FACTORS AFFECTING RISK BEHAVIORS ON ROAD TRAFFIC ACCIDENT AMONG DRIVERS OF MEKELE TOWN, TIGRAY, NORTHERN ETHIOPIA.

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A THESIS PAPER SUBMITTED TO THE DEPARTMENT OF HEALTH EDUCATION AND BEHAVIORAL SCIENCES, SCHOOL OF GRADUATE STUDIES, PUBLIC HEALTH AND MEDICAL SCIENCES COLLEGE, JIMMA UNIVERSITY; IN PARTIAL FULLFILMENT FOR THE REQUIREMENTS FOR DEGREE OF MASTERS OF PUBLIC HEALTH (MPH) IN HEALTH EDUCATION AND HEALTH PROMOTION

MAY 2011

JIMMA, ETHIOPIA

JIMMA UNIVERSITY COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES DEPARTMENT OF HEALTH EDUCATION AND BEHAVIORAL SCIENCE

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Abstract

Background:- Road traffic accident : is collisions between vehicles; between vehicles and pedestrians; between vehicles and animals; or between vehicles and fixed obstacle . Due to its perception as a disease of development, road traffic accidents – and related injuries -- tend to be under-recognized as major health problems in developing countries. However, over 90% of the world's fatalities on the roads occur in low-income and middle-income countries. 1.26 million and 20 and 50 million people globally are estimated to be disabled each year. 85% of the cause for road traffic accident is attributed to human risk behaviors.

Objective:- To identify factors affecting risk behaviors of driving among drivers in Mekelle town.

Methodology: - A cross- sectional study consisting 350 drivers was conducted using quantitative which was triangulated by qualitative study(FGDs and indepth interview). Interviewer administered questionnaire was used for the quantitative part, and analyzed by binary and multiple logistic regression using SPSS version 16. Association between independent and dependent variables was assessed using Chi-square tests. Regression Analysis was used to assess the predictor of several independent variables on risk behaviors. and findings were presented in text, table and graph form..

Result: Out of 351 study subjects planned to be included in the study, 350 responded giving a response rate of 99.7%. Of the total respondents 172 (49.2%), 75 (21.4%) and 103 (29.4%) were private car, taxi and bajaj drivers. The mean age of the respondents was 28.7 (SD±9.9). 233 (66.6%) of them were found to be risk groups where as 117 (33.4%) were not risk group. Drivers with with low attitude towards safety road were 13.7 times more likely risk as compare with those positive attitude. Drivers with with high monthly family income 9.2 times more likely risk than as comared to with those low income, Drivers with secondary educational status were more likely 9.2 times risk than the teritiary status. Drivers who didn't get advice from family, friends, passengers and owner of the vehicle were 2.9 times more likely risk as compare to with those who got advice.

Conclusion and Recommendation: Attitude, family monthly income, education and advice were found the independent predictors of risk behaviors of driving of the respondents.

Our study recommends that drivers should be equipped with comperhensive, complete and up to date education and information focused on target audience which can bring attitudinal change on avoiding risk behaviors related to road traffic accidents and enhancing method of prevention to ensure that the decision on road safety is a fully informed one.

Acknowledgement

First and foremost I would like to thank Almighty God for all that are Doing in my life.

I would like to give my heartfelt thanks to my respectful Advisors Mr. Eshetu Girma , Mr Lakew Abebe and Mr. Amiyu Godesso for their unreserved constructive comment and support throughout the preparation and finalizing of this thesis .

I would like to forward my sincerely and deeply felt to Ms Laura Sminkey Communication Officer, WHO Geneva, for her genuine advice and referring me to contact pertinent bodies who have ample experiences in the area of Road Traffic Accidents.

I would like to express my deepest thank to Mr. S. M. Sohel Mahmud Accident Research Institute , Bangladesh University of Engineering and Technology, Dhaka, for his genuine cooperation and advice by sending important points to give due attention and focus while developing questionnaire.

I am grateful to Jimma University for provision of this golden opportunity and sponsoring me to carry out this Master thesis.

I would like to express my thank to chief inspector police traffic Afera Berhe, head of the zonal office of traffic Mekelle town, Inspector police traffic Hailemariam, head of Mekelle town police traffic for their cooperation in giving me all the information and arranging and facilitating to carry out the indepth interview with the selected study subject in a very smooth way.

My sincere thank also goes to Mr. Tesfay Ebuy, head department for licensing and quality control of driving Mekelle zonal office of road, transport and industry for his genuine cooperation in giving me all the list and profile of house car, taxi and bajaj available in Mekelle.

I would like to thank all data collectors, supervisors, both quantitative and qualitative study subjects for their unlimited cooperation to meet my study its overall scope and goal.

Finally, I would like to express my appreciation to my advisers and colleagues of MPH students for their unlimited encouragement and psychological treatment while I was in mournfully and in

a deep sadness because of my mother's death at this critical juncture of developing the proposal and finalizing this thesis.

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Abbreviations

AIDS……Acquired Immuno Deficiency Syndrome

AOR…….Adjusted Odd Ratio

BAC……..Blood A lcohol Concentration

FGDs……Focus Group Discussions

HIV……..Human Immune Virus

MPH……Master of Public Health

RTA……Road Traffic Accident

WHO……World Health Organization

TB……Tuberculosis

USA……United States of America

Chapter One

1. Introduction

1.1 Background Information

Road traffic accident (RTA), here defined as “An accident that occurred on a way or street open to public traffic; resulted in one or more persons being killed or injured, and at least one moving vehicle was involved. Thus, RTA is collisions between vehicles; between vehicles and pedestrians; between vehicles and animals; or between vehicles and fixed obstacles”, are a major global public health challenge. This is the standard definition recommended by the Economic Commission for Europe and the World Health Organization (1).

The World report on road traffic accident prevention is the first major report being jointly issued by the WHO and the World Bank on this subject. It underscores their concern that unsafe road traffic systems are seriously harming global public health and development. It contends that the level of road traffic accident is unacceptable and that it is largely avoidable. This report has indicated that road traffic accidents are a major but neglected public health challenge that requires concerted efforts for effective and sustainable prevention. Of all the systems with which people have to deal every day, road traffic systems are the most complex and the most dangerous. Worldwide, an estimated 1.2 million people are killed in road crashes each year and as many as 50 million are injured. Projections indicate that these figures will increase by about 65% over the next 20 years unless there is new commitment to prevention. Nevertheless, the tragedy behind these figures attracts less mass media attention than other, less frequent types of tragedy (2).

More than a million people are killed on the world's roads each year. The total is expected to increase steeply as the number of motor vehicles increases rapidly in many formerly less-motorized countries, and will likely exceed 2 million by the year 2020. Traffic crashes are one of the world's largest public health problems. The problem is all the more acute because the victims

are overwhelmingly young and healthy prior to their crashes. More than 40,000 people are killed on the roads of the United States each year. In a typical

month more Americans die in traffic than were killed by the 11 September 2001 terrorist attacks on New York and Washington. The families of the traffic-crash victims receive no particular consideration or compensation from the nation or its major charitable organizations. Since the coming of the automobile in the early days of the twentieth century, more than three million Americans have been killed in traffic crashes, vastly more than the 650,000 American battle deaths in all wars, from the start of the revolutionary war in 1775 through the 2003 war in Iraq. When 14 teenagers died in the 1999 Columbine High School shootings, much of the population of the US, led by President Clinton, grieved along with the bereaved families. Yet more teenagers are killed on a typical day in US traffic. In 2002, 5,933 people aged 13-19 were killed, which is an average of 16.3 teenagers killed per day.

Injuries due to traffic crashes vastly outnumber fatalities, with over 5 million occurring per year in the US, most of them minor. The number of injuries reported depends strongly on the level of injury included. Applying the US ratio of 120 injuries for each fatality implies about 120 million annual traffic injuries worldwide. Dividing this by the world population of 6 billion, implies that the average human being has a near two percent chance of being injured in traffic each year - more than a fifty percent chance in a lifetime.
Traffic crashes also damage property, especially vehicles. By converting all losses to monetary values, it is estimated that US traffic crashes in 2000 cost $231 billion,8 an amount greater than the Gross Domestic Product of all but a few countries(3).

According to Federal Police Commission Report the toll rate of human life is becoming significantly high among pedestrians and passengers from time to time in Ethiopia. This report indicated that in 2007 the deaths by road user categories drivers 4 wheelers, Passengers 4 wheelers, Pedestrians, Riders motorized, 2 or 3 wheelers, Cyclist, Others were 6%, 37%, 55%, 1%, <1% and 1% respectively(4).

From the above, it is clear that road traffic accidents are threatening human, social, and economic development in Ethiopia like other many African countries. Having all these crude facts that much needs to be done to slow and/or reverse the trend.

1.2. Statement of the Problem

The magnitude of pedestrian fatalities ranges from more than half in African sub-region (55%) to 15% or less in America or Europe. The distribution also varies across low-income, middle-income and high income countries. 45% of road traffic fatalities in low income countries are among pedestrians, whereas an estimated 29% in middle-income and 18% in high-income countries are among pedestrians. The burden of road traffic accidents on vulnerable road users differs substantially across income levels. An estimated total of 227 835 pedestrians die in low-income countries, as opposed to 161,501 in middle-income countries and 22,500 in high income countries each year(5).

Acccording to WHO report 90% of the world's fatalities on the roads occur in low-income and middle-income countries, which have only 48% of the world's registered vehicles. Current and projected trends in motorization indicate that the problem of RTAs will get worse, leading to a global public health crisis (6).

A study noted that RTAs are a major global public health problem, but most of it occurs in low- and middle-income countries including Ethiopia. Pedestrians and passengers of commercial vehicles are the most vulnerable in Ethiopia, whereas in high-income countries crashes involve primarily privately owned vehicles with the driver being the main car occupant injured or killed. Road traffic accidents are a huge public health and development problem in Ethiopia. Its current situation requires a high level political commitment, immediate decisions and actions in order to curb the growing problem. Otherwise, it will get worse from day-to-day as motorization and population increase rapidly (7).

Prevention measures against road traffic accidents are largely uncoordinated and unplanned. There is a great need for stakeholders to handle the issue in a comprehensive manner so as to take effective action against the problem rather than acting in isolation. The result has been more deaths and enormous economic burdens on nations, especially in developing countries. As in other major public health problems such as HIV/AIDS, the efforts of just one sector cannot produce the desired outcome in traffic accident prevention.

The question of traffic accident is one of the major public issues that remained largely unaddressed by the public health community in Ethiopia. Academic institutions and research organizations have to do much more to measure the magnitude and impact of the problem on the highways as well as to come up with appropriate and cost affective intervention recommendations. It has been indicated that, accordingly, by 2020 traffic accident is expected to be the third major killer after HIV/AIDS and TB (8,9).

In Mekelle, in 2009 there were a total 313 RTAs. Of these 37, 74, 25 and 177 were death, heavy injury, light injury and property damage respectively. And in 2010 the total number RTAs were 353, of these death, heavy injury, light injury and property damage were 17, 80, 88 and 197 respectively. This report indicated that the total the properties lost associated with these accidents was estimated in 2009 and 2010 were 138,833.47 and 92,969.85 US dollar respectively. On the other hand the report showed that 81% of the cause was related to human risk behavior (10, 11). As this report indicated that there is an increase of RTAs from time to time and human risk behavior took large segment for the cause, but the factor forhuman risk behavior was not studied, because of this the present study was found paramount important to investigate and to see the gap that what factors could affect the risk behavior that would could aggravate the RTAs.

Chapter Two

2.1 Literature Review

Road traffic accident (RTA), one of the most common Accident, is defined as a fatal or non-fatal injury incurred as the result of road traffic crash. Due to its perception as a 'disease of development', road traffic accidents – and related injuries -- tend to be under-recognized as major health problems in developing countries . However, RTAs are thought to be the most common cause of death, resulting in 1.26 million each year, 20.7% of all deaths from injuries (12). In addition to these deaths, between20 and 50 million people globally are estimated to be injured or disabled each year.(13). A study noted that human behaviors, are the most common factors, accounting for more than 85% of all traffic crashes(14).

Road traffic accidents are one of the fastest growing epidemics in the South-East Asia Region Every hour 40 people in the Region die as a result of a collision. It is estimated that 306, 000 people were killed on the roads of countries of the South-East Asia Region in 2004. The burden of road traffic accident has been rising rapidly in the South- East Asia as countries increasingly motorize. Road traffic accident was the tenth leading cause of deaths in the Region responsible for 2% of all causes of mortality. The study also revealed that road traffic accident was the leading cause of mortality due to injury, accounting for 18% of injury related mortality (15)

A total of 25,110 accidents and 3,415 fatalities were recorded in Addis Ababa during 2000-2009. The mean number of fatalities per year was 342 with a range of 247-345. The mortality rate was 13.3 per 100,000 population. The majority of fatalities were pedestrian, 2970(87%) followed by passengers 297(9%) and drivers 148(4%). More than 75% of all fatalities were male(16).

