age, marital status, ethnicity, religion, educational status, occupation, income, family size) and behavioral risk factors (i.e. smoking status, dietary habits such as, fruit and vegetable intake and the frequency of salty food intake, physical activity habits, alcohol intake, sleep duration and the habit of chewing khat). For diet, the questionnaire, details about consumption of fruit and vegetables, sources of fried foods, soft drinks, and salt intake was included.

The physical activity section was assessing work-related, walk/ cycling-related and recreational/sports-related physical activities. In the smoking section, data on ever smoking, current smoking, daily smoking, and duration of smoking, was collected. Alcohol was converted into standardized units using show cards for the different types of alcohols. Sleep durations were assessed for average hours slept per night. The tool was adapted from the World Health Organization instrument for stepwise surveillance **(WHO STEPS**) of chronic disease risk factors (68). In accordance with the STEPS manual, a few additional questions were added to supplement the questionnaire and to reflect the local context of Ethiopia. It was first written in English, translated into Afan Oromo (local language), and was translated back into English by professionals who speak both languages for keeping consistency.

To make important modifications, the questionnaire was pre-tested on 5% of the sample randomly selected in the same population in adjacent kebeles. Six data collectors, 4 nurses, were recruited. Two supervisors (MSc) were involved to supervise overall situation of data collection procedure. In addition, one day training was given to data collectors and to the supervisors. Participants were informed

about the content of the interviews to enable them understand the procedures and give their full approval.

4.8 Data quality control:

Data was collected by trained data collectors. The collected data were checked for completeness and consistency on daily basis by super visors. Visited houses were marked (given number) to avoid revisit by other data collectors and to enable revisit in case of incomplete and inconsistent responses. Before the actual data collection took place, pretest was done on the sample of 5% of the 844 (43) in adjacent kebele to ensure the validity of the survey tools. Based on the findings of the pretest, the tools was modified. After checking for completeness, the collected data were edited to exclude errors, reorganized, coded and entered into Epidata version 3.1 for double data entry verification (to identify data consistency), then was exported to SPSS version 21.00 for windows for cleaning and statistical analysis.

4.9 Data Analysis:

The exported data were analyzed for frequency of distribution, proportion, and percentages for variables, mean ± SD. First, data on the prevalence of each seven individual risky behavior was presented. Then, to assess the joint impact of lifestyle behaviors, lifestyle risk indices was created. In index, each participant scored a single point for each of the risky lifestyle behavior: current smoker, risky drinking (drinking more than 2 drinks a day), low physical activity (< 600 MET.), lower tertile of dietary practice (scoring first and second rank), prolonged sitting time for > 7 hours per day, and sleep duration of < 7 hours or > 9 hours per day and khat chewing behavior (possible index range 0 to 7). The prevalence of risky lifestyle score was determined.

Next, two-step cluster analysis procedure was generated to identify different risky lifestyle clustering patterns based on seven risky lifestyle behaviors and socio demographic variables. Then, the risky lifestyle index score was subsequently classified into tertiles and dichotomized as high risk lifestyle score (highest Tertile) and low risk lifestyle score (Middle Tertile and, Lowest Tertile). Lastly, for each demographic covariate, differences in individuals' level of risky behavior was examined. Socioeconomic and demographic covariates were selected for inclusion in the study because of their association with the prevalence of behavioral risk factors score.

Bivariate and multivariable logistic regressions analysis were conducted to explore presence of associations and identify independent predictors of dichotomized risky lifestyle score as dependent varia-

ble. Then, variables with P-value of <0.25 at the analysis was entered into multivariable logistic regression in order to identify interaction between the variables and to control potential confounders as well as to calculate odds ratios with 95% confidence intervals. Variables having p-value of less than **0.05** was declared associated with high risk lifestyle for metabolic syndrome. Finally, results were presented in tables, graphs and interpretations of findings made as possible.

5. Ethical consideration:

The study was approved by IRB (Institutional Review board) of the college of health sciences's research and publication office, Jimma University. Official letters was written by School of Public Health, Jimma University to the respective officials of the Jimma Town's health Bauru officers as well as to every administrators of the selected kebele to obtain permission. Informed Verbal Consent of the respondents were obtained after giving information and thoroughly explaining the aim of the study to each respondent. The subjects were interviewed in their homes individually to maintain privacy. They were not required to give their name. Information concerning the individual was not passed to a third party. As the study is based on interview it carries no or minimal risk.

5.1 Dissemination plan:

At the end of the study, study findings will be presented to the academic of Jimma University. Copies of the paper will be submitted to Jimma University College of health Sciences, department of population and family healthy; human nutrition unit. The findings will also be distributed to Jimma town and its kebeles, Zonal and Regional health Bureau as well as Government and Non-governmental organizations those have the mandate or interest to update the information and make use of it/for intervention. Then, the research paper will be presented on the national and the international symposium on the unhealthy lifestyle factors for metabolic syndrome and substance use, annual conferences and trainings. Finally, attempts will be made to publish the work in the Journal of health and behavioral sciences to make accessible to all individuals who may want to use it.

5.2 Definition of terms and operational definition:

Definition of lifestyle behaviors.

Adult: Individuals aged 18- 65 years.

1) Tobacco consumption: Current smoker, was defined as a person who was reported currently either a daily or an occasional smoker at least one cigarette per week (37). For the purposes of the analysis, currently nonsmoker smoker" was considered not at risk for health (coded 0). Whereas, current smoker was classified as at risk for health (coded 1).

2) Alcohol consumption: Participants were asked ''how many alcoholic drinks do you have each week?'' and ''on how many days each week do you usually drink alcohol?'' These variables were used to identify the approximate number of alcoholic drinks consumed each day. With one drink defined as 1 standard bottle of regular beer (285ml), 1 single measure of spirits (30ml) , 1 medium size glass of wine (120ml) , 1 measure of areki , 1 flask/ brille of teji, 2 glass/ burciko of tella. Note : Note: net alcohol content of a standard drink is approximately 10g of ethanol (69,70). A binary variable was constructed to distinguish between participants consuming two or less than (coded as 0) alcoholic drinks a day. Risky drinking was defined as drinking more than two drinks a day (coded 1) (63).

3) Unhealthy dietary practice: Based on a previously used scale, dietary practices was assessed using five items that evaluated the daily frequency of fruit and vegetable consumption , amount of salt used per day per person, the number of times soft drinks, and fried food were consumed in the previous 7 days. Then responses were converted to z-scores and summed together. The inverse of the z-scores for soft drink, salt and fried food were used in the summary score of dietary practices so that a higher score reflected a better dietary practices. Finally, the dietary practice score was subsequently classified into tertiles (Highest Tertile (better diet) whereas, the middle tertile and lowest tertile (classified as **un healthy diet**)) Participant (45).

4) Physical activity:

Physical activity was measured using the General Physical Activity Questionnaire (GPAQ). The instrument gathered information on physical activity in three domains (activity at work, travel to and from places, and recreational activities), as well as time spent sitting.

The questionnaire also assessed vigorous and moderate activities performed at work and for recreational activities. Information on the number of days per week spent on different activities and the time spent in a typical day for each activity was also recorded. For physical activity, in addition to the total minutes of activity, the activity volume was also computed by weighing each type of activity by its

energy requirement in metabolic equivalents (METs). One MET was defined as the energy cost of sitting quietly and was equivalent to a caloric consumption of 1 kcal/kg/hour.

A MET-minute showed the total activity volume on a weekly basis, and it was calculated by multiplying time spent on each activity during a week by the MET values of each level of activity. MET values for different level activities were set as 4 MET for moderate-intensity physical activity, 8 MET for vigorous physical activity, and 4 MET for transport-related walking or cycling.

The total physical activity for GPAQ was calculated as the sum of total moderate, vigorous, and transport-related activities per week. The number of days and total physical activity in MET-minutes per week were used to classify respondents into three categories of physical activity: a low, moderate, or high level. A person reaching any of the following criteria is classified in the 'high physical activity' category: vigorous intensity activity for at least 3 days per week, achieving a minimum of at least 1,500 MET-minutes per week; or 7 or more days of any combination of walking and moderate vigorous intensity activities per week, achieving a minimum of at least 3,000 MET-minutes per week.

A person who is not meeting the criteria for the 'high' category but is meeting any of the following criteria is classified in the 'moderate physical activity category': 3 or more days per week of vigorous intensity activity for at least 20 minutes per day, 5 or more days per week of moderate-intensity activity or walking for at least 30 minutes per day, or 5 or more days per week of any combination of walking and moderate- or vigorous intensity activities, achieving a minimum of at least 600 MET-minutes per week. A person not meeting any of the above-mentioned criteria falls in the 'low physical activity' category (71).

5) Sedentary behaviors: was defined as sedentary behaviors (from the Latin sedere, "to sit") include sitting during commuting, in the workplace and the domestic environment, and during leisure time. Sedentary behaviors such TV viewing, computer use, or sitting in an automobile typically are in the energy expenditure range of 1.0 to 1.5 METs (multiples of the basal metabolic rate). Thus, sitting for >7 h/d behavior was classified as sedentary (at risk) (2).

6) Sleep duration: normative sleep duration was defined as 7–9 hours based on published recommendations for adults. Short sleep duration (defined as sleep duration of < 7 hours; long sleep duration (defined as having > 9 hours. Short sleep and long sleep duration was summed and was classified as unhealthy sleep duration (72).

7) **Khat use;** current prevalence of khat use was defined as the proportion of participants who currently used khat regularly in the last month. Non- chewer was a person who has never or was currently

not chewing regularly either. At risk respondent was classified under currently regular chewers whereas, other was classified as low risk (8).

