ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF PUBLIC HEALTH

ASSESSING THE PREVALENCE OF DIABETES MELLITUS AND IMPAIRED FASTING GLUCOSE LEVEL AND THEIR RISK FACTORS AMONG FEDERAL POLICE MEMBERS AT FEDERAL POLICE COMMISSION RESIDING IN ADDIS ABABA, ETHIOPIA BETWEEN APRIL AND MAY 2015

By TARIKU TESFAYE (Bsc)

A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master in Public Health

MAY, 2015

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Assessing the Prevalence of Diabetes Mellitus and Impaired Fasting Glucose Level and contributing factors among Federal Police members at Federal Police Commission residing in Addis Ababa, Ethiopia between April and May 2015

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LIST OF ACRONOMYS

ADF- American Diabetes Federation

BMI- Body Mass Index

CNCDs- Chronic non-communicable diseases

IDF- International Diabetes Federation

EFPC- Ethiopia Federal Police Commission

IGF-Impaired Fasting Glucose

IGT-Impaired Glucose Tolerance

IGH-Impaired Glucose Homeostasis

FPRH- Federal Police Referral Hospital

IDDM- Insulin Dependent Diabetes mellitus

NIDDM- Non Insulin Dependent Diabetes mellitus

OGTT- Oral Glucose Tolerance Test

SSA- Sub Saharan Africa

WHO- World Health Organization

Abstract

Background

Globally, the prevalence of diabetes mellitus across various occupational groups and its relationship with an occupational factor is a topic of recent interest. Police officers as an occupational group are exposed to unhealthy life style, excessive alcohol consumption and smoking which intern leads to diabetes mellitus and other cardiovascular diseases than the general population. Due to this reason the present study were conducted among federal police officers in Addis Ababa.

Objectives: The objective of this study was to assess the prevalence of diabetes mellitus and impaired fasting glucose level and identify their risk factors among federal police members at Federal Police Commission residing in Addis Ababa, Ethiopia between April and May 2015

Methodology: A cross-sectional study was employed using multi-stage sampling technique. The study populations were all federal police members living in Addis Ababa and served the police commission for at least a year. The total sample size for the study was 1003. The data were collected using structured questionnaire, physical examinations and blood samples, by using the WHO stepwise approach. Data were entered into SPSS version 20.0. The entered data were cleaned and analyzed Frequency distributions, percentage, tables and charts were used to show result of univariate analysis. Cross tabulation, chi-square tests, and 95% confidence interval used to present results of bivariate analysis. Multivariate logistic regression analyses were done to control potential confounding variables.

Result: Out of 1003 eligible subjects 936 (93.3) police officer were participated in this study. Of the total subjects tested for blood glucose level the prevalence of impaired glucose homeostasis (IGH) were 13%, out of which 47 (5.0 %) were diabetes and 73 (8.0%) impaired fasting glucose. Age ≥45 years (p=0.044, AOR= 4.9 (1.04, 23.1)), having history of first degree relative who suffered from diabetes (P=0.008, AOR= 3.2 (1.4, 7.5)), and Hypertension (P=0.000, AOR= 4.5 (2.6, 7.8)), Body Mass Index (P=0.000, AOR= 6.0 (1.2, 30.2)) were found to have stastical significance with the prevalence of Impaired Glucose Homeostasis among the study participants.

Conclusion: The study identified a high prevalence of diabetes mellitus and impaired fasting glucose level among police officers. Finally, the study recommend awareness and prevention of diabetes mellitus program should be given priority as that of communicable diseases by federal police health service directorate, Federal Minster Health and Non Governmental Organizations who works in collaboration with Federal Police Commissions.

1. INTRODUCTION

1.1. BACKGROUND

Diabetes mellitus is characterized by chronic hyperglycemia which becomes an emerging public health problem due to its high prevalence, association with cardiovascular diseases, and overall morbidity and mortality (1). A recent estimate indicates that more than 387 million (8.5%) of people worldwide have diabetes. Among these Africa account a 22 million (5.1%) people with diabetes which is likely to increase by 70% in 2035 (2).

Approximately 5.1 million people whose age is between 20-79 years died from diabetes in 2013, accounting for 8.4% of all global mortality among people in this age group. This estimated number of death is similar in magnitude to the combined deaths from several infectious diseases and is equivalent to one death in every six seconds. Almost half of deaths due to diabetes are in people under the age of 60 years (3).

Among people with diabetes mellitus in developing countries the majority were with age group of 45 to 64 years while those in developed countries are aged 65 years and above. This indicates that developing countries are losing productive age groups than developed once. This in turn brings double burden in the region; that already affected with communicable diseases such as ' HIV AIDS ', tuberculosis and other infectious diseases (4).

The impact of diabetes mellitus is bound to continue globally if nothing is done to curb the rising Prevalence of Impaired Glucose Tolerance (IGT) which is now affecting 316 million people (6.9%). The vast majority (70%) of these people live in low and middle income countries. By

2035, the number of people with IGT will increase to 471 million, or 8.0% of the adult population unless something is done to reduce the risk factors associated with the development of the disease (5).

Before the 1990s, diabetes mellitus was considered as a rare medical condition in Sub-Saharan Africa (6). However, currently many studies revealed that the prevalence and incidence of type 2 diabetes is rising in the region, mostly it is due to life style changes (westernization), lack of physical activities, increased rural urban migration (urbanization), high calorie intake and increased life expectancy (ageing) of the population (7, 8).

According to World Health Organizations global estimation of diabetes mellitus in Sub- Saharan Africa the number of diabetes cases in 2013 ranges from 4.5-5.0% (8). This could increase by 98% which is from 12.1 million in 2010 to about 23.1 millions in 2030. The impaired glucose tolerance that was reported in 2010 (26.9 million) is also expected to rise to 47.3 million in 2030 (9).

In Ethiopia, it is difficult to find population based data on the exact prevalence of diabetes. However, there are some studies done on selected population groups that showed an increase prevalence of 4.6 % and 5.1% diabetes (10, 11). It is also the second causes for patients to attend health care services in most hospital of the countries (12-15). According to the 2014 report of the International Diabetes Federation (IDF), the number of people aged 20-79 years living with diabetes in Ethiopia was estimated to be 4.9 million and more than 2.9 million (6.9%) people live with impaired glucose tolerance (2). Among these more than 1.4 million people were undiagnosed for diabetes mellitus and its prevalence is higher in urban than rural population (2).

Globally, the prevalence of diabetes across various occupational groups and its relationship with an occupational factor is a topic of recent interest. Police officers as occupational group exposed to unhealthy life style, excessive alcohol consumption and smoking which in turn leads to diabetes mellitus and other cardio vascular diseases than other population. For instance, the study conducted among police officer in India showed that this occupational group had higher prevalence of metabolic syndrome and other cardio metabolic abnormalities compared to the general population (16-17). In US, a cohort study conducted among police force also showed that these groups are at risk of developing non communicable diseases and cardio vascular diseases at earlier age and that they dies much earlier compared to other groups (18). But the situation of Ethiopian police officers is unknown, even though the groups are predisposed to those factors responsible for developing diabetes mellitus due to nature of the work.

Evidence from many studies indicates that police officer with well managed diabetes mellitus are capable of safe and effective job performance on duty (16-19). However, those who are undiagnosed may be at risk of sudden in capitation and death, thus it will affect their ability to perform well. So, knowing the prevalence of diabetes mellitus and impaired fasting glucose level and its risk factors among police officer will give us a clue for appropriate intervention. Therefore the present study was conducted to estimate the prevalence of diabetes mellitus and impaired fasting glucose level and to identify possible contributory factors among federal police in Addis Ababa, Ethiopia.

1.2. STATEMENT OF THE PROBLEM

According to global estimation of diabetes in 2014, 387 million people worldwide had diabetes and there were 5.1 million deaths associated with it (2). By 2035 this figure could rise to 592 million unless some preventive measures are taken (5). In United State of America (USA) reports of National Diabetes Statistics of 2014 indicated that 29.1 million people or 9.3% of the US population had diabetes, among those 8.1 million people were undiagnosed for diabetes (20).

In Africa the prevalence of diabetes is increasing with ageing of the population and life style change which is associated with rapid urbanization and westernization (21). Traditional rural communities still have low prevalence, at most 1-2%, except in some high risk group where it could reach as 1-20% of prevalence of diabetes among adult populations of urban community (22).

According to 2009 International Diabetes Federation (IDF) estimation the number of adults with diabetes in Sub Saharan Africa was projected to increase by 98%, from 12.1 million in 2010 to 23.1 million in 2030 and impaired glucose tolerance in the region will expected to rise by 75.8% from 26.9 million in 2010 to 47.3 million in 2030 (23).

In Ethiopia, national data on prevalence and incidence of diabetes are not sufficient. Even though, diabetes mellitus among other chronic non-communicable diseases is the second leading cause of hospital admission and medical care of most hospital in Ethiopia (12-15). It is also a cause of death, disability and hospital stays and absentees from duty among Federal police member. However, there was no study done on the prevalence of diabetes in this group of populations in Ethiopia.

Therefore; the purpose of this study was to assess the prevalence of diabetes mellitus and impaired fasting glucose level and identify their risk factors among federal police members at Federal Police Commission residing in Addis Ababa, Ethiopia between April and May 2015

SIGNIFICANCE AND RATIONAL OF THE STUDY

In Ethiopia, hospital registration data indicate that the prevalence of chronic non-communicable diseases is ever increasing. Diabetes is one of the chronic non-communicable diseases which is becoming the major cause for hospital admission in Addis Ababa (13, 14). This is also true for police referral hospital which gives service for police members and their family in the country. Literatures indicates that lack of physical activities, excessive alcohol consumption, unhealthy eating behavior, smoking and ageing of the population deriving this epidemic in worldwide (30-47). Few studies (10,12) done in Addis Ababa in selective group of population indicate that increasing number of diabetes was found but the situation in Federal police officers is unknown even though the group is predisposed to those factors that lead to diabetes mellitus. So the finding of this study is the initial for the commission of police in the country and can be also useful at the national level for policy makers. Finally, through identifying police officers at greatest risk of developing the diseases, the finding will help to develop prevention and intervention strategies.

2. LITERATURE REVIEW

2.1. PREVALENCE OF DIABETES MELLITUS

2.1.1. GLOBAL SITUATION

Today diabetes mellitus (especially type 2 diabetes mellitus) affected the world population in epidemic forms. This epidemic has been triggered by social and economic development as well as urbanization, which is linked with general improvements in nutrition and increasing life expectancy, they are aggravated by some risk factors such as unhealthy dietary habit, smoking, excessive alcohol consumption, hypertension, obesity, overweight, increased body mass index and sedentary life style (21).

For instance, in 2014 as reported by International Diabetes Federation, there are 387 million people living with diabetes worldwide. Among these people 46% of them are undiagnosed for diabetes. The majority of them are aged 40-59 years, and 80% of them live in low-and middle income countries. If these trends continue, by 2035, some 592 million people, or one adult in 10, will have diabetes (2).

The International Diabetes Federation, currently states that the top 5 countries with the highest amount of diabetes patients are China, India, USA, Russia and Brazil; however, the countries with the highest prevalence are nations such as Saudi Arabia, Nauru and Mauritius (3).

This is still higher in people who have moved away from the traditional way of life, either to live in towns and cities or through migration to another country. For example in urban South India (12%), in migrants to Mauritius, Fiji, Singapore, and Tanzania (15-20%), in urban Taiwan (15%-20%), and among people of African origin living in Jamaica (10%) and Jamaicans living in the

UK (15%) (22). But, the prevalence of type 2 diabetes is lowest among people who still have a conventional or primitive lifestyle as either hunter-gathers or subsistence farmers. Mapuche Indians in Chile, rural Bantu in Tanzania and rural communities in the pacific Islands and South Asia are the pertinent example (23).

Globally, the prevalence of diabetes across various occupational groups and its relationship with an occupational factor is a topic of recent interest. Police officers as occupational group are exposed to unhealthy life style, excessive alcohol consumption and smoking which in turn leads to diabetes mellitus and cardio vascular diseases more than other population. A cross sectional study which was conducted by J. Ramakrishnan et al, among 256 policemen in puducherry, South India during 2008-2009 reported 33.6% prevalence of diabetes. The study also found 45.7% history of alcohol consumption, 23% smokers and 51.6% obese police personnel. The prevalence of diabetes in this study is also 2.5 times higher than the population based study in India (17).

The other cross sectional study, which was conducted by Kumar et al among 1817 police personnel in India during July-November in 2011, reported that 15 % prevalence of diabetes mellitus. Age, hypertension, family histories of diabetes, waist circumference were being identified as risk factors for diabetes mellitus (18).

2.1.2. **AFRICAN SITUATION**

The WHO STEPwise approach for chronic non-communicable disease survey which was undertaken in a few African countries reported that the prevalence of diabetes varies widely from one country to another, ranging from 3-11 % (25, 26). The islands of Seychelles and democratic Republic of Congo have some of the highest rates of diabetes in the region (27). The absolute and relative mortality rates from diabetes are highest in the 20-39 years of age groups that are most economical and productive population in Africa.

