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Magnitude of Visual Impairment and Substance Use Disorders and, Their Association with Road Traffic Accident among Drivers of Public Transportation in Jimma Zone, South West Ethiopia, 2019.

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A Thesis to be presented to the Department of Biomedical Sciences, Institute of Health, Jimma University; In Partial Fulfillment of the Requirements for the Master of science Degree in Medical Physiology.

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## **Abstract**

**Introduction:** Around 4500 Ethiopians die every year due to Road Traffic Accidents (RTAs). Various factors contributed for high prevalence as well as fatality of RTAs in Ethiopia including the road safety, the vehicles condition, the driver's condition, the legislation and its implementation, and other factors. Driver related factors collectively contribute for 82% RTAs. Driver's vision impairment is one of the factors for increasing prevalence and fatality of RTAs. Those drivers with a visual disorder had fifteen times more accidents than those without these problems. The use of alcohol and psychoactive drugs impair driving skill, and there is a significant association between a number of psychoactive substances usages and increased crash risk. Although there are various measures to intervene RTAs, the magnitude of visual impairment and substance use disorders among drivers of public transportation in Jimma Zone are not known objectively.

**Objective:** The main aim of the present study was to assess magnitude of visual impairment and substance use disorders and, their association with road traffic accident among drivers of public transportation in Jimma Zone.

**Matherials and Methods:** Cross sectional study design was employed in the present study. The sample size of the study was 402. Subjects were approached while waiting their turn using systematic random sampling technique. Semi-structured interviewer-administered questionnaire was used along measurement of visual functions. Data were entered to Epi-data manager version 4.4.1 and exported to Stastical Package for Social scienses (SPSS) version 25 for statistical analysis. Results of the descriptive analysis were summarized by frequencies, means and proportions, and presented by using tables and figures. Bivariate and multiple logistic regression were applied to determine association between dependent and independent variables.

**Results:** In the present study prevalence of self-reported road traffic accident (RTA) for the last one year was 142 (35.7%) (95% CI=31.02% to 40.38%). Two hundred fifty eight (64.8%) of the respondents were married, and 140 (35.2 %) were not. Mean age of drivers was 32.11years (SD  $\pm$ 9.133). Five point five percent (22) of the repondents were night shift workers. Among drivers, sixteen (4%) and 28 (7%) of them had color vision abnormality and subnormal depth perception respectively. Severe khat use disorder, moderate alcohol use disorder, abnormal color vision, stereopsis abnormality, work schedule, marital status, and age of drivers were significantly association with RTA.

**Conclusion and Recommendation:** In conclusion, the present study revealed that there were stastically significant association between RTA and, severe khat use disorder, moderate alcohol use disorder, stereopsis abnormality, work schedule, color vision and marital status of drivers. There were also statistically significant association between age of drivers and occurrence of road traffic accident. We sugest eye examination in drivers whose age is greater than fifty years. We advise awareness creation about the association of RTA and night time driving for drivers. We recommend transport authority officials to use efforts to tackle the use of substances among drivers. We also recommend researchers to conduct research using stronger research desings

*Key words:* Drivers, visual impairment, substance use disorder, road traffic accident

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## **Abbreviations**

AORs	Adjusted Odd Ratios
BMI	Body Mass Index
CI	Confidence Interval
CNS	Central Nervous System
CORs	Crude Odd Ratios
DALYs	Disability-Adjusted Life-Years
DRUID	Driving under the Influence of alcohol, Illicit Drugs and medicines
DSM	Diagnostic and Statistical Manual of Mental Disorder
ETB	Ethiopian Birr
G.C.	Gregorean Calender
ICD	International Classification of Diseases
JMC	Jimma Medical Center
Kg	Killogram
Km	Kilometer
M	Metere
N	Number
NPL	Not Perceiving Light
NSDUH	National Surveys on Drug Use and Health
ORs	Odds Ratio
RTA	Road Traffic Accident

SD	Standard Deviation
SPSS	Statistical Package for Social Sciences
UFOV	Useful Field of Vision
UK	United Kingdom
USA	United States of America
VAQ	Visual Activities Questionnaire
VA	Visual Acuity
VI	Visual Impairment
WHO	World Health Organization

# **1. Introduction**

## **1.1 Background**

Road Traffic Accidents (RTAs) are collisions between vehicles, between vehicles and pedestrians, between vehicles and animals, or between vehicles and geographical or architectural obstacles (1). Globally, RTAs are issue of major public health importance and are projected to be the third leading cause of Disability-Adjusted Life-Years (DALYs) by 2020. In 2010 about 1.24 million people lost their lives in road traffic crashes, making RTAs the eighth leading cause of death globally. Additionally, 20–50 million people were non-fatally injured on the road (2). The burden of road traffic injuries in Africa is high and there is an underestimation of road traffic fatalities despite 34% increase road deaths in Africa in the past 35 years (3).

Road traffic accident incriminates three groups of factors that increase the risk of injury. These factors are host factors, factors associated with the roadway environment and agent factors (4). Host factors play a pivotal role in causing RTA. At the individual level some of the risks include male gender, young age and behaviors such as substance abuse. Physiological conditions such as advanced age may also impair the individual's ability to function safely in a traffic environment (5). Driver's personality (6), emotion (7), visual impairment (8), mental disorders (9) and substance use disorders (10) are main among driver related factors.

Eyes play a key role in all life forms to perceive and react to their environment. Visual impairment is defined as a functional limitation of the eye(s) or visual system and can manifest as reduced visual acuity or contrast sensitivity, visual field loss, photophobia, diplopia, visual distortion, visual perceptual difficulties, or any combination of the above. Visual impairment is caused by cataract, glaucoma, uncorrected refractive errors, age-related macular degeneration and corneal opacity (11).

Substance is defined as any psychoactive compound with the potential to cause health and social problems, including addiction (12). Substance use disorder is a maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by two (or more) of the Diagnostic and Statistical Manual of Mental Disorder (DSM V) fifth edition criteria, occurring

with in twelve month period (13). It is known that driving under the influence of alcohol or any substance that affect central nervous system increases the risk of involvement in road traffic accident. The use of alcohol and psychoactive drugs may impair driving skills, and previous studies have found significant associations between a number of psychoactive substances usage and increased crash risk especially alcohol (14,15). Among the substances used by drivers, khat is the most common one in Eastern African countries including Ethiopia. The psycho-stimulant component of khat is cathinone, which is released in to the circulation within 15–45 minutes of chewing (16).

## 1.2 Statement of the Problem

Road traffic accidents are major cause of fatalities worldwide (2). Worldwide, it has been estimated that the number of people killed in RTAs each year is about 1.2 million and the number of the injured could be as high as 50 million, whereas 1–3% of gross national product (GNP) is lost from RTA globally (17). In many low-income countries, the prevalence of traffic related injuries is such that they represent between 30% and 86% of all trauma admissions(18). On European Union roads alone, an average of 46,000 deaths occurred annually (19). While South-East Asia has the highest proportion of global road fatalities (one-third of the 1.2 million occurring each year in the world), the road traffic injury mortality rate is highest in Africa (28.3 per 100,000 population when corrected for under-reporting (20).

RTAs have been the principal causes of fatality and disability in African Countries mainly among those aged 5–29 years. Every day in Africa, about 2,400 individuals die from injuries and the leading cause of the injury is road traffic crash (21). In Nigeria, between 1980 and 1989, a total of 343,032 RTAs were reported (19). Road traffic accident is also a major public health problem in Ethiopia. The gravity of the problem is getting worse from time to time, approaching a crisis level and requiring urgent and multi-pronged actions (22).

Among African countries, Ethiopia has a relatively high burden of RTAs. It is challenging to accurately estimate the public health burden and causes of RTAs, where underreporting was a major problem (23). Reports demonstrate that about 41,594 RTAs occurred between July 2005 and June 2011 in Ethiopia (24). About 3% of Ethiopians were involved in a road traffic crash as a passenger, driver, or pedestrian in 2017. More RTAs occurred in the productive age group excluding deaths (5).

Vision is inarguably a fundamental component of safe driving (4). Any significant loss of visual function such as visual acuity or visual field will diminish a person's ability to operate a motor vehicle safely on today's congested high-speed road ways (25). If the distance vision is poor, the driver may not see the hazards until it is too late to react safely. The peripheral visual field is needed to make the best use of side and rear mirrors and keep them adjusted correctly. The depth of perception is needed to be able to judge distance well, overtake other vehicles and change lane especially in a busy traffic. A driver with marked visual defect may fail to react appropriately due to inability to perceive a potentially dangerous situation. Color vision is important in the

recognition of traffic signs and signals, various vehicle lamps and signals. Drivers should be able to recognize and respond to these stimuli in the driving environment. The ability to adapt to decreased illumination and to recover rapidly from exposure to glaring headlights is of great importance for night driving. People with reduced contrast sensitivity may experience difficulty in driving in spite of having adequate visual acuity to drive. Loss of contrast sensitivity can be associated with increased age, cataract, refractive surgery as well as other ocular disorders (25). Impaired visual processing and glaucoma played a role in the etiology of older driver crashes. The use of alcohol, illegal drugs and psychoactive medicinal drugs may increase the risk of involvement in traffic accidents. This is reflected by frequent findings of alcohol and drugs in blood samples from fatally injured drivers (26). Most of these victims of RTA are in their working age and, thus, they are breadwinners for their families (27). Psycho-stimulant use has been implicated as increasing the risk of fatal and injury crashes, especially for occupational driving, such as long-distance trucking. The increasing number of traffic accidents in Eastern Africa countries has been related to khat chewing habits (28). Khat use was consistently regarded as an important contributor to Ethiopia's high crash rates. It increased driver confidence and vehicle speed while also making drivers irritable and impairing concentration. Traffic police officers regarded the practice of relying on khat to stay awake as especially dangerous, because it leads to a misplaced sense of alertness. High levels of khat consumption causes hallucinations that can lead drivers to swerve to avoid imaginary objects (26).

Driver related causes of RTAs, which accounts for 82% of the accidents, are not given enough attention in spite of increasing both prevalence and severity of RTA (29). Though 95% of the sensory requirement for driving has been shown to be vision (30), various researchers found no correlation between visual impairment and the occurrence of RTA (18,30), rather other factors, such as the habits of the drivers like the use of CNS stimulants (19) and the level of compliance to the traffic laws (20), have been shown to contribute to the occurrence of RTA. Alcohol depresses the cerebral centers, thus making the drivers to overestimate their abilities and underestimate their mistakes. Awareness and reaction to stimuli, and muscular coordination are all impaired by alcohol (19). In Ethiopia, there is scarcity of studies on visual functions and other factors, and even the conducted researches focus only visual acuity and color vision but other parameters like visual field, contrast sensitivity and depth perception were left unstudied. Thus, this research aims to

investigate the magnitude of road traffic accident and its association with visual impairment and substance use disorders among drivers of public transportation in Jimma Zone

### **1.3 Significance of the Study**

The present study assessed magnitude of visual impairment and substance use disorders and, their association with RTA among drivers of public transportation in Jimma Zone. The result of the present study will give some evidence for the local, regional and federal government officials and other stakeholders to develop evidence based regulations and strategies to tackle RTAs in the area. Moreover, this study will recommend the possible prevention and control options to decision makers and other stakeholders in order to decrease death and disability resulting from road traffic accidents. It will also be used as a base line for further studies in the area.