9) Risky Life styles for metabolic syndrome: this is a composite variable measured by a combination of the above seven indicators, where the presence of each indicator was given a score of "1" and its absence was given a score of "0. Then the values was summed as a risky lifestyle index with the values ranging from zero to seven. Eventually, having at least one of the risky behaviors was labeled as risky life style.

Clustering pattern of risky lifestyle: was defined as simultaneous occurrence of two or more risky lifestyle behaviors on individuals.

High risky lifestyle: was defined as scoring more than three risky lifestyle score (highest tertile) (73).

Chronic disease: It was denoted individuals as having a chronic disease if they report that a physician or health professional told them they had either heart disease (angina, heart attack, or congestive heart failure), hypertension, or diabetes.

Wealth index: The World Bank usually encourages their researchers to utilize the asset index to classify household socio-economic position in middle- and low-income countries where household income and expenditure data are unreliable. In this study, participants were asked about the avail- ability of seventeen household items in their household and its quantity (i.e., how many of that particular item were in the participants home). Washing machine, television, stove, car, cart, and motorcycle.

Factor analysis was used to give different weights for different household items and to develop a comprehensive asset index (first extracted component in the analysis), which was used as a proxy of the socioeconomic status. The Kaiser- Meyer-Olkin (KMO) measure of sampling adequacy is an index used to examine the appropriateness of factor analysis. The KMO uses values between 0 and 1, with small values meaning that, overall, the variables have too little in common to warrant a factor analysis. The KMO was the maximum value calculated when combining the factor analysis, including all asset items taxi and washing machine. Therefore, we removed them from the variable set. Keeping the other fifteen items in the analysis. We used the distribution of the first factor score to set the cut-off values for asset index categorization (quintile). Finally, three categories were created: 1) low: the lowest and second-lowest quintile, 2) moderate: medium and second- highest quintile, 3) high: highest quintile)(3).

CHAPTER SIX: RESULTS

5.1 Socio demographic characteristics.

A total of 844 adults were interviewed, yielding response rate of 97.3%. Among the 822 study participants, 397 (48.30%) were females and 425 (51.7%) were males. and, 388 (47.2%) was found in age interval of 25 to 34 years. Whereas, the majority 452 (55.0%) was Oromo by ethnicity and 342 (41.5%) Muslim by religion.

Thirty percent was government employee, followed by 425 (28.2%) self-employee. In addition, about fifty percent was married and 34.30% was never married. Nearly five percent of the sample had no formal schooling and larger proportion (39.9%) of them had low wealth status. two third (60.30%) of the study sample was from urban areas.

Moreover, 496(69.6%) did not have children, and 606 (73.70%) live with family members. At the same time, 7.9% reported that having chronic non communicable diseases 9.0% had already an advice on common risky lifestyle within the past three years from health care workers (**Table 1.**).

Table 1: Distribution of socio-demographic characteristics of the study participants in Jimma Town, southwest Ethiopia, 2016.

Socio-demographic characteristics		Frequency	Percentage (%)
Sex of respondents	Female	397	48.3
	Male	425	51.7
Age category	18_24	140	17
	25_34	388	47.2
	35_44	146	17.8
	45_64	148	18
Ethnic category	Oromo	452	55
	Amhara	113	13.7
	Gurage	91	11.1
	Kefa	95	11.6
	Dawro	71	8.6
Religion category	Orthodox	314	38.2
	Muslim	342	41.6
	Protestant	130	15.8
	Others	36	4.4
Marital status	Married	426	51.8
	Single	282	34.3
	Widowed	44	5.4
	Divorced	70	8.5
Educational level	No schooling	40	4.9
	Primary	196	23.8
	Secondary	242	29.4
	College and above	344	41.8
Occupation category	Government	310	37.7
	Non-government	40	4.9
	Self-employed	254	30.9
	House wife	98	11.9
	Student	80	9.7
	Retired	40	4.9
Wealth status	Low wealth	328	39.9
	Medium wealth	166	20.2
	High wealth	328	39.9
Living condition	Alone	146	17.8
	With friend	70	8.5
	With family	606	73.7
Past residence	Urban	496	60.3
	Rural	326	39.7
Risky lifestyle advice	No	748	91
	Yes	74	9
Past history of illness	No	758	92.2
	Yes	64	7.8

6.2 Prevalence of risky lifestyles.

With regard to the prevalence of each of the seven risk factors, the most common risky behavior was unhealthy diet practicing. About sixty six percent of the sample had unhealthy eating practices. Of them, 37.3% was male and 29.7% was women. While, forty eight percent of study sample was reported currently chewing khat. Among them, 35.5% was male and 13.12% was women. Similarly, 46.2% of the sample was sat for more than seven hours per day for which, 23.8% was male, and 22.4% was women. Furthermore, a 40.1% of the study sample was slept either too little or too much. For which, 30.2% was men and about twenty nine percent was women. In addition, 29%, 23.4% and 18.7% was classified as low for physical activity level, current smoker and risky drinker respectively (Figure 3).

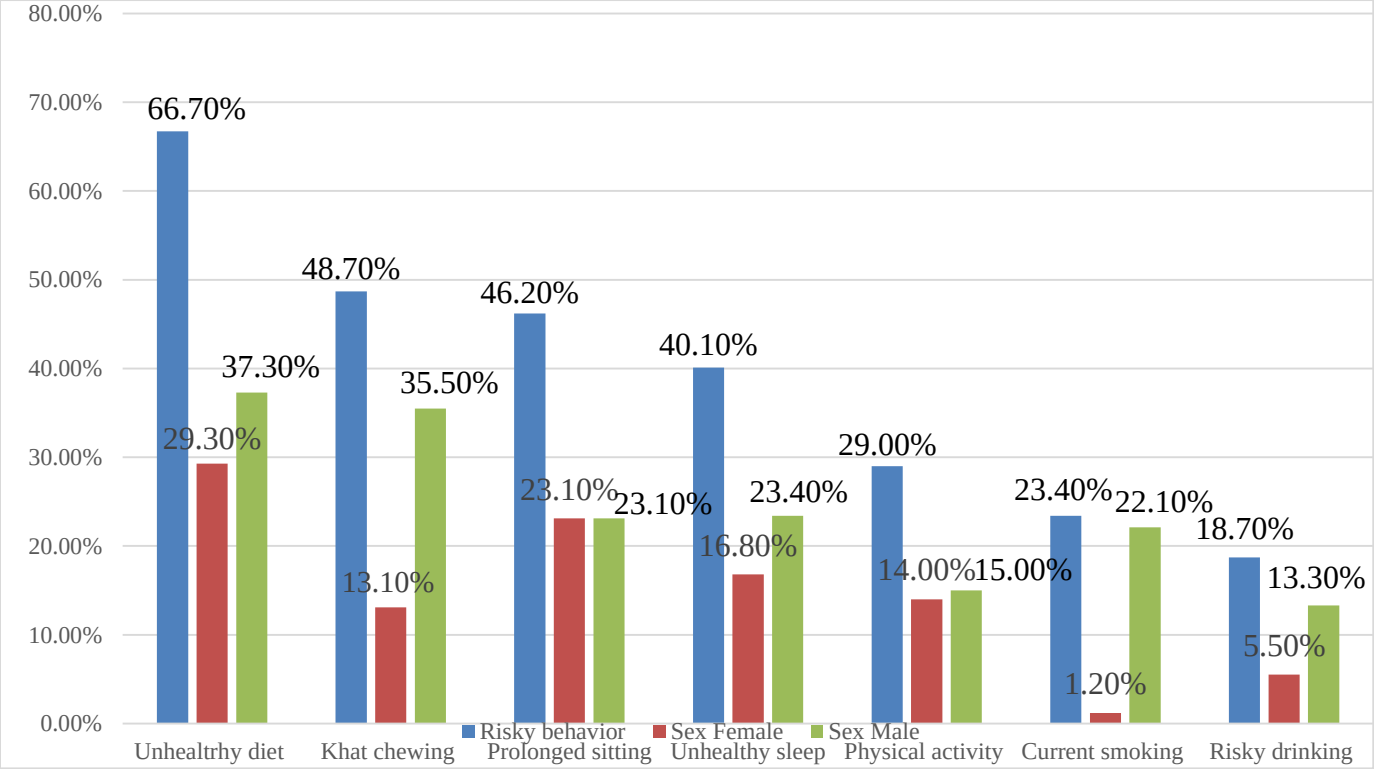

Figure 3: Distribution of each risky lifestyle behaviors by sex among adults aged _> 18 years in Jimma town, Jimma Zone, Southwest Ethiopia, in May, 2016.

5.3 Prevalence of risky lifestyle score by age category.

For each survey participant, a total risky lifestyle behavior index score was created, ranging from 0 (having none of the seven risk factors) to 7 (having all seven of the risk factors). Based on the observed frequencies of each individual risk factor in this sample, the expected percent of respondents having

none of the factors and all seven risk factors is 34 (4.1%) and 8(1%), respectively. About seventeen percent was estimated to have had one risk factor, 200(24.3%) had two risk factors, 182(22.1%) had three risk factors, 172(20.6 %) had four, 60(7.3%) had five, and 28(3.4%) had six or more risky lifestyle behaviors (**Table 2.**).

Table 2: Distribution of risky lifestyle behavior score among adults aged _> 18 years in Jimma town, Jimma Zone, south west Ethiopia, in May, 2016.