Over the past few decades, diabetes mellitus has emerged as an important non communicable disease in sub-Saharan Africa (8).Within 20 years unless something is done to curb the rising prevalence of risk factors for diabetes, the number of cases will be expected to increase by 98%, and impaired glucose tolerance in the region expected to rise by 75.8% (26).

There is also study which show that the increasing trend of diabetes in the region (28, 29). For instance a study done in Luanda between March 2009 to April 2011, which is the capital city of Republic of Angola showed that the prevalence of diabetes mellitus and IGT were 7.1% and 12.9% from previously < 2.% respectively, which indicate a future increases in the frequency of diabetes in this population. In this study the age group with the highest frequency of diabetes was 60 to 69 years (33%) followed by the age group 40 to 49 years (30%) (28).

The other studies that were conducted in Democratic Republic of Congo in Kinshasa Hinterland between January and April 2005, revealed that the highest prevalence of diabetes when it was compared with other Sub Saharan African study. The degree of urbanization (westernization) and life style changes were thought to be a clear determinants factor for the increased in the number of diabetes in this study (29).

2.1.3. ETHIOPIAN CONDITION

Few studies undertaken on epidemiology of diabetes demonstrated an increasing prevalence of diabetes that previously thought as a rare medical case in Ethiopia (14.15). In addition IDF reported Ethiopia to be ranked 3rd among ten top countries in Africa with 2.9 million cases and estimated prevalence of 4.85. The number of people with impaired glucose tolerance also estimated 6.9%. Among these more than 1.4 million people were undiagnosed for diabetes mellitus and its prevalence is higher in urban than rural population (2).

Few cross sectional study undertaken in selected groups in the countries also demonstrated a higher prevalence of diabetes. For instance Institutional based cross sectional study by Megerssa et al which were conducted between December 2012 to February 2013 among 422 voluntaries, in Bishoftu town and A cross sectional study by ACIP and MIRT in Addis Ababa between December 2009 and January 2010 among 2205 commercial bank workers and teachers reported a 5.1% and 4.5 prevalence of diabetes mellitus respectively (12, 13). Now a day’s diabetes mellitus associated with occupational factors in many countries. Among this occupation the highly risk groups are police officers. But, in our set up data regarding diabetes among police officers were not appreciated yet. So identifying the prevalence of diabetes mellitus and its risk factors also is important for planning and allocation of resource.

2.2. RISK FACTORS FOR TYPE 2 DIABETES

Many risk factors are responsible for the development of type 2 diabetes globally. Sex, age, unhealthy dietary habit, smoking, excessive alcohol consumption, hypertension, obesity, overweight, increased body mass index, sedentary life style and family history of diabetes or hypertensions are the most frequently documented risk factors (30-47).

Age

In most populations, the prevalence of type 2 diabetes is low before the age of 30 years but increases with older age (30-32). A study done by Harris and et al, in the 3rd NHANES survey of 1988-94 found that the prevalence of diabetes mellitus increased from 1-2% among person in the age group 20-30 years, to 18-20 in the age group 60-74 years and the prevalence mounted at age 75 and above (30). However, studies on high risk communities, like Pima Indians of the USA, the prevalence of diabetes between ages 25-29 years (13%) reported was the same with US non-Hispanic white between ages of 60-64 years (32).

Gender

There is little evidence that type 2 diabetes risk differ between men and women when other factors are accounted (30-35). The prevalence and incidence of Type 2 diabetes vary some extent between sexes from one population to another, but these differences are relatively small and appear to be accounted for by differences in other risk factors such as obesity and physical activity (34, 35).

Family history

Most study indicates that presence of diabetes in a family member is established risk factors for type 2 diabetes (33, 34). For instance, pima Indians and Caucasians with at least one diabetes parent have a much higher incidence of type 2 diabetes than those who are equally obese but do not have a diabetic parent (31).

Smoking

Many prospective studies reported that current smoking is a risk factor for developing type 2 diabetes mellitus (36-38). In addition, Meta analysis including 25 prospective studies by Wany Y, Ji J, Liu Y-J, Derg X-He Q-q in 2013 showed that current smokers has 45% risk for developing type 2-diabetes compared to non smoker (36). On the basis of this review, it is estimated that 12% of all type 2-diabetes in the US attributed to smoking. The study by Jee et al among Korea Men and Women in 2010 also showed that the association between smoking and Type 2 diabetes is stronger for heavy smoker ≥20 cigarettes /day compared with light smoker or fewer smokers (37). Study by Zhang and et al in 2011, association between passive and active smoking and incident of Type 2 diabetes in Women, suggests that smoking is strongly and independently associated with the risk of incident type 2 diabetes persisted in a dose-dependent manner (38). This study also reported that there is an increased risk of diabetes mellitus which persisted for 20 years after cessations of smoking among former active smokers. In addition study by Kamauru M. et al in 2011 also found an increased risk of type 2 diabetes in the first two to three years after smoking cessation (39).

Alcohol consumption

In the majority of prospective study reports heavy drinkers have higher risk of type 2 diabetes than light or moderate drinkers (41, 42). A Meta-Analysis study by Koppess and et al in 2005 also reported that moderate alcohol consumption reduce approximately 30% of type 2 diabetes, whereas no risk reduction was observed in alcohol consumer of ≥ 48mg/dl (43).

Physical activates: Many epidemiological studies have found physical inactivity to be strong risk factor for type 2 diabetes (44, 45). In the nutritional health survey (46) each 2 hour /day increment of time spent watching television was associated with a 14% increase in diabetes risk. Each 2 hour /day increment of standing or walking around at home was associated with a 12% reduction in risk. Each 1 hour /day increment of brisk walking was associated with a 34% reduction in risk. Sedentary life style like sitting at work for prolonged time, television watching for >2 hours was associated with type 2 diabetes. There are also studies which indicate that moderate and vigours physical activities reduce the risk of developing diabetes (44). Other studies show that physical activity plays important role in the delaying or prevention of development of Type 2 diabetes in those at risk of diabetes mellitus both directly by improving insulin sensitivity and reducing insulin resistance, and indirectly by beneficial changes in body mass and body composition (45).

Body Mass Index (BMI): Data from the third National Health and Nutrition Examination Survey (NHANES III) in USA indicated that two thirds of adults, both men and women, had BMI >27kg/m^2, and the prevalence of type 2 diabetes parallel to the increased prevalence of BMI (31). The study conducted by E.j-Sung, S. Sunwoo, S.W. Kim, et al, also reported that there is a strong positive relationship between body mass index (BMI) and the risk for, Type 2 diabetes in

Korea adults. In this study risk of Type 2 diabetes increased with BMI greater than 23kg/m^2 after adjusting for other risk factors (47).

2.3. DIAGNOSIS OF DIABETES IN EPIDEMIOLOGICAL SETTINGS

In epidemiological settings, diabetes can be determined with sufficient validity on the basis of a single fasting blood glucose analysis. This helps to define prevalence as well as provide estimate of population changes in diabetes and related Impaired Glucose Level in a resource limited settings. In clinical settings however, at least one additional Fasting Glucose Level (FGL) and/ or Oral Glucose Tolerance Test (OGTT) usually needed to confirm the diagnosis, especially in asymptomatic subjects when the fasting glucose value lies in the uncertain range (48).

2.4. CONCEPTUAL FRAME WORK OF THE STUDY

Figure 1.Conceptual framework of the study (1, 41-46, 50)

3. OBJECTIVES

3.1. General objectives:

3.1.1. To assess the prevalence of diabetes mellitus and impaired fasting glucose level and their risk factors among federal police members at federal police commission residing in Addis Ababa, Ethiopia between April and May 2015.

3.2. Specific objectives:

3.2.1. To assess the prevalence of diabetes mellitus among federal police member at federal police commission residing in Addis Ababa, Ethiopia between April and May 2015.

3.2.2. To assess the prevalence of impaired fasting glucose level among federal police members at federal police commission residing in Addis Ababa, Ethiopia between April and May 2015.

3.2.3. To identify risk factors associated with diabetes mellitus among federal police members at federal police commission residing in Addis Ababa, Ethiopia between April and May 2015.

3.2.4. To identify risk factors associated with impaired glucose homeostasis among federal police members at federal police commission residing in Addis Ababa, Ethiopia between April and May 2015.

4. METHODOLOGY

4.1. STUDY AREA AND PERIOD

The studies were conducted in Addis Ababa city from April to May 2015. Addis Ababa is the capital city of Ethiopia with a population of 3,048,631 with a total area of 540 km^2 and population density of 5,645.61 per km^2. Addis Ababa is metropolitan city with prestige of being one of cities in the continent of Africa. This makes Addis Ababa a city of sensitive to stability, peace and social welfare. These issues are related mainly to the job of Federal Police work. The city is currently structured in to ten sub-municipalities (kifle ketemas) and 203 districts (kebels) (51).

The Police Force as a modern institution was established in 1935 (52) during Emperial Haile Sellasie regimen as a law enforcement body and it has continued its tradition of serving of the government of the day, when the country adopted the Federal System, the structure of the police force changed substantially, each regional state has got a police forces of its own and it is accountable to elected regional bodies. Federal police, which is the interest of this study, is governed by federal ministries and structured as a Federal police commissions. The federal police Commission have four main sectors (zerf) namely Federal police human resource sectors, Federal police crime prevention sectors, Federal police crime investigation sectors and Ethiopian police University College. Within each sector there is a department. This study used the structures that were found in Federal Police Commissions (53). The officer gets medical service from one referral Hospital which is found in Lideta sub city, two Health center and eight health post.

4.2. STUDY DESIGN

Community based cross-sectional study design was employed.

4.3. SOURCE POPULATION

All Ethiopian Federal police officers who lives and work in Addis Ababa.

4.4. STUDY POPULATION

Selected Federal Police officer who live and works in Addis Ababa during the study period

4.5. INCLUSION AND EXCLUSION CRITERIA

Inclusion criteria

- Federal police members who were working and living in Addis Ababa and served police commission for 1 year and above included in the study.

E**xclusion Criteria**

- Federal police members who were fresh recruits and served the police commission less than 1years; pregnant women, and critically ill were excluded from the study.

4.6 SAMPLE SIZE DETERMINATIONS

Sample size was determined by using the prevalence of diabetes mellitus that were reported in Bishoftu town study 5 % (13).

$$\mathbf{n = \frac{(Z\alpha/2)^2\, p(1-p)}{d^2}}$$

$\alpha = 0.05$ or $Z\alpha/2=1.96$

$p = 0.05$, from study conducted in Bishoftu town.

$d = 0.02$

$$n = \frac{(1.96)^2\ .05(1-0.05)}{0.02^2} = 456$$

By using the design effect (multiplying by 2), and adding 10% non response rate, the final sample size for the study were

456x2=912+ (912x10%) =1,003 subjects.

4.7. SAMPLING PROCEDURE

A Systematic Sampling method was employed in order to select a representative sample of respondents from all federal police sectors in Addis Ababa city.

First

1. All federal police commission sectors were listed
2. Then, list of all departments available in the sector.
3. From all departments available in the sector; two departments were selected using random sampling method.

Second

1. The total sample sizes were distributed to the listed department proportional to their police officers size.
2. Using systematic random sampling method respondents were selected from each department

SCHEMATIC PRESENTATION OF SAMPLING PROCEDURES

Federal police commission

All the 4 sectors were selected

4 Federal police commission sector which constitute 16 departments

N= 30,000

A total of 8 departments were selected

from the sectors using random sampling method

8 Department

n=1003

The total sample size of the study subjects

were proportionally allocated, to each department

a1=301	**a2=201**	**a3=181**	**a4=167**	**a5=54**	**a6=33**	**a7=33**	**a8=33**

From each department respondents were selected by systematic random sampling method using their Identity Number.

4.8. DATA COLLECTION PROCEDURE

A four-days training on interviewing technique, questionnaire administration and physical measurements techniques, were given to the data collectors a week before the actual survey by the principal investigator, assisted by the research advisor. Data was collected by two nurses, two health officers and two-laboratory technician who were working in federal police referral hospital.

Participant's eligibility determined by verifying the time of their last meal in order to ascertain that they undergo an overnight fasting of at least eight hours. Participants were informed about the purpose of the study through the data collector to enhance maximum participation. Those who accept to participate requested to register at the office and were informed when to undergo an overnight fasting before their test. Socio-demographic data and relevant behavioral and life style characteristics were recorded; then, anthropometric measurements and biochemical tests were taken and recommended for each participant in the next day.

The study used a modified form of the WHO Global Risk Factor Surveillance Questionnaire (54). Pretest was carried out to ensure suitability of the questionnaires for the survey. An Amharic translated version of the questionnaires were used during the study.

Blood pressure was measured with subjects in the seating position after waiting in a quiet room with leg uncrossed for at least five minutes. Depending on the size of the subjects' right upper arm, one of two mercury sphygmomanometer with different size cuffs used to take three readings for blood pressure, measured to the nearest 2mmHg, at interval of one minute each following the WHO recommendation (54).

Heights of subjects was measured to the nearest 0.1cm, using a standard stadiometer with subjects standing upright position and without shoes on feet in order ensure that, an upright position was maintained.