Risk behavioral factors while driving

Excessive Speed

The speed of the vehicle is an important determinant of accident; the faster the vehicle is travelling, the greater the energy inflicted on the occupants during a crash and the greater the injury. Research on effective speed management indicates that the speed limits on urban roads should not exceed 50 km/h. speed limits in residential areas or near schools or roadside markets should be brought down. An increase of 1 km/h in mean traffic speed results in a 3% increase in the incidence of accident crashes and a 4%-5% increase in fatal crashes(17). A 5% increase in average speed leads to an approximately 10% increase in crashes that cause injuries, and a 20% increase in fatal crashes. Pedestrians have a 90% chance of survival when struck by a car travelling at 30 km/h or below but less than 50% chance of surviving an impact at 45 km/h. Pedestrians have almost no chance of surviving an impact at 80 km/h(18).

Another study revealed that if a car suddenly stops when travelling at 50 km/h, the human body becomes like a pinball— bouncing off the inside of the car. The car can also collide with people in the car who are wearing their safety belt, severely injuring them. Passengers in a car with an impact speed of 80 km/h are 20 times more likely to die than at an impact speed of 32 km/h(19). Another Study revealed that speeding is a key contributing factor in traffic collisions and injuries in Africa, regardless of the variation of policy investigation and reporting in different countries(20).

On the other hand a study report indicated that speeding is a contributing factor in 75% of the traffic fatal crashes in South Africa(21) A study made in Dar-es-Salam in Tanzania between 1999 and 2001has showed that speeding was a contributing factor in more than 25% of all traffic crashes(22).

Driving after drink alcohol

Drinking driving is another key risk factors contributing to traffic crashes and injuries.

Alcohol is a leading contributor to road traffic injuries. One survey found that one-third to more than two-thirds of fatally injured drivers in developing countries had alcohol in their blood (23)**.** A strong, positive association between increasing blood alcohol concentration and the risk of road traffic accident involvement has been documented by researchers for many decades. Alcohol use is generally seen as contributing to traffic accident by impairing driving capabilities and thus increasing the risk of crash involvement (24). Recent evidence, however, suggests that alcohol use may also increase injury risk in the crash itself by reducing tolerance of body tissues to trauma as well as potentially compromising medical diagnosis and treatment (25).

Human risk behaviors are also felt to be the main causes of RTAs in Kenya responsible for 85.5% of all reported causes. Despite this recognition no information on the prevalence of alcohol intoxication in drivers or among traffic casualties has been collected in Kenya. (26).

According to study made in South Asia, Alcohol impairs judgment and increases the possibility of involvement in other high risk behaviours (e.g. speeding, violating traffic rules, etc.). It also affects vision and poses difficulties in identifying risks and perceiving dangerous situations in the road environment. Several studies conducted in India, Nepal and Sri Lanka showed that a significant number of road traffic accidents are contributed by alcohol. In Sri Lanka, the number of people riding vehicles under the influence of alcohol increased from 1494 in 1984 to 5667 in 1999. Information from the police also indicated that more than 10% of drivers were under the influence of alcohol. It was also observed from a study that 12% of all patients admitted to the emergency departments of hospitals following RTAs had been under the influence of alcohol. In a hospital-based study in Nepal found that most of the road traffic accidents occurred during weekends and nearly 17% of these accidents occurred because the driver was under the influence of alcohol. A hospital-based study conducted in casualty departments in India revealed that 7% of road traffic accident patients had consumed alcohol. Another study also found that 29% of two-wheeler victims had been under the influence of alcohol (27).

Un fasten Seat-belts

Seat-belt use reduces crash death risk by 40%-65%, moderate and severe injuries by 43%-65% and all injuries from 40%-50% (,28, 29,30). Wearing a vehicle safety belt reduces the risk of being killed or seriously injured in a road crash by about 40%. Use of child restraints has been shown to reduce infant crash deaths by about 71% and the deaths of small children by 54% (31).

Mobile phoning while Driving

The National Safety Council of USA estimates 25 percent of all crashes in 2008 involved talking on cell phones – accounting for 1.4 million crashes and 645,000 injuries that year. In addition to the thousands of fatalities, many more people suffer serious life-changing injuries in motor vehicle crashes. (32).

A study indicated that at any point during the day, 11 percent of drivers are talking on cell phones(33). Another study revealed that More than half of respondents reported talking on cell phones while driving during the previous 30 days (34). During 2009, cell phone distractions while driving hit USA nation's political and media agendas (35).

In 2009: More than 200 state bills were introduced to ban cell phone use – texting and talking – while driving (36). Laws passed were front-page news. The U.S. Department of Transportation convened a Distracted Driving Summit, which the Secretary of Transportation called the most important meeting in the Department of Transportation's history. President Barack Obama issued an Executive order banning federal employees from texting while driving(37). A National Safety Council membership survey showed employers of all sizes, sectors and industries are implementing employee policies banning talking and texting while driving. Public opinion polls show a majority of the public support these efforts (38,39).

Many drivers mistakenly believe talking on a hands-free cell phone is safer than handheld. A hands-free device most often is a headset that communicates via wire or wireless with a phone, or a factory-installed or aftermarket feature built into vehicles that often includes voice recognition. Many hands-free devices allow voice-activated dialing and operation. Hands-free

devices often are seen as a solution to the risks of driver distraction because they help eliminate two obvious risks – visual, looking away from the road and manual, removing your hands off of the steering wheel. However, a third type of distraction can occur when using cell phones while driving – cognitive, taking your mind off the road. Hands-free devices do not eliminate cognitive distraction (33). A study made in Qatar showed that 25% of Road traffic injured drivers were distracted by using mobile phone (40).

Factors affecting of Risk behaviors of Driving

Traffic Law and Regulation

Traffic law and law enforcement vary and in general are inadequate in African countries. The lack of specific regulation and the power and will to punish those who violate the law render to a large extent the unsafe road in many countries in the continent. Many reasons are proposed to account for the phenomenon, including historical/cultural, economic and political reason. Traffic safety has been deemed as accidents, an act of God (41).

Lacking of the awareness of the potential consequence of unsafe driving, which the traffic law intends to control, the public may resent the impediment of safety devices, the inconvenience of traffic fines, and therefore against certain traffic laws. For instance, the helmet law (for motorcyclists) enacted in 1976 was later repealed in Nigeria, and the wearing rate declined from 92% in 1982 to 10% in 1996, resulting in a dramatic increase in head injuries(42). Laws which establish for drivers can lead to reductions of between 4% and 24% in the number of crashes involving young people (43). Some studies done in America showed that mandatory child restraint laws and their enforcement lead to an increase in the use of child restraints(44,45).

Serious checkpoints and random breath-testing have been found to lower alcohol-related crashes by about 20% and an effective way to deter drunk driving is to raise drivers' perceived risk of getting caught(46). In many African countries alcohol as a contributing factor in traffic crashes and injuries mentioned by many researchers, however most of the findings and statistics are under report. Lack of detection and enforcement has been cited in literatures as the reason for

concern. In Tanzania, for example, the lack of identification of drinking and driving as a contributing factor has been specifically attributed to the lack of technology, logistics and culture, as well as reluctant in enforcing drinking and driving laws(47). Lack of devices on the road side, the police has to take the drivers to medical centers, where doctors may or may not be available for blood concentration test in the name of law enforcement (48, 49).

Age

The drivers age is also known to be an important factors contributing to risk behavior of driving and results in occurance of road traffic accidents. Adolecesents or young drivers are frequently involved in traffic accidents than other age groups. The problem with young drivers is that they like risk taking behavior, also they lack driving skill (50).

Another study made in Arabian Gulf indicated that young drivers had the highest proportion of risk behaviors with specific to mobile phoning while driving and these groups were among the victims of RTAs(51).

Education

According to the study made in Quatar showed that education level was found to be one of the predictor of risk behavior and road traffic accidents as well. This study indicated that drivers whose their educational status was found riskiest than the other educational levels. So education can be one of the factors that could affect the risk behavior of drivers(40).

Income

A study done in Quatar indicated that drivers who had high income were found significantly practicing risk behaviors and exposed to accidents than the low and average income status(40).
A study made by Leon, S.R, stated that increase income percapita is associated with increase mis behave and ultimately increase accidents. If the level of economy increases the capacity to pay vehicles at the same time increases and youngsters would get a chance to drive and relax with peer groups by excercising un necessary risky behaviors (52).

Knowledge and Attitude

A study revealed that poor road-user behavior exhibited by drivers in some developing countries may be due to their lack of knowledge about road safety rules and regulations or their general attitude towards road safety matters. Drivers knowledge in Jamaica, Pakistan and Thailand indicated that there were only few topics where a lack of knowledge was widespread. One such example was stopping distances where 87% of the drivers underestimated the distance required to stop in an emergency when traveling at 30mph(53).

Answering questions on stopping and following distance also proved to be a problem for professional drivers in Cameroon and Zimbabwe with truck and bus drivers un able to answer more than half of the questions on driving knowledge and skill correctly. Other areas of driver behavior such as not stopping at pedestrian crossing, traffic signs and stop signs were found to be due to poor attitude rather than to poor knowledge. Although attitudes are notoriously difficult to change, there would seem to be some potential for improving them by introducing publicity and enforcement campaign(54).

Driving experiences

A study done in Quatar noted that drivers who had more than five years driving experience were found more excercisng risk behaviors and resulted in car accidents(40). On the one hand according to the study made in Tanzania drivers who were not having driving experience found to be high vulnerable to car accidents (55).

Experiencing of car accident as reinforcing factor for risk behavior

A study done in Turkey indicated that drivers were not able to read the road and take precautions relating to it. Most of the study subjects saw traffic accident as a result of fate. According to the Turkey study even if drivers encountered with car accidents their risk behavior may not be changed (56).

Advice or warning given from family, friends, owner of the vehicle, passengers as reinforcing factor

A study done in Seweden reported that attempts are being made to persuade young persons to intervene when they observe their friends that are driving after alcohol consumption. They can show their concern by avoiding riding with a drunk driver or by trying to stop him/ her from driving. This attempt is found in bringing marvelles achievement and need to be strengthened (57).

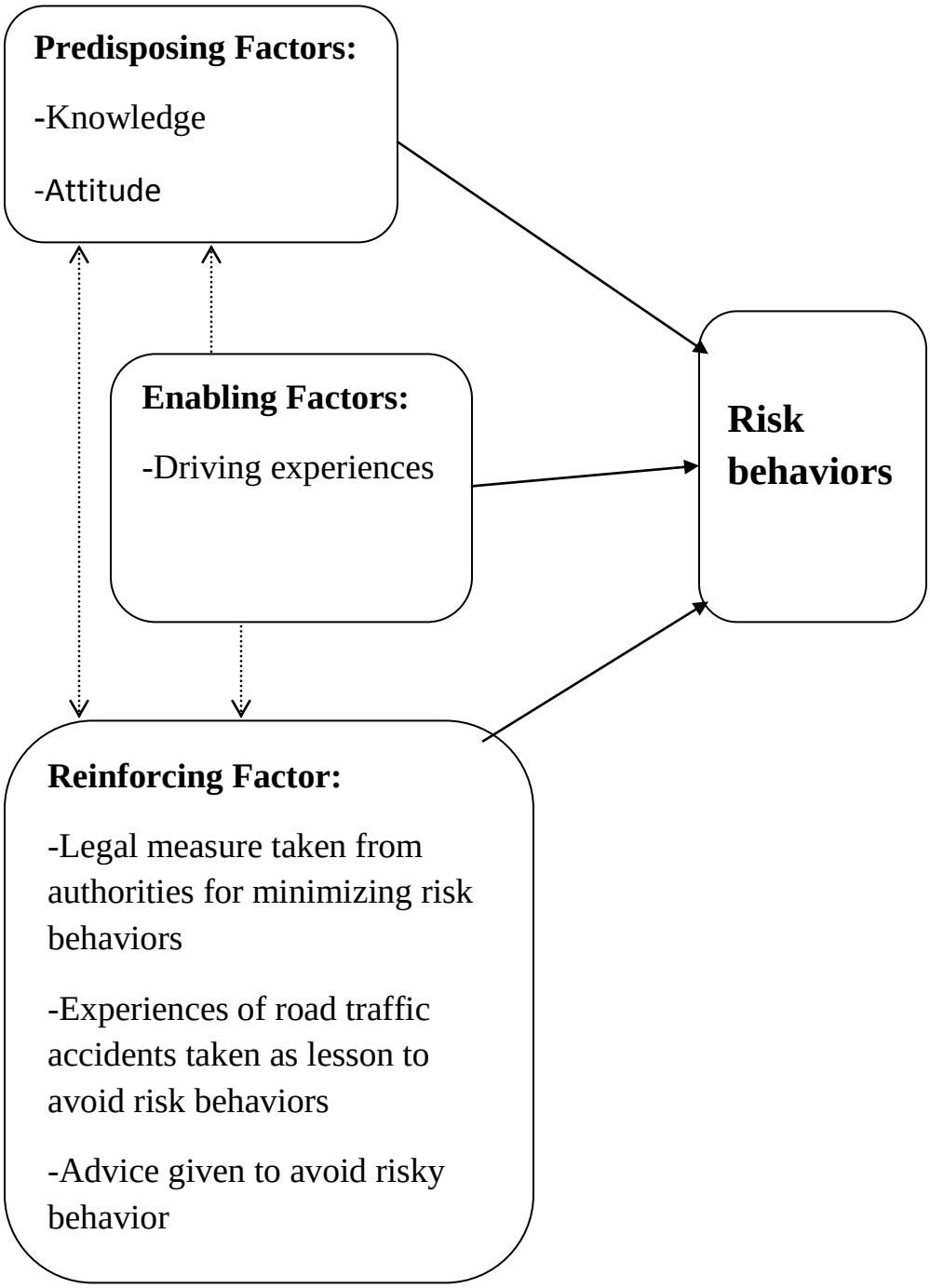

Figure 1: Conceptual frame work on factors associated with risk behaviors of drivers.