Number of risky lifestyle behaviors	Frequency	Percent
0	34	4.1
1	146	17.8
2	200	24.3
3	182	22.1
4	172	20.9
5	60	7.3
6	20	2.4
7	8	1
Total	822	100

5.4. Clustering pattern of risky lifestyles.

We also did an analysis of the simultaneous occurrence (clustering pattern) of risky lifestyle behaviors. 86 (10.50%) of the study subjects had all seven risky lifestyle behaviors simultaneously. Moreover, these seven risky behavior patterns overlapped for 71 (8.6%) of respondents.

Whereas, of the individuals who had six risk factors, the most common grouping of the factor were all except smoking for 74 (9.0%) of the study samples. Consistent with this prevailing six factors, those with five risk factors, the combination of unhealthy diet practices, smoking, in adequate physical activity, risky drinking, and khat chewing constitute 6.6%.

Furthermore, among those with four risk factors including: unhealthy diet, inadequate physical activity, prolonged sitting time and unhealthy sleep pattern was by far the second most common combination for 83(10.10%) of individuals. In addition, the most common two cluster risk factors were inadequate physical activity and risky drinking, for 46 (5.6%) of respondents. Moreover, among those with one risk factor, the most common single risk behavior was unhealthy diet accounting for (16.8%) of respondents (Table 3).

Table 2: Prevalence of clustering pattern of risky lifestyles among adults in Jimma town, Southwest Ethiopia, in June, 2016.

Risky styles	Smoking	Diet	P. activity	Sedentary	Drinking	Sleep	Khat	Frequency	%
7	+	+	+	+	+	+	+	86	10.50
7	+	+	+	+	+	+	+	71	8.60
6	+	-	+	+	+	+	+	74	9.00
5	+	+	_	+	+	+	_	54	6.60
4	+	+	+	_	+	_	+	83	10.10
4	+	_	_	+	+	+	+	38	4.60
4	+	+	_	+	+	_	_	44	5.40
2	_	_	+	_	+	_	_	46	5.60
1	_	+	_	_	_	_	_	80	9.70
0	_		_	_	_	_	_	246	29.9
Total								822	100

Note: '+' is presence of risky behavior. '–'indicate absence of risky behaviors.

5.5 Clustering pattern of risky lifestyle by socio demographic factors.

Next, risky lifestyle index score dichotomized and related with socio demographic and health differences to examine the clustering pattern of these behaviors by socio demographic and healthy differences among study population.

For the entire sample, seventy eight percent of the samples had two or more risk factors. Of them, a 576(78.1%) had at least two clustered risky lifestyles. A, 375 (58.4%) of men had more clustered risk factors than . Most of 309 (48.1%) of individuals aged 25 to 34 had higher risk factor scores, compared to other younger age groups, followed by 380 (59.2%) of Oromo and 302 (947.2%)of Muslim individuals.

With regard to marital status, 328(51.1 %) of married individuals had substantially higher clustered risk factor scores, followed by, 36.50% of individuals who currently was government employee. Education level was also related to higher clustered risk factors. The majority, 266(41.7 %) of the college and above schooled had higher risk factor cluster.

A majority, 268 (41.7 %) of low wealth asset and 60.5% of individuals who previously lived in urban was related to clustered risky lifestyle. Having children, current living condition, past history of chronic illness and information of common risky lifestyle behavior was also associated with a cluster risk factor level (**Table 3**.).

Table 3: Distribution of socio demographic factors by clustering pattern of risky lifestyle score among adults aged ≥18 year in Jimma Town, south west Ethiopia, in May, 2016.

Variables		Clustering pattern of risky lifestyle			
		No		Yes	
		Count	%	Count	%
Sex of respondents	female	130	72.2%	267	41.6%
	male	50	27.8%	375	58.4%
Age category	18_24	33	18.3%	107	16.7%
	25_34	79	43.9%	309	48.1%
	35_44	38	21.1%	108	16.8%
	45_64	30	16.7%	118	18.4%
Ethnic category	Oromo	72	40.0%	380	59.2%
	Amhara	30	16.7%	83	12.9%
	Gurage	32	17.8%	59	9.2%
	Kefa	26	14.4%	69	10.7%
	Dawro	20	11.1%	51	7.9%
Religion category	Orthodox	92	51.1%	222	34.6%
	Muslim	40	22.2%	302	47.0%
	Protestant	40	22.2%	90	14.0%
	Others	8	4.4%	28	4.4%
Marital status	Married	98	54.4%	328	51.1%
	Single	48	26.7%	234	36.4%
	Widowed	14	7.8%	30	4.7%
	Divorced	20	11.1%	50	7.8%
Educational level	No schooling	6	3.3%	34	5.3%
	Primary	50	27.8%	146	22.7%
	Secondary	46	25.6%	196	30.5%
	College+	78	43.3%	266	41.4%
Occupation category	Government	76	42.2%	234	36.4%
	Non-government	8	4.4%	32	5.0%
	Self-employee	54	30.0%	200	31.2%
	House wife	26	14.4%	72	11.2%
	Student	10	5.6%	70	10.9%
	Retired	6	3.3%	34	5.3%
Wealth status	Low wealth	60	33.3%	268	41.7%
	Medium wealth	38	21.1%	128	19.9%
	High wealth	82	45.6%	246	38.3%
Living condition	Alone	18	10.0%	128	19.9%
	With friend	8	4.4%	62	9.7%
	With family	154	85.6%	452	70.4%
Past residence	Urban	110	61.1%	386	60.1%
	Rural	70	38.9%	256	39.9%
Number of children	No child	90	50.0%	482	75.1%
	one child	30	16.7%	50	7.8%
	two to four child	48	26.7%	78	12.1%
	Above four	12	6.7%	32	5.0%
Past history of illness	No	164	91.1%	594	92.5%

	Yes	16	8.9%	48	7.5%
Risky lifestyle advice	No	163	90.6%	585	91.1%
	Yes	17	9.4%	57	8.9%

5.6 High risk lifestyle for metabolic syndrome.

Furthermore, risky lifestyle index score was dichotomized, as high risk for individuals with highest tertile rank (more than three risky lifestyle score) otherwise lower risk for individuals with medium and low tertile score, then bivariate and multivariable logistic regression was computed by socio demographic factors. The prevalence of high or more than three risky lifestyle was 31.7 %, while 69.3% had low level risk index score.

Men, had more risk lifestyle than women. About 195(23.7%) of men had high level risky factor. And individuals within age interval of 25 to 34, 15.8% and 45 to 60 years, 6.6% had higher risk factor scores than the rest age groups.

With regard to race/ethnicity, 19.7% of Oromo individuals had substantially higher risk factor scores, followed by, 15.8 % of currently married individuals compared to others. The majority, 10.7% of government employee, and 13.7 % of college and above schooled individuals was also related with high risk lifestyle behaviors. Higher risk lifestyle behavior was also related with wealth status; about 13.9% of the lower wealth asset individual had high risk lifestyle score.

Similarly, being Muslim, 16.5%, 20.0% of the individuals currently living with family members, and 27.5% of giving no birth were related with high risk lifestyle behavior (**Table 5**.).

Table 4: Distribution of socio demographic factors by high risk lifestyle factors among adults aged ≥ 18 year in Jimma Town, south west Ethiopia, in May, 2016.

Variables	Respondents	High risk lifestyle score			
		No		Yes	
		Count	%	Count	%
Sex	Female	332	59.1	65	25
	Male	230	40.9	195	75
Age category	18_24	102	18.1	38	14.6
	25_34	258	45.9	130	50
	35_44	108	19.2	38	14.6
	45_64	94	16.7	54	20.8
Ethnic category	Oromo	290	51.6	162	62.3
	Amhara	88	15.7	25	9.6
	Gurage	68	12.1	23	8.8
	Kefa	68	12.1	27	10.4
	Dawro	48	8.5	23	8.8
Religion category	Orthodox	232	41.3	82	31.5
	Muslim	206	36.7	136	52.3
	Protestant	102	18.1	28	10.8
	Others	22	3.9	14	5.4
Marital status	Married	296	52.7	130	50
	Single	172	30.6	110	42.3
	Widowed	38	6.8	6	2.3
	Divorced	56	10	14	5.4
Educational level	No schooling	28	5	12	4.6
	Primary	148	26.3	48	18.5
	Secondary	154	27.4	88	33.8
	_> College	232	41.3	112	43.1
Occupation category	Government	222	39.5	88	33.8
	Non-government	24	4.3	16	6.2
	Self-employee	168	29.9	86	33.1
	House wife	84	14.9	14	5.4
	Student	40	7.1	40	15.4
	Retired	24	4.3	16	6.2
Wealth status	Low wealth	214	38.1	114	43.8
	Medium wealth	108	19.2	58	22.3
	High wealth	240	42.7	88	33.8
Living condition	Alone	86	15.3	60	23.1
	With friend	34	6	36	13.8
	With family	442	78.6	164	63.1
Past residence	Urban	342	60.9	154	59.2
	Rural	220	39.1	106	40.8
Number of children	No child	346	61.6	226	86.9
	one child	76	13.5	4	1.5
	two to four child	110	19.6	16	6.2
	Above four	30	5.3	14	5.4

5.7 Bivariate logistic regression analysis predicting the likelihood of high risky lifestyle.

Using high risk lifestyle index score as dichotomized dependent variable, we estimated the proportional odds ratios for the demographic covariates. When each independent variable was entered in the model with dichotomized high risk lifestyle index score, most of them showed independent associations with high risk lifestyle index score. The results from the bivariate logistic regression was shown. Of them, a male compared to female is [COR=4.33 (95% CI: 3.12, 6.07) more likely to have high risky lifestyle, and association is statistically significant at P< 0.0001.