## **2. Literature Review**

### **2.1 Prevalence of Road Traffic Accident**

The global road fatality estimation based on 215 countries micro-level data showed firm increasing trends between 1980 and 2008. Subsequently, the global deaths tend to slow down. This developed models presented a plateauing transition stage of global road deaths before descending. The adjusted death during 2014 ranged between 792,000 and 905,000. The high range showed 40% lesser death than World Health Organization (WHO) estimate (31). The results showed in consistencies in road deaths between various WHO sectors. In Asia, the trend of crash fatalities for the sum of 52 countries followed closely that of the global trend, but with steeper increasing slope during the period from 1980 to 2000. In South America, it showed continuous ascending trends, but in Europe and Oceanic countries, it showed clear descending patterns. The trend in North and Central America did not change much during the period between 1980 and 2007. The developed models indicated drops of 33% in North and Central America, 18% in Oceania and 13% in Asia by 2025 compared with 2014, while they increase by over 44% in Africa and 32% in South America (31). Meta-analysis done in Africa to estimate the burden of road traffic injuries and deaths from 39 studies of 15 countries estimated pooled rate for road traffic injury was 65.2 per 100 000 population (95% confidence interval, CI: 60.8–69.5) and the death rate was 16.6 per 100 000 population (95% CI: 15.2–18.0). The Meta analysis showed that road traffic injury rates increased in Africa from 40.7 per 100 000 population in the 1990s to 92.9 per 100 000 population between 2010 and 2015, while death rates decreased from 19.9 per 100 000 population in the 1990s to 9.3 per 100 000 population between 2010 and 2015. The highest road traffic death rate was among motorized four-wheeler occupants at 5.9 per 100 000 population (95% CI: 4.4–7.4), closely followed by pedestrians at 3.4 per 100 000 population (95% CI: 2.5–4.2) (3). In one crosssectional study done in India only few respondents 37 (19%) had history of involvement in RTA while driving (32). In Ethiopia from June 2012 to May 2013 based on capture capture-recapture model estimate, the incidence of deaths and injuries ranged from 368 to 390 and 1,869 to 1,895 per billion vehicle kilometer, traffic police and hospital report respectively in most congested high way of Addis Ababa –Hawassa (23). The prevalence of RTA is 26.4% (n = 188) and 16.3% in cross sectional studies done in Mekele in 2015 and Bahrdar in March 2016 respectively (31,33). But the prevalence of self-reported RTA was higher in a study done Arbaminch city. The study showed that, from 200 sampled drivers 62% of the drivers were involved in one or more accidents in the

last three years (34). In a similar study done in Jimma in 2010 prevalence of self-reported road traffic accident was 15.6% for the last one year (35).

## **2.2 Substance Use and Road Traffic Accident**

In Europe the prevalence and injury risk of driving with alcohol and illicit drugs and medicines has been estimated as part of DRUD (Driving under the Influence of Alcohol, illicit Drugs and medicines) project. In 2015 from blood samples of injured/died drivers by RTA in thirteen European countries prevalence of alcohol (concentration  $\geq 0.1\text{g/l}$ ) was highest among other substances (36). In most studies alcohol (37,38) and cigarette were frequently used by drivers, even though the association with RTA is higher among alcohol users (39).

In USA, according to the 2016 National Survey on Drug Use and Health (NSDUH), 20.7 million people aged 16 or older drove under the influence of alcohol in the past year and 11.8 million drove under the influence of illicit drugs (38). In a study done in Nezerland by collecting blood of 993 drivers involved in RTA to examine the association between the use of alcohol, illicit drugs and/or medicinal drugs and the severity of an accidents, in 83% (802/962) of the cases, the blood alcohol concentration exceeded the legal limit of 0.5 mg/ml of the country, and the median blood alcohol concentration was about 1.5 mg/ml. The percentage of drug-positive cases was 41% (66/160) for the group with a blood alcohol concentration less than 0.5 mg/ml. For the other cases with blood alcohol concentrations of 0.5–0.8, 0.8–1.3 mg/ml and more than 1.3 mg/ml, the percentage cases with additional illicit and medicinal drug use were 35% (29/82), 35% (71/205) and 30% (155/515), respectively, and this result shows that no association between the blood alcohol concentration and severity of the accident (40).

In Spain between 1991 and 2000, some type of psychoactive substance was detected among 50.1% of those drivers killed in road accidents, this being mainly alcohol (43.8%) and, less frequently, illicit drugs (8.8%) and medicinal drugs (4.4%) (41). A case-control study in Norway in 2012 found that the ORs for being killed in a traffic crash with blood alcohol concentration above the legal limit of the country (0.02 g/dl) was 199.5 (95% CI 112.6– 353.2). For the use of amphetamines without other substances the OR was 41.6 (95% CI 12.6–137.1), and for use of two or more substances 85.0 (95% CI 46.3–156.1). The OR for general use of only one medicinal drug was 6.0 (10). The effects of specific drugs on driving differ depending on how they act in the brain. For example, marijuana can slow reaction time, impair judgment of time and distance, and

decrease coordination, alcohol consumption is known to induce faster driving, and cannabis has shown to reduce driving speed. Moreover, alcohol increases self-confidence estimation (38), whereas drivers under the influence of cannabis seem to be more cautious in accordance with some experimental results (40).

A cross sectional study done in Mekele, Ethiopia in 2015, history of alcohol use were associated with higher odds of (AOR = 1.51, 1.00–2.28) road traffic accident involvement (31). Similarly in a study done at Arbaminch city drivers who drive after having alcohol are expected to have 1.845 more accident than those who do not have alcohol (34). In a study done at Jimma in 2010, 23.1% of study participants drank alcohol while driving were involved in RTA (35).

### **2.3 Visual Impairment and Road Traffic Accident**

A cross-sectional study done in Nigeria to assess visual function of drivers and its relationship to road traffic accidents in Urban Africa in 2014, eight percent of the drivers were visually impaired in one eye with cataract, the leading cause of visual impairment in the better eyes of the affected drivers. The relationship between visual impairment (VI) and RTA was however not statistically significant ( $p=0.46$ ,  $\chi^2=0.3$ ,  $RR=0.62$ ). Among the 45.5% drivers involved in RTAs, none of them were mon-ocularly blind. Three point five percent were blind in one eye out of which 28.6% were not perceiving light (NPL) in that eye. Four percent of the drivers had visual field defect of which two point five had prior history of RTAs. However, this was not statistically significant. Four point five percent were color defective and ten percent of them had a past history of RTA. However, color vision is not significantly associated with RTAs in this study (19). In a similar study done in Cape Coast municipality of Ghana which include 206 commercial drivers, six point eight percent had visual impairment (defined as  $VA < 6/18$  to  $6/60$  in the better eye). Visual impairment was not significantly associated with a positive history of RTA ( $\chi^2=5.982$ ,  $p = 0.050$ ) (42). Similarly in a study done in central regions of Ghana to determine the relationship between some visual functions with occurrence of RTA, there was no statistically significant association between abnormal stereopsis ( $p = 0.56$ ), poor vision due to refractive error ( $p = 0.388$ ) and the occurrence of RTAs (43). In a cross-sectional study done on 90 commercial drivers of Nigerian community, the prevalence of visual impairment was two point three percent in better eye and no association with RTA. And none of the respondents had color vision defect (44).

A cross-sectional study done in Jimma among drivers in 2010 reported that the prevalence of binocular visual impairment was 1.6% and there was a significant association between visual impairment and road traffic accident ( $P < 0.05$ ). Uncorrected refractive error was seen in 7.6% and 8.8% of drivers in the right and left eyes respectively, and 6.2% of them had vision less than what is required to obtain driving license (visual acuity of 6/12) (35).

## **2.4 Sociodemographic Characteristics and Road Traffic Accident**

A number of researches showed that young and old drivers have higher RTA rate than middle aged ones (45). But the causes in those high risk groups are different, alcohol and excessive speed are for young aged driver but visual impairment and other medical conditions for older ones (4). A study done by Bilban M. in 2002 which focuses on the differences in the occurrence and type of injuries between the young and the elderly drivers, based on an analysis of all road accidents in Slovenia in the period between 1998-2000, older people (over 65) caused only four point seven of all road accidents (46). In a study done in Nigeria the age range was 25 to 62 years with mean of 37.8 years ( $SD \pm 9.1$ ). Three hundred and fifty (87.5%) drivers were less than 50 years old. Majority (98.2%) of the drivers have had some form of formal education and could read and write (19). Review of literatures done by Lee De Milia and his collages in 2011 showed that there is positive relationship between long working hours and fatigue which in turn have increased risk of RTA. The study conducted in Ukraine in 2011 using a road side driver test shows that fatigue in some cases, though not on a generalized basis, adversely affects skills needed for driving, such as reaction time, resistance to monotony, anticipation speed, or visual-motor coordination. Their ages ranged between 22 and 70 years with a mean age of 45.2 years ( $SD \pm 10.7$ ). The respondents all were males. The majority of the respondents were married (95.6%), half of the respondents (50%) had secondary education, 34.4% had primary education, and 12.2% had no formal education while the remaining three point three percent had tertiary education. In Melbourne a study done by J. E. Keefe and his friends to establish the association between impaired vision and drivers' decisions to stop driving, voluntarily restrict driving, and motor vehicle accidents, the greatest proportion of (35%) accidents reported were in the age group 50-69 but the younger age groups drove greater distances each year than the older drivers (47). Obesity and night time driving were also shown to be among the risk factors of occurrence of RTA (48,49), but the causes of accidents among night time drivers were sleepiness (50) use of psychoactive substances and darkness (51). In a cross-sectional study done on 90 commercial drivers of Nigerian community, 58% of them had more

than 20 years driving experience (47). The experience of the driver increases in one year would increase the accidents frequency by 0.951 which is found from the study done in Arbaminch City (34). In a study done in Jimma among drivers, RTA is associated with age less than 35 years and marital status of currently not in union (35).

## 2.5 Conceptual framework

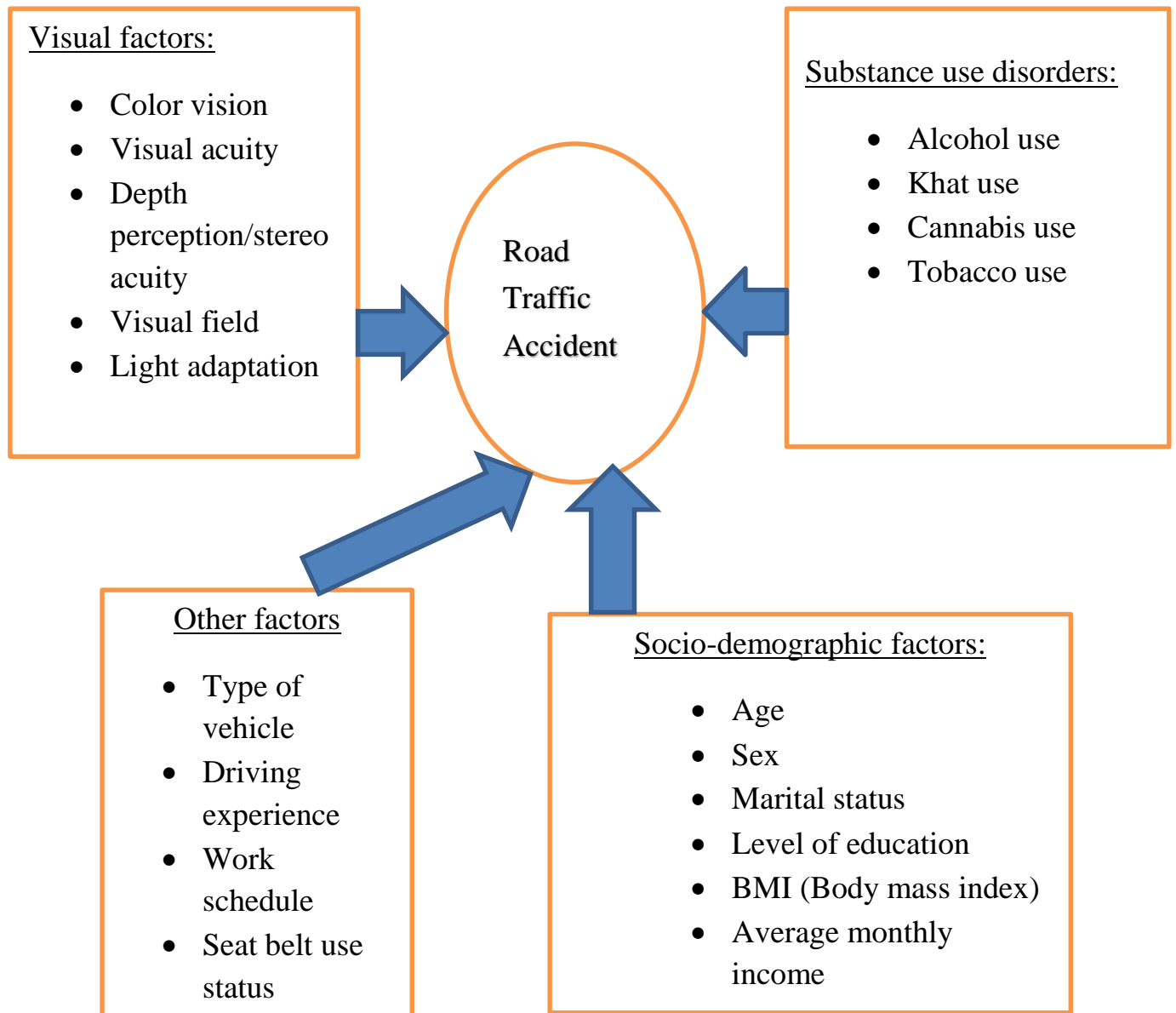


Figure 1 Conceptual frame work developed after reviewing different literatures

### **3. Objectives**

#### **3.1 General Objective**

The general objective of the study was to assess magnitude of visual impairment and substance use disorders and, their association with road traffic accident among drivers of public transportation in Jimma Zone, South West Ethiopia, 2019.