Weight was measured with subjects with light dress and they were asked to stand with both feet close together on bathroom. The weight recorded to the nearest kilogram. Next, the waist and hip-circumference was measured with the use of a flexible tape calibrated with centimeters. Waist circumferences was measured at the mid-way between the lower most rib margin and the iliac crest at the end of normal expiration while the hip circumferences was measured at the level of the widest circumference of hip over the greater trochanter. Both measurements were taken three times and the average of the three reading was used for the calculation of the body mass index.

4.9. OPERATIONAL DEFINITIONS

Police officers: an individual who takes at least 6 months of police training (53)

- **Rank**: designation given to police officers based on the service year, professional qualification in education (by joining police university college) or work efficiency.
- Lower rank: those rank from constable to chief sergeant
- Middle rank: those rank from assistant inspector to inspector.
- Higher rank: those rank from chief inspector to general commissioner.

- **First degree relative who suffered from diabetes or hypertension**

Previous history of the respondent father, mother, full brother or sister had diabetes and/or hypertension.

- **Risk factor**

Any attribute, characteristic or exposure of individual, which increase the likelihood of developing the disease of interest.

- **Smoking**

For the purpose of this study the following terms defined as:-

- ✓ **Current smoking** –an individual who were current smoker at the time of study.
- ✓ **Past smoker**- an individual who were previous histories of cigarette smoking but stop at the time of study.
- ✓ **Non-smoker** - an individual who has no history of smoking.

- **Alcohol intake**

For the purpose of this study alcohol intake defined as:-

- ❖ **Past drinker:** an individual who has previous histories of drinking alcohol but stop at the time of study.
- ❖ **Current drinker**: an individual who were alcohol drinker at the time of study.

Low fruit and vegetables intake

- o An individual who didn't consume of fruits and vegetables daily.

- **Physical activities**

For the purpose of this study participant were measured by asking the amount of time they spend doing different types of physical activities in their employment, transport and leisure time. Finally the time they spent on different activities were added and converted in to MET. The term

MET is an abbreviation for metabolic equivalent and used to reflect the intensity of the specific physical activity. MET is defined as the ratio of the associated metabolic rate for specific activity divided by the resting metabolic rate. The resting metabolic rate is equivalent to 1MET and reflects the energy cost of sitting quietly. The MET values for the three domains (56):-

- In active - <600 MET minutes per week.
- Moderately active from 600- 1500 MET minutes per week.
- Vigorously active- > 1500 MET minutes per week.

Body Mass Index (BMI) were defined as follows; (57)

- ❖ Under weight BMI<18.5
- ❖ Normal BMI 18.5 to 24.9
- ❖ Overweight BMI≥25.0 and <29.9
- ❖ Obese BMI ≥30.0

- **Central obesity**

A waist hip ratio greater than1.0 in men or greater than 0.85 in women (57).

- **Diabetes mellitus**

A fasting capillary whole blood glucose value equal to or greater than 6.1mmol/l

(≥110mg/dl) (48).

- **Hypertension**

The average systolic blood pressure readings ≥140mmHg and/or diastolic blood pressure readings ≥90mmHg (48).

- **Impaired fasting glucose (IFG)**

A fasting capillary whole blood glucose value ≥5.6mmol/l (≥100mg/dl) and <6.1mmol/l (110mg/dl) (48).

- **Impaired Glucose Homeostasis (IGH)**

A fasting capillary whole blood glucose level ≥5.6 mmol/l (≥100mg/dl**)** (48).

- **Normal fasting glucose**

A fasting capillary whole blood glucose value <5.6mmo/l (<100mg/dl) (48)

4. 10. VARIABLES

Independent variables

Age, sex, police rank, ethnicity, religion, marital status, monthly income, family history of diabetes or hypertension, height, weight, body mass index, waist hip ratio, diastolic and systolic pressure, history of smoking, alcohol consumption, chat chewing, physical activity, dietary consumption.

Dependent variables

- Impaired Glucose Homeostasis as either diabetes mellitus or impaired fasting glucose level

4.11. DATA QUALITY MANAGEMENT

The quality of data was assured through the following mechanism:

- With the use of structured questionnaires which is translated into Amharic language and back translated to English language by another person.
- The data collection tool was pretested before the actual data collection on Addis Ababa police officers.
- Data collectors and coordinators were trained before one week of the actual data collection.
- The data collection procedures were checked frequently through supervision and frequent checking of information collected for its consistency on the same day by the coordinator.
- Physical measurements were recorded twice, and in some cases three times to minimize observer error in measurements and recording as well as rotation of data collector to compare values.
- Comparing the sphygmomanometer in the field with that normally used in the Hospital before and after each day of data collection.
- The glucometer machine and tests strips were periodically checked for its consistency on the same day by the coordinator.
- Coding and data cleaning were done at the end of each day of data collection and recorded.

4.12. DATA ANALYSIS PROCEDURES

Data were entered into SPSS version 20.0. The entered data were cleaned and analyzed Frequency distributions, percentage, tables and charts were used to show result of univariate analysis. Cross tabulation, chi-square tests, and 95% confidence interval used to present results of bivariate analysis. Multivariate logistic regression analyses were done to control potential confounding variables. This study assessed factors associated with the prevalence of diabetes mellitus among study subjects a binary logistic regression model was used to examine factors associated with diabetes mellitus among study participants (0= fasting glucose level ≥6.1mmol/l, 1= fasting glucose level <6.1 mmol/l). Variables with $p< 0.02$ were considered in the bivariate analysis and variable with $p<0.05$ were considered significant in the multivariate. In order to assess factors associated with diabetes mellitus and impaired fasting glucose a binary logistic regression model was used to examine factors associated with IGH among study participants (0= fasting glucose level < 5.6 mmol/l, 1= fasting blood glucose level ≥ 5.6 mmol/l).

An enter logistic regression analysis method was utilized in order to find out the association of IGH. Variables with $p<0.05$ were considered significant in the multivariate.

4.13. ETHICAL ISSUES

Ethical clearance and permission were obtained from research Ethics Review Committee of the School of Public Health of Addis Ababa University. Before the actual data collection started, permission was obtained from police commission. The study was conducted with an informed written consent obtained from each participant and data collection was conducted confidentially. The different steps in the data collection process were carefully explained to the study participants, who also assured that they could withdraw from the study at any times if they so desired.

Universal precaution measures were employed during biochemical testing to minimize potential harm to the lab technician and the study participants. Study participants found to have arterial blood pressure ≥160/100 mmHg or abnormally high fasting blood glucose level were immediately informed of their result and referred to federal police referral hospital for immediate management and follow up.

4.14. DISSEMINATION OF RESULT

The results of this study were presented to the School of Public Health, College of Health Science Addis Ababa University as partial fulfillment of Masters Degree in Public Health. Furthermore, the results of this study were disseminated to the police commission.

5. RESULT

Out of 1003 eligible subjects, a total of 936 (93.3%) police officers aged from 18-55 years participated in this study. Among the non-respondents, 60 (5.98%) not available due to work related problem and 7 (0.7%) respondents were on annual leave during the study period

5.1. Socio-demographic characteristics of the study participants

Among the total respondents 740 (79.1%) were males and 196 (20.1%) were females, with a male to female ratio of 3.8:1. The age of the study participants ranged from 18 to 55 years, with a mean and median age of 29.53 ± 8.722 and 27.0 years respectively. Majority of the respondents were lower rank police officers which constitutes 710 (75.9%), followed by middle rank constitutes of 125 (13.4%) subjects, and the third group were higher ranks constitutes of 110 (10.8%) respondents.

Five hundred seventy eight (61.8%) of the study subjects served the police commission below 10 years, followed by 203 (21.7%) and 155 (16.6%) who served from 11-20 years and greater than 20 years respectively. Majority of respondents belongs to orthodox Christian religion that constitutes of 621 (66.3%).

The majority, (56%) study subjects were single. However, there were also a high proportion of married 370 (39.5%) of the study subjects and the rest 42 (4.5%) either divorced and separated or widowed. A total of 56 (6.0%) of study subjects has first degree relative who suffered from diabetes (Table 1).

Characteristics	Number (n)	Percent (%)
Sex		
Male	740	79.1
Female	196	20.9
Age		
<25	342	36.6
25-34	362	38.7
35-44	142	15.2
>=45	89	9.5
Police rank		
Lower rank	710	75.9
Middle rank	125	13.4
Higher rank	101	10.8
Year of service		
1-10	578	61.8
11-20	203	21.7
≥20	155	16.6
Religion		
Orthodox	625	66.3
Muslim	121	12.9
Protestant	183	19.6
Other	11	1.2

Table 1: Socio-demographic characteristics of the study participants at Federal Police Commission (FPC) May 2015 Addis Ababa, Ethiopia (n=936)

5.2. Behavioural characteristics of the study participants:

Overall, 63 (6.7%) of the study participants reported that they had history of smoking cigarettes in their life time, and out of which 47 (5%) were current smokers. Among current smokers majority of (83%) were daily smokers. Approximately 55.2% of current smoker just smoked cigarettes for greater than or equal to 10 years and the number of cigarettes smoked ranges from 3-15 sticks per day, with a mean of 7 cigarettes per day. The overall numbers of participants who have ever chewed khat (stimulant leaf) were 104 (11.1%).

Among the study subjects 664 (71%) had ever consumed alcohol in their life and out of which 656 (98.5%) were current drinker. Of those who ever consumed alcohol, 45.1% drink alcohol less than three days a month, followed by 162 (24.6%) from 1-4 days per week. Majority of the study participants (88.2%), do not eat vegetables and fruits every days. The remaining subjects (11.8) either eat vegetables and fruit once or more a days.

Overall, 338 (36.1%) of the study participants were physically inactive, that is, they reported low work, travel, or leisure time physical activity. The prevalence of physical inactivity increased with age from 18% among 18-24 years to 77.5% among those aged ≥45 years, with the greatest increase between the 25-34 years to 35-44 years age groups (Table 2).

Characteristics	Number	percentage (%)
Ever smoked		
Yes	63	6.7
No	873	93.3
Current smoker		
Yes	47	74.6
No	16	25.4
Chew khat		
Yes	104	11.1
No	832	88.9
Ever taken alcohol		
Yes	664	70.9
No	272	29.1
Low consumption of Fruits/vegetables		
Yes	854	91.2
No	82	8.6
Physical activity		
Active	420	44.9
Moderate	171	18.3
Inactive	345	36.9

Table 2: Behavioral characteristics of study subjects at FPC May 2015 Addis Ababa, Ethiopia (n=936)

5.3. Anthropometric measurements of study participants

Among study subjects 770 (82.3%) of participants had systolic blood pressure of less than 140 mmHg and 166 (17.7%) were found to have systolic hypertension. The mean and median systolic blood pressure were 118.7mmHg (±10.227mmHg) and 120mmHg (±10.227mmHg) respectively. Of the study participants 771 (82.4) had diastolic blood pressure less than 90 mmHg and 165 (17.6%) found to have diastolic hypertension. The mean and median diastolic blood pressure were 79.20mmHg (±8.989mmHg) and 80mmHg (±8.989mmHg) respectively. In general 167 (17.8%) of the study participants were found to have hypertension. Out of the 167 hypertensive subjects, 142 (85%) were males and 25 (15%) were females. Among the 167 hypertensive subjects, only 20 (12%) were previously diagnosed to have hypertension. The ratio of diagnosed to undiagnosed hypertension was 1:8.5.

Overall, 753 (80.4 %) of the study participants had body mass index (BMI) < 25 kg/m^2, and 183 (18.5%) of the study subjects had BMI ≥25.0 kg/m^2, out of which 167 (91.9%) were overweight and 15 (8.1%) were obese (Figure 2). One hundred sixty seven (17.8 %) of the study subjects were found to have central obesity. Out of the 168 centrally obese subjects 123 (73.7%) were females and 44 (26.3%) were males.