Marital status was also strongly associated with high risk lifestyle. Being, single never married compared to married is (COR= 1.5 [95% CI: 1.062, 1.997]) more related to develop high risky lifestyle, whereas being widowed compared to currently married is (COR= 1.95[95% CI: 0.148, 0.871) less likely to have high lifestyle behavior. In addition, religion was associated with high risky lifestyle. An individual with Muslim religion compared to Orthodox religion is about 1.9 times more likely to have high level risky lifestyle behavior with a 95 percent confidence interval of (1.34 to 2.604), P < 0.0001, therefore the association strongly significant.

On the other hand, being home maker compared to government employee was 58% times less significantly to have high risky lifestyle behavior with a 95 percent confidence of interval of (COR=0.42 [95%CI: 0.227, 0.779]), p=0.006, while being student when compared to government employee is (COR=2.52 [95% CI: 1.525 , 4.172) associated with high risky lifestyle behavior. Similarly, having a higher wealth asset compared to low is (COR= 0.69 [95% CI: 0.493, 0.961) less likely to have high risky lifestyle .The association is statistically significant at p-value of 0.028.

Whereas, an individual who is currently living with family members compared to an individual currently living alone was less likely to develop high risky lifestyle with a 95% percent confidence interval of (COR= 0.45[95%CI: 0.36, 0.774) p=0.001, the association is statistically significant. There was no association between any age group, educational status and previous residential area and high risk lifestyle. A 95 percent confidence interval included one and p was > 0.05 (**Table 6.).**

Table 5: Bivariate logistic regression analyses predicting the likelihood of high risky lifestyles among adults aged _> 18 year in Jimma Town, South west Ethiopia, in May 2016.

Model 1		**High risk lifestyle behavior**				**COR**	**95% C.I.**	
		No		Yes				
		Count	%	Count	%		Lower	Upper
Sex	female	332	59.1	65	25			
	Male	230	40.9	195	75	2.45	1.49	4.04
Age category	18_24	102	18.1	38	14.6			
	25_34	258	45.9	130	50	1.77	1.02	3.08
	35_44	108	19.2	38	14.6	1.56	0.74	3.27
	45_64	94	16.7	54	20.8	3.33	1.56	7.1
Marital status	Married	296	52.7	130	50			
	Single	172	30.6	110	42.3	0.89	0.53	1.52
	Widowed	38	6.8	6	2.3	0.22	0.07	0.66
	Divorced	56	10	14	5.4	0.52	0.25	1.09
Educational level	No schooling	28	5	12	4.6			
	Primary	148	26.3	48	18.5	0.93	0.39	2.2
	Secondary	154	27.4	88	33.8	1.97	0.83	4.67
	_> College	232	41.3	112	43.1	1.29	0.51	3.27
Occupation category	Government	222	39.5	88	33.8			
	Non-govern-ment	24	4.3	16	6.2	1.682	0.853	3.317
	Self-employee	168	29.9	86	33.1	1.291	0.902	1.848
	House wife	84	14.9	14	5.4	0.42	0.227	0.779
	Student	40	7.1	40	15.4	2.523	1.525	4.172
	Retired	24	4.3	16	6.2	1.682	0.853	3.317
Wealth status	Low wealth	214	38.1	114	43.8			
	Medium wealth	108	19.2	58	22.3	1.3	0.82	2.06
	High wealth	240	42.7	88	33.8	0.69	0.49	0.96
Living condition	Alone	86	15.3	60	23.1			
	With friend	34	6	36	13.8	1.28	0.64	2.56
	With family	442	78.6	164	63.1	0.45	0.26	0.77
Past residence	Urban	342	60.9	154	59.2			
	Rural	220	39.1	106	40.8	0.76	0.53	1.09
Number of children	No child	346	61.6	226	86.9			
	one child	76	13.5	4	1.5	0.17	0.05	0.52
	two to four child	110	19.6	16	6.2	0.78	0.36	1.67
	Above four	30	5.3	14	5.4	3.4	1.26	9.21

5.7 Multivariable logistic regression analysis predicting the likelihood of high risky lifestyle.

All independent covariates with p value < 0.25 were entered into the multivariable logistic regression model to differentiate predictor covariates for high risky lifestyle score and the proportional odds ratios for the predictor covariates were estimated. The results from the multivariable logistic regression analyses was revealed that some of the covariates were associated with a greater increase for the risk of having high risk lifestyle for the metabolic syndrome.

Out of them, being a male compared to female is 2.4 (AOR= 2.40 [95% CI: 1.338 to 3.597) times more likely to develop high risky lifestyle score, and is statistically significant at P < 0.0001. While, a subject within an age interval of 45- 64 year is approximately 3.39 times as likely to have high risky lifestyles as a similar subject within younger age 18-29 year and the odds could be as much as 1.61 times or as little as 7.15 times smaller with 95 percent confidence. Whereas, individual with age 25 to 34 is also 1.74 (AOR=1.74 [95% CI: 1.00 to 3.009) times more likely to have high risky lifestyle.

Besides, the odds ratio for a subject with a widowed marital status is 0.21 with a 95 percent confidence interval of (AOR= 0.21[95% CI: 0.051, 0.507). Therefore, a widowed subject compared to currently married individual is 80% times less likely to develop high risky lifestyle behavior. Whereas, a divorced / separated individual is also 0.48 times less likely to high risky lifestyle behavior with a 95% confidence interval of (0.23 to 0.985).

With regard to occupational status, being student is 2.85 times significantly more likely to develop high risk lifestyles when compared to a subject with governmental occupation with a 95 percent confidence (AOR=2.85 [95%CI:1.478, 5.873) with p <0.001.

While, an individual currently living with family members is 57% times less likely to have high risky lifestyle behaviors compared to a subject currently living alone with a 95% of confidence interval of(AOR=0.43 [95%CI:0.262, 0.765) with p< 0.001. Beside this, having more than four children is 3.4 times more likely to high risky lifestyle contrary to those having none child with a 95 percent confidence interval (1.255, 9.207). Whereas, having one child is 0.17 (AOR=0.17[95%CI: 0.06, 0.55) times less likely to have high risk lifestyle compared to no child person.

On the other hand, wealthy status, previous living area, and educational level were not predictor of high risk lifestyle for metabolic syndrome. None of their group had showed association p value was >0.05 and a 95 percent confidence included one. None of the tested interactions were statistically significant (**Table 7**.).

Table 6: Multivariable logistic regression analyses predicting the likelihood of high risky lifestyle among adults _>18 year in Jimma Town, South west Ethiopia, in May, 2016.

Model 2		**High risk lifestyle score**				**AOR**	**95% CI.**	
		No		Yes			Lower	Upper
		Count	%	Count	%			
Sex	female	332	59.1	65	25			
	Male	230	40.9	195	75	2.4	1.45	3.97
Age category	18_24	102	18.1	38	14.6			
	25_34	258	45.9	130	50	1.74	1	3.03
	35_44	108	19.2	38	14.6	1.52	0.72	3.18
	45_64	94	16.7	54	20.8	3.49	1.63	7.47
Marital status	Married	296	52.7	130	50			
	Single	172	30.6	110	42.3	0.9	0.53	1.53
	Widowed	38	6.8	6	2.3	0.21	0.07	0.66
	Divorced	56	10	14	5.4	0.47	0.22	1
Educational level	No schooling	28	5	12	4.6			
	Primary	148	26.3	48	18.5	0.94	0.4	2.25
	Secondary	154	27.4	88	33.8	2.07	0.86	4.97
	_> College	232	41.3	112	43.1	1.34	0.52	3.42
Occupation category	Government	222	39.5	88	33.8			
	Non-government	24	4.3	16	6.2	1.25	0.55	2.81
	Self-employee	168	29.9	86	33.1	1.33	0.84	2.12
	House wife	84	14.9	14	5.4	0.54	0.22	1.3
	Student	40	7.1	40	15.4	2.85	1.42	5.75
	Retired	24	4.3	16	6.2	1.98	0.86	4.53
Wealth status	Low wealth	214	38.1	114	43.8			
	Medium wealth	108	19.2	58	22.3	1.3	0.82	2.06
	High wealth	240	42.7	88	33.8	0.79	0.51	1.22
Living condition	Alone	86	15.3	60	23.1			
	With friend	34	6	36	13.8	1.14	0.57	2.29
	With family	442	78.6	164	63.1	0.43	0.25	0.74
Past residence	Urban	342	60.9	154	59.2			
	Rural	220	39.1	106	40.8	0.76	0.53	1.09
Number of children	No child	346	61.6	226	86.9			
	one child	76	13.5	4	1.5	0.17	0.06	0.55
	two to four child	110	19.6	16	6.2	0.78	0.37	1.68
	Above four	30	5.3	14	5.4	3.86	1.41	10.54

CHAPTER SIX: DISCUSSION

Chronic non-communicable diseases are the leading causes of death and disability worldwide, and are increasing rapidly in the developing countries and have often been driven by risky lifestyle behaviors. In particular, cigarette smoking, excessive drinking, physical inactivity, and inadequate daily con-as-sumption of fruits and vegetables and others are common modifiable risky lifestyle behaviors that contribute to the development of many chronic diseases or conditions, such as heart attack, angina or coronary heart disease, stroke, and type 2 diabetes in the adult population.

This study examined the prevalence of seven risky lifestyle behaviors, and clustering pattern of risky lifestyle behaviors among adult population in Jimma town. This study also examined the prevalence and predictors of high risk lifestyle factors in this adult population.