#### **3.2 Specific Objectives**

1. To evaluate prevalence of road traffic accident among drivers of public transportation in Jimma Zone, South West Ethiopia, 2019
2. To identify the magnitude of visual impairment among drivers of public transportation in Jimma Zone, South West Ethiopia, 2019.
3. To determine prevalence of substance use disorders among drivers of public transportation in Jimma Zone, South West Ethiopia, 2019.
4. To determine the association between RTA and visual impairment among drivers of public transportation in Jimma Zone, South West Ethiopia, 2019.
5. To determine the association between RTA and substance use disorders among drivers of public transportation in Jimma Zone, South West Ethiopia, 2019

## **4. Materials and Methods**

### **4.1 Study Area and Period**

The Study was conducted in Jimma Zone, which is located in the Oromia Region, South West Ethiopia. And it is 352 kilometres (Kms) far from the capital city, Addis Ababa. Jimma Zone has 18 woredas. Jimma Zone Transport Authority has registered a total of 7219 vehicles working in public transportation. From them, 6070 are four wheel vehicles and 1149 are three wheel vehicles. There is one central station in Jimma Town and other seventeen stations in woreda towns. There are total of 681 transport lines from Jimma Town both within and out of the Zone. The study was conducted from March 25, 2019 to June 25, 2019.

### **4.2 Study Design**

Community based cross sectional study design was employed.

### **4.3 Population**

Licensed drivers (including three wheel vehicles) working on public transportation were invited to participate in the study at their station, while waiting their turn. Study participants were informed about the nature of the study, and participation was voluntary and anonymous.

#### ***4.3.1 Source Population***

All licensed drivers of public transportation (including three wheel car) working in Jimma Zone.

#### ***4.3.2 Study Population***

All sampled 398 drivers were study population.

#### ***4.3.3 Study Unit***

Individual drivers were the study unit

## **4.4 Inclusion and Exclusion Criteria**

### ***4.4.1 Inclusion Criteria***

Licensed public transportation drivers, driving vehicle having greater than two wheel in Jimma Zone

Drivers working in Jimma Zone at least for a year were included in present study.



#### 4.4.2 Exclusion criteria

Drivers working beyond the border of Jimma Zone during the data collection period were excluded.

#### 4.5 Sample Size Determination

The sample size was calculated using single population proportion formula with prevalence of 50% ( $P=0.5$ ), 95% confidence interval and margin error of 5% ( $w=0.05$ )

$$\frac{(Z\alpha/2)^2 p(1 - p)}{w^2}$$

$$n = (1.96)^2 * 0.5(0.5)/0.05^2$$

$$n = 384$$

Since the population is less than 10,000

$$NF = \frac{n}{1 + \frac{n}{N}}$$

$$NF = 384/1 + 384/7219 = 365$$

By adding 10% non-response rate, the minimum final sample size of the study was 402.

Where;

NF= final sample size

n= sample size from the formula

N = Size of the study population

w=margin of error

#### 4.6 Sampling Technique/Procedure

Systematic random sampling technique was used to select study participants in the stations based on their turn. Sample size was allocated proportionally to all stations.

## **4.7 Data Collection Procedures**

Data collection tools

Interview administered semi structured questionnaire along with visual function tests: The ocular examination procedures such as visual acuity, stereopsis and color vision, was conducted by two optometrists with relevant practice experience. Visual acuity (static) was measured for each eye with Snellen's chart at six meter. Color vision was tested using Ishara's pseudo-isochromatic 38 plate edition, while the LANG test was used to measure the drivers' gross and fine depth perception.

## **4.8 Operational Definitions**

Self-reported RTA is any form or type of recalled RTA that occurred in the last one year due to driver's own fault or from other causes and resulted in either human or material damage (35).

Property damage: It is when body/spare part of the moving vehicle is injured or destruction of materials around the accident or death of wild animal is occurred.

Minor injury when the accident resulted in simple laceration of one or more people (passenger or pedestrian) and when disability is not happen.

Major injury with out death: It is when the accident resulted in disability of one or more people (passenger or pedestrian).

Death: It is when the accident resulted in death of one or more people (passenger or pedestrian).

Visual impairment: VA of 6/6-6/18 is considered as normal vision, < 6/18-6/60 is classified as moderate visual impairment (VI) and < 6/60-3/60 is classified as severe VI while VA of less than 3/60 is classified as blindness (29).

Color blindness: Drivers who can read 13 or less plates are considered as color blind (52).

Normal color vision: Drivers who read 17 or more plates are considered as normal for color vision (52).

Normal stereopsis: Drivers who did correct localization and naming of all hidden objects, typically jumping eye movements from one object to the next are classied as normal for depth perception (53).

Subnormal stereopsis: If only one hidden object is localized and named correctly, eyes are scanning the plate for objects then stereopsis is classified as subnormal (53).

Abnormal stereopsis: If no object can be detected, and eye movements also do not indicate the recognition of the 3D objects then stereopsis is classified as abnormal (53).

#### Substance use disorders

Substance use disorder status of drivers were classified based on the score of their response for questions in ASSIST for a specific substance (54). Accordingly, substance use disorders are classified as:

No/Mild khat use disorder if the score of respondents answer for the use of khat is between zero and three.

Moderate khat use disorder if the score of respondents answer for the use of khat is between four and twenty seven.

Severe khat use disorder if the score of respondents answer for the use of khat is above twenty seven.

No/Mild alcohol use disorder if the score of respondents answer for the use of alcohol is between zero and ten.

Moderate alcohol use disorder if the score of respondents answer for the use of alcohol is between eleven and twenty six.

Severe alcohol use disorder if the respondents answer for the use of alcohol is above twenty seven.

No/Mild tobacco use disorder if the score of respondents answer for the use of tobacco is between zero and three.

Moderate tobacco use disorder if the score of respondents answer for the use of tobacco is between four and twenty seven.

Severe tobacco use disorder if the score of respondents answer use of tobacco was above twenty seven.

No/Mild cannabis use disorder if the score of respondents answer for the use of cannabis is between zero and three.

Moderate cannabis use disorder if the score of respondents answer for the use of cannabis is between four and twenty seven.

Severe cannabis use disorder if the score of respondents answer use of tobacco is above twenty seven.

## **4.9 Study Variables**

### ***4.9.1 Dependent variable***

Dependent variable of the study was self-reported road traffic accident.

### ***4.9.2 Independent variables***

1. Socio-demographic and other characteristics: sex, age, average monthly income, marital status, educational status, driving experience, vehicle type, BMI, seat belt use status and work schedule.
2. Vision: visual acuity, visual fields (peripheral vision), color vision, light adaptation binocular vision and depth perception.
3. Substance use disorder: alcohol use disorder, khat use disorder, tobacco use disorder and cannabis use disorder.

## **4.10 Data Management and Statistical Analysis**

The collected data were cleared and checked manually. All data were entered into Epidata manager version 4.4.1.0, and exported to Statistical Package for Social Science (SPSS) version 25 software for further statistical analysis. Descriptive statistics was used to determine the frequency of dependent and independent variables. Bivariate and multivariate logistic regression were used to examine the association between dependent and independent variables. Variables, which showed significant association on bivariate analysis, were fitted in to multiple logistic regression model to determine the the associated factors for RTA.

## **4.11 Quality Assurance**

Intially, the questionnaire has been prepared in English language and it was translated to Amharic and Affan Oromo languages then back to English. Pretest of data collection tool (questionnaire)

was done in Butajira Town among twenty drivers (5% of the total sample size) and necessary corrections were done after the pretest prior to the actual data collection period. Two days training was given to the data collectors and daily entrance of collected data was done. Data collectors were a team of two Psychiatry nurses and two Optometry nurses. And supervision was done by the principal investigator.

#### **4.13 Ethical Clearance**

Ethical clearance was obtained from Institutional Ethical Review Board (IREB) of Jimma University. Formal letter was obtained from Jimma Zone Transport Authority and respective woreda offices. Written consent was obtained from each participant before the beginning of the data collection. After getting permission from the study participant, each study participant was informed about the research, their right to abandon the involvement at any time and confidentiality of information was maintained during data collection, analysis and interpretation of results. Findings were presented in aggregated form and individual information was kept confidentially.

## 5. Results

### 5.1 Sociodemographic and Other Characteristics of Respondents

#### 5.1.1 Sociodemographic and Economic Status of Respondents

Three hundred ninety eight drivers were participated in this study making response rate of 99%. Their ages ranged between 16 and 69 years with a mean age of 32.11 years ( $\pm$ SD $\pm$ 9.133). Three hundred ninety four (99%) of respondents were males and the rest four (1%) were females. Two hundred fifty eight (64.8%) of the respondents were married, and 140 (35.2 %) were not. Majority of the respondents (54.8%, N=218) had primary education, and 154 (38.7%) had secondary education, while the remaining 26 (6.7%) had above secondary school education. Average monthly income of the respondents was 4239.45 ETB (SD $\pm$ 2347.029). Details of sociodemographic characteristics of respondents is described below in table1.

Table 1 : Socio- demographic and economic characteristics among respondents in Jimma Zone, South West Ethiopia, from April 25 to June 25, 2019 G.C. (N=398)

Variables	Categories	Frequency	Percentage (%)
Age in years	<35 years	284	71.4
	35-49 years	92	23.1
	>50 years	22	5.5
	Total	398	100.0
Sex	Male	394	99
	Female	4	1
	Total	398	100.0
Marital status	Married	258	64.8
	Currently not in union	140	35.5
	Total	398	100.0
Average monthly income in ETB	<2000ETB	51	63.75
	>2000ETB	29	36.25
Educational status	Primary school	218	54.8
	Secondary school graduate	154	38.7
	Above	26	6.5
	Total	398	100.0

*ETB refers to Ethiopian birr*

### 5.1.2 Driving Experience and Other Related Variables

Average driving experience of respondents was 6.72 years (SD  $\pm$ 6.103). Two hundred sixty two (65.8%) of the respondents were day time shift workers, 114 (28.6%) of them were irregular shift workers and the rest 22 (5.5) were nightshift workers. Majority of the respondents, (84.7%, N=337), were four wheel vehicle drivers. The mean of height (M), weight (Kgs) and BMI (kilogram/m<sup>2</sup>) of the sampled and analyzed 398 drivers were 1.71m (SD $\pm$ 0.067), 68.15Kg (SD $\pm$ 7.44) and 23.17 (SD $\pm$ 2.39) respectively (table 2).

Table 2: Driving experience and other related variables among drivers of public transportation in Jimma Zone, South West Ethiopia, April 25-June 25, 2019 G.C. ( N=398)

Variables	Categories	Frequency	Percentage (%)
Driving experience	< 5 years	219	55.0
	5-10 years	112	28.1
	11-15 years	35	8.8
	16-20 years	16	4.0
	>20 years	16	4.0
	Total	398	100.0
Seat belt use status	Always (100%)	73	18.3
	Most of the time (75-95% )	96	24.1
	More than 50%	87	21.9
	Less than 50%	56	14.1
	Seldom (less than 25%)	16	4.0
	Never	9	2.3
	NA	61	15.3
Total	398	100.0	
Work schedule	Day time shift	262	65.8
	Night time shift	22	5.5
	Irregular	114	28.6
	Total	398	100.0
Vehicle type	Three wheel	61	15.3
	Four wheel	337	84.7
	Total	398	100.0
BMI (kilogram/m <sup>2</sup> )	Under weight (<18.5)	10	2.5
	Normal (18.5-24.9)	301	75.6
	Over weight (>25)	87	21.8
	Total	398	100.0

NA refers to seat belt is not applicable for three wheel vehicle, BMI body mass index, m<sup>2</sup> metere square.