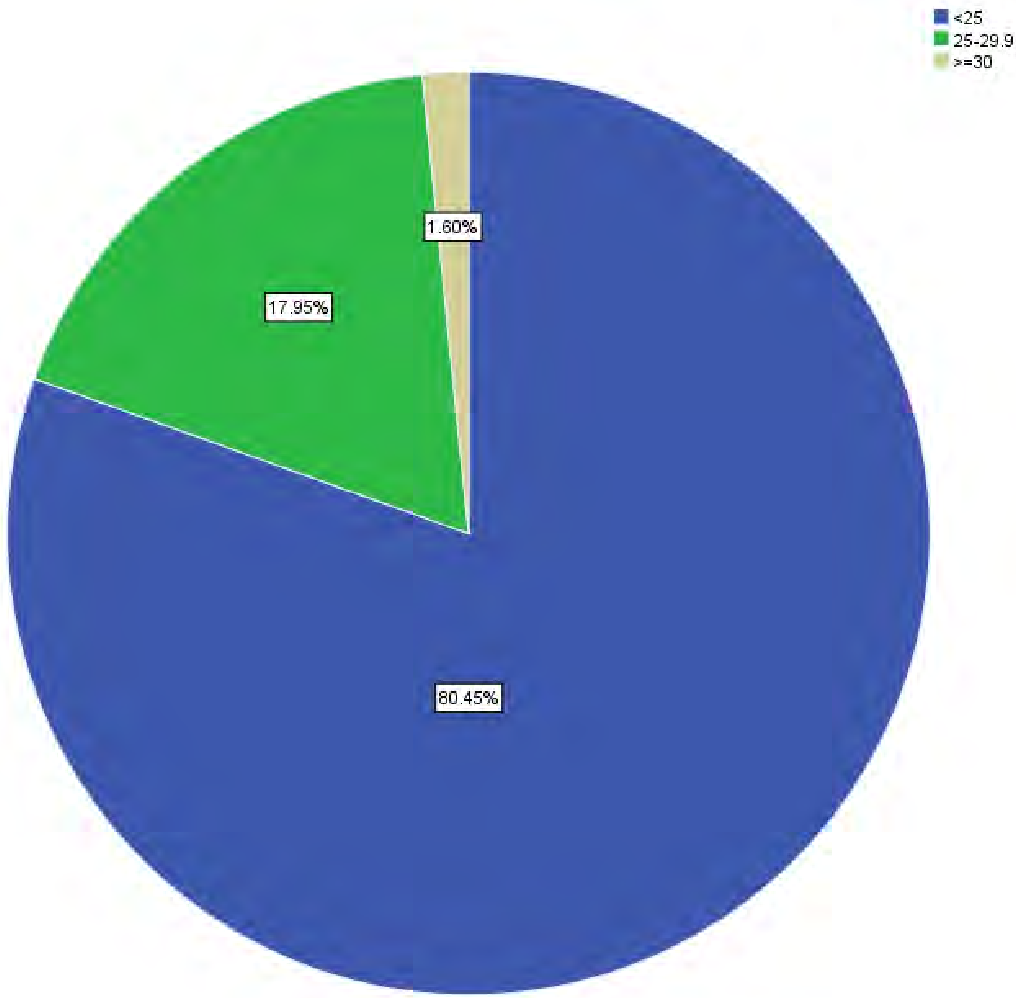

Figure 2: Body Mass Index (BMI) of the study the participants at FPC May 2015 Addis Ababa, Ethiopia (n=936)

5.4. Study Outcome

Of the total participants who were tested 47 (5%) had diabetes, while 75 (8%) had impaired fasting glucose with overall impaired glucose homeostasis was present in 120 (13%) of the respondents. Out of study participant with diabetes 15 (31.9%) were already known diabetes and the rest 32 (68.1%) did not know their blood glucose status and the ratio of diagnosed to undiagnosed diabetes was 1:2.1.

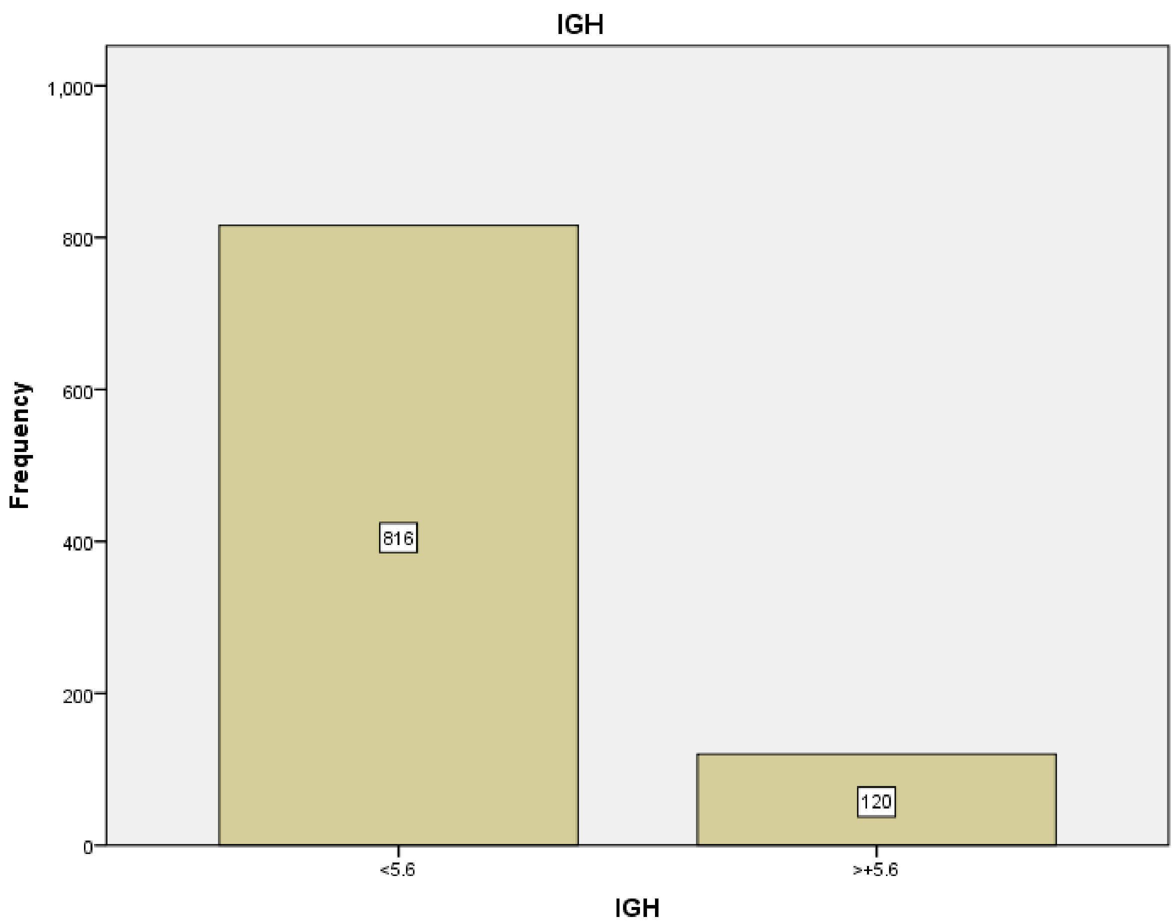

Figure 3: Fasting Blood Glucose level among the study participants at FPC May 2015 Addis Ababa, Ethiopia (n=936)

5.5. Bivariate analysis of risk factors variables with diabetes mellitus

This study assessed factors associated with the prevalence of diabetes mellitus among study subjects. In order to assess factors associated with diabetes mellitus among study subjects a binary logistic regression model was used to examine factors associated with diabetes mellitus among study participants (0= fasting glucose level ≥6.1mmol/l, 1= fasting glucose level <6.1 mmol/l).

An enter logistic regression analysis method was utilized in order to find out the association of diabetes mellitus. Variables with $p < 0.02$ were considered in the bivariate analysis and variable with $p<0.05$ were considered significant in the multivariate. In bivariate analysis of socio-demographic variables with diabetes mellitus, age (P=0.000), Police rank (P=0.000), year of service (p=0.000) and family history of diabetes (P=0.000) were found to have statistically significance association with the prevalence of diabetes mellitus in this study. There was no stastical significance difference found in the prevalence of diabetes with sex, ethnic group, religion, monthly income and education level in this study.

Among the behavioural characteristics smoking (P=0.000), chewing khat (P=0.006) and sedentary life style (P=0.000) were associated with diabetes mellitus. But alcohol intake (P=0.828), fruit and vegetables consumption (P=0.950) found to have no statistical significance association with the prevalence of diabetes mellitus in this study. Hypertension (P=0.000), BMI (P=0.000) and WHR (P=0.000) were found to have statistical significance association among study participants (table 3).

Characteristics		Presence of diabetes mellitus Yes	No	X^2	COR (95%CI)	P-value
Age	<25	2 (0.6)	341 (99.4)	79.388	1.00	
	25-34	6 (1.7)	356 (98.3)		2.9 (0.6, 14)	0.198
	35-44	20 (14.1)	122 (85.9)		28.0 .0 (6.4, 121.3)	0.000**
	≥45	19 (21.3)	70 (78.7)		46.3 (10.5, 203)	0.000**
Family history	Yes	11 (19.6)	45 (80.4)	16.262	5.6 (2.7, 11.9)	0.000**
	No	33 (4.2)	762 (95.8)		1.00	
Ever smoked	Yes	11 (17.5)	52 (82.5)	14.385	4.9 (2.4, 10.2)	0.000**
	No	36 (4.1)	837(95.9)	1.00		
Chew khat	Yes	10 (9.6)	94 (90.4)	5.513	6.7 (1.7, 25.5)	0.006**
	No	37 (4.4)	795 (95.6)		1.00	
History of alcohol	Yes	34 (5.1)	630 (94.9)	0.048	0.9 (0.5, 1.7)	0.828*
	No	13 (4.8)	259 (95.2)		1.00	
Low consumption	Yes	43 (5.0)	811(95.0)	0.04	1.0 (0.4, 3.0)	0.950*
(Fruits and vegetables)	No	4 (4.9)	78 (95.1)		1.00	1.00
Physical activities	Active	4 (1.0)	416 (99.0)	56.767	1.00	
	Moderate	1 (0.6)	170 (99.4)		0.6 (0.1, 5.5)	0.661
	Lower	42 (12.2)	303 (87.8)		14.4 (5.1, 40.6)	0.000**
Hypertension	Yes	11 (1.4)	758 (98.8)	83.422	18.9 (9.4, 38.1)	0.000**
	No	36 (21.6)	131 (78.4)		1.00	1.00
BMI	<25	13 (1.7)	740(98.3)	69.907		
	25-29.9	28 (16.7)	140 (83.3)		11.4 (5.5, 22.5)	0.000**
	≥30	6 (40.6)	9 (60.4)		37.9 (1.8, 122.9)	0.000**
WHR	obese	30 (18.0)	137 (82.0)	53.309	9.8 (5.2, 19.1)	0.000**
	Normal	17 (2.2)	752 (97.8)		1.00	

Significant P< 0.05

Table 3: Bivariate association of socio-demographic, behavioural and anthropometric risk factor variables with diabetes mellitus among the study participants at FPC May 2015 Addis Ababa, Ethiopia. (n=936)

5.6. Bivariate analysis of risk factors variables with Impaired Glucose homeostasis

This study assessed factors associated with the prevalence of IGH among the study subjects. In order to assess factors associated with diabetes mellitus and impaired fasting glucose a binary logistic regression model was used to examine factors associated with IGH among study participants (0= fasting glucose level < 5.6 mmol/l, 1= fasting blood glucose level ≥ 5.6 mmol/l).

An enter logistic regression analysis method was utilized in order to find out the association of IGH. Variables with p< 0.2 were considered in the bivariate analysis and variable with p<0.05 were considered significant in the multivariate. In bivariate analysis socio-demographic variables with diabetes mellitus and impaired glucose homeostasis, age was found to have stastical significance association with the prevalence of both diabetes mellitus and impaired fasting glucose (P=0.000).

Police rank (P=0.000), year of service (P=0.000) and family history of diabetes (P=0.000) were found to have statistical significance with the prevalence of IGH in this study. There was no stastical significance difference found in the prevalence of IGH with sex, ethnic group, religion, monthly income and education level in this study.

Among the behavioural characteristics smoking (P=0.000), chewing khat (P=0.000) and sedentary life style (P=0.000) were found to have statistical significance difference with the prevalence of IGH. But alcohol intake, fruit and vegetables consumption found to have no statistical significance association with the prevalence of IGH in this study. Hypertension (P=0.000), Body Mass Index (P=0.000) and Waist Hip Ratio (P=0.000) were found to have statistical significance association among study participants (Table 4).