Among the risky lifestyle behaviors for metabolic syndrome, this study documented a prevalence rate of current smoking among the study population to be 23.4%. Out of this, males against females con-stituted 22.1 % and 1.20 % respectively for current smoking. This indicates that considerable propor-tion of the community was smoking that might put them at higher risk for metabolic syndrome. This finding is approximately two third times lower than that reported by the previous study in which 35.5% prevalence rate of current smoking was documented (34).

Findings from this current study on prevalence of smoking (23.4%) is consistent with that of Butajira, Southern Ethiopia, 15.6% , Bahir dar Town, Amhara Region, 6.0% ,) and that of Addis Ababa, of which 4.5% prevalence rate among males and 1% among females were observed compared to the current study (23.4 % for males and 1.20% for females)(39,49,61). This discrepancy could be due to difference in study setting, and socio cultural differences.

This finding is also consistent with study conducted in slum area of Kenya , 12.4% (50) with that of 7.7% (Ghana) to 46.9% (India) (10). Possible explanation for these differences would be due to sample size, socio cultural and study setting differences. In general, males on the average smoked cigarette more than females on daily basis. This indicates that considerable proportion of the community was smoking that might put them at higher risk for metabolic syndrome.

In this findings the prevalence of unhealthy diet practicing was 66.7%, males accounted for 37.3% against 29.3% in females. This means that males practice unhealthy diet more than females at all, thus increasing their risk of developing NCDs attributable to unhealthy diet practicing. This trend is more consistent with findings from other countries than Ethiopia. For instance, consistent with report of

urban slum area, Kenya 57.2%, 81.2% , Brazil, 17.2% Australia , and 33.4 that of North America (45,54,75).

On the part of inadequate physical activity, the study documented an overall prevalence rate of low 29.1% physical activity among the study subjects. This means that more than quarter of the respondent are considered physically inactivate be either at their work place or on their normal leisure. This finding by the present study corresponds to that reported by the previous study in which low physical activity was 14.4% in Kenya , 59.7% in South Africa 59.7% (10,45). It is also corresponds to that of Mexico , 37.7% and North America, 33.93% (10,54).

In this study, the prevalence of prolonged sitting/ sedentary behavior was 46.2%. This finding is also more similar with other studies. Comparing to finding from North America , 59.65% it is lower and is higher than findings from Australia ,25% (2,54). Possible explanations for these differences in risk factor co-occurrence between these finding and other are the diversity in levels of urbanization and socioeconomic development in low-, middle- and high-income countries, and the rate of 'risk transition' from infectious disease burden to non-communicable diseases burden over time.

It was also observed that the prevalence of risky drinking (drinking more than two drinks a day) was found to be 18.7% which is lower than finding from Slam area, Kenya, 49.5%(45) and findings from Australia 19.1% and North America, 29.03% (2,54). We also found the prevalence of unhealthy sleep pattern, sleeping less than seven hours or more than nine hours per night was 40.1%. The findings regarding sleep duration are also consistent with other studies, it is lower compared to 48.4% findings in Gwangju Metropolitan City, Korea (55) . In addition, the findings from Australia , 23.1% and North America, 59.86% (2,54).

The current prevalence of khat chewing , was 48.3% in this findings, which is lower than the previous finding in Jimma town, (68.5%) (76) , and finding in Butajira (61) , Ethiopia, but higher than that of Bahir Dar town, North Ethiopia, 19.6% (49). This is also consistent with findings from Jazan, Saudi Arabia, 28.7% (31). This discrepancy could be due to difference in study setting, and socio cultural differences.

In this study, the prevalence of risky lifestyle score was also documented, in which 4.1% had no risk factor, about fourteen percent is estimated to have had one risk factor, 25.3% had two risk factors, 23.1% had three risk factors, 23.6 % had four, 9.2% had five, and 3.7% had six or more risky lifestyles score. Although the prevalence of the seven risk behaviors in our study was low, this study was more consistent with the study from Australia, 31.2% of participants reported no risk behavior (lifestyle risk

index score = 0), 36.7% had one risk behavior, and 21.4%, 8.1%, 2.1%, 0.4%, and 0.04% had a lifestyle risk index score of 2, 3, 4, 5, and 6, respectively (63).

Similarly, study from America, only 10% of the adult U.S. population is estimated to have none of the four risk factors. Thirty three percent had one risk factor, 41% had two risk factors, and 17% had three or more risk factors (65) .Another consistent finding from Australia was also showed, 1.5% of the sample scored zero on the unhealthy lifestyle index, whereas only 0.2% reported all eight unhealthy lifestyles. Nearly 50% of the sample reported 3 or 4 unhealthy lifestyles (2).

Possible explanations for the differences in risk factor co-occurrence between these finding and other are the diversity in levels of urbanization and socioeconomic development in low-, middle- and high-income countries, and the rate of 'risk transition' from infectious disease burden to non-communicable diseases burden over time.

Regarding the combination of simultaneous occurrence of risk factors for metabolic syndrome, this study also document the prevalence of 78.9% among respondents, and the most frequent pattern was the simultaneity of all risky behaviors 10.5%. This findings also similar with other findings. In study conducted in Kenya, clustering pattern of common risk factor for metabolic syndrome was 20%. In addition, in a study conducted in South Africa, clustering of NCD risk factors was also (68.9%) (77). It may also reach 70% in rural Asian populations (10). Regarding the combination of simultaneous risk factors for CNCD, at least two factors were present in 59.4% of the respondents, in Florianopolis, Brazil, and the most frequent pattern was the simultaneity of inadequate diet and physical inactivity (30.6%) (78). About 17% of the study population from a sample of 29,183 subjects in the United States had also three or more risk factors (65).

Possible explanations for the differences in risk factor co-occurrence between these finding and other are the diversity in levels of urbanization and socioeconomic development in low-, middle- and high-income countries, and the rate of 'risk transition' from infectious disease burden to non-communicable diseases burden over time.

Higher lifestyle risk scores were more prevalent among males, those who were widowed, 45 to 64 and 25 to 34 age interval, student, currently living with family members, have children and those with Muslim religion.

A male compared to female is 2.2 (95% CI 1.338 to 3.597) times more likely to develop high risky lifestyle behavior, Men, in general, showed more prone to present risk factors than women. Researchers who have addressed gender differences reported that socioeconomic and cultural factors can influence these behaviors. This is an issue of concern if we take into account that men make use of health

services less frequently—especially for health prevention—and the higher morbidity and mortality from cardiovascular diseases that men have compared with women (78).

When comparing our data with those on the North American population, similar results were observed, and together, the risk of having one or more risk factors was higher among the young. This result may be attributed to the young's lack of concern with NCDs; because of the insidious course of these diseases, they usually manifest clinically in individuals after 40 years old (65).

As in other studies, we found that the individuals who are students are more likely to develop the four or more risky lifestyle score simultaneously. Based on these data, reaching young adults at lower educational attainment levels with effective messages about healthy lifestyle factors before the onset of chronic disease is clearly a reasonable strategy to consider. This may be especially true considering the infrequent interaction that young presymptomatic adults have with the healthcare delivery systems.

In this study, widowed and those currently living with family members were strongly associated with the presence of high level risk factor score for non-communicable disease. This social gradient was also observed in studies about the simultaneity of risk factors in England, and the United States (64,65). These inequalities in health could be strongly tackled if we consider the principle of proportionate universalism.

Another example of health inequalities found in this study was regarding religion and having children were more likely to develop high risky lifestyle / four or more risk factors for metabolic syndrome simultaneously compared to others. This reflects the interplay of the underlying social, economic, and cultural driving forces with risky lifestyle for metabolic syndrome. The findings of this study call for the provision of prevention, early detection, and cost-effective management of non- communicable diseases, which remains inadequate.

Some population-based studies examined the risk factors in a stratified approach for men and women. The studies that had a gender-stratification approach investigated the different prevalence on risk behaviors and in associations between men and women, particularly in high-income countries. However, in this study, no interaction was identified.

6.4 Strength and Limitation of the study.

Strength:

- Selection bias was minimized since it was community based study with probability sampling technique.
- Interviewers used were health workers, who know the localities, and speaks local languages.
- High response rate.
- This study was new study to include all seven risky behaviors at the same time.
- Furthermore, logistic regression model was used to complement the findings.

Limitations:

- Sensitive variables smoking, alcohol consumption, and physical activity may be reported with less accuracy which can result in an underestimation of the findings.
- Also the definition of unhealthy diet can contribute to this underestimation. This definition was the most difficult, because the subject of nutritional behavior is extensive. We only focused on the frequency of consumption, because it is a good indication of healthy eating habits. May be this definition (no details on daily consumption and no precisions on portion size) has led to the fact that no gradient in socio-economic inequalities could be shown.
- In addition, the measures used to assess lifestyle risk factors such as, physical, sleep duration and sedentary behavior, are not fully in line with literature. Such measures are adopted from other literatures done on developed countries might be incomparable with our set up.
- Another shortcoming of this study is the mix of different risky lifestyle behaviors and more particularly the cut-off points for defining the risky lifestyle for metabolic syndrome to create the lifestyle index, as no single instrument or procedure is optimal. Dichotomization of the lifestyle index represents a major simplification but it makes interpretation of such a complex matter easier.
- Finally, study is a cross-sectional study, which determines that we could not examined the changes in prevalence of these risk factors for metabolic syndrome over time.

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATION

7.1 Conclusions:

This study attempts to assess the prevalence, clustering of risk and major risk factors for developing high risk lifestyle for metabolic syndrome for non-communicable diseases in the Jimma Town , south west Ethiopia.