## 5.2 Self-reported Road Traffic Accident among Drivers

The prevalence of self-reported road traffic accident (RTA) for the last one year was 35.7% (95% CI =31.02-40.38%). Property damage was the most prevalent type of accident 61 (43.7%) followed by minor injury 29 (20.4%), major injury without death 41 (28.9%) and death 11 (7.7%). (Figure 2).

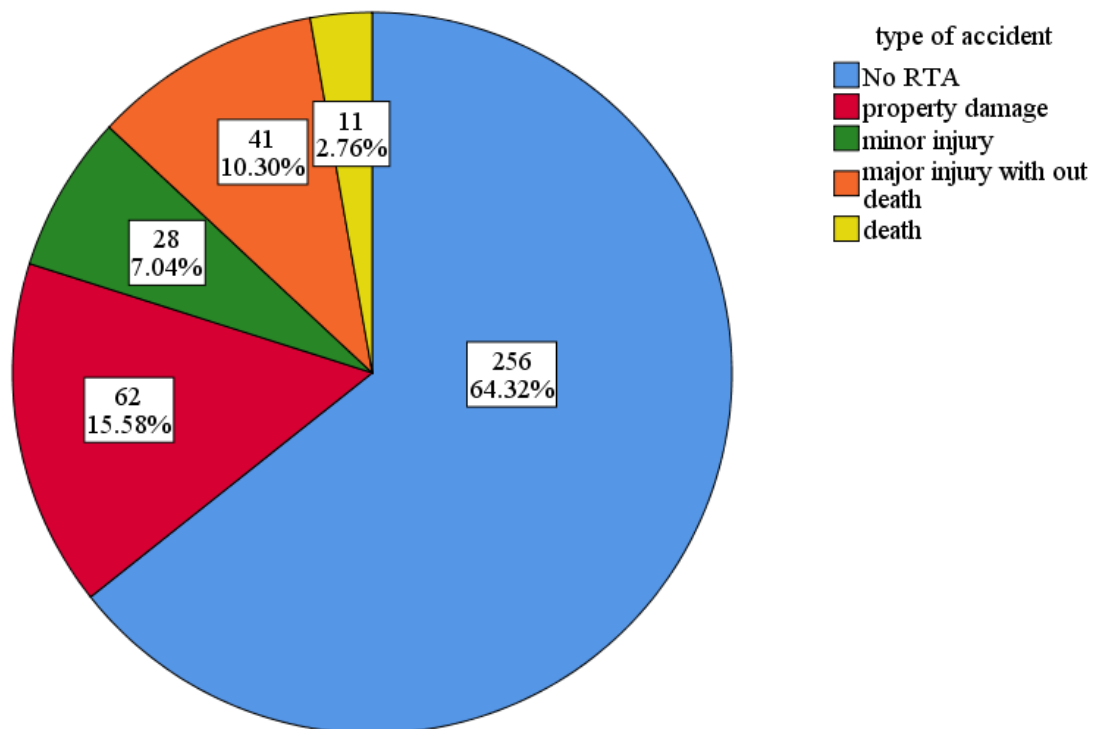


Figure 2: Prevalence of self-reported road traffic accident and accident type among respondents in Jimma Zone, South West Ethiopia, from April 25 to June 25, 2019 G.C. (N=398)



### 5.3 Visual Status of Drivers

Of the respondents, 387 (97.2%), of them had normal visual acuity in both eyes while six and nine of them had visual acuity less than 6/18 in right and left eye respectively. Four of the respondents had moderate visual impairment in both eyes. But none of the respondents had severe visual impairment. Sixteen (4%), 11(2.8%) and 28 (7%) of them had visual field defect, abnormal color vision and abnormal depth perception (table 3).

Table 3: Visual status of public transportation drivers in Jimma Zone, South West Ethiopia, from April 25 to June 25, 2019 G.C. (N=398)

Variables	Categories	Frequency	Percentage (%)
	6/6-6/18	392	98.5
Visual acuity (right eye)	<6/18	6	1.5
	Total	398	100.0
	6/6-6/18	389	97.7
Visual acuity ( left eye)	<6/18	9	2.3
	Total	398	100.0
Visual acuity (both eyes)	Normal	394	99.0
	Binocular VI	4	1
	Total	388	100.00
	Normal	382	96.0
Color vision (Ishara's test )	Abnormal	16	4.0
	Total	398	100.0
	Normal	387	97.2
Visual fields (confrontation to each eye)	Abnormal	11	2.8
	Total	398	100.0
	Normal	383	94.7
Light adaptation test	Abnormal	13	3.3
	Total	398	100.0
	Normal	366	92.0
Stereopsis (Lang stereo acuity test)	Subnormal	4	1.0
	Abnormal	28	7.0
	Total	398	100.0
Are eye glass worn?	Yes	19	4.8
	No	379	95.2
	Total	398	100.0
Do you have vision test during licensing	Yes	398	100.0
	No	0	0.0
	Total	398	100.0

## 5.4 Substance Use of Drivers

From the total 398 respondents, 17 (4.3%), 10 (2.5%), 15 (3.8%), and 13 (3.3%), of them had severe khat, alcohol, cannabis and tobacco use disorder respectively (table 4).

**Table 4:** Substance use disorder classification among respondents in Jimma Zone, South West Ethiopia, from April 25 to June 25, 2019 G.C. (N=398)

Variables	Categories	Frequency	Percentage (%)
Alcohol use Disorder	No/Mild	343	86.2
	Moderate	45	11.3
	Severe	10	2.5
	Total	398	100.0
Khat use Disorder	No/Mild	234	58.8
	Moderate	147	36.9
	Severe	17	4.3
	Total	398	100.0
Tobacco use Disorder	No/Mild	341	85.7
	Moderate	44	11.1
	Severe	13	3.3
	Total	398	100.0
Cannabis use Disorder	No/Mild	370	93.0
	Moderate	13	3.3
	Severe	15	3.8
	Total	398	100.0

## 5.5 Association between RTA and, Sociodemographic and Economic Characteristics of Respondents

To see the association between RTA and sociodemographic characteristics, binary logistic regression was done by taking each variable at a time. P-value of <0.25 was used as a cut off point for candidate variable selection for multivariate analysis. Accordingly, eight variables (age, work schedule, marital status, BMI, educational status, driving experience and average monthly income) were fulfilled the criterion. COR with 95% CI and p-value of the binary logistic regression outcome is described in table 5 below.

Table 5: Bivariate analysis of sociodemographic characteristics and road traffic accident among respondents in Jimma Zone, South West Ethiopia, April 25-June 25, 2019 G.C. (N=398)

Variables	Categories	Self-reported road traffic accident			COR (95% CI)	P- value
		No N (%)	Yes N (%)	Total N (%)		
Sex	Male	253 (63.6)	141 (35.4)	394 (99)	1	0.658
	Female	3 (0.8)	1(0.2)	4 (1)	0.6 (0.062-5.804)	
	Total	256 (64.3)	142 (35.7)	398 (100)		
Educationa l status	Elementary	147 (36.9)	71(17.8)	218 (54.8)	0.414 (0.182-0.941)	0.109
	High school	97 (24.4)	57 (14.3)	154 (38.7)	0.504 (0.214-1.164)	0.035*
	Graduate					
Marital status	Above	12 (3.0)	14 (3.5)	26 (6.5)		
	Total	256 (64.3)	142 (35.7)	398 (100)		
	Married	177(44.5)	81 (20.4)	258(64.9)	1	
Seatbelt use status	Currently not in union	79 (19.8)	61 (15.3)	140(35.2)	1.687 (1.103-2.581)	0.016*
	Total	256 (64.3)	142(35.7)	398 (100)		
	Always (100% )	50 (12.6)	23 (5.8)	73 (18.4)	1	
Vehicle type	Most of the time (75-95% )	67 (15.3)	29 (6.5)	96 (21.8)	0.941 (0.487-1.118)	0.856
	More than 50%	61 (16.8)	26 (7.3)	87 (24.1)	0.927 (0.477-1.818)	0.825
	Less than 50%	25 (6.3)	31 (7.8 )	56 (14.1)	2.696 (1.309-5.)	0.007*
	Seldom (less than 25% )	5 (1.3)	11 (2.8)	16 (4.0)	2.741 (1.287-5.550)	0.009*
	Never	6 (1.5)	3 (0.8)	9 (2.3)	4.783 (1.489 15.360)	0.912
Driving experience	NA	42 (10.6)	19 (4.8)	61 (15.3)	1.807 (0.250-4.733)	0.964
	Three wheel	42 (10.6)	19 (4.9)	61 (15.3)	0.787 (0.438-1.414)	0.423
	Four wheel	214 (53.8)	123 (30.9)	337 (84.7)	1	
Work schedule	Total	256 (64.3)	142 (35.7)	398 (100)		
	< 5 years	155 (38.9)	64 (16.1)	219 (55.0)	0.138 (0.0430.443)	0.001
	5-10 years	68(17.1)	44 (11.1)	112 (28.2)	0.216 (0.065-0.771)	0.012
	11-15 years	19 (4.8)	16 (4.1)	35 (8.9)	0.281 (0.076-1.043)	0.058
	16-20 years	10 (2.5)	6 (1.5)	16 (4.0)	0.2 (.044-0.913)	0.038
	>20 years	4 (1.0)	12 (3.0)	16(4.0)	1	
Average monthly income in ETB	Total	256 (64.3)	142 (35.7)	398 (100)		
	Day time shift	199 (50.0)	63 (15.8)	262 (65.8)	1	
	Night time shift	6(1.5)	16 (4.0)	22 (5.5)	8.423 (3.161-22.446)	0.00*
Age	Irregular	51 (12.8)	63 (15.8)	114 (28.6)	3.902 (2.450-6.214)	0.00*
	Total	256 (64.3)	142 (35.7)	398 (100)		
	<2000ETB	65 (16.3)	21 (5.3)	86 (21.6)	0.510 (0.297-0.877)	0.015*
BMI (kilogram/ m <sup>2</sup> )	>2000ETB	191 (48.0)	121 (30.4)	312 (78.4)	1	
	Total	256 (64.3)	142 (35.7)	398 (100)		
	<35 years	199 (50.0)	85 (21.4)	284 (71.4)	1	
BMI (kilogram/ m <sup>2</sup> )	35-49 years	52 (13.1)	40 (10.1)	92 (23.2)	1.801 (1.110-2.923)	0.017
	>50 years	5 (1.3)	17 (4.3)	22 (5.5)	7.960 (2.845-22.273)	0.00*
	Total	256 (64.3)	142 (35.7)	398 (100)		
BMI (kilogram/ m <sup>2</sup> )	Under weight (<18.5)	6 (1.5)	4 (1.0)	10 (2.5)	0.944 (0.246-3.589)	0.933
	Normal (18.5 -24.9)	199 (50.0)	102 (25.6)	301 (75.6)	0.726 (0.445-1.184)	0.199
	Over weight (>25)	51 (12.8)	36 (9.0)	87 (21.8)	1	0.422

\*  $P\text{-value} \leq 0.05$ , NA refers to seat belt is not applicable for three wheel vehicle  $m^2$  metere square, N number, BMI body mass index, and ETB Ethiopian birr.

## 5.6 Association between Road Traffic Accident and Visual Status of Respondents

To see the association between RTA and visual status variables, binary logistic regression was done by taking each variable at a time. P-value of  $< 0.25\%$  was used as a cut point for candidate variable selection for multivariate analysis. Accordingly, six variables (V/A of right eye, V/A of left eye, depth perception, visual field, color vision and light adaptation) were fulfilled the criterion. COR with 95% C.I. and p-value of the binary logistic regression outcome is described in table 6 below.