Characteristics		Presence of IGH				
		Yes (%)	No (%)	X^2	COR (95%CI)	P-value
Age	<25	7 (2.0)	336 (98.0)	161.234	1.00	
	25-34	28 (7.7)	334 (92.3)		4.0 (1.7, 9.3)	0.001**
	35-44	39 (27.5)	103 (72.5)		18.2 (7.9. 41.9)	0.000**
	>=45	46 (51.8)	43 (48.3)		51.4 (21.8, 120.9)	0.000**
Family history	Yes	31 (47.0)	35 (63.0)	24.13	5.8 (2.3, 14.3)	0.000**
	No	89 (11.5)	704 (88.6)		1.00	
Ever smoked	Yes	20 (31.7)	43 (68.7)	16.725	3.6 (2.0, 6.4)	0.000**
	No	100 (11.5)	773 (88.5)		1.00	
Currently smoker	Yes	19 (40.4)	28 (59.6)	7.839	10.2 (1.2, 83.6)	0.031*
	No	1 (6.2)	15 (93.8)		1.00	
History of alcohol	Yes	92 (13.9)	572 (86.1)	2.273	0.72 (0.5, 1.1)	0.145*
	No	28 (10.3)	243 (89.7)		1.00	
Low consumption	Yes	107 (12.6)	748 (87.4)	0.7	1.00	
(Fruits and vegetables)	No	13 (16)	68 (84)		0.8 (0.4, 1.4)	0.391*
Physical activities	Active	20 (4.8)	401 (95.2)	65.053	1.00	
	Moderate	18 (10.2)	159 (89.8)		2.3 (1.2, 4.4)	0.015**
	Lower	82 (24.3)	256 (75.7)		6.4 (3.8, 10.7)	0.000*
Hypertension	Yes	76 (45.5)	91 (54.5)	149.548	13.8 (8.9, 21.2)	0.000**
	No	44 (5.7)	725 (54.5)	1.00		
BMI	<25	46 (6.1)	707(93.9)	128.215	1.00	
	25-29.9	64 (38.1)	104 (61.9)		9.5 (6.2, 14.6)	0.000**
	>=30	10 (66.7)	5 (33.3)		30.7 (10.1, 93.7)	0.000**
WHR	Yes	54 (32.3)	113 (67.7)	56.408	5.1 (3.4, 7.7)	0.000**
	No	66 (8.6)	703 (91.4)		1.00	

Significant, $p<0.05$

Table 4: Bivariate association of socio-demographic, behavioural and anthropometric characteristics risk factors variables with IGH among the study participants at FPC May 2015 Addis Ababa, Ethiopia (n=936)

5.7. Multivariate association of risk factors variables with diabetes mellitus

In order to assess factors associated with diabetes mellitus among study subjects a binary logistic regression model was used to examine the association among study participants (0= fasting glucose level $\geq$6.1mmol/l, 1= fasting glucose level <6.1 mmol/l). An enter logistic regression analysis method was utilized to ascertain the association and variables with $p< 0.02$ were included in this analysis and variable with $p<0.05$ were considered significant in the multivariate.

In multivariate logistic regression analysis of the study participants higher rank were found to have 3.8 times at risk of having diabetes mellitus than participants with lower rank, AOR=3.8 (1.1, 13.7). Having history of first degree relative who suffered from diabetes were found to have about 6.9 times more likely to have diabetes mellitus, AOR=6.9 (2.0, 23.5). Age and years of service did not show an independent significant association with the prevalence of diabetes.

Among the behavioural characteristics chewing Khat and low physical activities were found to have statistical significance association with diabetes mellitus, AOR 19.6 (1.6, 244.4) and 31.1 (3.0, 317.9) respectively. Study participants with low physical activity found to have about 31 times more likely to develop diabetes than participant who engaged in vigours physical activities. There was no statistical significance found among those participant ever smoked cigarettes.

Study participants with hypertension were found to have about 6.7 times more likely to have diabetes mellitus than study participant with normal blood pressure, AOR=6.7(2.6, 17.2). Waist hip ratio were found to have statistical significant with prevalence of diabetes, AOR=4.6 (1.9, 10.9). There is also no statistical significance was found on BMI of the study participants (Table 5)

		Presence of diabetes mellitus				
Characteristics		Yes (%)	No (%)	COR (95%CI)	P-value	AOR (95%CI)
Age	<25	2 (0.6)	341 (99.4)	1.00	1.00	1.00
	25-34	6 (1.7)	356 (98.3)	46.3 (10.5, 203)	0.419*	2.9 (0.2, 36.1)
	35-44	20 (14.1)	122 (85.9)	16.1 (6.2, 41.8)	0.108*	4.4 (0.7, 26.6)
	≥45	19 (21.3)	70 (78.7)	1.7 (0.8, 3.3)	0.646*	0.8 (0.3, 2.3)
Family history	Yes	11 (19.6)	45 (80.4)	5.6 (2.7, 11.9)	0.002**	6.9 (2.0, 23.5)
	No	33 (4.2)	762 (95.8)	1.00		
Ever smoked	Yes	11 (17.5)	52 (82.5)	4.9 (2.4, 10.2)	0.704*	0.8 (0.3, 2.4)
	No	36 (4.1)	837(95.9)	1.00	1.00	
Chew khat	Yes	10 (25.0)	94 (75.0)	6.7 (1.7, 25.5)	0.021**	19.6 (1.6, 244.4)
	No	37 (4.4)	795 (95.6)	1.00	1.00	
Physical activities	Active	4 (1.0)	416 (99.0)	1.00	1.00	
	Moderate	1 (0.6)	170 (99.4)	23.6 (1.2, 4.4)	0.004**	4.1 (1.2, 14.2)
	Lower	42 (12.2)	303 (87.8)	14.4 (5.1, 40.6)	0.026**	31.1 (3.0, 317.9)
Hypertension	Yes	11 (1.4)	758 (98.8)	19.0 (9.4, 38.4)	0.000**	6.7 (2.6, 17.2)
	No	36 (21.6)	131 (78.4)	1.00	1.00	
BMI	<25	13 (1.7)	740 (98.3)	1.00	-	-
	25-29.9	28 (16.7)	140 (83.3)	38.0 (11.8, 122.2)	0.532*	1.7 (0.3, 9.4)
	>=30	6 (40.6)	9 (60.4)	3.3 (1.1, 10.1)	0.667*	0.7(0.2, 3.4)
WHR						
	Obese	30 (18.0)	137 (82.0)	9.7 (5.2, 18.1)	0.001**	4.6 (1.9, 10.9)
	Normal	17 (2.2)	752 (97.8)	1.00		

Significant, $p<0.05$

Table 5: Multivariate associations of socio-demographic, behavioural, and anthropometric measurements with diabetes mellitus among study participants at FPC May 2015 Addis Ababa, Ethiopia (n=936)

5.8. Multivariate association of risk factors variables with IGH

In binary logistic regression analysis of the study participants age ≥45 years were found to have 4.9 times at risk of having impaired glucose homeostasis than <25 years of age, AOR=4.9 (1.04, 23.1). A family history of diabetes also showed an independent significant association with the prevalence of IGH. Participants with positive family history of diabetes was about 3 times more likely to develop IGH, than study subjects with no family history of diabetes, AOR=3.2 (1.4, 7.5). Police rank and years of service did not show an independent significant association with the prevalence of diabetes and impaired fasting glucose level.

Hypertension (both systolic and diastolic hypertension), body mass index and waist hip ratio were found to have statistical significant with IGH. Study subjects with hypertension were about 4.5 times more likely to develop IGH than study subjects with normal blood pressure, AOR=4.5 (2.6, 7.8). Participants with BMI of ≥30 kg/m^2 were found to be 6 times at risk of to have IGH than study subject with BMI of <25, AOR=6.0 (1.2, 30.2).

None of the behavioural characteristics such as history of cigarette smoking, chewing khat, alcohol consumption, fruit and vegetable intake and physical activities of the study subjects were found to have statistical significances (Table 6).

Characteristics		Yes	No	COR (95%CI)	P-value	AOR (95%CI)
		Presence of IGH				
Age	<25	7 (2.0)	336 (98.0)	1.00	1.00	1.00
	25-34	28 (7.7)	334 (92.3)	4.0 (1.7, 9.3)	0.241*	1.8 (0.7, 4.8)
	35-44	39 (27.5)	103 (72.5)	18.2 (7.9. 41.9)	0.102*	3.1 (0.8, 12.0)
	≥45	46 (51.8)	43 (48.3)	51.4 (21.8, 120.9)	0.044**	4.9 (1.04, 23.1)
Police	Lower rank	47 (6.6)	663 (93.4)	1.00	-	-
Rank	Middle rank	23 (18.4)	102 (81.6)	3.2 (1.9, 5.5)	0.074*	0.5 (0.2, 1.1)
	Higher rank	50 (49.5)	51.9 (50.9)	13.8(8.5, 22.6)	0.827*	0.9 (0.4, 2.6)
Service	1-10	20 (3.5)	268 (89.0)	1.00	-	-
Year	11-20	27 (13.3)	254 (87.0)	4.3 (2.3, 7.8)	0.068*	2.4 (1.0, 6.1)
	>20	73 (47.1)	82 (52.9)	24.8 (14.4, 42.9)	0.062*	3.3 (0.9, 11.9)
Family history	Yes	31 (47.0)	35 (63.0)	5.8 (2.3, 14.3)	0.008**	3.2 (1.4, 7.5)
	No	89 (11.5)	704 (88.6)	1.00		
Ever smoked	Yes	20 (31.7)	43 (68.7)	3.6 (2.0, 6.4)	0.978*	1.0 (0.4, 2.6)
	No	100 (11.5)	773 (88.5)	1.00	-	-
Chew khat	Yes	5 (41.7)	7 (58.3)	5.6 (1.8, 18.0)	0.267*	2.8 (0.6, 17.8)
	Yes, daily	21(22.8)	71 (77.2)	2.3 (1.4, 4.0)	0.051*	2.5 (1.0, 6.4)
	No, not all	94 (11.3)	738 (88.7)	1.00	-	-
Current alcohol	Yes	91 (13.9)	565 (86.1)	1.5 (0.2, 11.6)	0.367*	0.8 (0.4, 1.4)
Consumption	No	1 (10.0)	9 (90.0)	1.00		
Physical	Active	20 (4.8)	401 (95.2)	65.053 1.00	-	-
Activities	Moderate	18 (10.2)	159 (89.8)	2.3 (1.2, 4.4)	0.259*	1.5 (0.7, 3.0)
	Lower	82 (24.3)	256 (75.7)	6.4 (3.8, 10.7)	0.248*	1.6 (0.7, 3.7)
Hypertension	Yes	76 (45.5)	91 (54.5)	13.8 (8.9, 21.2)	0.000**	4.5 (2.6, 7.8)
	No	44 (5.7)	725 (54.5)	1.00	-	-
BMI	<25	46 (6.1)	707(93.9)	1.00	-	-
	25-29.9	64 (38.1)	104 (61.9)	9.5 (6.2, 14.6)	0.000**	3.0 (1.7, 5.4)
	≥30	10 (66.7)	5 (33.3)	30.7 (10.1, 93.7)	0.030**	6.0 (1.2, 30.2)
WHR	Yes	54 (32.3)	113 (67.7)	5.1 (3.4, 7.7)	0.000**	4.5 (2.6, 7.8)
	No	66 (8.6)	703 (91.4)	1.00	-	-

Significant, $p<0.05$

Table 6: Multivariate associations of socio-demographic, behavioural, and anthropometrics measurements with IGH at FPC May 2015 Addis Ababa, Ethiopia (n=936)

6. DISCUSSIONS

The prevalence of impaired glucose homeostasis (IGH) in the present study was 13%. Out of which 5% (3.8, 6.6) were diabetes mellitus and 8% were impaired fasting glucose. Out of subjects with diabetes mellitus the proportion of diagnosed to undiagnosed diabetes was 1:2.1. Sixty eight percent of study subjects with diabetes were unaware of their blood glucose level before the survey. This higher prevalence of undiagnosed diabetes might be due to the priority given to communicable disease in the department of police commission and lack of decentralized health service for chronic non communicable diseases. This is also similar to cross sectional studies in developing countries that reported a higher prevalence of undiagnosed diabetes mellitus due to lack of Healthy facility as a contributing factors (25,26,57,59).

The prevalence of diabetes mellitus (5.0%) found also consistent to the estimated national prevalence of Ethiopia; 4.85% reported by the IDF in 2014 (2). Comparable prevalence (4.5%) was also reported by ACIPH and MIRT among commercial bank workers and teachers in Addis Ababa (12). There also similar studies in Bishoftu town which reports 5.1% of undiagnosed diabetes (13). In contrast to this study higher prevalence of 33.6%, 32.1%, and 15.0% of diabetes were reported by J. Ramakrishnan et al (17), Shaban et al (24) and Kumar et al (19), respectively among police officers in India. This might be due to the high genetic predisposition of Indian people to diabetes mellitus and low prevalence of smoking, alcohol consumption and larger proportion of younger study subjects in the present studies. There was also higher prevalence of diabetes (7%) report by Enang, OE, Otu AA, Essien OE, et al in Calabar (57). In contrast to this a low prevalence of diabetes reported by Manjunath et al among military army in India (6.67% overall prevalence of diabetes) (16).

The prevalence of impaired fasting glucose (8 %) in this study was comparable to a study done by J.Ramakrishnan et al, on policemen in Puducherry India that reported 7.0% of impaired fasting glucose (17). There was also another study in Calabar by Enang, OE, Otu AA, Essien OE, et al that reported 7% of impaired fasting glucose level (57). In contrast to this study lower prevalence (1.1) of impaired fasting glucose level was reported by Kumar et al (19) among police officers in Bankura India. This might be accounted due to different criteria used for diagnoses of fasting impaired glucose level among Indian police officers.

The study also found a significance increase in prevalence of diabetes mellitus and impaired fasting glucose with hypertension. This is similar to the study by Shaban et al (24), Kumar et al (19), Manjunath ea al (16), among police officers in India and Megerssa et al in Ethiopia (13).

In this study BMI of the study participants found to have an increased risk factor for having IGH. This also similar with study which was conducted by Nagaya et al (18) among police officers in India which stated that the increasing higher prevalence of diabetes among police officers were due to their BMI compared to the general population. There is also similar study by Megressa et al (13). A cohort study by Mesinger et al (49) also reported association between BMI with diabetes. In addition central obesity was associated with the prevalence of diabetes in this study. This is also comparable with the study by Shaban et al (24), Manjunath et al (16) among police officer in India.