- ✓ This study revealed prevalence of risky lifestyle for metabolic syndrome across adult population in Jimma Town. Of the seven common risky lifestyle behaviors for metabolic syndrome, unhealthy diet had the highest prevalence in the study area.
- ✓ A three –fourth of the study population had more than one clustered risky lifestyle behavior.
- ✓ While, approximately one third of them had high risky lifestyle score for metabolic syndrome.
- ✓ As the prevalence of at least two clustering risky lifestyle behavior for metabolic syndrome was significantly high in the study population, and some population groups were at increased odds of having high risk lifestyle score for metabolic syndrome.
- ✓ Being men, age, being widowed, being student, living with family members, having children and religion were strongly associated with high risky lifestyle score for metabolic syndrome.

7.2 Recommendations.

- Drawing from key findings of the study, the following recommendations are made for consideration and implementation by health policy-makers, institutions and all stakeholders.

Government:

- Strengthening integration of risky lifestyle behavior change communication into Public Health Care services and developing healthy lifestyle guidelines for ensuring healthy lifestyle adherence among the population.
- Targeting risky behaviors simultaneously or sequentially, because of the cluster effect, is a surplus value of these intervention programs.
- Establishment of a guideline that could be used for risk communication with health professionals and their clients, policymakers or other stakeholders.
- Developing prevention and promotion programs which focus on the adults, especially men adults and socio-cultural status.
- Keeping on tackling the socio-economic inequalities needs to be the message.
- Integration of NCD prevention programs into the school curriculum to ensure reduction of risk behaviors among populations. Formulation and strengthening of policies to control the incidence of substance use in public places to minimize the effects of substance abuse on the general public as a whole.

Town Health Management Team (THMT).

- Embarking on community based nutrition education programs on the risky lifestyle behaviors for metabolic syndrome and its preventive strategies.
- Strengthening action to promote healthy diet and physical activity in the community. Strengthening the initiation of home-based programs on healthy diet and indoor and outdoor physical exercises with the men and the elderly as specific targets.

Kebele Assembly.

- Provision of funds for research into risky lifestyle behaviors in the town.
- Future work in this area will focus on quantifying health outcomes in relation to the risky lifestyle score over time.
- It will be of interest whether having more children, identified in our study will have higher than average rates of chronic disease in the future.

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Annex II: English version questionnaire

Jimma University, College of health sciences, school of graduate studies; Department of population and family health; **Human nutrition.**

Consent and information sheet.

My name is_____, I am here on behalf of Jimma University, College of Health Sciences, and department of human nutrition. I am doing this study for the partial fulfillment of the requirements for a master's of science (**MSc**.) in human nutrition. The objective of this study is to assess prevalence and associated factors of central obesity and risky lifestyles for metabolic syndrome among adults in Jimma town, south west Ethiopia, 2016. Your cooperation and honestly participation in responding to the questionnaire will provide us valid result, show us our real status, and help to make intervention. Hence, we request you to participate honestly. Again, every aspect of the study is voluntary. Your name will not be written in this form and all information that you give us will be kept confidential. You may skip any question that you prefer not to answer, but we would appreciate your cooperation. You may also ask us to clarify questions if you do not understand them or can stop the interview at any time. Only number identifies your responses to our questions, never by name.

Do you agree to participate in this study?

Yes … ……. 2. No…….

Thank you for help!

Name of Kebele _____ HH No. _____Date of interview _____

Questionnaire code _____

Name of data collector_____ sign_____

Name of supervisor_____ Sign _____

The questionnaire has four parts.

A. DEMOGRAPHIC INFORMATION.	
A0. Unique Identification Number	ID_____
A1. Sex of the respondent Circle ONLY ONE answer	Male---------- Female …….0
For female respondants only.	
A2. Have you ever gave birth?	1. YES 0. NO
If yes for Q. A2 A3. How many times you gave birth?	1. One 2. Two to four 3. Five and above
A4. Are you having/seeing a mensus this month?	1. Yes 0. No
A5. Ethnic Group	1. Amhara 2. Oromo 3. Gurage 4. Tigre 5. Dawro 6. Yem 7. Kafa 8. Wolaita 9. Other (**specify**)_____
A6. How old are you? Age in years	_____Years
A7. Religion.	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5.Other specify_____
A8. Which of the following best describes your main work status over the last 12 months? **Circle ONLY ONE** answer.	1. Government employee 2. Non-government employee 3. Self-employed 4. Non-paid 5. Student 6. Homemaker 7. Retired 8. Unemployed (able to work)

	9. Unemployed (unable to work)
A9. What is your martial status? Circle ONLY ONE answer.	1. Married 2. Single-never married 3. Widowed 4. Divorced 5. Separated Refused answer
A10. Past residency.	1. Urban 2. Rural
A11. What is the highest level of education you have completed? Circle **ONLY ONE** answer.	1. No formal schooling 2. Primary(1-8) 3. Secondary(9-12) 4. Diploma 5. First Degree 6. Master(second degree) 7. Terminal degree(PhD)
A 13. Total family size including yourself, living in your household?	---------- Number of people.
A 14. Current living condition.	1. Alone 2. With friends 3. With families
A 13. Time of work? Circle **ONLY ONE** answer.	1. Full day 2. Half day 3. Shift work Other (**specify**)……

B. BEHAVIOURAL MEASUREMENTS
Tobacco smoking.

B1. Do you currently smoke tobacco? (Circle **ONLY ONE** answer)	1.Yes 0. No (**if NO go to Q. B6**)
B2. If **yes**, do you currently smoke tobacco daily?	1.Yes 0. No
B3. How old were you when you first started smoking?	_____Years
B5. On average, how many cigarettes (stick) do you smoke each day/ week?	---------No. of sticks/ day----------sticks/week
B6. In the past, did you **ever smoke**?	1. Yes 0. No
If yes Q. B6, how old were you when you quit smoking?	---------- age (years)
How many cigarettes (sticks) you were smoking each day/ week?	----------a day ---------- a week
Alcohol consumption.	
B7. Have you ever consumed any alcoholic drink?	1.Yes 0. No
B8. Have you ever consumed any alcohol within the past 12 months?	1. Yes 0. No
B9. During the past 12 months, how frequently have you had at least one standard alcoholic drink in a typical week? (**Circle ONLY ONE answer).**	1. Daily 1. 5-6 days per week 2. 3-4 days per week 3. 1-2 days per week 4. 1-3 days per month 5. Less than once a month
B15. During each of those **days**, how many standard drinks did you have each day?	---- number of drink
Khat chewing	
B 16. Have you ever chewed Khat?	1. Yes 0. No
B17. If yes, have you chewed during the last one month?	1. Yes 0. No

B18. If **Yes,** in **a typical week** how many days do you chew Khat?	----------Days
B19. For how many years you have chewed?	----------years
Dietary practices: The next questions ask about the fruits and vegetables that you usually eat. As you answer these questions please think of a typical week in the **last year**.	
B 16. In a typical **week,** on how many days do you eat fruit?	_____Days
B 17. How many servings of fruit do you eat on 1 of those days?	----------days
B 18. **In a typical week**, on how many days do you eat vegetables?	_____Days
B 19. How many servings of vegetables do you eat on 1 of those days?	
B20. In a typical week, on how many days do you eat protein source foods from animals (beef, lamb, chicken, fish, and egg)?	_____Days
B21. In a typical week, on how many days do you eat protein source foods from plants (pea, bean, chickpea, nuts, groundnuts)?	_____Days
B19. In a typical week, on how many days do you eat energy source foods (cereal grains, energy rich tubers such as potato, sweet potatoes)?	_____Days
B 20. In a typical week, on how many days do you eat milk and milk products (milk, cheese, Yo-gurt)?	_____Days
B 21. In a typical week, on how many days do you eat fats (fats and oils)?	_____Days

B 22. In a typical week, on how many days do you eat /drink discretionary calories (soft drinks, sugar, chocolates, honey…)	_____Days
B 23. In a typical week, on how many days do you eat foods fried /baked in an oil (eg. Chips, Biscuits, crackers, cakes)	_____Days
B 24. On average, how many meals per week do you eat that were not prepared at a home? By meal, I mean breakfast, lunch or dinner.	……..No of meals
B 26. Do you skip breakfast?'	1) Yes 2) No
B 27. How often do you skip breakfast within a week?	1) Once 2) Two times 3) Three or more times
B 28. Do you eat snacks?	1) Yes 2) No
Dietary salt consumption.	
B 29**. How often** do you add salt to your food before you eat it or as you are eating it?	1. Always 2. Often 3. Sometimes 4. Rarely 5. Never
B30. How often is salt added in cooking or preparing foods in your household?	1. Always 2. Often 3. Sometimes 4. Rarely 5. Never
B31. What kind of salt do you use for cooking or meal preparation in your household?	1. Iodized 2 . Non-iodized 2. I don't know
B32. How much salt do you think you consume?	1. Far too much 2. Too much 3. Just the right amount 4. Too little 5. Far too little
B33. How many kilos of non-iodized salt /pack of iodized salt do you use per month for your house hold?	---------- Non-iodized (kg.) Or ---------- Iodized in (packs).