Table 6: Bivariate analysis of visual status and road traffic accident history of respondents, in Jimma Zone, South West Ethiopia, April 25-June 25, 2019 G.C. (N=398)

Variables	Categories	Self-reported road traffic accident			COR(95% CI)	P-value
		No N (%)	Yes N (%)	Total N (%)		
Visual acuity (right eye)	Normal	255 (64.1)	137 (34.4)	392	1	0.043*
	VI	1 (0.3)	5 (1.3)	6	9.307 (1.076-80.461)	
Visual acuity (left eye)	Normal	252 (63.3)	139 (35.0)	391 (98.3)	1	0.220
	VI	4 (1.0)	3 (0.7)	7 (1.7)	2.229 (0.607-8.704)	
Visual acuity (both eyes)	Normal	255 (64.1)	139 (34.0)	394 (99.0)	1	
	VI	1 (0.3)	3 (0.8)	4 (1.0)		
Are eye glass worn?	Yes	11 (2.8)	8 (2.0)	19 (4.8)	1.33 (0.552-3.386)	0.550
	No	245 (61.6)	134 (33.4)	379 (95.2)	1	
Light adaptation	Normal	253 (63.6)	132 (33.2)	385 (96.7)	1	0.005*
	Abnormal	3 (0.8)	10 (2.5)	13 (3.3)	6.389 (1.729-23.613)	
Visual field	Normal	254 (63.8)	133 (33.4)	387 (97.2)	1	0.006*
	Abnormal	2 (0.5)	9 (2.3)	11 (2.8)	8.594 (1.831-40.348)	
Color vision	Normal	252 (63.3)	130 (32.7)	382 (96.0)	1	0.003*
	Abnormal	4 (1.0)	12 (3.0)	16 (4.0)	5.815 (1.839-18.388)	
Stereopsis(Lang stereo-acuity test)	Normal	248 (62.3)	118 (29.6)	366 (92.0)	1	0.460
	Subnormal	2 (0.5)	2 (0.5)	4 (1.0)	2.102 (0.292-15.103)	
	Abnormal	6 (1.5)	22 (5.5)	28 (7.0)	7.706 (3.044-19.510)	

\*  $P\text{-value} \leq 0.05$ , N number

### 5.7 Association between Substance Use Disorders and RTA among Respondents.

To see the association between RTA and substance use disorders binary logistic regression was done by taking each variable at a time. P-value of <0.25% was used as a cut off point for candidate variable selection for multivariate analysis. Accordingly, all of them fulfilled the criterion. COR with 95% C.I. and p-value of the binary logistic regression outcome is described in table 7 below.

Table 7: Bivariate analysis of substance use disorders and road traffic accident among respondents in Jimma Zone, South West Ethiopia, April 25-June 25, 2019 G.C. (N=398)

Variables	Categories	Self-reported road traffic accident			COR (95% CI)	P- value
		No N (%)	Yes N (%)	Total N (%)		
Alcohol use disorder	No/mild	236 (59.3)	107(26.9)	343 (86.2)	1	
	Moderate	19 (4.8)	26 (6.5)	45 (11.5)	2.39 5 (1.201-4.773)	0.013*
	Severe	1 (0.3)	9 (2.3)	10 (2.5)	15.750 (1.936-128.129)	0.010*
Tobacco use disorder	No/mild	230(57.8)	111(27.9)	341(85.7)	1	
	Moderate	21 (5.3)	23 (5.8)	44(11.1)	1.842 (0.901-3.767)	0.094
	Severe	5(1.3)	8(2.0)	13(3.3)	0.949 (0.154-5.857)	0.955
Cannabis use disorder	No/mild	246 (61.8)	124(31.2)	370 (93.0)	1	
	Moderate	5 (1.3)	8 (2.0)	13(3.3)	2.771 (0.803-9.567)	0.107
	Severe	5 (1.3)	10 (2.5)	15 (3.8)	2.310 (0.534-9.984)	0.162
Khat use disorder	No/mild	165(41.5)	71(17.8)	236(59.3)	1	
	Moderate	87 (21.9)	58(14.6)	145(36.4)	0.771 (0.294-1.718)	0.449
	Severe	4 (1.0%)	13 (3.3)	17 (4.3)	5.091 (1.146-22.620)	0.032*

\*  $P\text{-value} \leq 0.05$ ,  $N$  number

Logistic regression model was applied to identify the influencing factors by putting visual factors, substance use disorders and some selected background variables together in order to control the confounding effect of other variables in determining association between visual functions and

substance use disorders and, road traffic accident. In the bivariate analysis, the candidate variables having p-value < 0.25 were selected for the final model. Accordingly eighteen variables (age of drivers, marital status, educational status, BMI, driving experience, average monthly income, work schedule, seatbelt use status, VI of Right eye, VI of left eye, light adaptation, color vision, depth perception, visual field, khat use disorder, alcohol use disorder cannabis use disorder and tobacco use disorder) were identified as the expected associated factors for the occurrence of RTA. Further, multivariate analysis (binary logistic regression with back ward LR method) was used to identify the main predictor variables by controlling the confounders. Finally six variables (night time driving, age of driver's, abnormal color vision, stereopsis abnormality, moderate alcohol use disorder, severe khat use disorder and marital status) with p-value less than 0.05 fitted the final model and were identified as the associated factors with the occurrence of RTAs which is described in table 8 in detail.

By making all other variables constant; the likelihood of occurrence of RTA among drivers was 5.87 times among night time shift workers than day time shift workers, 3.89 times among drivers of age > 50 years than those < 35 years age and 1.54 times among drivers who were not in union than who were married. Among substance use disorders, severe khat use disorder was strongly associated with high odds ratio. The likelihood of occurrence of RTA was 11.44 and 2.5 times among drivers who had severe khat use disorder and moderate alcohol use disorder compared to those who didn't have the disorders.

Table 8: Multivariate logistic regression analysis of RTA and determinant factors among repondents in Jimma Zone, South West Ethiopia, from April 25 to June 25, 2019 G.C. (N=398)

Variables	Categories	Self-reported road traffic accident		AOR(95% CI)	P- value
		No N (%)	Yes N (%)		
Marital status	Married	177(44.5)	81(20.4)	1	
	Currently not in union	79(19.8)	61(15.3)	1.536(1.01-2.33)*	0.029*
Educational Status	Elementary	147(36.9)	71(17.8)	0.82 (0.49-1.37)	0.419
	High school	97(24.4%)	57(14.3)	2.11 (0.78-5.71)	0.219
	Above	12(3.0%)	14(3.5)	1	
income in ETB	<2000ETB	65(16.3)	21(5.3)	0.78 (0.40-1.44)	0.533
	>2000ETB			1	
Seatbelt use status	Always (100%)	191(48.0)	121(30.4)	1	
	Most of the time (75-95%)	50(12.6)	23(5.8)	1	
	More than 50%	67(15.3)	29(6.5)	0.666 (0.32-1.40)	0.151
	Less than 50%	61(16.8)	26(7.3)	0.67 (0.32-1.44)	0.176
	Seldom (less than 25%)	25(6.3)	31(7.8)	2.05 (0.92-4.60)	0.105
	Never	5(1.3)	11(2.8)	3.13 (0.87-11.28)	0.102
Driving experience	NA	6(1.5)	3(0.8)	1.23 (0.26-5.74)	0.776
	< 5 years	42 (10.6%)	19 (4.8)	1.08 (0.48-2.41)	
	5-10 years	155(38.9)	64 (16.1)	1.18 (0.65-2.14)	0.338
	11-15 years	68(17.1)	44(11.1)	1.41 (0.54-3.64)	0.483
	16-20 years	19(4.8)	16(4.1)	0.34 (0.07-1.59)	0.738
	>20 years	10(2.5)	6(1.5)	1.49 (0.30-7.34)	0.10
Work schedule	Day time shift	4(1.0)	12(3.0)	1	
	Night time shift	199(50.0)	63(15.8)	1	
	Irregular	6(1.5)	16(4.0)	5.87(1.76-19.62)	0.004*
Age	<35 years	51(12.8)	63(15.8)	2.97 (1.72-5.12)	<0.001*
	35-49 years	199(50.0)	85(21.4)	1	
	>50 years	52(13.1)	40(10.1)	1.66 (0.87-3.18)	0.124
BMI (Kg/m <sup>2</sup> )	Underweight (<18.5)	5(1.3)	17(4.3)	3.89 (1.02-14.80)	0.046*
	Normal(18.5-24.9)	6(1.5)	4(1.0)	2.69 (0.61-11.99)	0.606
	Over weight (>25)	199(50.0)	102(25.6)	1.061 (0.58-1.93)	0.623
Visual acuity (right eye)	Normal	51(12.8)	36(9.0)	1	
	VI	255 (64.1)	137 (34.4)	1	
Visual acuity (left eye)	Normal	1 (0.3)	5 (1.3)	1.90 (0.05-73.00)	0.713
	VI	252 (63.3)	139 (35.0)	1	
Light adaptation	Normal	4 (1.0)	3 (0.7)	0.68 (0.07-6.46)	0.840
	Abnormal	253 (63.6)	132 (33.2)	1	
Visual field	Normal	3 (0.8)	10 (2.5)	0.38 (0.04-3.98)	0.46
	Abnormal	254 (63.8)	133 (33.4)	1	
Color vision	Normal	2 (0.5)	9 (2.3)	1.764 (0.134-23.183)	0.714
	Abnormal	252 (63.3)	130 (32.7)	1	
Stereopsis(Lang stereo-acuity test)	Normal	4 (1.0)	12 (3.0)	4.42 (1.25-15.68)	0.035
	Subnormal	248 (62.3)	118 (29.6)	1	
	Abnormal	2 (0.5)	2 (0.5)	1.41(0.14-14.20)	0.769
Alcohol use disorder	No/mild	6 (1.5)	22 (5.5)	5.81(1.80-18.72)**	0.003*
	Moderate	236 (59.3)	107(26.9)	1	
	Severe	19 (4.8)	26 (6.5)	2.48 (1.09-5.63)	0.030*
Tobacco use disorder	No/mild	1 (0.3)	9 (2.3)	8.36 (0.750-93.32)	0.084
	Moderate	230(57.8)	111(27.9)	1	
	Severe	21 (5.3)	23 (5.8)	1.07 (0.44-2.63)	0.884
Cannabis use disorder	No/mild	5(1.3)	8(2.0)	1.29 (0.25-6.62)	0.755
	Moderate	246 (61.8)	124(31.2)	1	
	Severe	5 (1.3)	8 (2.0)	1.45 (0.32-6.57)	0.633
Khat use disorder	No/mild	5 (1.3)	10 (2.5)	1.49 (0.36-6.21)	0.581
	Moderate	165(41.5)	71(17.8)	1	
	Severe	87 (21.9)	58(14.6)	1.20 (0.69-2.10)	0.515
		4 (1.0%)	13 (3.3)	11.44 (2.87-45.67)	0.001*

*\*stastically, AOR adjusted odds ratio, COR crude odds ratios, ETB Ethiopian Birr (currency), N number; BMI Body Mass Index, Kg/m<sup>2</sup> kilogram per mtere square and NA Not Aplicable.*

## **6. Discussion**

In the present study the prevalence of self-reported RTA for the last one year was 35.7 % (95% CI =31.02%-40.38%). The finding of the present study was lower than similar study done in Enugu, Nigeria, 43.6% (55). Enugu is a bigger and more industrialized city than our study area. People in such big cities tend to be in a hurry in pursuit of their economic activities and this may predispose to increase in the occurrence of RTA. The prevalence of RTA found amongst government drivers in Ibadan, Nigeria by Nwosu (56) was 3.5%. This is lower than the prevalence in the present study because government drivers are possibly more careful because many government agencies often give incentives for accident free driving, and also it is assumed that they spend lesser hours on the roads than the commercial drivers (56). The finding of the present study was lower than previous reports from Arbaminch, Ethiopia (2 studies), 47% (57), and 62% (34). These variations could be due to differences in sample size, methods of data collections, and reference time frame. Besides, data for the Arbaminch work were gathered from the road traffic accident (RTA) trauma victims presented to the city hospital. In a similar study done in Jimma in 2010 G.C. prevalence of self-reported road traffic accident was 15.6% for the last one year (35), which is lower than the prevalence in the present study. This difference might be due to the difference in study participant selection (our study was conducted among public transportation drivers only but the former study was conducted among government and commercial drivers) and commercial drivers are more risky than government drivers for the occurrence of RTA

In the present study study a mean age of the drivers was 32.11 years (SD±9.133). In the present study the occurrence of RTA was 7 times (AOR =3.89, CI=1.02-14.80, p-value =0.046) higher among drivers of age group greater than 50 years compared to those drivers whose age was < 35 years. Our finding is in contradiction with the studies done in Nigeria and Jimma where road crash prevalence was higher among older drivers (35,58). This shows that older age had effect on rates of RTA occurrence that might be related to increasing visual impairment in old age, since 95% of the sensory requirement for driving is visual (59,60). Moreover, there is universal agreement among researchers that vision plays a significant role in driving performance, and that there are age-related visual changes (60). In contradiction to this; association of highest RTA with younger



age group was reported from other Nigerian study (18). But the causes in those high risk groups are different ,alcohol and high speed are for young aged driver but visual impairment and other medical conditions for older ones (4). In the present study there was statistically significant association between age of drivers and self-reported RTA (AOR =7.0, CI=2.273-21.604, p-value <0.01). The finding of the present study is in agreement with the study done in Ghana (43). But in contradiction to our finding, in other studies conducted in Nigeria there was no statistically significant association between age of drivers and RTA (45,46).