Age was found to have significant association with impaired fasting glucose in this study. This is similar with the study which was conducted by Manjunath M.L et al (16), among military army in India; they found that IGH tend to increase with advanced age. This can be explained by progressive decline in the strength and endurance of musculature, which causes muscle atrophy, of developing impaired glucose. Among the behavioural characteristics chewing khat were found to have statistical significant with diabetes mellitus which need to be confirmed with other studies.

Physical inactivates were found to have statistical significance with diabetes in this study. This is similar to many cross sectional (58-61) and cohort studies (37-41) that proved lack of physical activities is an established risk factor of having diabetes mellitus and those who were engaged in moderate to vigours physical activities has lower risk (15, 16). This is also similar with the study done by Colberg and et al, they stated that participation in regular physical activities improve blood glucose control and can prevent or delay type 2 diabetes, blood pressure and cardiovascular events, mortality and morbidity (33).

The other risk factor which was associated with both diabetes mellitus and impaired glucose homeostasis in this study were having first degree relatives who were suffered from diabetes mellitus, which was proved by many studies the fact that family history for developing diabetes mellitus and impaired fasting glucose level (16, 17, 31). There was no significant sex difference observed in prevalence of diabetes mellitus and IGH in this study. This is consistent with reports from many studies on diabetes in different countries, like Angola (28), Nigeria (57, 59), South Africa (60), Botswana (61), China (58) and the 3rd NHANES, in USA (31). In general, some gender differences have been observed in some communities. However there are no consistence patterns seen from different studies in the world. The consensus, therefore, is that the difference sometimes observed might be the fact that represents the effect of the prevalence of different factors in different populations (31-32, 38).

There is also no significant ethnic and religion difference on IGH among study subjects in contrast to other global study like Pima Indians, Africa Americans and Arabs (31). This might be due to cultural and life style similarity of study participants in the present study. There were no statistical significance differences found on police rank and years of service in this study with both diabetes mellitus and impaired glucose homeostasis. This is also comparable with the study by Kumar et al (19). In contrast to this study police rank and year of service were associated with diabetes mellitus in Manjunath et al study (16). This might be accounted due to majority of the study subjects in this survey were lower rank and served less than 10 years.

There were no statistical significance observed in this study in prevalence of diabetes mellitus and IGH with smoking and alcohol consumption in contrast to many global studies (). This might be due to low prevalence of smoking and alcohol consumption in this study.

Marital status, educational level and fruit/vegetable consumption found no significance association with diabetes mellitus and impaired glucose level in this study.

6.1. STRENGTH OF THE STUDY

- The study followed the WHO STEPwise approach for chronic non-communicable diseases risk factors surveillance among the study population.
- The survey used questionnaires that were pretested in Addis Ababa police officers, for its suitability and similarity of the study population.
- The study involves larger sample size which allowed for greater precisions.
- The study may give base line information on prevalence of diabetes mellitus and impaired fasting glucose and their contributing factors in the department of police in the country.
- The study uses a fasting glucose test that is recommended by American Diabetes Associations in resource limiting setting for epidemiological studies.
- The study follows several data quality management such as carefully training of data collectors.

6.2. LIMITATION OF THE STUDY

- Due to resource limitation the oral glucose tolerance tests were not performed which may decreases the strength of the study.
- Since the study were conducted among police officers with different life style and work culture, it is difficult to generalize for the actual population of the countries.
- Respondent bias on behavioural characteristics respond due fear of the strict rule of department
- Observer bias

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7. CONCLUSION

- . The study identified a high prevalence of diabetes mellitus and impaired fasting glucose among police officers.
- The independent risk factors that were associated with diabetes mellitus were low physical activities, chewing khat, having first degree relative who suffered from Diabetes Mellitus, Body Mass Index, and Waist Hip Ratio.
- The independent risk factors that were associated with Impaired Glucose Homeostasis were age, low physical activities, hypertension, Body Mass Index and Waist Hip Ratio.

8. RECOMMENDATIONS

- ✓ Diabetes mellitus prevention program should be given priority as that of communicable diseases by federal police health service directorate, Federal Minster Health and Non Governmental Organizations who works in collaboration with Federal Police Commissions.
- ✓ Risk Factors that predisposed to diabetes mellitus and impaired fasting glucose should be identified and measure that reduces those factors should be strengthening among police officers by Health Promotion and Diseases prevention department in collaboration to Federal Police Commissions.
- ✓ Screening and early detection should be performed by health promotion and diseases prevention department of Federal Police Commissions to reduce the risk and burden of the diseases management.
- ✓ Diabetes mellitus surveillance should be decentralized in the whole place where health service given to all police officers in the countries that will help to identify the real burden.
- ✓ Further study needed to be conducted to support this finding.

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Annex I: STUDY INFORMATION SHEET AND CONSENT FORM

Questionnaire for the assessment of prevalence and determinant of diabetes mellitus and impaired fasting glucose level among Federal police member in Addis Ababa, Ethiopia

Questionnaire serial number_______________

Introduction

I am a student of Master of Public Health in Addis Ababa University, Public Health Department. This questionnaire is designed for research works which were approved by Addis Ababa university school of public health to be conducted in partial fulfillment of a master degree in public health. The purpose of this study is to find out how many Federal Police Member on the Commission have diabetes. Diabetes is a potentially serious long-term condition, which can result in severe disability or even death if not properly managed. However, early detection and control of the blood sugar level have been found to markedly reduce the risk of complications and this is what we hope to do here.

Confidentiality and consent form

I would like to request your participation in this study that will involve asking you some questions and conducting some tests. Before we proceed, I will request you to listen carefully to what I am going to read to you about the purpose of this study and what it involves and tell me whether you are willing to participate in this research or not. The survey will be made up of three parts as follows:

1. Ask you some questions that have been found to be associated with the disease.
2. Take some body measurements such as weight, height and blood pressure.
3. Do a simple blood test to check your blood sugar level, and so determine if you are at risk of developing the disease now or in future.

The whole test will take about one hour and you will be asked to have nothing to eat or drink except plain water from midnight before the test. We would like to assure you that the information obtained will be strictly for our research use. Your name will not be used in our report and the information obtained will not be used in any way that will identify you. The interview is voluntary.

Would you be willing to participate?

Yes ☐ No ☐

If you are willing to participate, please continue to respond to the questions.

Thank you very much for your cooperation

Interviewer's name_______________Signature____Date of interview__________

Supervisor's name________________ Signature__________

If you need additional information you can contact Principal investigator;

Name: Tariku Tesfaye Tel.No; +251910034792

Step I A. Socio-demographic Information of Respondent			
			CODE
SD 001	Sex	Male 1 Female 2	
SD 002	Age in completed years	_____in years	
SD 003	Police rank	1. Constable 2. Assistant sergeant 3. Deputy sergeant 4. Sergeant 5. Chief sergeant 6. Assistant inspector 7. Deputy inspector 8. Inspector 9. Chief inspector 10. Deputy commander 11. Commander 12. Assistant commissioner 13. Deputy commissioner 14. Commissioner general	
SD 004	Year of service in completed years in police commission	_______years	
SD 005	Religions	1. Orthodox-Christian 2. Muslim 3. Protestant 4. Catholic other, specify________	
SD 006	To which ethnic group do you belong?	1. Oromo 2. Amhara 3. Tigre 4. Gurage 5. Sidama 6. Woliata 7. Kembata 8. Hadiya 9. Somalia 10. Afar Other, specify___________	

SD 007	Marital status	1. Single 2. married 3. Separated 4. Widowed 5. Divorced		☐
				☐
SD 008	What is your total average monthly income?	1. __________birr Don't know		☐
SD 009	Are you a known diabetes patient?	1. Yes 2. No →skip to Q 013		☐
SD 010	For how long you have diagnosed of diabetes?	_________________ years		☐
SD 011	Do you have any other chronic non communicable disease from the listed	1. Hypertension 2. Heart disease 3. cancer 4. Other, specify		☐
SD 012	Do you have any first -degree relative who suffer from any chronic disease such as hypertension or diabetes?	1. Yes 2. No → skip to Q 101 3. Don't know		
SD 013	If yes to number 013, specify relative(s) and nature of disease(s) from the following list	Relative	Nature of the diseases	☐
	1. Diabetes 2. Hypertension 3. Heart disease 4. Don't know the nature of disease 5. Others, specify_____			
B. Now I am going to ask you some questions about various health behaviors. This includes things like smoking, drinking alcohol, eating fruits and vegetables and physical activity. Let's start with smoking.				
				CODE

SB 101	Have you ever smoked any tobacco products, such as cigarettes, shisha?	1. Yes 2. No →skip to Q10	☐
SB 102	If yes to Q 101, Do you currently smoke any tobacco products, such as cigarettes, shish? *(NOTE: Currently = past 12 months)*	Yes 1 No 2 →skip to Q no 106	☐
SB 103	If yes, have you ever smoked tobacco products on regular basis?	1. Yes, daily 2. Yes, but not daily 3. No, never daily	☐
SB 104	If yes, when did you start smoking tobacco product daily? (select one response only)	1. Since the last_________years 2. Since the last________months 3. Since the last_________weeks 4. On____/____/____Date (Day/month/year) 5. At ______years of age	
SB 105	On the average, how many of the following listed items do you smoke each day?	1. --------no of factory produced cigarettes per day 2. -------no of hand rolled (local) cigarettes per day 3. --------no of local pipes (Gaya) full tobacco/ day Other ---------------------- (specify type ,and no per day) e.g. 'shisha'	☐
SB 106	Do you chew chat?	Yes, daily 1 Yes, sometimes 2 No, not all 3	☐
C. Alcohol Consumption The next questions ask about the consumption of alcohol.			
ALC 201	Have you ever taken any type of alcoholic drink? (beer, wine, local 'areke', 'tella' and 'tej')	Yes 1 No, 2→ skip to diet section	☐
ALC 202	Have you consumed alcohol within the past 12 months?	Yes 1 No 2	☐
ALC 203	In the past 12 months, how frequently have you had at least one drink?	5 or more days a week 1 1-4 days a week 2 Less than three days this month 3 Less than even a month 4	

ALC 204	When you drink alcohol, what is your average consumption at a sitting?	Numbers of drinks Don't Know DK	
Diet			
The next questions ask about the fruits and vegetables that you may eat.			
D 301	How many times per day do you usually take fruits? (select one response)	I don't eat fruit at all 1 I don't eat fruit everyday 2 I take fruits once a day 3 I take fruits 2-4 times per day 4 I take fruits 5 or more times per day 5	
D 302	How many times per day do you usually eat vegetables? (select one response)	Don't eat vegetable at all 1 Don't eat vegetable everyday 2 I eat vegetable once a day 3 I eat vegetables 2-4 times per day 4 I eat vegetables 5 or more times per day 5	
Next I am going to ask you about the time you spend doing different types of physical activity in minutes in a day in a weeks. Please answer these questions even if you do not consider yourself to be an active person. Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, household chores, harvesting food, fishing or hunting for food, seeking employment.			
PA 401	Does your work involve mostly sitting or standing, with walking for no more than 10 minutes at a time?	Yes 1 No 2 If yes skip to Q 406	
PA 402	Does your work involve vigorous activities, like *heavy lifting, digging or construction work* for at least 10 minutes at a time?	Yes 1 No 2 If your response is no skip to Q 404	
PA 403a	In a typical week, on how many days do you do vigorous activities as part of your work?	Days a week	
PA 403b	On a typical day on which work you do vigours activities, how much time do you spend doing such work?	In hours and minute Or in minutes only.	Hours: minutes Minutes
PA 404	Does your work involve moderately intense activities, like brisk walking *or carrying light loads* for at least 10minutes at a time?	Yes 1 No 2→ skip to Q 406	

PA 405a	In a typical week, on how many days do you do moderately intense activities as part of your work?	Days a week	☐
PA 405b	On a typical day on which did moderately intense activities, how much time do you spend doing such work?	In hours and minute Or in minutes only.	Hours: minutes ☐☐ Minutes ☐☐☐
PA 406	How long is your typical work day?	Number of hours	☐
Other than activities that you've already mentioned, I would like to ask you about the way you travel to and from places. For example to work, for shopping, to market, to church etc			
PA 407	Do you walk or use a bicycle (*pedal cycle*) for at least 10 minutes continuously to get to and from places?	Yes 1 No 2→ skip to Q 409	☐
PA 408a	How much time would you spend walking or bicycling for travel on a typical day?	In hours and minute Or in minutes only.	Hours: minutes ☐☐ Minutes ☐
The next questions ask about activities you do in your leisure time. Think about activities you do for recreation, fitness or sports. Do not include the physical activities you do at work or for travel mentioned already.			
PA 409	Does your *leisure time* involve mostly sitting, reclining, or standing, with no physical activity lasting more than 10 minutes at a time?	Yes 1 No 2	☐
PA 410	In your *leisure time*, do you do any vigorous activities like *running or strenuous sports, weight lifting* for at least 10 minutes at a time?	Yes 1 No 2 →skip to Q 412	☐
PA 411a	If Yes, In a typical week, on how many days do you do vigorous activities as part of your *leisure time*?	Days a week	☐
PA 411b	How much time do you spend doing This on a typical day?	In hours and minute Or in minutes only.	Hours: minutes ☐☐ Minutes ☐
PA 412	In your leisure time do you do any moderate-intensity activities like brisk walking, cycling or swimming for at least 10 minutes at a time?	Yes 1 No 2 →skip to Q 414	☐