B34. How important to you is lowering the salt in your diet?	1. Very important 2. Somewhat important 3. Not at all important
Oil Use Practice. The next questions ask about the oil or fat that is most often used for meal preparation in your household, and about meals that you eat outside a home.	
B35. What type of oil or fat is **most often** used for meal preparation in your household? (**Circle ONLY ONE answer**)	1. Liquid Vegetable oil 2. Solidified vegetable oil 3. Butter 4. Margarine / peanut butter 5. Sheno lega 6. Other 7. None in particular 8. None used 9. Don't know
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.	
B38. Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like [carrying or lifting heavy loads, digging or construction work] for at least 10 minutes continuously?	1. Yes 0. No
B39. In a typical week, on how many days do you do vigorous-intensity activities as part of your work?	_____Days
B40. How much time do you spend doing vigorous-intensity activities at work on a typical day?	____Hours: ___Minutes
B41. Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking [or carrying light loads] for at least 10 minutes continuously?	1. Yes 0. No
B42. In a typical week, on how many days do you do moderate-intensity activities as part of your work?	_____Days
B43. How much time do you spend doing moderate-intensity activities at work on a **typical day**?	____Hours: ___Minutes

Travel to and From Places. 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.	
B44. Do you walk or use a bicycle (pedal cycle) for at least 10 minutes continuously to get to and from places?	1. Yes 0. No
B45. 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?	_____Days
B46. How much time do you spend walking or bicycling for travel on a typical day?	____Hours, OR ----------Minutes
Recreational activities. 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).**	
B47. 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?	1. Yes 0. No
B48. In a typical week, on how many days do you do vigorous-intensity sports, fitness, or recreational (leisure) activities?	_____Days
B49. How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	____Hours OR,----------Minutes
B50. Do you do any moderate-intensity sports, fitness, or recreational (**leisure**) activities that cause a small increase in breathing or heart rate such as brisk walking, [cycling, swimming, and volleyball] for at least 10 minutes continuously?	1. Yes 0. No
B51. In a typical week, on how many days do you do moderate-intensity sports, fitness, or recreational (leisure) activities?	_____Days
C. HOUSEHOLD WEALTH	

B52. How much time do you spend doing moderate-intensity sports, fitness or recreational (leisure) activities on a typical day?	_____Hours OR,----------_Minute	
Sedentary Behavior. 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, taxi, reading, playing cards or watching television, but do not include time spent sleeping		
B53. How much time do you usually spend sitting or reclining on a typical day?	_____Hours OR,----------Minutes	
Sleep habits.		
B54. About how many hours of sleep did you get on a typical night during the **past month**"?	_____Hours	
Do you often have a fragmented sleep with multiple wake up and falling sleep cycle?	1. No 2. Sometimes 3. Yes most of the time.	
Past history of illnesses (Circle only one answer)	1. Yes	0. No
B57. Have you ever been told by a doctor or other health worker that you have **raised cholesterol**?	1	0
B58. Have you ever been told by a doctor or other health worker that you have raised blood sugar or diabetes?	1	0
B 59. Have you ever been told by a doctor or other health worker that you have **raised blood pressure or hypertension?**	1	0
B73. Have you ever been told that you had **a heart disease** (angina) or **a stroke** (cerebrovascular accident or incident) by doctors?	1	0
Life Style Advices. During the **past three years,** has a doctor or other health worker advised you to do any of the following?	**1. Yes**	**0. No**
B70. Quit using tobacco or don't start or khat chewing	1	0

B71. Reduce salt in your diet	1	0
B72. Eat at least five servings of fruit and/or vegetables each day	1	0
B73. Reduce fat in your diet	1	0
B74. Start or do more physical activity	1	0
B75. Maintain a healthy body weight or lose weight	1	0

Does the household have any of the following properties? (Circle)		Yes	No
E1	Functioning CD player	1	0
E2	Functioning Flat screen Television	1	0
E3	Gas Stove/Cylinder	1	0
E4	Refrigerator(fridge)	1	0
E5	Electric stove	1	0
E6	Bicycle	1	0
E7	Motor Cycle	1	0
E8	Cart/Gari	1	0
E11	Sofa	1	0
E12	Spring mattress	1	0
E13	Car	1	0
E14	Bajaj	1	0
E15	Taxi	1	0
E16	Own house	1	0

E17	Ipad	1	0
E18	Video camera	1	0
E19	Digital Camera	1	0
E2	Washing machine	1	0

Annex III: Gaaffii Afaan Oromoo (Afan Oromo version)

Maqaan koo ……yommuun jedhamu kanan argamus asuma Jimma University, College of Health Sciences, Department of population and family healthy barataa degree lammaffaa/master dha. Kaayyoon qorannoo kanas bulchiinsa magaalaa Jimma ,keessatti namoota jiraatan haalaa amala jireenya isaanii fayyaan akka wal qabatanii uumamuu danda'an murteessuu fi akkasumas furmaata danda'amu itti kennuufidha.

Kanaafuu gaaffii kana keessatti fedhiinii fi amanamummaatiin hirmaachuun keessan bu'aa sirrii ta'e argachuu fi furmaata itti kennuuf ga'ee guddaa qaba. Hirmaannaan keessan fedha keessanirratti Kan hundaa'e yommuu ta'u **maqaan** keessan Kan hin barreeffamne ta'uu fi deebiin isin nuuf kennitan hundi **icciitiin** isaa Kan eegame ta'uusaa gamanumaan beekuu qabdu. Gaaffiin ifa hin taanes yoo jiraate gaafachuun Ni danda'ama.

Hirmaachuuf fedha qabda?

Eeyyee 2. lakki

Maqaa Nama odeefannoo funaanuu……mallatoo ……guyyaa …….

Maqaa Nama to'atuu……..mallattoo……..…guyyaa…….....

Maqaa qorataa……....mallattoo……guyyaa…….. ……

Gaaffichi kutaa 3 qaba.

Kutaa 1: Gaaffilee Afaan oromootiin qophaa'an kan walii galaa.

A. Odeeffannoo hawaasummaa.	
A0. Unique Identification Numberl(iak-kofsa waraqa enyuma)	ID_____

B. BEHAVIOURAL MEASUREMENTS	
Tobacco smoking. (sijara harkisuu)	
B1. Do you currently smoke tobacco? (Circle **ONLY ONE** answer)(yeroa amma sijaraa ni harkistaa)	1.Yes(eyyen) 0. No(lakki) (**if NO go to Q. B6**)
B2. If **yes**, do you currently smoke tobacco daily?(yoon eyyen jettan guyyurra harkistuu)	1.Yes(eyyen) 0. No(lakki)
B3. How old were you when you first started smoking?(umrii meqatti jalqabde)	_____(wag-gaadhan)Years
B5. On average, how many cigarettes (stick) do you smoke each day/ week?(firii meeqa guyyatti arsitaa)	---------No. of sticks/ day----------sticks/week
B6. In the past, did you **ever smoke**?(kanadura aasitee beektaa)	2. (eyyen)Yes 0. No(lakki)
If yes Q. B6, how old were you when you quit smoking?(wagga meqatti aarsu dhaabde)	---------- (umrii waggaan)age (years)
How many cigarettes (sticks) you were smoking each day/ week?(guyyatti meeqa aarsu turtee)	----------a day(guyyatti) ---------- a week(torbeetti)
Alcohol consumption.(alkoolii dhuguuu)	
B7. Have you ever consumed any alcoholic drink?(farsoo dhugdee beektaa)	1.Yes(eyyen) 0. No(lakkii)
B8. Have you ever consumed any alcohol within the past 12 months?(ji'oota 12 darbe keessa farso dhugdee beektaa)	2. Yes(eyyen) 0. No(lakki)
B9. During the past 12 months, how frequently have you had at least one standard alcoholic drink in a typical week? (**Circle ONLY ONE answer).**	1. Daily (guyyarra) 6. 5-6 days per week(guyya 5-6 torbeetti) 7. 3-4 days per week(guyya 3-4 torbetti) 8. 1-2 days per week(guyya 1-2 torbetti) 9. 1-3 days per month(guyya 1-3 ji;atti)
	14. Student(baarata)

(Ji'a kudha lamaan darban kana kessatti dhugaati sadarkaa eeggatee torbbeetti meeqa dhugde)	10. Less than once a month(altokko gadi ji;atti)
B15. During each of those **days**, how many standard drinks did you have each day?(goyyota tokkon tokkon san keesatti dhugaatii meeqa fay-yadamu turte guyyatti)	----
Khat chewing(jimaa qama'uu)	
B 16. Have you ever chewed Khat?(jimaa qaamte beektaa)	1. Yes(eyyen) 0. No(lakkii)
B17. If yes, have you chewed during the last one month?(yoon eyyen jette ji'a darbe kessa qamtee jirta)	1. Yes(eyyen) 0. No(lakkii)
B18. If **Yes,** in **a typical week** how many days do you chew Khat?(torbeetti guyya meeqa qaamtaa)	----------(guyyota)Days
B19. For how many years you have chewed?(wagga meeqaf qaamte beektaa)	----------(waggaan)-years
Dietary practices:(akkaata soorataa) The next questions ask about the fruits and vegetables that you usually eat. As you answer these questions please think of a typical week in the **last year**.	
B 16. In a typical **week,** on how many days do you eat fruit?(torbeetti guyya meeqa fudura nyaatta)	_____Days(guyyan)
B 17. How many servings of fruit do you eat on 1 of those days?(guyyoota san keessatti almeeqa fudura nyaatta)	----------days (guyyaan)
B 18. **In a typical week**, on how many days do you eat vegetables?(guyya meeqa kudra nyaatta)	_____Days(guyyan)