2.2 Significance of The Study

As reports and studies indicated that traffic accident is becoming a major public health hazard in Ethiopia. Behavioral problems by drivers, luck of efficiency, low level of driving experience, lack of awareness about security, lack of technical fitness of vehicles are mentioned as major causes behind the traffic accidents.

On the other hand study showed that the quality and paucity of surveillance data from African countries are a fundamental problem and should be the first technical priority if effective countermeasure is to be developed and implemented successfully. With some exceptions, the current system underestimates the size of the problem(58).

Therefore, deficient information and available of data on determinant behavioral factors for RTA, would prevents the RTA from acquiring deserving public and political attention and adequate funding. Moreover, without good data, the nature of the problem cannot be well defined, nor can effective solutions be rationally and scientifically identified. Moreover, without quality and a representative data, the potential effectiveness of the program cannot be evaluated and disseminated to refine programs, secure funding, and generate scientific knowledge, which could be institutionalized and disseminated for use.

Hence, this study foremost identifyed factors potentially related to risk behaviors on road traffic accident among the drivers of Mekelle town with specific to behavioral causes and to bring this facts on factors to all the stake holders to be known; planners and further to local health care providers to bring a behavioral change towards avoiding of risk beviors of driving and ultimately reduction and avoiding of road traffic accident for drivers and for the general community.

Furthermore the study would generate information in area of topic for researchers to further investigate about factors affecting risk behaviors of driving.

Chapter Three

3.1 Objectives

3.1.1. General Objectives:

To assess factors affecting risk behaviors of driving among drivers of Mekelle town,2011.

3.1.2 Specific objective

- To describe the predisposing factors affecting risk behaviors among study subject..
- To assess the enabling factors affecting risk behaviors among study subject.
- To identify the reinforcing factors affecting risk behaviors among study subject.

Chapter Four

4. Methods and Materials

4.1. Study area Period

The study entirely concentrated and focused on factors affecting risk behaviors of driving among drivers of Mekelle town.

Mekelle is capita city of the Tigray National Region State of Ethiopia. It is situated 783 kms, north of from Addis Ababa at an attitude of 2000 ms above sea level. The maximum and minimum annual temperature is 30.3 & 5.9 respectively, and the minimum annual rainfall is 570.6mms.

Administratively, Mekelle is divided into seven Kifle Ketema (sub city) namely Semen, Adi-Haki, Hadnet, Hawelty, Kedamay-Weyane & Ayder. The number of population in 2011 G.C. is estimated to about 260,000 (59).

The total number of registered and licensed House car, Taxi and Bajaj in 2011 G.C. were 931, 405 and 555 respectively. (11).

Study period: The study was conducted in April 10 - 27, 2011.

4.2. Study Design

A cross- sectional study using quantitative and for triangulation purpose qualitative methods was conducted.

4.3. Population

4.3.1. Source population

All drivers of Mekelle town.

4.3.2. Study population:

All eligible drivers and Key informants who are sampled to be studied during the study period in Mekelle town.

Inclusion criteria and Exclusion criteria

Inclusion criteria

Anyone who was driving a house car, any type of taxi, and bajaj working in Public Transport in Mekelle town were included in the study.

Exclusion criteria

Other drivers who were driving out side Mekelle, eventhough they drove house car, taxi and Bajaj at the time of study period in Mekelle town were not included.

Drivers of the study subject who was sick and unable to communicate were not included in the study.

4.4. Sample size and Sampling Technique

4.4.1. Sample Size Determination for Quantitative Using Primarily Data Collection.

To determine sample size a single proportion population formula was employed by considering the following formula and criteria:-

$n=Z^2 p(1-p)/W2$

Desired precision (W) 5%

Expected prevalence(P)50% (since Prevalence of risk behavior was not Known, prevalence of 50% was taken)

Confidence level (Z) 95%(1.96)

Calculated sample size 384.16

But, since the total study subjects were below 10,000 the final sample size was determined using correction formula as follows

Correction formula

nf = n/(1+n/N); where;

ni= 384.16 and N= 1910; then,

$$nf = \frac{384.16}{1 + \frac{384.16}{1891}}$$

$$= \frac{384.16}{\frac{1891+384.16}{1891}}$$

$$\frac{(384.16)\ (1891)}{2275.16} = 319.29 = 319$$

And the estimated non response rate 10% was added to 319

10% **x** 319=32; Therefore, the sample size were: 319 +32= 351

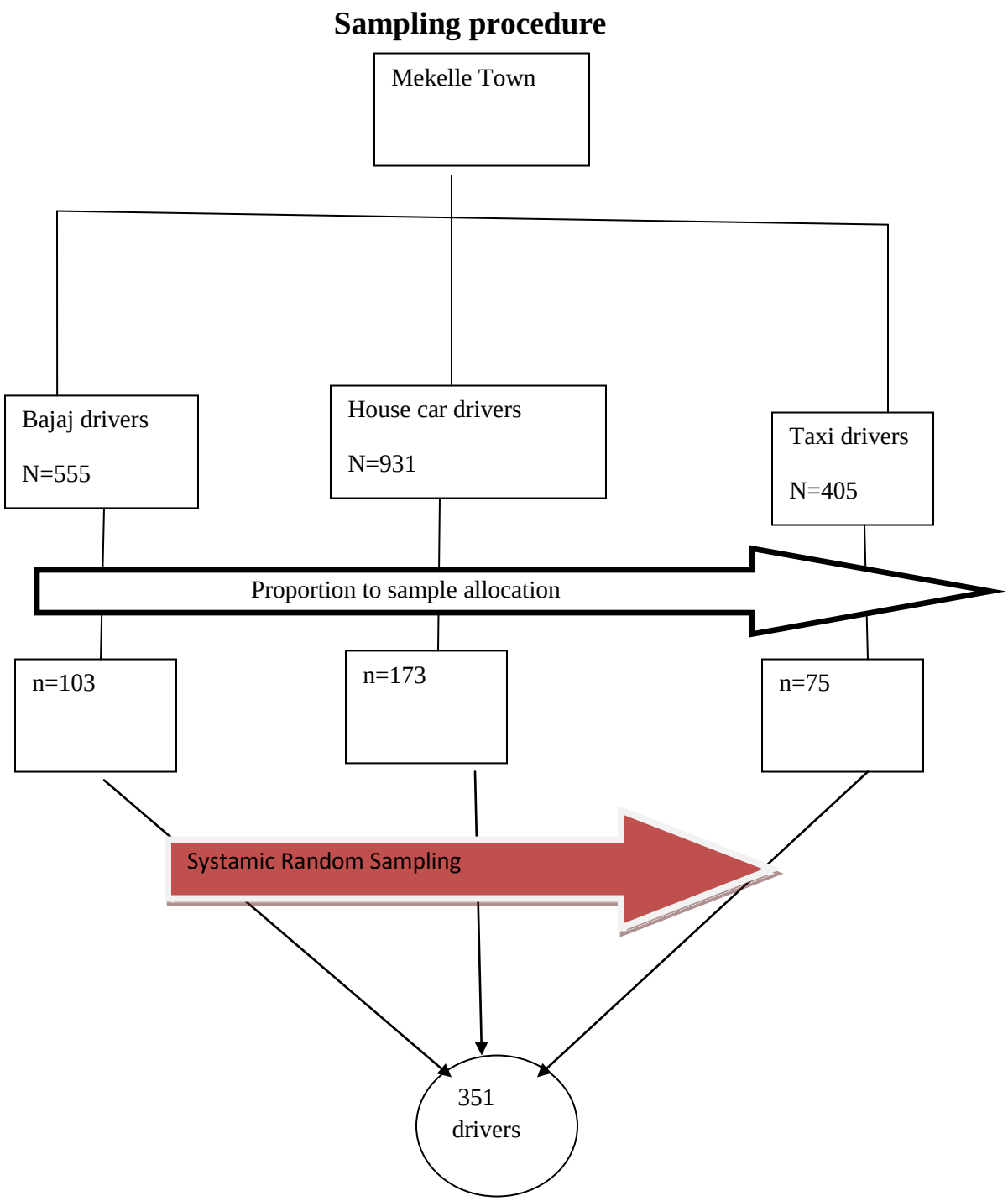

Figure 2: Schematic presentation of sampling procedure of factors affecting risk behaviour of driving Mekelle Town,2011.

4.4.2. Sampling Technique

4.4.2.1 Quantitative

Respondents were stratified according to the list given by the office of road and transport of Mekelle town, and their sample size was alocated proportionately: Accordinglly, the sample size for the private car, taxi and bajaj were 173, 75 and 103 respectively. And to get each study unit the proportion of N/n (931/173, 405/75 and 555/103) was calculated the Kth fraction or interval of 5 was obtained and then a systematic random sampling of every fifith of the sampling frame was studied.

4.4.2.1.1. Selection and approaching of Study Subjects:

Taxi and Bajaj: Taxi and Bajaj had 16 and 7 stations respectively for departing to different destinations in the town. The schedule of station for the taxi was set a program on quarter base by the office of road, transport and industry of Mekelle town, so according to the schedule every taxi would stay in one station only for two days and then rotate to another station. Whereas baja's stations were fixed. Tracing of the selected study subject wase done by approaching the Taxi's and Bajaj's association and each station coordinator.

Private car drivers were traced at their home, working areas etc. after getting all the names and locations/ Kebele of the owner of the vehicles from office of road and transport of Mekelle town and tracing the owner or the driver of the private car different private garages, traffics and other residents were cooperated. Data collection was done by six BSc holder, of these three environmental health professionals, two nurses and management. Two BSc holders were involved as supervisor in the study.

4.4.2.2 Qualitative

For triangulation purpose, different participants were engaged in the qualitative study of in-depth interview (to search sensitive issues) and FGDs (and to have an iteractive discussions). Subjects were selected conveniently until the response was saturated.

4.4.2.2.1 .In-depth Interviewing

The most obvious way to conduct this kind of qualitative research would be to make use of open answer questions and let the participants speak freely about their experiences. So for

triangulation and to have the advantage and maximize the opportunity in depth interview with a minimum of 10 police traffic polices of Mekelle town was held based on the developed interview guide using tape recorder. The principal investigator was entirely involved in the collection of the data.

4.4.2.2.2 .Focus Group Discussion

Four FGDs were conducted to strengthen the findings of quantitative study. FGD guide was developed before the study is conducted.

During the conducting of the four FGDs the following participants were included:

1. The 1st FGD was conducted among individuals comprising of 6 individuals who had a background of health and working as health desk and health committee in each Kifle ketema of Mekelle town.

2. The 2nd FGD was conducted among individuals comprising 7 individuals who had a background of health working as supervisors of urban health extension workers and health committee of each kifle ketema which they represent.

3. The 3nd FGD was conducted with drivers of 6 individuals who were not involved in the quantitative study as respondents.