The present study also showed that RTA was significantly associated with marital status of the drivers. As the logistic regression analysis showed the risk of accident involvement was higher among drivers who were not union than who were married (AOR=1.536, CI=1.013-2.329, p-value= 0.043). This is in agreement to the finding from the previous study in Jimma Town (35). This variation by marital status may be explained partly by the fact that drivers who are married would take a greater care while driving as they have family responsibility (35).

The results of the present study showed 262 (65.8%), 22 (5.5%) and 114 (28.6%) worked at day time, night time shift and at irregular shift (some night and day time shift) respectively. There was statistically significant association between night driving and occurrence of self-reported road traffic accident (AOR=5.872 95%CI=1.757-19.621, p-value<0.01). The finding of the current study is in agreement with other studies conducted in Sweeden (49), USA (texas) (61) and United Kingdom (UK) (62).

In the present study among 398 respondents, seventeen (4.2%), ten (2.5%), thirteen (3.3%) and fifteen (3.8%) of the respondents had severe khat, alcohol, cannabis and tobacco use disorder. respectively. This high prevalence of khat use disorder might be due to the nature of the study area where cultivation of khat is high. There was statistically significant association between sever khat use disorder and history of RTA (AOR=11.44, 95% CI=2.87-3.45.67, p-value<0.01). In contrast to the present study in most studies alcohol (37,38) and cigarette were frequently used by drivers, even though the association with RTA was higher among alcohol users (39).

The findings of the present study is also in line with the findings of a cross sectional study done in Mekele, Ethiopia in 2015, where, history of alcohol use were associated with higher odds of (AOR = 1.51, 1.00–2.28) RTA (31). Similarly in a study done in Arbaminch City drivers who drive after

having alcohol are expected to have 1.845 more accident than those who do not have alcohol use (34). In Jimma, 23.1% of study participants drank alcohol while driving were involved in RTA (35).

The present study revealed that the prevalence of binocular visual impairment was 1.3% but 1.5% and 2.3% in right eye and left eye respectively. National survey conducted on low vision and blindness in Ethiopia in 2005-2006 showed a 3.7% low vision prevalence (63) with considerable regional variations; 3.8% and 2.6% respectively in rural and urban population. The difference here might be due to the fact that the present study was conducted on drivers who are expected to have good vision to obtain their driving license. The other difference may be due to difference in age composition as 10.6% of participants in the national study (63) were older people (50 years and above) as compared to 5.5% in the present study. In the present study no driver had monocular blindness or severe visual impairment. The finding of the current study is in agreement with the previous study conducted in Jimma (35) but it is disagreement with Nigerian study where the prevalence of monocular blindness was 3.3% (64). The difference might be due to variation in the age composition as 16.3% of participants in the Nigerian study (64) were older people compared to 5.5% in this study. The minimum VA requirement to meet driving licenses in Ethiopia is 6/12.5 (35). When binocular presenting VA of 6/12 is used as a cut-off value; 3.2% of the drivers had vision less than the required standards. Our finding is lower than the study done in Brisbane drivers, Australia where nearly 6% of the survey group had VA worse than 6/12 (65). The finding of the present study is also lower than previous study done in Jimma Town (35). The Nigerian study also showed that a significant number of drivers on the roads operate motor vehicle with vision below the legal requirement of the country (64). This difference may be due to the presence of higher proportion (100%) of drivers tested for vision during licensing in our study. The present study showed no statistically significant association between binocular VI and history of self-reported RTA and this is in agreement with the findings of cross-sectional study done in Nigeria, central regions of Ghana and Cape Coast (19,42–44). But it is in contradiction with other studies (12,35,58,66). In the present study, there were only sixteen (4.0%) drivers who had color vision abnormality. This finding is lower than reports from Nigeria and Niger where the prevalence of color blindness was 4.3% and 6.1% respectively (67,68). But higher than the study done in Jimma 2010 (35). Color vision is significantly associated with RTA in the present study which is in agreement with the study done in Ghana (19). But our finding is in contrast to other studies

(35,59,64,69). In our study abnormal stereopsis was found in 7% of all the drivers. There was statistically significant association between abnormal stereopsis and the occurrence of RTAs, which is in contradiction with other studies conducted in Nigeria (64), as well as Ovenseri Ogbomo and Adofon (42) in Cape Coast, Ghana.

### **Limitation of the study**

Second prevalence of RTA was assessed using self-reported manner and this could affect prevalence of RTA due to recall bias of drivers, and died. And also a social desirability bias might also occur because people usually tend to over-report the interests of investigators.

Though the causes of RTA are multi factorial, only some factors were included in the present study.

Use of Ishara pseudo-isochromatic plate for color vision assessment which could only detect congenital color defect as other tests such as Fans-wort Munsell 100 Hue test which could detect acquired color vision defect were not available at the time of this study.

## **7. Conclusions and Recommendations**

### **7.1 Conclusions**

In this study, prevalence of self-reported road traffic accident was 35.7%. In conclusion, the present study revealed that there were significant associations between RTA and, severe khat use disorder, moderate alcohol use disorder, stereopsis abnormality, driving at night, color vision and marital status of drivers. There was also statistically significant association between age of drivers and occurrence of road traffic accident.

### **7.2 Recommendation**

Because our results indicate that there was risk of occurrence of RTA among drivers of age greater than fifty years, we suggest eye examination in drivers whose age is greater than fifty years.

The present study found that night shift workers were at high risk of involving in RTA, hence we advise awareness creation about the association of RTA and night time driving for drivers.

We recommend transport authority officials to use efforts to tackle the use of substances among drivers.

We also recommend researchers to conduct research using stronger study designs.

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## **Annexes**

### **Annex I Consent form**

#### **A English version**

My name is \_\_\_\_\_, I am Optometrist/Psychiatric Nurse working in JMC and now I am collecting data for the research being conducted to assess magnitude of visual impairment and substance use disorders, and their association with Road traffic accidents among drivers of public transportation in Jimma Zone, by Wondwosen Debebe who is the student of Masters in medical physiology in Jimma University. You are selected as one of study subject by chance.

The investigator employed me for this data collection to maintain your data strictly confidential, we believe that the findings of this study will have some evidence and information for governmental and non -governmental organizations

Study will be conducted through Questioners and visual examination and it will not cause any harm. Your name and other personal identifiers will not be recorded on data collection form and the information that you give us will be kept confidential and will also be used for this study purpose only. You have full right not to participate for this study.

If you have any questions about this study you may ask me or the principal investigator Wondwosen Debebe Tel: 0921535771

Are you willing to participate for this study?

1. Yes
2. No (End the interview)

Signature of the interviewer which shows that the respondent has consented (verbally) to take part in the study \_\_\_\_\_

## **B. Consent form (Affan Oromo version)**

Maqaan kiyya -----jedhama. Hospitaala yuuniversity jimmaatti, ogeessa ijaa/ogeessa sammuu ta'een tajaajilaa jira. Yeroo ammaa kana qorannoo midhaan araada adda addaa fayyadamun dhufanu fi rakkoolen ijaa konkolaachistoota irratti argaman hangam balaa konkolaata walin walqabatu kan jedhu irratti barataa mastersi yunivarsiti jimmaa kan ta'e wondwossed debbabatin gaggeefamuf odeeffanno barbaachisu sassaaban jira. Isinis qorannoo kana gaggeessuf filatamtanittu.

Gageessan qorannoo kanaa odeeffanno keennitan kana iccitin akka eegamuf na qacareera. Bu'aan qorannoo kanaas dhaabbilee motummaa fi mitmotummaa ta'anif ragaa fi odeeffanno ni laata jenne abdanna.

Qorannon Kun Kan gaggeefamu gaaffi fi deebifi qorannoo ijaa midhaa hin geessisne fayyadamudhani. Odeeffannoo kana irratti maqaan keessani fi waa'en dhunfaa keessani kan hin caqasamne, iccitin odeeffannoo kana gutumatti kan eegamu fi odeeffannoon kun qorannoo kanaaf fayyadamuf kan oolu qofa ta'uu isaa isin hubachisna. Qorannoo kana keessatti hirmaachu dhisuf mirga guutu qabdu,

Qorannoo kana irratti gaaffi yoo qabaattan ana yookan gageessaa qorannoo kana gaafachu ni dandeessu.

Lakk bilbilaa; 0921535771

qorannoo kana keessatti hirmaachuf fedhi qabda?

1. eyyee
2. Lakki (xumura gaaffi fi deebi)

Mallattoo nama odeeffannoo kana sassaabu hirmaattonni feedhi isaanitin kan hirmaatan ta'uu agarsisuf-----

**C. Consent form (Amharic version)**

ስሜ \_\_\_\_\_ ይባላል። በጅም ህክምና ማዕከል እየሰራሁ የምገኝ ስሆን በጅም ዩኒቨርሲቲ የሜድሳል ፊዚዮሎጂ የማሳተርስ ተማሪ የሆኑት ወንድስን ደበበ በጅም ዞን ፕብሊክ ትራንስፖርት አገልግሎት እየሰጡ ባሉ አሽከርካሪዎች የአይን እና የ ዕፅ መጠቀም ችግር እና ከትራፊክ አደጋ ጋር ያላቸው ግንኙነት በሚል ርእስ ላይ ለሚሰሩት ጥናትና ምርምር መረጃ ሰብሳቢ ነኝ። እርስዎ በእጣ አማካኝነት የዚህ ጥናት አካል ተደርገው ተመርጠዋል።

አጥኚው ይህንን መረጃ ለመሰበሰብና የሚሰበሰበውን መረጃ ሚስጠራዊነት ለመጠበቅ ኃላፊነቱን የሰጠኝ ሲሆን ከጥናቱ የተገኘው ውጤት ለመንግስታዊና መንግስታዊ ላይሆኑ ድርጅቶች በመረጃነት ያገለግላል። ጥናቱ የሚከናወነው በቃለ መጠይቅና በምርመራ ሲሆን በእርስዎ ላይ ምንም ዓይነት ጉዳት አያስከትልም። የእርስዎ ስምና ግላዊ የሆኑ መረጃዎች በመረጃ ስብሰባው ወቅት አይዘገቡም። የተሰበሰቡት መረጃዎች የሚዉሉት ለጥናቱ አገልግሎት ብቻ ነው። በጥናቱ ለመሳተፍ ካልፈለጉ ያለመሳተፍ ሙሉ መብት አለዎት። በጥናቱ ላይ ምንም አይነት ጥያቄ ቢኖረዎት እኔን (መረጃ ሰብሳቢውን) ወይም ዋና አጥኚ የሆኑትን ወንድወሰን ደበበን መጠየቅ ይችላሉ። (ስልክ ቁጥር: 0921535771)

በጥናቱ ላይ ተሳታፊ ለመሆን ፈቃደኛ ነዎት?

- 1. አዎ
- 2. አይደለሁም (ካሉ መጠይቁ ይቋረጥ)

ቃለ መጠይቁን ያደረገውና በጥናቱ ላይ ፈቃደኛ መሆኑን በቃል ያረጋገጠው አካል ስምና ፊርማ

\_\_\_\_\_

## Annex II Questioner

### A Questioner (English Version)

1	Socio-demographic and economic characteristics of drivers	
101	Age	
102	Sex	1. Male 2. Female
103	Work xperience/driving experience	
104	Average monthly Income in ETB	
105	How much education have you had?	1. Less than 12 years. 2. Some college 3. College graduate. 4. High school graduate 5. Post graduate degree
106	What is your marital status?	1. Married 2. Single 3. widowed 4. Divorced
107	What is your height?	_____meters
108	What is your weight?	_____K.Gs
109	BMI	
2	Self –reported road traffic accident and near-misses history	
201	Please select that which is closest to describing your work schedule.	1. I always work a daytime shift. 2. I always work an evening shift 3. I always work a nighttime shift 4. My shift is irregular but it 5. includes some night time or evening work
202	Have you faced road traffic accident in the last one year?	1. yes 2. no
203	If yes when? And how many?	
204	Have you experienced a near miss accident due to driving?	1. No 2. Once 3. 2-3 times four or more times
205	Do you wear seat belts when you drive?	1. Always (100% of the time) 2. Most of the time (75-95% of the time) 3. More than 50% of the time 4. Less than 50% of the time 5. Seldom (less than 25% of the time) 6. Never

3. Vision:

A. visual examination

301	Visual acuity	
	Right eye	Uncorrected_____
	Left eye	Uncorrected_____
	Are eye glasses worn?	1. Yes 2. No
302	Visual adaptation test (dlight adaptation)	
303	Visual fields (Confrontation to each eye)	
304	Color vision test (Ishara's)	
305	Contrast sensitivity	
306	Stereopsis (Lang Stereo acuity test)	
307	Do you have eye test during licensing?	