B 19. How many servings of vegetables do you eat on 1 of those days?(yero meeqa kudraa nyatta guyya tokkoti)	
B20. In a typical week, on how many days do you eat protein source foods from animals (beef, lamb, chicken, fish, and egg)?(guyya meqa nyaata ijaarsa kan beelada nyaata)	_____Days(guyyan)
B21. In a typical week, on how many days do you eat protein source foods from plants (pea, bean, chickpea, nuts, groundnuts)?(guyya meqa nyaata ijaarsa kan biqilaa nyaatta)	_____Days(guyya)
B19. In a typical week, on how many days do you eat energy source foods (cereal grains, energy rich tubers such as potato, sweet potatoes)?(guyya meeqaa nyaata annisaa nyaatta)	_____Days(guyyaa)
B 20. In a typical week, on how many days do you eat milk and milk products (milk, cheese, Yogurt)?(guyya meeqa aannani fi buaa isaa argattaa)	_____Days(guyyaa)
B 21. In a typical week, on how many days do you eat fats (fats and oils)?(cooma guyya meqa argatta)	_____Days(guyyaa)
B 22. In a typical week, on how many days do you eat /drink discretionary calories (soft drinks, sugar, chocolates, honey…)(guyya meeqa dgugaati lallafa argatta)	_____Days(guyyaa)
B 23. In a typical week, on how many days do you eat foods fried /baked in an oil (eg. Chips, Biscuits, crackers, cakes)(guyya meqa nyaata zeytaan bilchaate argattaa)	_____Days(guyyaa)
B 24. On average, how many meals per week do you eat that were not prepared at a home? By meal, I mean breakfast, lunch or dinner.(torbetti yeroo meqaaa sorata manatti hin qophahin nyaatta)	……..No of meals (lakkofsa nyaataa)
B 26. Do you skip breakfast?'(ciree ni dhiftaa)	3) Yes(eyyen) 4) No(lakki)

B 27. How often do you skip breakfast within a week?(torbeetti almeeqa ciree dhiftaa)	4) Once (altokko) 5) Two times (al lama) 6) Three or more times (al sadihifi sani ol)
B 28. Do you eat snacks?(nyaata dabalta ni nyaatta)	3) Yes (eyyen) 4) No (laakki)
Dietary salt consumption.(ashaboo nyaataa)	
B 29**. How often** do you add salt to your food before you eat it or as you are eating it?	6. Always(yeroo hunda) 7. Often(bayyinaan) 8. Sometimes(darbe darbe) 9. Rarely(akka tasa) 10. Never(hin fayyadamu)
B30. How often is salt added in cooking or preparing foods in your household?(	6. Always (yero hunda) 7. Often(bayyinan) 8. Sometimes(darbe darbe) 9. Rarely(akka tasa) 10. Never(hin fayyadamu)
B31. What kind of salt do you use for cooking or meal preparation in your household?(ashaboo kan akkami fayyadamta nyata qophessuf)	3. Iodized(ayoodinii) 2 . Non-iodized(kan ayoodinii hin qabne) 4. I don't know(hin beekuu)
B32. How much salt do you think you consume?(hangam takka nyadga jatte yaadda)	6. Far too much(bayye heddu) 7. Too much(heeddu) 8. Just the right amount(hanga barbachisu) 9. Too little(watikko) 10. Far too little(badaa xinnoo)
B33. How many kilos of non-iodized salt /pack of iodized salt do you use per month for your house hold?(ji'atti kilo meeqa fayyadamta)	---------- Non-iodized (kg.)(kan ayoodini hinqabne) Or ---------- Iodized in (packs).(kan ayoodinii qabuu)
B34. How important to you is lowering the salt in your diet?(ashaboo tiqessu hangam si fayyada)	4. Very important(halan barbachisa) 5. Somewhat important(barbachisadha) 6. Not at all important(hin barbachisuu)
Oil Use Practice.(zeeyta fayyadamuu) The next questions ask about the oil or fat that is most often used for meal preparation in your household, and about meals that you eat outside a home.	
B35. What type of oil or fat is **most often** used for meal preparation in your household? (gosa zeytii yero bayye fayyadamtuu) (**Circle ONLY ONE answer**)	10. Liquid Vegetable oil(dhangalao) 11. Solidified vegetable oil(jajjaboo) 12. Butter (dhadhaa) 13. Margarine / peanut butter(14. Sheno lega(shenoo lagaa)

	15. Other(kan biraa) 16. None in particular(hin murtoyne) 17. None used(hin fayyadamne) 18. Don't know(hin beekuu)
Physical Activity.(sochii qaamaa) 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.	
B38. Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like [carrying or lifting heavy loads, digging or construction work] for at least 10 minutes continuously?	1. Yes(eyyen) 0. No(lakkii)
B39. In a typical week, on how many days do you do vigorous-intensity activities as part of your work?(yeroo meeqa hoji ulfataa goota)	_____(guyyan)Days
B40. How much time do you spend doing vigorous-intensity activities at work on a typical day?	____(sa'aa)Hours: ___(daqiiqa)Minutes
B41. Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking [or carrying light loads] for at least 10 minutes continuously?	1. Yes(eyyen) 0. No(lakki)
B42. In a typical week, on how many days do you do moderate-intensity activities as part of your work?	_____(guyyan)Days
B43. How much time do you spend doing moderate-intensity activities at work on a **typical day**?(yeroo meeqa hojii giddu galaa hojjatta)	____(sa'aa)Hours: ___(daqiqaa)Minutes
Travel to and From Places.(sochi bakkerra gara bakkee) 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.	
B44. Do you walk or use a bicycle (pedal cycle) for at least 10 minutes continuously to get to and from places?(yoon xinnate daqiqa 10niif sochii milaa ykn saykilaa ni gootaa)	1.(eyyen) Yes 0. (lakki)No

B45. 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?(yeroo meeeqa sochi goota)	_____(guyyan)Days
B46. How much time do you spend walking or bicycling for travel on a typical day?	____(sa'aa)Hours, OR ----------(daqiqaa)Minutes
Recreational activities.(sochii bashannanaa) 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).**	
B47. 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?	1. (eyyen)Yes 0.(lakkii) No
B48. In a typical week, on how many days do you do vigorous-intensity sports, fitness, or recreational (leisure) activities?(yeroo meeqa yero boqonna keetitti sochi goota)	_____(guyyan)Days
B49. How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?(yeoo hangam fayyadamta)	____Hours OR,----------Minutes
B50. Do you do any moderate-intensity sports, fitness, or recreational (**leisure**) activities that cause a small increase in breathing or heart rate such as brisk walking, [cycling, swimming, and volleyball] for at least 10 minutes continuously?(sochi kammiyyu kan hargansu fi dhahanna onne dabalu yoon tinnaate daqiqaa 10niif walittti dhaabde ni hojjatta)	1. (eyyen)Yes 0.(lakki) No
B51. In a typical week, on how many days do you do moderate-intensity sports, fitness, or recreational (leisure) activities? (toorbeetti yeroo meeqa sochi giddu gala guyya meeqa hojjatta)	_____(guyyaan)Days
B52. How much time do you spend doing moderate-intensity sports, fitness or recreational (leisure) activities on a typical day?(sa'a meeqa sirra fudhataa sochii giddu gala hojjachuf guyya tokkotti)	_____(sa'a)Hours OR,----------_(daqiqa)Minute

Sedentary Behavior.(amala sochimalee jirachuu) 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, taxi, reading, playing cards or watching television, but do not include time spent sleeping		
B53. How much time do you usually spend sitting or reclining on a typical day?(sa'a meeqa sochii malee dabarsita)	_____(sa'a)Hours OR,----------(daqiqa)Minutes	
Sleep habits.(amala hirribaa)		
B54. About how many hours of sleep did you get on a typical night during the **past month**"?(ji'a darbe keessa sa'a meeqa halkan tokkotti rafta)	_____(sa'a)Hours	
Do you often have a fragmented sleep with multiple wake up and falling sleep cycle?(yeroo heddu hirribba ciccita ni rafta)	2. (lakki)No 2. (darbe darbe)Sometimes 3. Yes most of the time.(eyyen yero heddu)	
Past history of illnesses (Circle only one answer)(dhibde tanaduraa)	1. (eyyen)Yes	0.(lakki) No
B57. Have you ever been told by a doctor or other health worker that you have **raised cholesterol**?(kollestrolin kee ida'e jedhamte beektaa)	1	0
B58. Have you ever been told by a doctor or other health worker that you have raised blood sugar or diabetes?(sukkarri qaama kee olkaera jedhamte beektaa)	1	0
B 59. Have you ever been told by a doctor or other health worker that you have **raised blood pressure or hypertension?(dhibban dhiigaa ke idaera jedhamte beektaa)**	1	0
B73. Have you ever been told that you had **a heart disease** (angina) or **a stroke** (cerebrovascular accident or incident) by doctors?(dhibdee onne qabda jedhamte beektaa)	1	0

Life Style Advices.(goorsa akkata jireenyaa) During the **past three years,** has a doctor or other health worker advised you to do any of the following?(wagga sadeen darbe keessa kan arman gadii gorfamte beekta)	**1. (eyyen)Yes**	**0. (lakki)No**
B70. Quit using tobacco or don't start or khat chewing(sijaara dhaabi ykn jimaa hin qama'in)	1	0
B71. Reduce salt in your diet(ashaboo nyaataa tiqqessi)	1	0
B72. Eat at least five servings of fruit and/or vegetables each day(yoon tinnaate fudra al shan nyaadhu)	1	0
B73. Reduce fat in your diet(cooma xiqqessi)	1	0
B74. Start or do more physical activity(sochii qaama hojjadh)	1	0
B75. Maintain a healthy body weight or lose weight(ulfaatina qaamaa kee eegii)	1	0