4. The 4th FGD was also conducted with drivers of 6 individuals who were not involved in the qualitative study as respondents.

The data collection was done by having one moderator and two raport writers and using tape recorders. The FGDs moderator was the principale investigator, and the two raportors were first BSc holders (Nurse and Environmental health).

4.4.2.2.3.Time Frame

In depth interview took 30 up to 45 minutes per individual .FGDs took also 45 minutes up to one hour per each FGD.

4.5. Measurement and Variables

4.5.1. Independent Variables:

Socio-Economic and Demographic Characteristic:- age, sex, marital status, religious, ethnicity, educational status, economic status (income).

Predisposing Factors: Knowledge and Attitude of the study subject.

Enabling Factors: Driving experiences of the study subject..

Reinforcing Factor: Advice/ warninig given from spouse, family, friends and owner of the vehicle on minimizing or avoiding risk behaviors, legal measure taken by authorities/ police traffic after violating traffic rules and regulation, and experiences of road traffic accidents taken as lesson to avoid risk behaviors.

4.5.2 Dependent Variables:

Risk behavior of driving :(Mobile phoning, unfasten seat belt, driving after drinking alcohol and excessive speed above 35 km per hour).

4.6. Data Collection Tools

4.6.1. Data collection procedures

4.6.1.1Quantitative

After reviewing of different literatures data collection tool which was structured close –ended and open ended questionnaire was contextualized or modified and adopted (60,61, 62, 63,64,65) and prepared to meet the objective of the study. And after intensive revision of the instruments, final version of the English language was developed and translated into Tigrigna.

4.6.1.1.1. Reliability and Factor loading

Although the questionnaire asked about attitude were taken literature directly, to confirm their reliability and factor loading the following four measures (on speed, seat belt, mobile phoning whil driving and driving after drinking) were done separately:

Attitude towards speed limit was measured by 4 items with reliability of œ=0.981 and explaining the variance of attitude towards seatbelt by 95%, each items with factor loading of (0.983, 0.979, 0.974, and 0.956).

On the other hand Attitude towards Seatbelt was measured by 4 items with reliability of œ=0.984 and explaining the variance of attitude towards seatbelt by 95.5%. each items with factor loading of (0.987,0.985,0.97,and 0.967).

Attitude towards mobile phoning while driving was also measured by 4 items with reliability of œ=0.980 and explaining the variance of attitude towards seatbelt by 94.3%. each items with factor loading of (0.960,0.971,0.977,and 0.977).

Attitude towards driving after drinking alcohol was measured by 4 items with reliability of œ=0.969 and explaining the variance of attitude towards seatbelt by 91.5%. each items with factor loading of (0.949,0.963,0.965,0.948).

4.6.1.2. Qualitative

The adopted and prepared interview guide and FGD guide (54) in English were translated in to Tigrigna which contains major information for collecting data from study subjects.

4.7.Operational Definitions

- **Road Traffic Accident [RTA]:** is a collision between vehicles; between vehicles and pedestrians; between vehicles and animals; or between vehicles and fixed obstacle with in two years period of time.
- **Risk behavior:** any one of the behavior like driving after drinking alcohol (with in the past12 months period of time), unfasten seat belt (with in the past12 months), excessive

speed which is above 35 Km/h (with in the past 6 months) and mobile calling or receiving while driving (within the past 12 months) was taken as as risk behavior. This means any respondent who had any one of the four behavior was considered as having risk behavior.

- **Less knowledgeable** means those who scored less than mean of the total knowledge assessing traffic sign questions.
- **Moderately knowledgeable:** means those who scored mean of the total knowledge assessing traffic sign questions.
- **Knowledgeable**: means those who scored more than mean of the total knowledge assessing traffic sign questions.
- **Negative attitude** means those who scored less than mean of the total attitude assessing questions.
- **Neutral attitude** means those who scored mean of the total attitude assessing questions
- **Positive attitude** means those who scored more than mean of the total attitude assessing questions.
- **Mobile:** In this study mobile could be with hand or hand free mobile phone.

4.8. Data processing, analysis, writing up and dissemination

Data analysis procedure

Quantitative

Data was checked for completeness, consistency entered into a computer program SPSS version 16. Data was edited, cleaned, checked and analyzed. During the process of analysis, frequencies of different variables were determined and odds ratio performed on some selected variables to determine the association of these selected variables. Association between risk behaviors and the explanatory variables was assessed using Chi-square tests and binary logistic regression was employed for candidating variables for determination of their predictability by entering the

multiple logistic regressions. Multiple logistic regression analysis was also used to determine the predictor of independent variables on risk behaviors of driving by controlling confounding factors. The strength of associations of the predictor was determined by AOR and 95% CI, and P-value <0.05 was taken significant level.

Qualitative

Data that were gathered from key informants of traffic police using in depth interview guide were recorded using tape recorder and then points were aggregated according to thematic areas. Quotes and respondents own words were put and then read again and again, and finally interpreted.

Data that were gathered from FGD discussants of drivers and community representatives (health committee) using FGDs guide was recorded by tape recorder then points were aggregated according to thematic areas. Quotes of the discussants were be put verbation and finally interpreted.

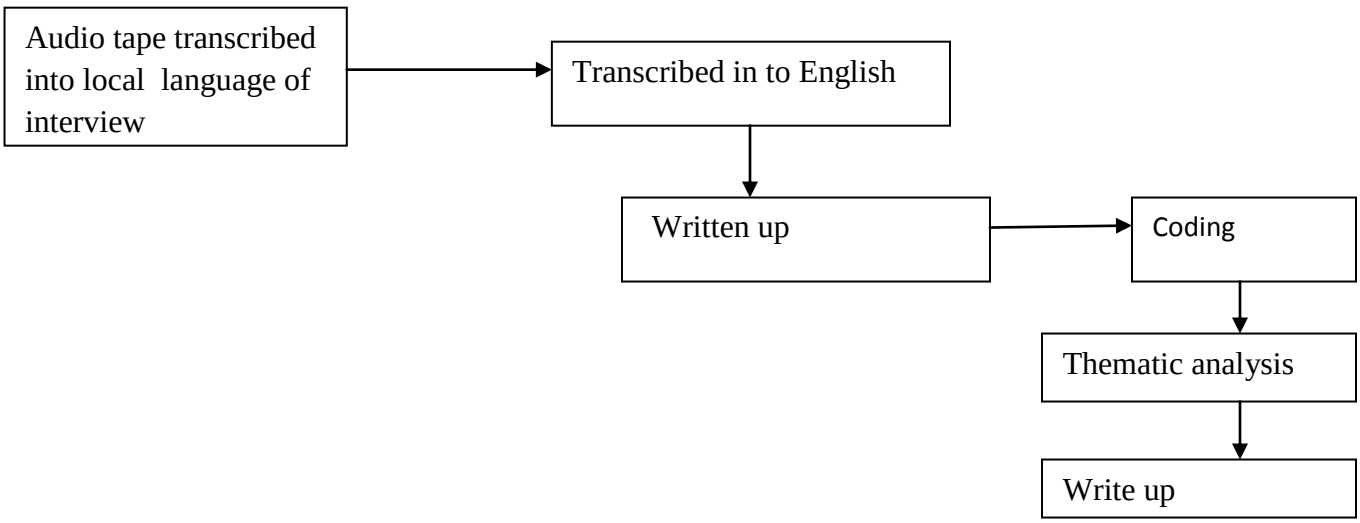

Figure 3: Diagrammatic Representation of Qualitative Data Step of Analysis

4.9. Data quality management

The adopted and prepared data collection tool in English version was translated in to Tigrigna again back into English to ensure the consistency and validity of the instrument. Before the main data collection was started pretesting of the instrument which accounted 5% or 18 individuals were carried out on similar population in Adigrat town and amendments were made accordingly. The overall data collection process was coordinated and supervised.

Training for two days for six data collectors and two supervisors was given on the entire content of the questionnaire. The training included discussion on the objectives of the study and on the contents of the questionnaire one by one, on the methodology of the study and on the issues of the confidentiality of the responses.

Qualitative data collection was handled by principal investigator and two note takers. On daily based transcription was done and analysis was started from the first day of in-depth interview and FGDs.

4.10. Ethical Consideration

After approved the study proposal by the ethical ethical review committee of Jimma University collage of Public health and Medical Sciences, letter of ethical clearance was obtained from JU department of Health education and Behavioral Sciences, and communicated to the Mekelle Town Administration, Tigray Regional Bureau of Health, Tigray Road and Transport Bureau, Tigray Police Commission and other relevant bodies.

Before commencing the data collection permission letter was again obtained from Mekelle Town Administration and this permission letter was communicated to taxi and bajaj associations and site/ station coordinators and to all study subjects. Before the data collection verbal consent was obtained from the study subjects including for tape recording. All information that obtained from the individual was treated confidential. The respondent right was guaranteed to stop or refuse participation at any time.

4.11. Writing up and dissemination

The scope of the analysis of both the quantitative and qualitative was included and study outputs on risk behaviors which could aggravate RTAs in Mekelle town. The framework of the study was providing core findings and conclusions of the collected data from the study populations. The developed cod book was entirely and effectively used during the analysis. A brief summary was made to the progress of the risk behavioral factors among the drivers of Mekelle town, based on the findings from the study subjects.

The finding will be communicated to potential stakeholders: Jimma University Department of Health Education, and Behavioral Sciences, Jimma University researchers, Tigray Regional Health Bureau, Tigray Road and Transport Bureau, Tigray Police Commission and all efforts will be made to communicate for publication both in the national and international scientific study journals.

Chapter Five Result

5.1. Socio-demographic characteristics

Out of 351 respondents planned to be included in the study, 350 responded giving a response rate of 99.7%. The mean age of the respondents was 28.7 (SD±9.9). There were 339 (96.9%) males and 11 (3.1%) females. Ethnically 344 (98%) were Tigray followed by 5(1.4%) Amhara. Regarding the marital status, 202 (57.8%), were single while married were 145(41.3%). Majority 284(80.9%) of the study participants were Orthodox Christians by religion. Majority of the respondents educational status was secondary school followed by primary school.

The average family size was found to be 3.7 (SD± 1.3). Half (50%) of the respondents reported a monthly family income below the median (2350 Birr) with the minimum and maximum monthly income of birr 700 and birr 10,000 respectively (Table 1).

Table 1: Frequency of Socio-Demographic Characteristics of Drivers of Mekelle Town, Tigray Region, Northern Ethiopia, April, 2011

Variables		**Frequency**	**Percent**
Sex(n=350)	Male	339	96.9
	Female	11	3.1
Ethnicity	Tigray	343	98.0
	Amhara	5	1.4
	Erob	2	0.6
Marital status	Single	202	57.8
	Married	144	41.1
	Other (Divorced, Widow)	4	1.1
Relation with current family residents	Son	148	42.2
	Spouse	146	41.7
	Reside alone	37	10.6
	Other (Brother, Sister, uncle)	19	5.4
Religion	Orthodox	283	80.9
	Muslim	48	13.7
	Catholic	11	3.1
	Protestant	8	2.3
Educational status	Primary school	122	34.9
	Secondary	185	52.8
	Tertiary level	43	12.3
Monthly family income	< 1000 Birr	93	26.6
	1000-2350 Birr	82	23.4
	2351-5000 Birr	126	36.0
	>5000 Birr	49	14.0

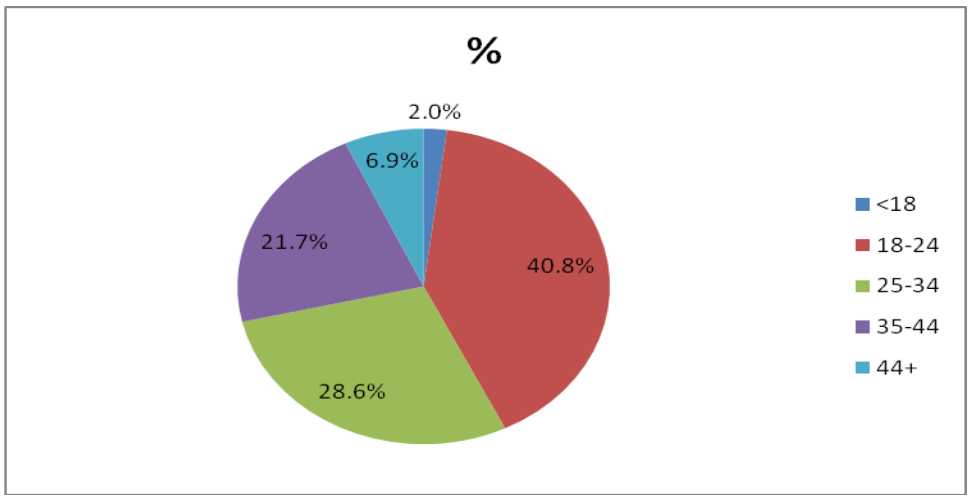

Figure 4: Age Distribution of Study Participants in Mekelle Town, Tigray Region, Northern Ethiopia, April, 2011

5.1.2. Type of vehicles operated by respondents and their driving experiences.

The study showed that among the 350 respondents, 172 (49.1%), were operating house car followed by 75 (21.4%) taxi and 103 (29.4%) bajaj. Regarding the ownership of the vehicles 139 (39.7%) were owned by the respondents while the 211 (60.) were owned by others. The finding indicated that the mean driving experiences was 3.5 (SD± 2.48) (Figure 5).