B. Visual Activities Questionnaire (VAQ)

301b	I have problems adjusting to bright room lighting, after the room lighting has been rather dim.	1. Never 2. Rarely 3. Sometimes 4. Often 5. Always
302b	It takes me a long time to adjust to darkness after being in bright light.	1. Never 2. Rarely 3. Sometimes 4. Often 5. Always
303b	Sometimes when I reach for an object, I find that it is further away (or closer) than I thought.	1. Never 2. Rarely 3. Sometimes 4. Often 5. Always
304b	I have trouble adjusting from bright to dim lighting, such as when going from daylight into a dark movie theater.6 of 14.	1. Never 2. Rarely 3. Sometimes 4. Often 5. Always

4 Substance use disorders (ASSIST)

401	In your life, which of the following substances have you ever used? (non-medical only)	yes	no
	Tobacco product (cigarettes, chewing tobacco, cigars,		
	Alcoholic beverages (beer, wine, spirits, etc.)		
	Cannabis (marijuana, pot, grass, hash, etc.)		
	Khat		
	Other (specify		
	If "No" to all items, stop interview		

402	In the past three months how often do you use the substances you mentioned? (first drug ,second drug etc.)	Never=0	Daily or twice=2	Monthly=3	Weekly=4	Daily or almost daily=5
	Tobacco products					
	Alcoholic beverages (beer, wine, ,					
	Cannabis (marijuana, pot, grass, hash, etc.)					
	Khat					
	Other (specify)_____					
	if "Never" to all items in Question 402, skip to Question 4066. If any substances in Question 402 were used in the previous three months, continue Questions 403, 404 &405 each substance each substance used.					

403	During the past three months past how often have you had a strong desire or urge to use had a strong	Never=0	Daily or twice=3	Monthly=4	Weekly=5	Dail or almost daily=6
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	desire or urge to use (FIRST DRUG, SECOND DRUG, etc.)					
	Tobacco products					
	Alcoholic beverages(beer,wine,					
	Cannabis (marijuana, pot, grass, hash,					
	Khat					
	Other (specify)					

404	During the past three months, how often has your use of (FIRST DRUG, SECOND DRUG, ETC) led to health, social, legal or financial problems?	never =0	once or twice =4	monthly =5	weekly =6	Daily or almost daily =7
	Tobacco products					
	Alcoholic beverages (beer, wine, spirits, etc.)					
	Other (specify)					

405	During the past three months how often have you failed to do what was normally expected to do because of your use of (FIRST DRUG, SECOND DRUG, etc.)	never =0	Ones or twice =5	monthly =6	weekly =7	Daily or almost daily =8
	Tobacco products					
	Alcoholic beverages (beer, wine, spirits, etc.)					
	Cannabis (marijuana, pot, grass, hash, etc.)					
	Khat					
	Other (specify)_____					

406	Has a friend or relative or anyone else ever expressed concern about your use of (FIRST DRUG, SECOND DRUG, etc.)	No never =0	Yes, in the past three months =6	Yes but not in the past three months =3
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	Tobacco products			
	Alcoholic beverages (beer, wine, spirits, etc.)			
	Cannabis (marijuana, pot, grass, hash, etc.) <sup>46</sup>			
	Khat			
	Other (specify) _____			

407	Have you ever tried and failed to control, cut down or stop using (FIRST DRUG, SECOND DRUG, etc.)	No never =0	Yes, in the past three months =6	Yes but not in the past three months =3
	Tobacco products			
	Alcoholic beverages (beer, wine, spirits, etc.)			
	Cannabis (marijuana, pot, grass, hash, etc.)			
	Khat			
	Other (specify) _____			

408	Have you ever used drug by injection in the past three months?	No, never	Yes, in the past three months	Yes but not in the past three months
		0	2	1

THANK YOU FOR YOUR PARTICIPATION.

## B Questioner (Affan Oromo version)

1	Socio Demographic characteristics of drivers	
101	Umrii	___waggaa-----
102	Saala	1. dhiira 2. Dubara
103	Muxannoo hooji	
104	Galii ji'aa	Qarshi-----
105	Sadarkaa barnotaa	1. kutaa 12 gadi. 2. Kolleeji 3. kolleeji irra kan eebbifame/te 4. Sadarkaa 2ffaa kan xumure/te 5. digrii 2ffaa fi isaa ol
106	gaa'ila	1. kan fuudhe/heerumte 2. Kan hin fuune/heerumne 3. kan gargar ba'ee/baate
107	dheerina	Metira-----
108	Ulfaatina	kilograama-----
109	BMI	
2	Balaa tiraafikaa kanaan dura mudatee ykn mudachuuf ture	
201	Filannoo kenname kessaa sagantaa hojii kee kan ibsu ykn kan itti dhiyaatu filadhu	1. yeroo hunda sagantaa guyyaa ti 2. yeroo hunda sagantaa galgalaa ti 3. yeroo hunda sagantaa halkani ti 4. sagantaa murtaa'e hin qabu garu yeroo tokko tokko galgalas halkanis nan hojjadha
202	balaan tiraafikaa waggaa darbe kessatti si mudate beekaa?	1. eeyye 2. lakki
203	yoo deebin kee 'eeyye' ta'e, yoomi fi eessatti si mudate?	
204	Balaa tiraafikaa si qunnamuf turee irraa oolte jira?	1. lakki 2. Yeroo tokko 3. yeroo 2-3 4. Yeroo 4 fi isaa ol
205	Yeroo konkolaachistu saqqii taa'umsa ni fayyadamta?	1. Yeroo hunda(100%) 2. Yeroo baay'ee (75-95%) 3. Dibbantaa 50 ol 4. dhibbantaa 50 gadi 5. Yeroo muraasa qofa (<25%) 6. Tasa hin fayyadamu

B. Gaaffilee qorannoo ija

301b	Kutaan dukkana'aa turee gara ifatti yeroo jijjiramu ifa sana walin wal barun si rakkisa?	<ol style="list-style-type: none"> <li>6. Tasa na hin mudatu</li> <li>7. Yeroo muraasa na mudata</li> <li>8. yeroo tokko tokko</li> <li>9. yeroo baay'ee</li> <li>10. yeroo hunda</li> <li>11. halkan hin konkolaachisu</li> </ol>
302b	Ifa cimaa kessaa baatee dukkana yommu seentu dukkana sana walin wal baruf yeroo dheraa sitti fudhata?	<ol style="list-style-type: none"> <li>1. Tasa</li> <li>2. Yeroo muraasa</li> <li>3. Yeroo tokko tokko</li> <li>4. Yeroo baay'ee</li> <li>5. Yeroo hunda</li> </ol>
303b	Yeroo ifa guddaa kessaa gara ifa xiqqaatti (dimlaayiti) seentu ifa xiqqaa sana walin walbaruf si rakkisa?	<ol style="list-style-type: none"> <li>1. Tasa</li> <li>2. Yeroo muraasa</li> <li>3. Yeroo tokko tokko</li> <li>4. Yeroo baay'ee</li> <li>5. Yeroo hunda</li> </ol>
304b	Gamoo tokko keessatti yeroo dheraaf turte gara aadutti yoo baatu ifa aadu sana walin wal baruf yeroo dheraa sitti fudhata?	<ol style="list-style-type: none"> <li>1. Tasa</li> <li>2. Yeroo muraasa</li> <li>3. Yeroo tokko tokko</li> <li>4. Yeroo baay'ee</li> <li>5. Yeroo hunda</li> </ol>

Rakkoolee araada fayyadamu (ASSIST)

401	Jireenya kee keessatti kanneen armaan gadi keessaa araada isa kam fayyadamte beekta? (non-medical only)	eeyye	lakkii
	Tambooo xuuxu, sijaaraa		
	Alkoolii garagaraa (biraa, wayini, araqee fi kkf.)		
	Haashishi (kanneen akka mariyuunaa fi kkf.)		
	Caatii		
	Kan biro (caqasii)		
	Hundumtu 'lakki' yoo ta'e gaaffi fi deebiin asirratti dhaabbata		

4 0 2	Ji'oota sadan darban keessatti araada kana si'a meeqa fayyadamte?	Tasa hin fayyada mne=0	Guyyaa guyyaa dhan ykn guyyaatti si'a lama=2	Ji'a ji'aa n=3	Torbee torbeedha n=4	Guyyaa guyyaadhan jechun ni danda'ama=5
	Tamboo xuuxu, sijaaraa					
	Alkoolii garagaraa (biraa, wayini, araqee fi kkf.)					
	Haashishi (kanneen akka mariyuunaa fi kkf.)					
	Caatii					
	Kan biro (caqasii)					
	deebin gaaffii 402 hundi 'tasa hin fayyadamne yoo ta'e, gara gaaffii lakk.4066tti darbi. Gosa araada tokko illee yoo fayyadamte gara gaaffilee lakk. 403, 404 &405 itti fufi.					

403	Ji'oota sadan darban kana keessatti si'a meeqaaf fedhii cimaa araada kana fayyadamuf qabaatte beekta	Tasa fedhihin qabaanne =0	Guyyaa guyyaadhan ykn guyyaatti si'a lama=3	Ji'a ji'aan =4	Torbee torbee dhan =5	Guyyaa guyyaadhan jechun ni danda'ama=6
	Tamboo xuuxu, sijaaraa					
	Alkoolii garagaraa (biraa, wayini, araqee fi kkf.)					
	Caatii					
	Haashishi (kanneen akka mariyuunaa fi kkf.)					
	Kan biro (caqasii)					

4 0 4	Ji'oota sadan darban kana keessatti araada fayyadamun kee si'a meeqaaf fayyaa, hawaasummaa fi galii kee irrattii rakkoo geessise beeka?	Tasa rakko naratii hin geessisne=0	Guyyaa guyyaadhan ykn guyyaatti si'a lama=4	Ji'a ji'aan =5	Torbee torbee dhan =6	Guyyaa guyyaadhan jechun ni danda'ama =7
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	Tamboo xuuxu, sijaaraa					
	Alkoolii garagaraa (biraa, wayini, araqee fi kkf.)					
	Kan biro (caqasii)					

405	Ji'oota sadan darban kana keessatti sababa araada fayyadamteef hojii raawwachu qabdu irraa si'a mee qaf dubatti deebite ykn osoo hin raawwatin hafte beekta?	Tasa =0	Guyyaa guyyaadhan ykn guyyaatti si'a lama==5	Ji'a jii'aa n =6	Torbee torbeedhan =7	Guyyaa guyyaadhan jechun ni danda'ama =8
	Tamboo xuuxu, sijaaraa					
	Alkoolii garagaraa (biraa, wayini, araqee fi kkf.)					
	Haashishi (kanneen akka mariyuunaa fi kkf.)					
	Kan biro (caqasii)					

406	Hiriyaan ykn firri ykn namni biro waa'ee araada fayyadamu kee irratti yaada ykn gorsa sif kennani beeku?	Tasa hin beekanu =0	Eeyye jii'oota sadan darban keessa=6	Eeyye garuu jii'oota sadan darban keessatti miti=3
	Tamboo xuuxu, sijaaraa			
	Alkoolii garagaraa (biraa, wayini, araqee fi kkf.)			
	Haashishi (kanneen akka mariyuunaa fi kkf.)			
	Caatii			
	Kan biro (caqasii)			

407	Araada kana fayyadamu dhisudhaaf ykn addaan kutuf ykn to'achuf yaalte beekta?	Tasa yaalee hin beeku=0	Eeyye jii'oota sadan darban keessa=6	Eeyye garuu jii'oota sadan darban keessatti miti=3
	Tamboo xuuxu, sijaaraa			
	Alkoolii garagaraa (biraa, wayini, araqee fi kkf.)			