PA 413a	If Yes, In a typical week, on how many days do you do moderately intense activities as part of *leisure time*?	Days a week	☐
PA 413b	How much time do you spend doing this on a typical day?	In hours and minute Or in minutes only.	Hours: minutes ☐☐ Minutes ☐☐
The following question is about sitting or reclining. Think back over the past 7 days, to time spent at work, at home, in *leisure*, including time spent sitting at a desk, visiting friends, reading, or watching television, but do not include time spent sleeping.			
PA 414	Over the past 7 days, how much time did you spend sitting or reclining on typical day?	In hours and minute Or in minutes only.	Hours: minutes ☐☐ Minutes ☐☐
	Step 2 Physical Measurements		
			CODE
PM 501	Pulse Rate (measured 3 times)	beats per min (bpm)______________1 beats per min____________________2 beats per min____________________3	☐
PM 502	Blood Pressure (measured 3 times)	systolic/diastolic____________mmHg systolic/diastolic____________mmHg systolic/diastolic____________ mmHg	☐
PM 503	Height in cm	_______________1 _______________2	☐
PM 504	Weight in kg	1. ___________kg 2. ___________kg	☐
PM 505	Waist in circumference in cm	G1 ---------cm G2 --------cm G3 --------cm	☐
PM 506	Hip circumference in cm	1_____________ 2_____________ 3_____________	☐

PM 507	Body Mass Index (BMI)	______________	☐
PM 508	Waist Hip Ratio(WHR)	______________	☐
Step 3. Biochemical Tests			
			CODE
BT 601	**Checking Fasting status**. When did you last take any food of fluids?(Excluding plain water)	Hours minutes	hours ☐☐ Minutes ☐☐
BT 602	Fasting blood glucose level (in mmol/l)	________________mmol/l	☐

አባሪ 2 የጥናት መረጃ ወረቀት እና የስምምነት ፎርም

የስኳር በሽታ ስርጭትን እና ተጽእኖ የሚያሳርፉ ነገሮችን ምግብ ከመወሰዱ በፊት በሚደረግ ምርመራ መሰረት በአዲስ አበባ- ኢትዮጵያ በሚገኙ የፌደራል ፖሊስ አባላቶች መካከል ያለውን ስርጭት ለመገምገም የቀረበ መጠይቅ መጋቢት 2007.

መጠይቅ ሲሪያል ቁ.______________

መግቢያ

በሕብረተሰብ ጤና በአዲስ አበባ ዩንቨርስቲ የሕብረተሰብ ትምህርት ክፍል የማስተርስ ተማሪ ነኝ፡፡ይህ መጠይቅ የተዘጋጀው ለጥናት ዓላማ ሲሆን በአዲስ አበባ ዩንቨርሲቲ ሕብረተሰብ ጤና ትምህርት ቤት የሚጸድቅ ሆኖ ለሕብረተሰብ ጤና የማስተርስ ዲግሪ የሚደረግ የማሟያ ጥናት ነው፡፡የዚህ ጥናት አላማ የፌደራል ፖሊስ ኮሚሽን አባላቶች ውስጥ ምን ያክሉ የስኳር በሽተኞች እንደሆኑ ለማወቅ ነው፡፡ ስኳር በሽታ በትክክኛው መንገድ ካልተስተናገደ ለረጅም ጊዜ ተጽንኦ የሚያሳድር ከፍተኛ የሆነ አካል ጉዳት ሊያስከትል የሚችል ሲሆን ሞትም ጭምር ሊያስከትል ይችላል፡፡ሆኖም ግን በሽታው በጊዜ ከተደረሰበትና በደም ውስጥ ያለው የስኳር መጠን ከተቆጣጠርነው ሊከሰቱ የሚችሉ መወሳሰቦች ማስወገድ የሚቻል ሲሆን እኛም ይህንኑ ለማሳካት ተስፋ እናደርጋለን፡፡

ሚስጥራዊነት እና የስምምነት ፎርም

በዚህ ጥናት ላይ እንዲሳተፉልኝ እየጠየኩኝ ይህም የተወሰኑ ጥያቄዎችን መጠየቅ እና ምርመራዎችን ማድረግ ያካትታል፡፡ከመቀጠላችን በፊት ቀጥሎ የማነበውን ጥንቃቄ እንዲያዳምጡኝ እየጠየኩኝ የጥናቱን አላማ እና የሚያካትታቸውን እገልጻለሁ በዚህም መሰረት በጥናቱ ለመሳተፍ ያሎትን ፈቃደኝነት ወይም በተቃራኒውም ከሆነ ይገልጹልኛል፡፡

ይህ ጥናት የሚሰራው በሶስት ክፍሎች ሲሆን እንደሚከተለው ይሆናል፡፡

1.ከበሽታው ጋር የተያያዙ የተወሰኑ ጥያቄዎችን እጠይቃለሁ፡፡

2.የተወሰኑ የሰውነት መለኪያ እንደ ክብደት፣ቁመት እና የደም ግፊት ያሉትን እወስዳለሁ፡፡

3.በሰውነትዎ ውስጥ ያለውን የሰውነት የስኳር መጠን ለማወቅ ቀላል ምርመራ አደርጋለሁ እናም አሁንም ሆነ ወደ ፊት ለበሽታው መጠቃት ያለውን እድል እንወስናለን፡፡

አጠቃላይ ጥናቱ ወደ አንድ ሰዓት የሚወስድ ሲሆን ከጥናቱ ቀደም ብሎ ከእኩለ ለሊት ጀምሮ ከንጹህ ውሃ በስተቀር የሚበላም ሆነ የሚጠጣ ነገር እንዳይወስዱ ይጠየቃሉ፡፡ልናረጋግጥሎት የምንወደው ነገር የሚገኙት መረጃዎች ለጥናታችን ብቻ እንደምንጠቀምባቸው ነው፡፡በሪፖርታችን ላይ ስሞዎትንም ሆነ ማንነቶን በሚገልጽ መልኩ መረጃዎችን አንጠቀምም፡፡ ቃለ መጠይቁ በፍቃደኝነት ላይ የተመሰረተ ነው፡፡

ለመሳተፍ ፈቃደኛ ኖት?

አዎ ☐ አይደለሁም ☐

ለመሳተፍ ፈቃደኛ ከሆኑ እባክዎ ጥያቄዎቹን መመለስ ይቀጥሉ

ለመሳተፍ ፈቃደኛ ስለሆኑ በጣም አመሰግናለሁ

የቃለ መጠይቅ አድራጊው ስም________________ፊርማ________ቃለመጠይቁ የተደረገበት ቀን ______

የሱፐርቫይዘር ስም ___________________ ፊርማ___________

ተጨማሪ መረጃ ከፈለጉ ዋናውን አጥኚ ሊያገኙ ይችላሉ

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ደረጃ I ማኅበዊራዊ -ዲሞግራፊ የመላሾች መረጃ			
			ኮድ
SD 001	ጾታ	ወንድ 1 ሴት 2	
SD 002	እድሜ	_____ዓመት	
SD 003	የፖሊስ ማእረግ	1. ኮንሰታብል 2. ረዳት ሳጅን 3. ምክትል ሳጅን 4. ሳጅን 5. ዋና ሳጅን 6. ረዳት ኢንስፔክተር 7. ምክትል ኢንስፔክተር 8. ኢንስፔክተር 9. ዋና ኢንስፔክተር 10. ምክትል ኮማንደረ 11. ኮማንደረ 12. ረዳት ኮሚሽነር 13. ምክትል ኮሚሽነር 14. ኮሚሽነር ጅነራል	
SD 004	የአገልገሎት ዘመን በፖልሰ ኮምሽን	________ዓመት	
SD 005	ሐይማኖት	1. ኦርቶዶክስ ክርስቲያን 2. ሙስሊም 3. ፕሮፔስታንት 4. ካቶሊክ ሌላ ከሆነ ይግልጹ ________	
SD 006	የትኛው ብሔረሰብ ኖት?	1. ኦሮሞ 2. አማራ 3. ትግሬ 4. ሌላ ከሆነ ይግልጹ ___________	
SD 007	የ ጋብቻ ሁኔ ታ	1. አ ግ ብቼ አ ላ ወቅ ም 2. በ አ ሁኑ ሰ ኣ ት ት ዳ ር ወስ ጥ ነ ኝ 3. ተለ ያ ይቻለ ሁ 4. ባ ሌ/ሚስ ቴ ሞቶ ብኛ ል 5. ተፋተቻለዉ	

SD 008	የትምህቸት ደረጃ	1. 1-4 2. 5-8 3. 9-12 4. ቴክኒክና ሙያ 5. >ዲፒሎማ	☐
SD 009	ወርሃዊ የገቢ መጠን ምን ያክል ነው?	1. __________ብር 2. አላውቅም	☐
SD 010	የስኳር በሽታ ታማም ኖት?	1. አዎ 2. አይደለዉም መልሶት አይደለዉም ከሆነ ወደ ጥ→ 013 ይህዱ	☐
SD 011	የስኳር በሽታ ከታማሙ ስንት ግዜ ሆኖት?	__________ዓመት	☐
SD 012	ቀጥሎ ከተዘረዘሩት ሌላ ተላላፍ ካልሆነ በሽታ ዉሰጥ እረሶ የትኛዉ ታካም ኖት?	1. ስኳር 2. ደም ብዛት ወይ የልብ በሽታ 3. የበሽታውን አይነት አላውቀውም ሌላ ካለ ይግለጹ______________	☐
SD 013	እርስዎ ወይም የመጀመሪያ ደረጃ ዝምድና ያላቸው ዘመዶችዎ በከባድ በሽታ እንደ ደም ብዛት ወይም ስኳር በመሳሰሉት የተጠቃ አለ?	1. አዎ 2. አይደለም ካሉ ወደ ጥያቄ 101 ይሂዱ 3. አላውቅም	☐

SD 014	ለ 11 ቁጥር ምላሾ አዎ ከሆነ ከዘመድዎችዎን እና የበሽታውን አይነት ከሚከተሉት ዝርዝር ውስጥ ይግለጹ 1.ስኳር 2. ደም ብዛት 3. የልብ በሽታ 4. የበሽታውን አይነት አላወቀውም ሌላ ካለ ይግለጹ_____________	ዘመድ______________________	☐

ለ.አሁን ስለተለያዩ የጤና ጸባዮች እጠይቀታለሁ፡፡ እነዚህም የሚያካትቱት እንደ ማጨስ፣አልኮል መጠጣት፣ ፍራፍሬዎችን እና አትክልቶችን መብላት እና የአካል እንቅስቃሴዎችን ያካትታል፡፡ ከማጨስ እንጀምር			
			ኮድ
SB 101	የትምባሆ ምርቶች የሆኑትን ሲጋራዎች፣ ትምባሆ ወይም ፒፓ አጨሰዉ ያዉቃሉ?	አዎ 1 አይደለም 2 አይደለም ካሉ ወደ ጥያቀ 106 ይሂዱ	☐
SB 102	በአሁኑ ሰዓት የትምባሆ ምርቶች የሆኑትን ሲጋራዎች፣ ትምባሆ ወይም ፒፓ ያጨሰሉ? *(ማሳሰቢያ፡ አሁን = ላለፉት 12 ወራት)*	አዎ 1 አይደለም 2 አይደለም ካሉ ወደ ጥያቀ 106 ይሂዱ	☐
SB 103	አዎ ካሉ በአሁኑ ሰዓት የትምባሆ ምርቶች በየቀኑ ያጨሰሉ?	አዎ 1 አይደለም 2	☐
SB 104	አዎ ካሉ፣ መቼ ነዉ በየቀኑ ማጨሰ የጀመሩት?	1.ባለፈዉ-----------ዓመት 2. ባለፈዉ-----------ወረ 3. ባለፈዉ-----------ሳምንት 4. በ------;------;-----ቀን (ቀን;ወረ;ዓመተ ምህረት)	☐
SB 105	በ አቬሬጅ በየቀኑ ምን ያክል የሲጋራ ምረቶቸን ያጨሳሉ?		☐
SB 106	ጫት ይቅማሉ?	አዎ በየቀኑ 1 አዎ አልፎ አልፎ 2 አይደለም በጭራሽ 3	☐