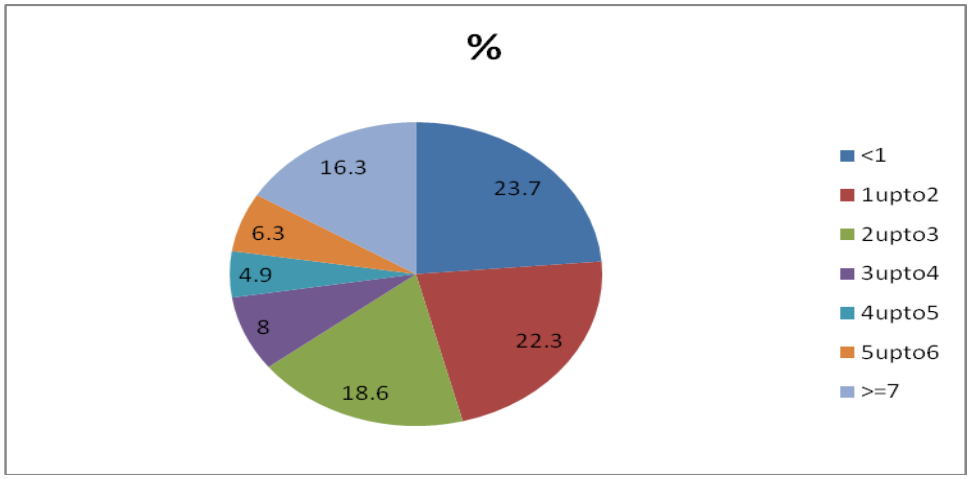

Figure 5: Driving Experience of study participants of Mekelle Town, Tigray Region, Northern Ethiopia, April, 2011

5.1.3. Knowledge of respondents related to traffic signs and avaliabilty of posted signs in Mekelle town.

5.1.3.1. Knowledge on traffic signs

For the purpose of assessing the knowledge of drivers on traffic signs, 10 basic traffic signs in color photograph form after consulting experts were developed (Annex 5), and all the respondents looked at the traffic signs and respond for what they looked (Table 2).

Table 2: Knowledge Assessing Traffic Signs and Given Response by Drivers of Mekelle Town, April, 2011

Variables	Response	Frequency	Percent
Four-way intersection is ahead. Watch for cross traffic!	Yes	347	99
	No	3	1
pedestrian is crossing, drive carefully!	Yes	349	99.7
	No	1	0.3
students ahead, slow down your speed !	Yes	271	77.4
	No	79	22.6
No overtaking for automobile!	Yes	177	50.6
	No	173	49.4
Closed to automobiles!	Yes	294	84
	No	56	16
No parking which means you can park for short period of time to pick or to drop someone	Yes	210	60
	No	140	40
No entry, or crossing this way is not allowed!	Yes	349	99.7
	No	1	0.3
No parking until you get another sign inscribed end !	Yes	287	82
	No	63	18
Maximum speed is 35 kms per hour !	Yes	307	87.7
	No	43	12.3
Stop and give way!	Yes	346	98.9
	No	4	1.1

The finding revealed that 100 (28.6%), 61 (17.4%) and 189 (54%) of the respondents were less knowledgeable, moderate knowledgeable and high knowledgeable respectively to the knowledge assessing photograph taking the mean as yardstick and recoding below the mean, mean and above the mean. The mean knowledge was found to be 0.839 (SD± 0.178). This means out of the 10 knowledge assessing questions the responded mean knew by the drivers was 8 The study showed that 50% of the bajaj drivers were low knowledgeable to traffic assessing questions(Fig.6)

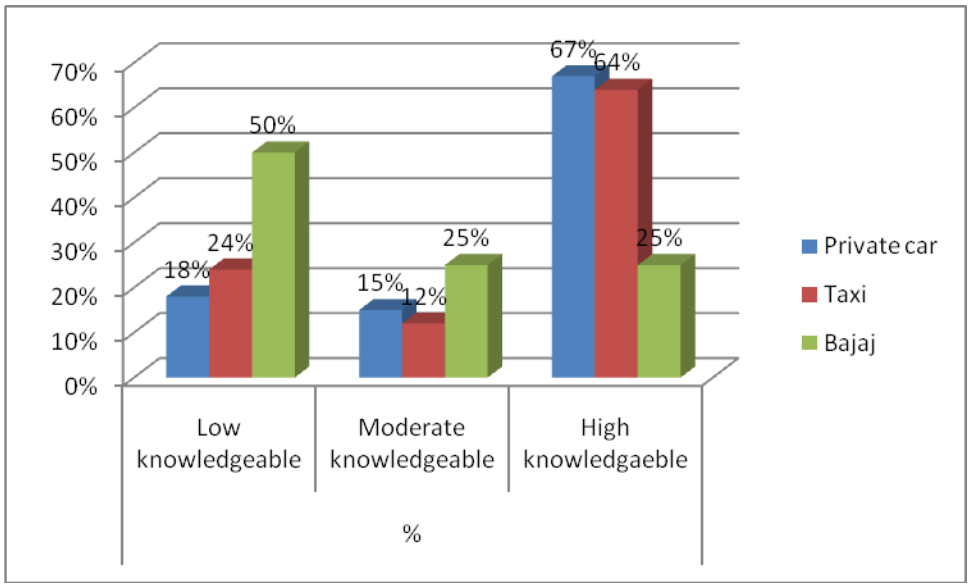

Figure 6: Knolwledge Level of Drivers related to the vehicle they operated, Mekelle Town, Tigray Region, Northern Ethiopia, April, 2011

The study showed that majority of age < 18 and 18-24 years old were found less knowledgeable to the traffic signs (Figure 6). This finding was supported by all FGDs discussants. All FGDs participants reported that *the youngsters and teenagers have poor knowledge to traffic signs and even they don't know the very important traffic signs.* On the other hand majority key informants of indepth interview said that most of the time traffic signs are violated by youngsters and this is

associated with poor knowledge to traffic signs because someone who has money can have any level of driving license within short period of time without detail assessment on his/her knowledge of traffic signs and regulation and maturity.

On the contrary few participants said that *the cause for violation is not associated with poor knowledge but rather associated with carelessness and negligence because specially those teenagers and youngster drivers they lack ethics of driving, poor attitude and they are cruel that means after collision with pedestrian they simply run away without taking the victim to hospital*

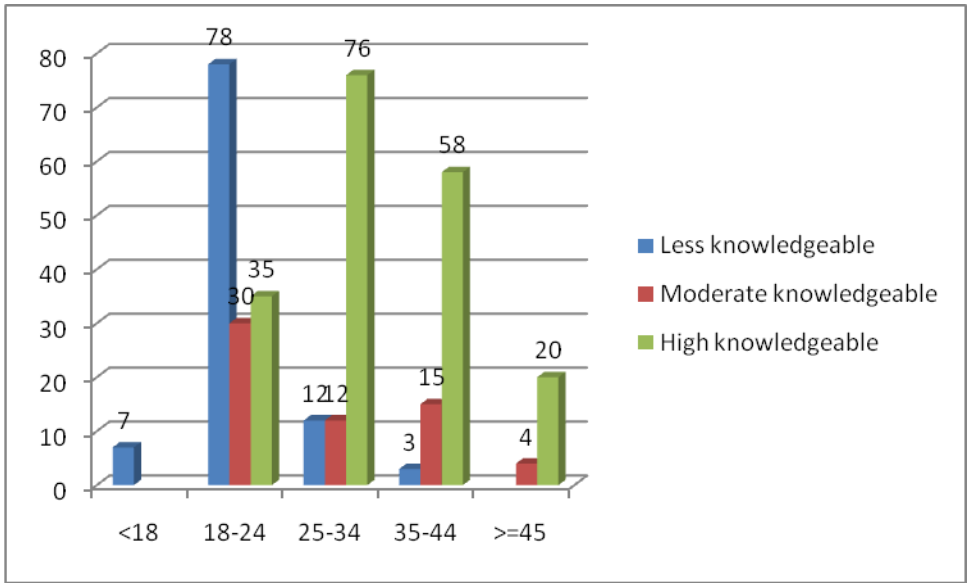

Figure 7: Knowledge Level of Driversrelated to Age distribution Mekelle Town, Tigray Region, Northern, Ethiopia, April, 2011

5.1.3.2. Avaliabilty of posted traffic signs in the town

The study investigated to relate the finding of the knowledge on traffic signs with the actual availability of traffic signs in Mekelle town while conducting qualitative study. All FGDs discussants reported that *there are some posted signs but they are not enough.* Few participants of health committee (includibg one female participant) said that *in our kifle ketema there is high traffic flows but in the school area there is no any traffic sign which gives warning to drive*

slowly and to give priority to students. All participants drawn from drivers and health committees reported that *there is no functional traffic light.* According to them the two traffic lights located at the Romanat square and in the area of Mekelle health center were out of use. All participants said that *traffic light should be installed in selected areas like Ajip, Dedebit Micro Financing Bank, the cross line which erected from Gebriel to town administration and from Hawziene square to Enkodo and the two existing non functional traffic lightsshould be maintained.*

On the other hand all key informants of indepth interviewees said that *there are some posted signs but in the new roads like Aishumdun via Adaha, Adihawsi, Hawelti and Agip via Ider Adishumdun there is no any traffic sign*. All the interviewee of the traffic polices said that *there are very danger sites where most drivers misbehaved and frequent accidents encountered and needs installation of traffic light, like the areas of Castle, Bubu hills via Trans, Ajip, Hashengie collage, Dedebit Micro Financing Bank, the cross line which erected from Gebriel to town administration and from Hawziene square to Enkodo and the two existing traffic lights should also be maintained.*

5.1.4. Attitude of respondents on excessive speed, unfasten seat belt, drinking while driving and using of mobile phoning while driving

The study has tried to investigate the attitude of drivers in the study area on excessive speed, unfasten seat belt, drinking alcohol and driving and mobile phone (calling and receiving) while driving and under each risk behavior four items were incorporated using likert scale with strongly agree, somewhat agree, somewhat disagree, not agree and strongly disagree.

Base on the above mentioned items of attitudes respondents were asked to rate, and the mean attitude was 3.24 (SD$\pm$ 1.03). The finding indicated that out of the 350 respondents 157 (44.9%), 12 (3.4%) and 181 (51.7%) had negative attitude, neutral attitude and positive attitude towards the risk behaviors respectively.

On the other hand all FGDs participants and majority of key informants of indepth interviewees revealed that *the cause for exercising unhealthy behavior is mainly associated with poor or low*

attitude towards road safety, most drivers in Mekelle have negative attitude especially towards using mobile phoning and un fasten seat belts while driving. This was also supported by three in-depth interview participants said that *drivers in Mekelle have negative attitude towards mobile and seat belts than the other risk behaviors.*

5.1.5. Evaluation of risk behaviors

5.1.5.1. Magnitude of risk group and type of risk behaviors.

The study indicated that out of 350 respondents excluding seat belt for baja whereas seat belt included as denominator for the others, 233 (66.6%) of them were found to be risk groups where as 117 (33.4%) were not risk group. Out of the 233 who categorized as risk group 129 (55.4%), 59 (25.3%) and 45 (19.3%) were house car, taxi and bajaj respondents respectively. Among the risk group respondents of age 18-24 about 49.8% were categorized as risk group of driving (Figure 7).