	Haashishi (kanneen akka mariyuunaa fi kkf.)			
	Caatii			
	Kan biro (caqasii)			

408	Ji'oota sadan darban kana keessatti araada gosa kamiyyu lilmodhan fudhatte (waraanamte) beekta?	Tasa fayyadame hin beeku=0	Eeyye ji'oota sadan darban keessa=2	Eeyye garuu ji'oota sadan darban keessatti miti=1

## Hirmaannaa keessanif galatooma

### C Questioner (Amharic version)

1	የአሽከርካሪው ማህበራዊና ኢኮኖሚያዊ ሁኔታ	
101	እድሜ	
102	ጾታ	1. ወንድ 2. ሴት
103	የስራ ልምድ/ በሹፍርና ያለዎት የስራ ልምድ/	
104	አማካኝ ወርሃዊ ገቢ (በኢትዮጵያ ብር)	
105	የትምህርት ደረጃ	1. ከ 12ኛ ክፍል በታች 2. የኮሌጅ ትምህርት የጀመረ 3. የኮሌጅ ምሩቅ 4. ሁለተኛ ደረጃ ትምህርት ቤት ያጠናቀቀ 5. ድህረ ምረቃ ትምህርት ያጠናቀቀ
106	የጋብቻ ሁኔታ	1. ያገባ 2. ያላገባ 3. የሞተባት/የሞተበት 4. የፈታ/የፈታች
107	ቁመት	-----ጫትር
108	ክብደት	ኪሎ ግራም
109	BMI	
110	መንጃ ፈቃዱን የተማሩበት ትምህርት ቤት	
2	አሽከርካሪው የሚያስታውሳቸው አደጋዎች	
201	እርስዎ የሚሰሩት በየትኛው ሰዓት ነው?	1. ሁል ጊዜ በቀኑ ፈረቃ እሰራለሁ::

	(የስራ ሰዓት)	2. ሁል ጊዜ በምሽት ፈረቃ እሰራለሁ። 3. ሁል ጊዜ በሌሊት እሰራለሁ 4. ወጥ የሆነ የስራ ሰዓት የለኝም 5. ውስን ሰዓት ካለዎት ያስቀምጡ
202	ባለፈው የአንድ ዓመት ጊዜ ውስጥ የትራፊክ አደጋ አጋጥሞዎት ያውቃል?	1. አዎ 2. አይደለም
203	መልስዎት አዎ ከሆነ መቼ እና ለምን ያህል ጊዜ?	
204	ባለፈው አንድ አመት ውስጥ በሚያሸከረክሩበት ጊዜ ለአደጋ ቅርብ የሆኑ አጋጣሚዎች ደርሶብዎት ያውቃሉ?	1. አያውቅም      2. አንድ ጊዜ 3. 2-3 ጊዜ      4. 4 ጊዜና በ ላይ
205	በሚያሸከረክሩበት ወቅት የአደጋ መከላከያ ቀበቶ ይለብሳሉ?	1. ሁል ጊዜ (100%) 2. አብዛኛውን ጊዜ (75-95%) 3. ከ50% በላይ 4. ከ50% በታች 5. አልፎ አልፎ (ከ25% በታች) 6. በጭራሽ አልጠቀምም

የእይታ ሁኔታ

301b	ደበዛዛ ብርሃን ካለበት ክፍል ውስጥ ቆይቼ ወደ ደማቅ ብርሃን አለበት ክፍል ስገባ ብርሃኑን መቆጣጠር ያቅተኛል።	በፍፁም አልፎ አልፎ አንዳንድ ጊዜ ብዙ ጊዜ ሁል ጊዜ
302b	ጨለማ ቦታ ከቆየሁ በኋላ ብርሃን ካለበት ቦታ ስሄድ ቶሎ ማየት አልችልም።	በፍፁም አልፎ አልፎ አንዳንድ ጊዜ ብዙ ጊዜ ሁል ጊዜ
303b	ቤት ውስጥ ቆይቼ ስወጣ የፀሃይ ብርሃን ለማየት/ ከፀይ ብርሃን ጋር ለመላመድ ረዘም ያለ ጊዜ ይወስድብኛል።	በፍፁም አልፎ አልፎ አንዳንድ ጊዜ ብዙ ጊዜ ሁል ጊዜ
304b	ከ ደማቅ ብርሃን ወደ ደበዛዛ ብርሃን ስሄድ (ለምሳሌ ከቀን ብርሃን ወደ ደበዛዛ የቲያትር ቤት) ስገባ ብርሃኑን የመቆጣጠር ችግር ይፈጠርብኛል።(6 ከ 14)	በፍፁም አልፎ አልፎ አንዳንድ ጊዜ ብዙ ጊዜ ሁል ጊዜ አላሸከረክርም

4 ዕዳችን ከመጠቀም አንፃር

401	በህይወት ዘመንዎት ከሚከተሉት የዕፅ አይነቶች የትኛዎቹን ተጠቅመው ያውቃሉ? (1ኛው ዕፅ ፣ ሁለተኛው ዕፅ ፣ ሶስተኛው ዕፅ ወ.ዘ.ተ.)	አ ዎ	ወስ ጄ አላ ው ቅም
	የትንባሆ ውጤቶች (ሲጋራ፣ ትንባኮ ማኘክ ፣		
	የአልኮል መጠጦች (ቢራ፣ ወይን፣ ስፕራይት ወ.ዘ.ተ.)		
	ካናቢስ (ማሪግራ፣ ፖት ግራስ፣ ወዘተ)		
	ጫት		
	ሌሎች ካሉ ይጠቀሱ		
	ዕዳችን ካልወሰዱ መጠይቁ ይቋረጥ		

402	ከላይ ከዘረዘርካቸው ዕዳች ካሉት 3 ወራት ውስጥ ለምን ያክል ጊዜ ወስደዋል? (1ኛው ዕፅ ፣ ሁለተኛው ዕፅ ፣ ሶስተኛው ዕፅ ወ.ዘ.ተ.)	በፍፁም =0	በየቀኑ ወይም በቀን ሁለት ጊዜ =2	በየወሩ =3	በየሳምንቱ =4	በየቀኑ =5
	የትንባኮ ውጤቶች (ሲጋራ፣ ትንባኮ ማኘክ፣ ሲጋር,					
	የአልኮል መጠጦች (ቢራ፣ ወይን፣ ወ.ዘ.ተ.)					
	ካናቢስ (ማሪግራ፣ ፖት ግራስ፣ ወዘተ)					
	ጫት					
	ሌሎች ካሉ ይጠቀሱ					
	I ለ ጥያቄ ቁጥር 402 መልሰዎት በፍፁም ወስጄ አላውቅም ከሆነ, ጥያቄ ቁጥር 4066ን ይዘለሉት. ከላይ ከዘረዘርካቸው ዕዳች ካሉት 3 ወራት ውስጥ ተጠቅመው ከሆነ ለጥያቄ ቁጥር 403፣ 404 እና 405 መልስ ይስጡ።					



403	ባለፉት 3 ወራት ውስጥ ከላይ የተዘረዘሩትን ዕቃዎችን ለመውሰድ ምን ያክል ፍላጎት ነበረዎት (1ኛው ዕዕ፣ ሁለተኛው ዕዕ፣ ሶስተኛው ዕዕ ወ.ዘ.ተ.)	በፍጹም =0	አንድ ወይም ሁለት ጊዜ =4	በየወሩ =5	በየሳምንቱ =6	በየቀኑ ወይም በየቀን በሚባል ሁኔታ 7
	የትንባሆ ውጤቶች (ሲጋራ፣ ትንባሆ ማኘክ፣)					
	የአልኮል መጠጦች (ቢራ፣ ወይን፣ ስፕሪት ወ.ዘ.ተ.)					
	ካናቢስ (ማሪግራ፣ ፖፕ ግራስ፣ ወዘተ)					
	ጫት					
	ሌሎች ካሉ ይጥቀሱ					

404	በተጠቀሟቸው ዕቃዎች ምክንያት ምን ያክል የጤና፣ ማህበራዊ ህጋዊ ወይም የገንዘብ ችግሮች አጋጠሙዎታል?(1ኛው ዕዕ ፣ ሁለተኛው ዕዕ ፣ ሶስተኛው ዕዕ ወ.ዘ.ተ.)	በፍጹም =0	አንድ ወይም ሁለት ጊዜ =4	በየወሩ =5	በየሳምንቱ =6	በየቀኑ ወይም በየቀን በሚባል ሁኔታ=7
	የትንባኮ ውጤቶች (ሲጋራ፣ የሚታኘክ ትንባኮ)					
	የአልኮል መጠጦች (ቢራ፣ ወይን፣ ስፕሪት ወ.ዘ.ተ.)					
	ጫት					
	ካናቢስ (ማሪግራ፣ ፖፕ ግራስ፣ ወዘተ)					

405	በተጠቀሟቸው ዕቃዎች ምክንያት መስራት እያለበዎት ምን ያክል ተግባራትን ሳያከናውኑ ቀርተዋል? (1ኛው ዕዕ ፣ ሁለተኛው ዕዕ ፣ ሶስተኛው ዕዕ ወ.ዘ.ተ.)	ምንም =0	አንድ ወይም ሁለት ጊዜ =5	በየወሩ =6	በየሳምንቱ =7	በየቀኑ ወይም በየቀን በሚባል ሁኔታ =8
	የትንባሆ ውጤቶች (ሲጋራ፣ ትንባሆ ማኘክ፣ ወ.ዘ.ተ.)					
	የአልኮል መጠጦች (ቢራ፣ ወይን፣ ስፕሪት ወ.ዘ.ተ.)					

	ጫት					
	ካናቢስ (ማሪዋና፣ ፖት ግራስ፣ ወዘተ)					

406	ዘመድ ወይም ጓደኛ ወይም ሌላ ሰው ስለሚጠቀሙት ዕፅ አነጋግረዎት ያውቃሉ? (1ኛው ዕፅ ፣ ሁለተኛው ዕፅ ፣ ሶስተኛው ዕፅ ወ.ዘ.ተ.)	በፍፁም =0	አዎ ላለፉት 3 ወራት ውስጥ =6	አዎ ግን ላለፉት 3 ወራት ውስጥ አይደለም =3
	የትንባህ ውጤቶች (ሲጋራ፣ ትንባህ ማኘክ)			
	የአልኮል መጠጦች (ቢራ፣ ወይን፣ ስፕሪይት ወ.ዘ.ተ.)			
	ጫት			
	ካናቢስ (ማሪዋና፣ ፖት ግራስ፣ ወዘተ)			

407	ዕፅ ላለመጠቀም ወስነው የወሰኑትን ውሳኔ ትተው ያውቃሉ? (1ኛው ዕፅ ፣ ሁለተኛው ዕፅ ፣ ሶስተኛው ዕፅ ወ.ዘ.ተ.)	በፍፁም =0	አዎ ላለፉት 3 ወራት ውስጥ =6	አዎ ግን ላለፉት 3 ወራት ውስጥ አይደለም =3
	የትንባህ ውጤቶች (ሲጋራ፣ ትንባህ ማኘክ፣			
	የአልኮል መጠጦች (ቢራ፣ ወይን፣ ስፕሪይት ወ.ዘ.ተ.)			
	ጫት			
	ካናቢስ (ማሪዋና፣ ፖት ግራስ፣ ወዘተ)			

408	ባለፉት ሶስት ወራት ውስጥ መድሃኒት በመርፌ ተሰጥተው ያውቃሉ	በፍፁም	አዎ ላለፉት 3 ወራት ውስጥ	አዎ ግን ላለፉት 3 ወራት ውስጥ አይደለም
		0	2	1

ስለተሳተፉ ክልብ እናመሰግናለን

## DECLARATION SHEET

I, the undersigned, declare that this thesis is my original work, has not been presented for a degree in this or any other university and all sources of material used for the thesis have been fully acknowledged

Wondwosen Debebe \_\_\_\_\_

Principal investigator                      Signature                      Date

Name of the Institution                      Jimma University

Date of submission \_\_\_\_\_

This thesis has been submitted upon my approval as university advisor

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Signature                      Date

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