ሐ.የ አልኮል አጠቃቀም የ ሚቀጥለ ው ጥያ ቄ የ አልኮል አጠቃቀምን በተመለከተ ነ ው			
ALC 201	ማናቸውም የ አልኮል መጠጦችን ወስደው ያ ውቃሉ? (ቢራ፣ ወይም፣ ስፐሪት፣ ጠላ እና ጠጅ)	አ ዎ 1 አ ይደለ ም 2 መልሱ አይደለም ከሆነ ወደ አ መጋገ ብ ክፍል ይሂዱ	
ALC 202	ላለፉት 12 ወራት ውስጥ አልኮል ወስደው ያውቃሉ?	አ ዎ 1 አ ይደለ ም 2	
ALC 203	ባለፉት 12 ወራት ቢያንስ አንድ መለኪያ በምን ያክል ድግምጋሚ ወስደዋል?	5 ወይም የበለጡ ቀናት በሳምንት ውስጥ 1 1-4 ቀናት በቀን 2 በዚህ ወር ውስጥ ከሶስት ቀናት ያነሰ 3 ከወር እንኳን ያነሰ 4	
ALC 204	አልኮል ሲጠጡ በአንዴ ተቀምጠው ምን ያክል በአማካይ ይጠቀማሉ?	--------------- የ መጠጦቹ ቁጥር አላውቅም	
ምግብ አጠቃቀም			
የ ሚከተለ ው ጥያ ቄ እርስዎ ስለ ሚጠቀሟቸው ፍራፍሬ እና አትክልት ነ ው			
D 301	በአብዛኛው ጊዜ በቀን ውስጥ ፍራፍሬዎች ለምን ያክል ጊዜ ይጠቀማሉ?(አንድ ምላሽ ይምረጡ)	ፍራፍሬ በጭራሽ አልበላም 1 በየቀኑ ፍራፍሬ አልበላም 2 ፍራፍሬዎችን በቀን አንዴ እወስዳለሁ 3 በእያንዳንዱ ቀን 2-4 ጊዜ ፍራፍሬ እወስዳለሁ 4 በእያንዳንዱ ቀን ከ5 ወይም በላይ ጊዜ ፍራፍሬ እወስዳለሁ 5	

D 302	በአብዛኛው ጊዜ በቀን ውስጥ አትክልት ለምን ያክል ጊዜ ይጠቀማሉ?(አንድ ምላሽ ይምረጡ)	አትክልት በጭራሽ አልበላም 1 በየቀኑ አትክልት አልበላም 2 በቀን አንዴ አትክልት እበላለሁ 3 በየቀኑ 2-4ጊዜ አትክልት እበላለሁ 4 በእያንዳንዱ ቀን ከ5 ወይም በላይ ጊዜ አትክልት እወስዳለሁ 5	☐

ቀጥሎ የተለያዩ የአካል እንቅስቃሴዎችን በመስራት ምን ያህል ደቂቃ በቀን እና በሳምንት በመስራት እንደም የማይቆጥሩ ቢሆንም ይመልሷቸው፡ ፡ በስራ ላይ የምታሳልፉትን ጊዜ በመጀመሪያ ያስቡት፡ ፡ በክፍያም ሆነ ያለክፍያ የውስጥ ስራዎች፣ ምግብ በመፈለግ፣ በአሳ ማስገር ወይም ምግብ በማደን፣ ስራ መፈለግ

PA 401	ስራዎት መቆም ወይስ መቀመጥ ይበዛበታል በአንድ ጊዜ ከ10 ደቂቃ ለማይበልጥ ጊዜ መራመድን አካቶ?	አዎ 1 አይደለም 2	☐
PA 402	ስራዎት ከባባድ እንቅስቃሴዎችን እንደ ከባድ እቃዎችን ማንሳት፣ መቆፈር ወይም የግንባታ ስራ ቢያንስ 10 ደቂቃ በአንድ ጊዜ የሚፈጅ ነው?	አዎ 1 አይደለም 2 መልሶ አይደለም ከሆነ ወደ ጥያቄ 404 ይሀዱ	☐
PA 403a	በተለመደ በሳምንት ውስጥ የሚሰሩት ከባድ ስራ የስራዎ አካል የሆነው ለምን ያህል ቀናት ነው?	በሳንምቱ ቀናት	☐
PA 403b	በተለመደ ቀን ውስጥ ከባድ ስራ የሚሰሩት ለምን ያህል ሰዓት ነው?	በሰዓት እና በደቂቃ ወይም በደቂቃ ብቻ	☐ ☐
PA 404	ስራዎት መካከለኛ የሆነ ጫና ያለበት ስራን ያካትታል ማለትም ፈጠን ያለ እርምጃ ወይም ቀለል ያሉ እቀቃዎችን በአንድ ጊዜ ከ10 ደቂቃ ለማያንስ ጊዜ መሸከምን?	አዎ 1 አይደለም 2 መልሶ አይደለም ከሆነ ወደ ጥያቄ 407 ይሀዱ	☐

PA 405a	በተለመደ ሳምንት ውስጥ በመካከለኛ ደረጃ ጫና ያለባቸውን ስራዎች የስራዎ አካል የሆኑነት ለምን ያህል ቀናት ነው?	ቀናት በሳምንት	☐
PA 405b	በተለመደ ቀን ውስጥ መካከለኛ ጫና ያለበትን ስራ በመስራት ምን ያህል ጊዜ ያሳልፋሉ?	በሰዓት እና በደቂቃ ወይም በደቂቃ ብቻ	☐
PA 406	የተለመደው የስራ ጊዜዎት በቀን ምን ያህል ነው?	ሰዓቱ በደቂቃ	☐
ሌሎች እንቅስቃሴዎች እርስዎ የተቀሷቸውከቦታ ቦታ በምን መልኩ እንደሚንቀሳቀሱ መጠየ ቅ እወዳለሁ ለምሳሌ ወደ ስራ ወደ ግብይት፣ ገበያ፣ ወደ ቤተክርስቲያ ወዘተ			
PA 407	በእግር ወይም በሳይክል(ፔዳል ያለው) ለ 10 ደቂቃዎች ከቦታ ቦታ ለመንቀሳቀስ ይጠቀማሉ?	አዎ 1 አይደለም 2 መልሶ አይደለም ከሆነ ወደ ጥያቄ 409 ይህዱ	☐
PA 408a	በተለመደ ቀን ውስጥ በመራመድ ወይም ሳይክል በመጋለብ ለመንቀሳቀስ ምን ያህል ጊዜ ያጠፉሉ?	በሰዓት እና በደቂቃ ወይም በደቂቃ ብቻ	☐
ቀጥሎ ያለው ጥያቄ በትርፍ ጊዜዎት የ ሚሰሩትን ስራ ይመለከታል፡ ፡ ለመዝናናት የምትሰሩትን ስራ፣ ለአካል እንቅስቃሴ እና ስፖርት እንቅስቃሴዎችን ያስቡ፡ ፡ የአካል እንቅስቃሴዎች በስራ ቦታ ወይም ለመጓጓዝ የምታሳልፉትን እና ቀደም ሲ የተጠቀሱትት አታካቱ፡ ፡			
PA 409	ትርፍ ጊዜዎት መቀመጥ፣ ጋደም ማለት ወይም መቆምን ማናቸውም አካላዊ እንቅስቃሴ ሳያደርጉ ከ 10 ደቂቃ የበለጠ ጊዜ ይደርሳል?	አዎ 1 አይደለም 2 መልሶ አይደለም ከሆነ ወደ ጥያቄ 412 ይህዱ	☐
PA 410	በትርፍ ጊዜዎት ከባድ እንቅስቃሴዎችን ማለትም ሩጫ ወይም አስቸጋሪ ስፖርት፣ ክብደት ማንሳት እየሰሩ ቢያንስ ለ 10 ደቂቃ ይቆያሉ?	አዎ 1 አይደለም 2	☐
PA 411a	አዎ ካሉ በተለመደ ሳምንት ውስጥ ከባድ እንቅስቃሴዎች በትርፍ ጊዜ ለምን ያህል ጊዜ ይሰራሉ?	ቀኖች በሳምንት	☐

PA 411b	ይህንን ስራ በመስራት በተለመደ ቀን ውስጥ ምን ያህል ጊዜ ያሳልፋሉ?	በሰዓት እና በደቂቃ ወይም በደቂቃ ብቻ	☐
PA 412	በትርፍ ጊዜዎት በመካከለኛ ደረጃ ጫና ያለበት ስራ እንደ ፈጣን እርምጃ፣ ሳይክል መጋለብ ወይም ዋና ቢያንስ ለ 10 ደቂቃ በአንድ ጊዜ ያደርጋሉ?	አዎ 1 አይደለም 2 መልሶ አይደለም ከሆነ ወደ ጥያቄ 414 ይሀዱ	☐
PA 413a	አዎ ካሉ በተለመደ ሳምንት ውስጥ መካከለኛ ጫና ያለበት እንቅስቃሴ ለምን ያህል ቀናት በትርፍ ጊዜዎት ያደርጋሉ?	ቀናት በሳምንት ውስጥ	☐
PA 413b	ይህንን ስራ በመስራት በተለመደ ቀን ውስጥ ምን ያህል ጊዜ ያሳልፋሉ?	በሰዓት እና በደቂቃ ወይም በደቂቃ ብቻ	☐
ቀጥሎ ያለው ጥያቄ መቀመጥንና ጋደም ማለትን ይመለከታል ያለፉትን 7 ቀናት መልሰው ያስቧቸው በስራ ላይ ያሳለፉትን፣ በትርፍ ጊዜ በወንበር ላይ በመቀመጥ፣ ጓደኛዎትን በመጎብኘት፣ በማንበብ ወይም ቴሌቭዥን በማየት ነገር ግን በእንቅል አያካቱ			
PA 414	ላለፉት 7 ቀናት በመቀመጥ ወይም ጋደም በማለት በተመለደ ቀን ውስጥ ምን ያህል ጊዜ አሳልፈዋል?	በሰዓት፣ በደቂቃ ወይም በደቂቃ ብቻ	☐

	ደረጃ 2 የአካል ልኬት		
			ኮድ
PM 501	የልብ ምት (ሶስት ጊዜ የተለካ)	ምት በደቂቃ ______________1 ምት በደቂቃ________________2 ምት በደቂቃ_________________3	☐

PM 502	የ ደም ግፊት (ሶ ስ ት ጊ ዜ የ ተለ ካ)	ሲ ስ ቶ ሊ ክ /ዲ ያ ስ ቶ ሊ ክ ______ሚሜሄ ግ ሲ ስ ቶ ሊ ክ /ዲ ያ ስ ቶ ሊ ክ ______ሚሜሄ ግ ሲ ስ ቶ ሊ ክ /ዲ ያ ስ ቶ ሊ ክ ______ሚሜሄ ግ	☐
PM 503	ቁ መት በ ሴ.ሜ	________________1 ________________2	☐
PM 504	ክብደት በኬ.ግ.	________________ኬ.ግ.	
PM 505	የ ወገ ብ ስ ፋት በ ሴ.ሜ	G1 ---------ሴ.ሜ G2 --------ሴ.ሜ G3 --------ሴ.ሜ	☐
PM 506	የ ዳሌ ዙሪያ በ ሴሜ	1______________ 2______________ 3______________	☐
PM 507	የ ክ ብደ ት/ቁ መት ን ጽጽ ር	________________	☐
PM 508	የ ወገ ብ ስ ፋት ከ ዳሌ ሲነ ጻጸ ር	________________	☐
ደ ረ ጃ 3 ባ ዮ ኬሚካ ል ምር መራ			
			ኮ ድ
BT 601	ምግ ብ ያ ለ መብላ ትን (ጾ ምን) ለ ማረ ገ ጥ ፈሳ ሽ ምግ ብ መቼ ወስ ደ ዋ ል (ውሃ ን ሳ ይ ጨምር)	በ ሰ ዓ ት_____________ በ ደ ቂ ቃ_____________	☐
BT 602	በ ጾ ም የ ደ ም ግ ሉ ኮ ስ መጠን (በ ሚሊ.ሞል /ሊ	________________ሚሊ.ሞል /ሊ	☐

Annex III: Declaration

I, the undersigned, declared that this is my original work and has not presented in this or any other university and all sources of materials used for this thesis have been duly acknowledged.

Name: Tariku Tesfaye

Signature: --

Date: --

Place: Addis Ababa University, School of Public Health

This thesis work has been submitted for the examination with the approval as university advisors.

Name: Dr. Naod Firdu (MD, MPH)

Signature: ---

Date: ---

Place: Addis Ababa University, School of Public Health

Annex: Assurance of principal Investigator

I undersigned here agrees to accept responsibility for scientific ethical and technical conduct of the research project and for provision of required progress reports as per terms and the condition of the research I will communicate to my advisors and other stakeholders involved in this research publications office in effect at the time of grant is forwarded as the result of this application.

Name of the student: Tariku Tesfaye

Signature: --------------------------------

Date: --

Approval of primary advisor

Name of the primary advisors: Dr Naod Firdu (MD, MPH)

Signature: ------------------------------------

Date: ---

ANNEX IV: CURRICULAM VITEA

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2. POST GRADUTE DIPLOMA IN POLICE SCIENCE FROM ETHIOPIAN POLICE UNIVERSITY COLLEGE, SENDAFA, 2011
3. MASTER IN PUBLIC HEALTH (MPH) DEGREE, FROM ADDIS ABABA UNIVERSITY, ETHIOPIA (2015) (IN VIEW)

PROFESSIONAL EXPERIANCES:

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RESEARCH EPERIANCES:

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