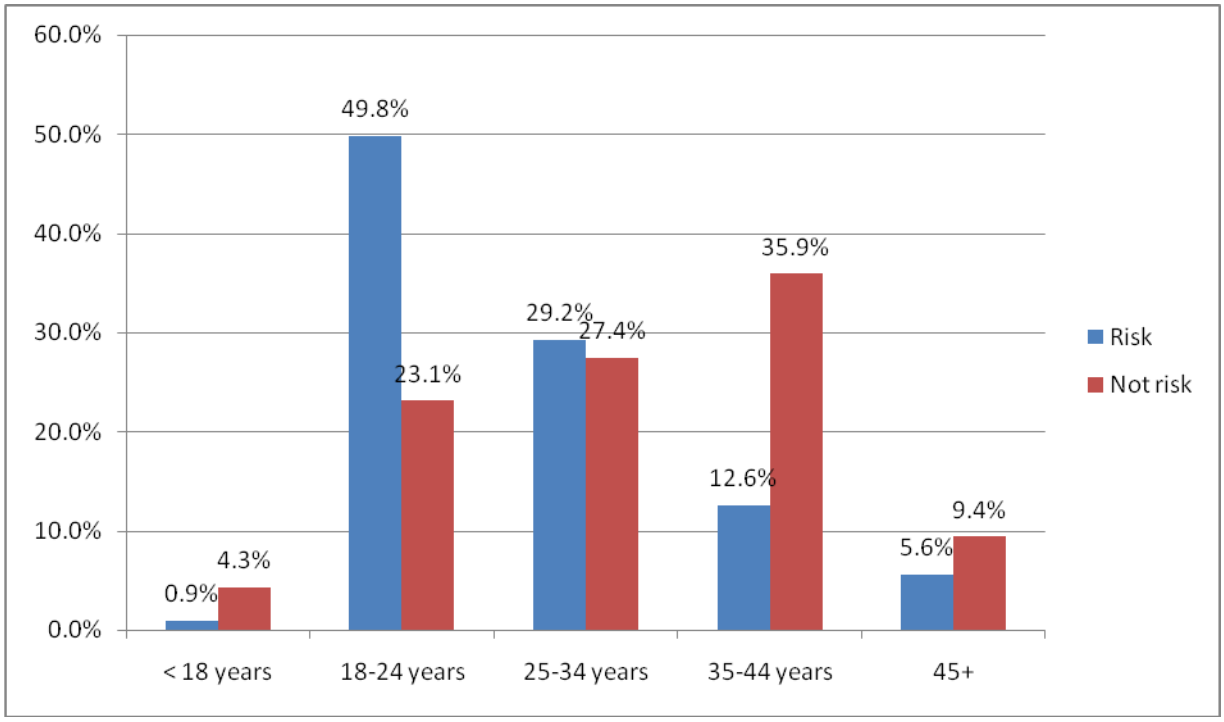

Figure 8: Age Distribution of Risk and Non Risk Drivers of Mekelle Town, Tigray Region, Northern Ethiopia, April, 2011

The study showed that among the risk groups 25.3% , 19.5% and 21.5% respondents were found whose driving experience of < 1year, 1-2 years and 2-3 years period of time respectively. (Figure 8).

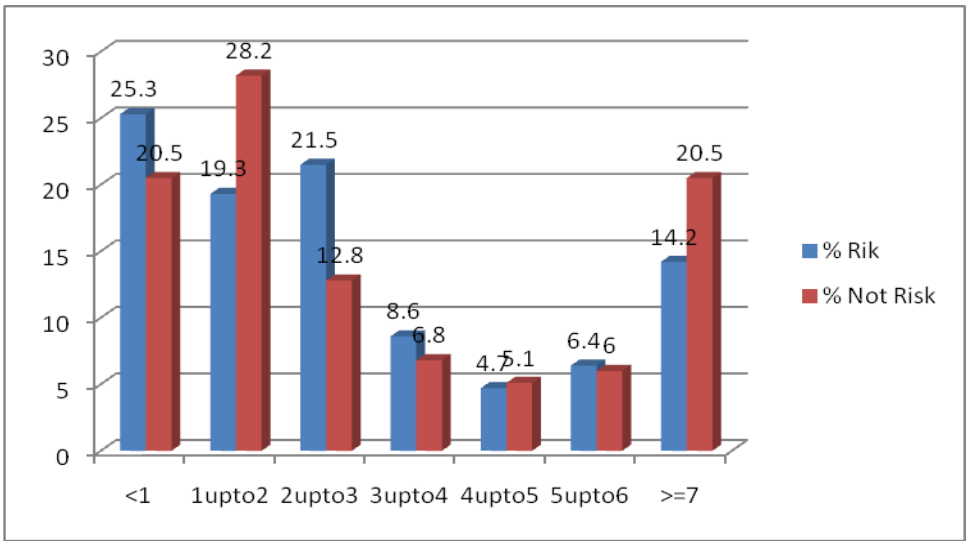

Figure 9: Driving experience distribution of Risk and Non Risk Drivers of Mekelle Town, Tigray Region, Northern, Ethiopia, April, 2011.

According to all participants FGDs and all key informants of indepth interview the most common risk behaviors related to driving observed in Mekelle town were mobile phoning, excessive speed, unfasten seat belt, driving after drinking alcohol, overloading, overtaking, violating traffic sign and not giving priority to pedestrians.

5.1.5.1.1. Mobile phone using while driving

The study showed that, of the total 350 respondents 148 (42.3%) were using mobile phone while driving vehicle within the past 12 months, whereas 202 (57.7%) were not using mobile phone when they drove a vehicle in the same period of time. Of the 148 respondents who were using mobile 88 (59.5), 28 (18.9) and 32 (21.6) were house car, taxi and bajaj respondents respectively. The reasons forwarded by the respondents why they used mobile was mobile phoning was important for their business, it was difficult for them to ignore when calls came from friends and clients. On the other hand among the reasons given by the respondents of non users of mobile were using mobile while driving would exposed to accident, distract drivng skill and the other reason was they feard of Birr 500.00 punishment from police traffic.

On the other hand all participants of FGDs members drawn from health committees and drivers revealed that "Drivers of Mekelle town terminate using mobile when they look traffic police or when they approached to areas where traffic polices would available.

Few discussants of FGDs drawn from drivers said that w*e believe that using mobile phoning has almost reduced by far comparing the previous years.* Whereas majority of discussants drawn from drivers and health committee FGDs members were not agree with the word by far. One participant drawn from drivers strengthened his objection and said that **"***Mobile Ab Izini Shifer ta-asira iya trkeb negergin abbey da-a tfitah ab Hawzien adebabay.***"**

This is to mean that every driver in Mekelle town is using mobile everywhere in every direction but mobile is only detached from the ear of the drivers when they enter Hawzien Square. According to discussants Hawzien Square is the place where traffic polices are always available.

Few in-depth interviewees said that *we believe that 70 – 80 % reduced compared to last two – three years.* On ther hand smajority of key informants of the in-depth interviewees said that u*sing mobile phoning while driving is only common when drivers are out of the eye of traffic police.* All key informants of indepth interviewees agreed that *what so ever small or big change in the reduction of using mobile while driving is the reason is attributed to the amount of punishment that is Birr 500.00.*

5.1.5.1.2. Drinking alcohol and driving

Out of the 350 total study subjects 288 (82.3%) of them took alcohol and 62 (17.7%) they never took alcohol at all. Of the respondents of 288 who took alcohol 28 (9.7%) were found driving after drinking alcohol within the last 12 monthes. Of the 28 respondents 21(75%), 5 (17.9%) and 2 (7.1%) were house car, bajaj and taxi respondents respectively. Among the reasons given by the respondents for why they drove after drinking alcohol were they believed that they were skillful and have self confidence in driving, and the other reseason given was though they knew its consequence danger they drunk and drove for enjoyment with friends.

On the other hand among the reasons given by those who were not drove after drinking alcohol was they believed that alcohol could expose them to accident.

Others of FGDs discussants drawn from drivers said that *most of the time those drivers who spend their night time in night clubs are driving their vehicles after taking too much alcohol drink.* These discussants extended their explanation that *most of the time those driving after drinking groups are house car occupants particularly those from the rich family.* One discussant of from the same group was justifying by saying that *"At night there are car accidents, and if in this time such kind of accidents are happened the chance of lebeling the driver could be a drunker and drove the vehicle after drinking."*

On the other hand all key informants of the in-depth interview were agreed that d*rinking and driving during night time is common but we lack instruments like Blood Alcohol Concentration (BAC) because of the inavaliability of this instrument we traffic polices faced a challenge while we are in front of court to respond what the level of the alcohol, and the driver who violated regulation by drinking and driving, and here most of the time drivers denayed if the case is alcohol we ourselves also couldn't justify regarding the level of alcohol.*

5.1.5.1.3. Unfasten Seat Belt

Un fasten seat belt was also investigated among private car and taxi drivers by excluding bajaj respondents from the denominator this was because the company did not installed seat belt for them. Out of 247 respondents of house car and taxi, 75 (81.5%) and 17 (18.5%) house car and taxi were found fasten their seat belt with in the past 12 months respectively. Whereas 97(62.6%) house car and 58(37.4%) taxi were unfasten thier seat belt in the same period of time. On the other hand as it has been mentioned above 103 (100%) of baja were not fasten seat belt. Some of the reasons given by the respondents of house car and taxi for not using seat belt were seat belt doesn't have importance and seat belt creats discomfort.

On the other hand all participants of FGDs agreed that *most drivers of Mekelle town do not wear seat belt.* Few participants drawn from health committees said that t*o have a corrective measure on seat belt the amount of punishment stated in regulation should be changed from 50.00 Birr to 200 to 300 hundred Birr.* But majority of discussants drawn from drivers said that w*e believe that punishment by itself cannot bring full change so has to be in lined or supported with current information and education on traffic related issues.*

All key informants of indepth interviewees agreed that m*ost drivers do not like to fasten seat belts. few* key informants of indepth interviewees said tha*t some drivers the reason they gave for not wearing seat belt is that wearing seat belt continuesly will damage our kidney.*

Few key informants of in depth interviewees said that *the fee for punishment of seat belt has to be changed from 50 birr to 200 birr to 300 hundred.* The reason given by the key informants was *drivers specially owner of vehicle they don't see the punishment of 50.00 as a big deal, so if the punishment high it will irritate them then they will be enforced to use.*

5.1.5.1.4. Excessive speed limit (above 35 km per hour)

Respondents were asked whether they follow speed limit of 35 km per hour which is recommended for Mekelle town or not within the past six months. Among the 350 respondents 303 (86.6%) were found to follow the recommended speed limit whereas 47 (13.4%) responded that they didn't follow the speed limi for the past 6 months. Of the 47 respondents who did not follow the speed limit 19 (40.4%), 18 (38.3%) and 10 (21.3%) were baja, house car and taxi respectively. The reasons given by the respondents who follow the speed limit were to prevent accident, to avoid punishment from police traffic related to excessive speed and the road of Mekelle town is not convenient to drive fast. On the other hand the main points mentioned as a reason for not following the speed limit by the respondents who did not follow the speed limit was someone who has skill full in driving didn't see the importance of speed limit.

All health committees and drivers discussants of FGDs said that *driving with excessive speed is observed and this is mostly observed among government drivers, taxi drivers particularly bajaj and house car which is drove by those teenagers, and the roads most of the time ecessive speed excercised are the road erected from Mekelle air port to Atse Yohannes secondary High School, the road which is erected from bus station to Elala, the road erected from Ajip to Elala, the road erected from Ajip to Ider referral hospital and some roads which serve as routs for taxi.*

Majority of key informants of the in-depth interviewees reported that i*n some roads which erect from Mekelle air port to Maydegene, and from Mesfin industry to Ellala mostly youngsters are observed while they are driving their vehicle with excessive speed.*

5.1.6. Legal measures taken by authorities/ traffic polices for minimizing risk behaviors and awareness and effectiveness of the issued regulation.

5.1.6.1. Legal measures taken

The study investigated if measures were taken by authorities or police traffic aiming at minimizing risk behaviors related to human factor. As the finding indicated with in the past of twelve months, out of 350 respondents 66 (18.9%) of them were stopped by traffic polices for punishment and warning, whereas 284 (81.1%) were not stopped. Of the 66 respondents stopped by polices 61 were stopped for one times and 5 of them were for two times. Among the reasons to be stopped were mobile phoning, excessive speed, unfasten seat belt, violating traffic signs and over loading.

5.1.6.2. Awarness on the issued regulation on traffic

During the FGDs and indepth interview the level of awereness of the regulation by drivers and residents was investigated. All participants of FGD drawn from health committees said that w*e don't know the regulation at all.* On the other hand all participants of FGDs drawn from drivers said that w*e don't know the regulation in detail.* Few participants drawn from drivers reported that w*e heard the information when people talked about it.* Another few participants drawn from drivers said that *we had a chance to hear on radio but it was not in detail rather it was a kind of highlight and very shallow information.*

All FGDs participants drawn from drivers said that *drivers of Mekelle town are not participating and were not involved while the regulation was developed or drafted, but we all drivers only know the amount of punishment specific to using mobile phoning and unfasten seat belts while we committed violation and stood infront of the traffic office to pay the punishment fee.*

This was supported by few key informants. The argument was that *it is difficult to say all drivers know the regulation even most of they don't know because when drivers got ticket for punishment and visit the traffic police office to pay and when they are told to pay the amount of money they get surprise and shout this indicates most drivers still are not aware of the*

regulation, but our office together with Mekelle town office of road and transport were giving information about the regulation using local media.

But to the contrary the majority of key informants said that 90% of the drivers know the regulation because information was given on local media and even main parts of the regulation were disseminated to taxi association and even to governmental sectors."

As far as awerness from the residents side is concerned all FGDs participants that were drawn from health committees and drivers reported that r*esidents of Mekelle are not totally aware of the regulation.* Few key informants of the indepth interviewees revealed that w*e can not say residents of the town aware of this regulation though explanaition was given on radio at one time.* But majority of key informants of indepth interviewees repoted that *to some extent residents are aware of the regulation because information was given on local radio and on top of that education was given in schools, factories.*

5.1.6.3. Effectiveness of the regulation in minimizing or avoiding risk behaviors

During the FGDs and indepth interview the level of effectiveness of the regulation of traffic on minimizing or avoiding risk behaviors was investigated. On the one hand all the FGDs discussants drawn from health committees preferred to be reserved to give any comment up on this issue the reason given was w*e don't know the regulation at all, so no comment.* On the other hand few FGDs participants drawn from drivers reported that *the regulation is implemented effectively in minimizing the risk behaviors in the town.*" Another few FGDs discussants drawn from drivers said that it is not implemented effectively, because the traffic polices are few in number.

On the other hand all key informants of indepth interviewees agreed that t*he regulation contributes a lot in minimizing risk behaviors on driving, but the regulation itself has a gap, because the regulation does not include pedal cyclist and animal carts, because of this traffic polices are in trouble in applying this regulation as kids whose age of 13 to 14 were riding a cycle and enter to main squares of the town where high traffic flows are there. So we police traffics are not in a position to carry out any measure to those cyclists and animal carts which are blamed for different accidents.* Few key informants of the indepth interview reported that t*he*

issue of pedal cyclists and animal carts were forgotten while the Bussiness Process Reengineering reform was carried out.

On the other hand all key informants of indepth interviewees revealed that b*ecause of the scarcity of police traffic in the town and not equipped with necessary materials the regulation wouldn't be fully effective.* As an example noted by the key informants was *if one driver is driving a vehicle after drinking alcohol what can traffic police do? it is nothing because we traffic polices are not equipped with Blood Alcohol Concentration tester instrument, though one traffic police was trained in Addis Ababa the last two years."* The other point mentioned by few key informants of indepth interviewees that the regulation not to be fully effective is that *in the town there is no radar for detecting the speed level of vehicle.*

5.1.7. Magnitude, perception, seriousness and responsible for RTAs in Mekelle.

5.1.7.1. Magnitude of RTAs

The study investigated about the magnitude of RTAs within the past two years. Among the 350 total respondents 77 (22%) had car accident while driving a vehicle whereas 273 (78%) of them had no car accident. Of the 77 respondents who had car accident, 68 and 9 of them had one times and two times of accident in the past two years respectively.

5.1.7.2. Perception on RTAs

The study investigated the perception of study subjects on RTAs through the FGDs and indepth interview. All FGDs discussants drawn from drivers and health committees, and all the key informants of indepth interviewees revealed their perception on road traffic accidents in many ways. Some of the points raised by all of them were:

*Road traffic accident is taken as a serious accident and its consequences could be beyond one imagination. as its name indicates someone without preparing himself can be perish even without telling to his/her family where his/ her asset is.*Discussants further elaborated their perception that RTA**:**

-Mostly happened by drivers negligence

-Road traffic accident can be reduced if drivers are careful and give value to their life, other passengers and pedestrians.

-RTA has negative impact on economy both at country and household level.

-RTA has negative social impact

- One FGDs participant drawn from health committees gave his witness and said that a*t one time I had a journey from Mekelle to shire and there was one passenger who sat beside me and that gay was phoning to his mother and he told to his mother that he is in a vehicle and probably after 30 minutes he would arrive home, but at that time while that gay was talking and laughing with his mother, incidentally that vehicle was overturned upside down. And that gay who was eager to see his mother perished once for all. And I realized that the accident was happened by the that driver because there were some mis behaved with that of driver.*

5.1.7.3. Road traffic accident and its seriousness in Mekelle

The study investigated wether RTAs was serious problem in Mekelle or not through the FGDs and indepth interview. All discussants of FGDs members and all key informants of the indepth interview agreed that r*oad traffic accident is serious problem in Mekelle and this is happened because drivers are seen to drive in excessive speed to overtake one the other and some of the drivers lack ethics and respection to pedestrians.* The participants revealed that *there are so many teenager and youngster drove, and even it is difficult to say they are qualified.*

5.1.7.4. Responsible for road traffic accident

According to all FGDs participants said that *the first responsible lies on the drivers, because a driver is trained, assumed that he/she is skillful and knows the regulation more than pedestrians and other passengers.* Few FGDs participants drawn from drivers said that *pedestrians of Mekelle didn't walk using their left walking side,* and according to these participants *pedestriants of Mekelle didn't know how and when to cross the Zibra lines.*

On the other hand all key informants of the indepth interviewees said in agreement to the above that *the first responsible lies on the drivers, because a driver is trained, assumed that he/she is skillful and knows the regulation more that pedestrians and other passengers. Next to drivers pedestrians of Mekelle don't walk using their left walking side, they don't how and when to cross the Zibra lines.* As one key informant of indepth interview quoted *" We di hagereseb mekina yiferif we di ketema gin Bi-eray yiferih"* This is to mean that the the villagers feared of car where as the Urbana residents feared of an oxen. Few interviewees blamed that *there is ill coordination in between the offices of road, transport and industry and police traffic, so these two sectors are also the one which can take responsibilty.*

5.1.8. Advices or warning given as reinforcing factor on minimizing risk behaviors while driving.

As the finding indicated among the 350 respondents 86 (24.6%) them had reported that advice and warning were given by their spouse, parents, friends, owner of vehicles and others on avoiding risk behaviors related to driving, whereas 264 (75.4%) of them didn't get any kind of advice or warning. According to those respondents of the 86 who had advice or warning 84 (97.7%) of them were advantageous in correcting their misbehave they showed on excessive speed, un fasten seat belt, alcohol drinking and driving, mobile phoning and other risk behavior, whereas 2 (2.3%) responded that they did not change their risk behavior.

On the other hand all participants of FGDs agreed that f*amilies, friends, passengers and owners can influence on drivers behaviors.* As an example given by all discussants was *if a driver want to overload passengers and if all passengers who sat first in that vehicle reject and shout together the behavior driver could be corrected.*

One FGDs participant drawn from health committees reported that *one day a driver and his conducter ("Weyala") told me to give space for one lady and to sat beside me and I replied that no I am not volantry because the seat is already occupied by this gay (another gay who sat*

ahead) and me. At that time all passengers were shouting at me and consider me as cruel. Look how we as people encourage illegal activities. So the problem lies on us. The answer to the question is yes advice and warning can have strong effect but the problem we ourselves do not know our right. So in this regard it needs a revolution of thinking and rethinking which could be supported by education to our people what the impct and benefit of discouraging risk behaviors on drivers by offering advice and warning.

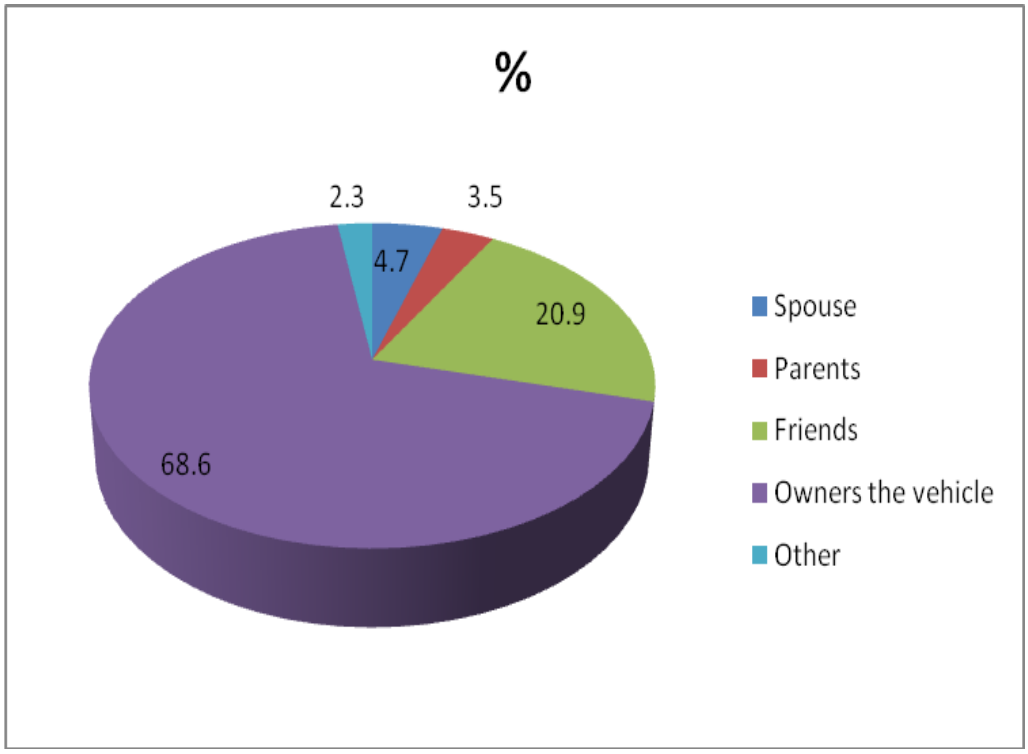

Figure 10: Drivers Who Received Advice from Family, Friends, Owner of the Vehicle and others Mekelle, Tigray Region, Northern Ethiopia

Determination of COR of different variables and risk behaviors using Binary logistic regression model.

After conducting a chi-square test and getting some association of variables with risk and non risk respondents, all the variables were enter to binary logistic regression model. According to this model age=p-value of .005, education=p-value of .021, monthly income=p-value of .001, attitude= p-value of .000 and .012, knowledge= p-value of .003, driving experience= p-value of .026, advice= p-value of .000 and experience of road traffic accident=p-value of .006 were become significant. Whereas driving license and stopped by traffic for ticketing or punishment were not significant in the model.

Determination of final predictors of risk behaviors using multiple logistic regression model

All variables which were significant in the binary logistic regression were entered in the multiple logistic regression by method of back ward stepwise and based on this process final predictors risk behaviors were determined. According to multiple logistic regression the variables: Middle upper income percentile= AOR=8.470, p-value=.000, 95% CI: 3.029, 10.680, Highest income percentile= AOR=9.242, p-value of .000, 95%CI: 2.804, 11.460, Negative attitude= AOR= 13.677, p-value of .000, 95%CI: . 3.314, 15.644, Neutral attitude =2.251, p-value of .005 95%CI: 2.258, 9.616, and Advice= AOR=2.985 p-value=.001, 95% CI: 1.545, 5.780 were significant to be the final predictors of driving risk behavior whereas other variables including age entered the multiple regression were not found to be predictors of driving risk behavior. (Table 3)

Table 3: Multiple Logistic Regression Model Showing Predictors of Different Variables and Risk Behaviors of Driving Among Drivers of Mekelle Town, North Ethiopia, April 2011.

Variable	COR (95% CI)	AOR (95% CI)	P-value
Age			
<18	.338 (.055, 2.101)	1.345 (.088, 20.541)	.831
18-24	.635 (.147, .899)*	3.256 (.877, 12.089)	.078
25-34	1.798 (.727, 4.450)	2.841 (.955, 8.450)	.060
35-44	.685 (.273, 1.721)	.940 (.331, 2.673)	.908
>=45	1.0	1.0	1.0
Education			
Primary	1.488 (.737, 3.066)	1.266 (.455, 3.517)	.652
Secondary	.224 (.112, .438)*	2.490 (1.024, 6.052)*	.044
Tertiary	1.0	1.0	1.0
Monthly income			
< 1000 Birr	1.0	1.0	1.0
1000-2350 Birr	1.625 (.886, 2.979)	2.367 (.955, 5.870)	.063
2351-5000 Birr	2.754 (1.555, 4.876)*	8.470 (3.029, 10.680)*	.000
>5000 Birr	3.656 (1.635, 8.478)*	9.242 (2.804, 11.460)*	.000
Attitude			
Negative attitude	.188 (.077,. 246)*	13.677 (3.314, 15.644)*	.000
Neutral attitude	.203 (.179, .234)*	2.251 (2.258, 9.616)*	.005

Positive attitude	1.0	1.0	1.0
Advice or warning given by anyone other than traffic police on avoiding risk behaviors of driving			
Yes	1.0	1.0	1.0
No	.274 (.166, .526)*	2.985 (1.545, 5.780)*	.001

Note: * = significance at p-value< 0.05

Chapter Six

Discussion

The present study indicated that attitude was significant (p-value .000) predictor with the risk behavior of the drivers of Mekelle town. Drivers who had negative attitude towards road safety were 13.7 times more likely risky as compared with those drivers who had positive attitude. This study showed that drivers who had also neutral attitude were found 2 times more likely risky than the respondents with positive attitude. During the FGDs and the key informants all discussants and interviewees were agree that the cause for risk practices and risk behaviors seen among drivers of Mekelle town was due to negative attitude of drivers of the town.

This finding is consistent with the study made by Iversen H. in Norway, that negative attitude was significantly predictor for the risk behavior observed in risk taking drivers. Iversens' study was on Risk taking attitude and risky driving behavior aimed at investigating whether attitudes towards traffic safety issues are predictors for future risk behaviour in traffic. Examination of identical item pools measuring attitude and behaviour among the same drivers (n=1604) at two data collection points enables investigation of consistency of measurements, and also a study of the relationship between the two variables. Attitudes measured at the first survey had consistent effects on risky driving behaviour measured at the second survey. Drivers who were involved in traffic accidents or crashes in the last year took more risks when driving. (66)

From the present finding we can understand that someone who had car accident in the previous time may not take as a lesson and change his/her risk behavior unless attitudinal change and some other important elements are realized.

On the other hand the presnt study showed that education was significant (p-value= .044) with the risk of drivers of Mekelle town. According to the study drivers who had secondary level education were found 2.5 times riskier than those respondents who had tertiary level of education. This finding is consistent with the study made in Turky which secondary level of education was significant for the risk behaviors observed (55).

From the present finding we can understand that as the level of education become high the risk taking behavior would decreases, this is because that someone with high level of education would feel that responsibility and cognition ability towards road safet could be enhanced.

On the the hand the present study noted that family monthly income of drivres was significant with the risk of behaviors. According to this study respondents with highest income percentile was found 3.6 times riskier than those respondents with lowest income. On the other hand respondents with middle upper income percentile was found 2.7 times riskier when compared with those drivres with lowest income.

The present finding was also supported by the qualitative finding of FGDs participants drawn from drivers reaveld that most of the time teenagers from the rich family are seen in the town spend their night in night clubs and drive their vehicle after they drunk alcohol.

In addition to this our finding is consistent with the study done in Norway among 1356 participants indicated that drivers who were excitement or enjoyment seeking was significantly associated and predictor of risk driving behavior and collusion (67).

The possible explanaition might be as the income per capita increases the tendency for relaxiation specially with that of youngsters would increase and those drivers with high family income could get a chance of using mobile phoning and drinking and driving frequently.

The present finding showed that drivers who didn't get advice or warning from their family, friends, owner of the vehicle and passengers were found 2.9 times risky as compared to those who got advice or warning from their family, friends owner of the vehicle and passengers.

This study is in agreement with our qualitative study that all FGDs participants agreed that "Passengers and owners can influence on drivers behaviors." As an example given by them was "if a driver want to overload passengers and if all passengers who sat first in that vehicle reject and shout together driver behavior could be corrected."

This study is consistent with the study made in Sweden that peer were significantly influence on risky drivers. According to this literature, in Sweden attempts are being made to persuade young persons to intervene when they observe their friends that are driving after alcohol consumption and positive issues started to achieve (56).

The possible explianation would be as level of influence from the family, owner of the vehicle friends and passsangers increases the misbehave of the drivers could be corrected.this means social influence would be regarded as the best for minimizing or avoiding the risk behavior of drivers.

Chapter Seven

Limitation and Strength of the study

7.1 Strength

Using both the quantitative and qualitative studies were employed.

7.2 Limitation

There could be a possibility of hiding information related to risk behavior by the respondents

Respondents were asked whether they drive after drunk alcohol, whether they used mobile while driving in the last 12 months such things could liable to a possible recall bias.

Respondents were asked for whether they were stopped by traffic if they committed mistake and this also liable to a possible recall bias.

There was no enough literatute done on factors affecting risk behaviors of driving in our country to compare with our finding..

Chapter Eight

8.Conclusion and Recommendation

8.1. Conclussion

In conclusion, the present study indicated that significant number of drivers had less knowledgeable about knowledge assessing questions on traffic sign. On the other hand nearly half of the drivers had less attitude towards road safety. based on the present findings attitude was found one of the predictor which independently affect the risk behavior among drivers of Mekelle town.

The study revealed that drivers with low driving experience were exercising risk behaviour. More than half of drivers who had punished by traffic were continuing risk behaviour. More than half of drivers who had experiences of car accident were continuing risk behaviour. The study showed also large number of drivers who had received advice and warning from family, friends, owner of the vehicle and passengers were found minimizing their risk behaviors whereas those drivers drivers who didn't get any advice or warning from their family friends, owner of the vehicle and passengers were not minimizing or avoiding the risk behaviors. based on the present findings high and middle monthly family income were found the predictor which independently affect the risk behavior among drivers of Mekelle town.

On the other hand the present study indicated that a considerable number of drivers who were received punishment from traffic were continuening experiencing of risk behavior. This means punishment alone might not bring change in the avoiding of risk behaviors unless it is supported with other educational and attitudinal changes.

According to the present investigation education was found as one predictor of risk behaviors among the study subjects. Our finding also indicated that respondents whose educational status of primary school was found riskiest group as compared with those whose educational background was tertiary level.

Ingeneral, we conclude that the factors that were affecting independently to the risk behaviors among drivers were the variables of attitude, education, family monthly income and advice given by the respondent family, friends, owner of the vehicle and passengers.

8.2. Recommendation

Depending on the results of our study the following recommendations are suggested to rectify the problem:

- Mekelle Town Road Construction Transprt office should give comprehensive and up-to-date information to the driver to enhance their knowledge.
- Tigray Region Road Construction and Transport should be made efforte to mainstreaming the issue of RTA and its strategic prevention by all relevant sectors.
- Mekelle Town Traffic office should create awareness about RTA and its prevention via media campaign.
- Tigray Regional Health Bureau should conduct target audience Health Education and promotion on RTA.
- Residents should influence on drivers to minimize and avoid risk behavior of driving

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ANNEX

ANNEX1: **Brief Summary of Data Collection Methods**

ANNEX**1**: QUESTIONNAIRE FORM OF DATA COLLECTION

English questionare

JIMMA UNIVERSITY COLLEGE OF PUBLIC HEALTH & MEDICAL SCIENCE
POSTGRADUATE SCHOOL DEPARTMENT OF HEALTH EDUCATION AND BEHAVIORAL SCIENCE

QUESTIONNAIRE FOR STUDY ON FACTORS AFFECTING RISK BEHAVIORAL ON ROAD TRAFFIC ACCIDENT AMONG DRIVERS IN MEKELE TOWN, TIGRAY, ETHIOPIA

INTRODUCTION AND INFORMED CONSENT FORM FOR THE ASSISTANCE:

Questionnaire number_____

Information sheet

Good morning – afternoon – evening (as appropriate). My name is _____ and I am one of the data collectors from Jimma University post graduate research team. We are conducting a study on factors affecting risk behaviors on traffic road accidents in Mekelle town that aims at reduction of traffic accidents.

As part of this study, we are interviewing a wide cross section of community members, traffic police and drivers. We will be able to make improvements to road safety through designing new educational materials. We would like you to complete the questionnaire as honestly as possible. The questionnaire should only take around 15 or 20 minutes to complete.

We really appreciate you taking time to complete the questionnaire. However please note that you are not under any obligation to do so. Completing the questionnaire is entirely voluntary. If we discuss anything you have not heard before or don't understand, please feel free to ask for clarification.

The information you are going to provide us will not applicable to prosecution purpose and it will be be kept strictly confidential, and will not be revealed to anyone. You do not need to put your name anywhere on the questionnaire. You can decline participating in the survey at any time.

Do you have any questions about the survey?

May I begin the interview now? **Yes** Start the interview **No** _____the interview stops here

Consent form (by data collector)

I have fully described the purpose of the research and the rights of the respondent to decide not to participate or discontinue his/her participation at any time in the process of the interview, and I confirm all these and the information in it is correct that by putting my signature in the space provided below.

Date_____ Signature of data collector_____

SECTION 1: Demographic Characteristics of the studied

QUESTIONNAIRE - ID	VARIABLE	CODE OF RESPONSE	SKIP
Q101	Age	_____	
Q102	Sex	1. Male……..……1	
		2. Female……..2	
Q103	Relation with the family?	1. Husband……1	
		2. Wife……..2	
		3. Son……3	
		4. Daughter……4	
		5. Others, specify_____5	
Q104	Religion	1. Orthodox……...1	
		2. Protestant……..2	
		3. Catholic……3	
		4. Muslim…….....4	
		5.Other, Specify_____ _____5	
Q105	What is your Marital Status?	1.Single……1	
		2.Married…….2	
		3.Divorced……3	
		4. Widow…….4	
		5. Other, specify……..5	
Q106	Ethnicity	1.Tigray……1	
		2.Erob……..2	
		3Kunama…….3	
		4.Amhara…….4	
		5.Other, specify_____._____5	

Q107	Educational Status	1.Can't read & write……..1	
		2.Read and write……2	
		3.Grade 1-4…….3	
		4.Grade 5-8……..4	
		5. Grade 9-10……..5	
		6.Grade 11-12……..6	
		7.10+1 up to 10+3……..7	
		8.Tertiary level……8	
Q108	Total household members	_____	
Q109	Family monthly income?	Birr_____	

SECTION 2: Driving Experience

QUESTIONNAIRE -ID	VARIABLE	CODE OF RESPONSE	SKIP
Q 201	What Type of Vehicle you operate?	1. House car……..1	
		2.Taxi……2	
		3.Bajaj……...3	
Q 202	Are you an owner of vehicle?	1.Yes……1	
		2.No……..2	
Q 203	Driving experience in year	_____	
Q 204	Which of the following best describes you?	1.I don't have license……1	
		2.I am learning to drive at the moment…….2	
		3.I have a driving license……..3	

SECTION 3: Knowledge: Can you named from these Traffic warning signs you see/ look (study subjects would have a chance to look over 10 traffic signs and they named each sign, and multiple answer is possible)

QUESTIONNAIRE -ID	VARIABLE	CODE OF RESPONSE	SKIP
Q 301	Crossroad. A four-way intersection is ahead. Watch for cross traffic.	1. Yes……1	
		2. No…….2	
Q302	Students ahead, slow down your speed	1. Yes……..1	
		2. No……2	
Q 303	Pedestrian crossing	1. Yes……1	
		2. No…….2	
Q 304	Automobiles no overtaking	1. Yes……1	
		2. No…….2	
Q305	Closed to automobiles	1. Yes……1	
		2. No…….2	
Q 306	No parking. Which means you can park to pick someone or to drop someone.	1. Yes……1	
		2. No…….2	
Q 307	No entry. Applies to vehicles facing to the sign.	1. Yes……1	
		2. No…….2	
Q 308	No parking until you get another sign inscribed end	1. Yes……1	
		2. No…….2	
Q 309	Maximum speed is 35 kms per hour	1. Yes……1	
		2. No…….2	
Q 3010	Stop and give way.	1. Yes……1	
		2. No…….2	

SECTION 4 : Attitude on speed: People have different attitude about driving. I'd like to tell me whether you agree or disagree with the following statement about driving.

QUESTIONNAIRE – ID	VARIABLE	CODE OF RESPONSE				
		1.Strongly Agree	**2. Somewhat Agree**	**3.Somewhat Disagree**	**4. Not Agree**	**5.Strongly Disagree**
Q401	I enjoy the feeling of speed					
Q402	The faster I drive, the more alert I am					
Q403	I often get impatient with slower drivers					
Q404	. I try to get where I am going as fast as I can					

SECTION 5 : Attitude on seat belt while driving:

QUESTIONNAIRE –ID	VARIABLE	CODE OF RESPONSE				
		1.Strongly Agree	**2. Somewhat Agree**	**3.Somewhat Disagree**	**4. Not Agree**	**5.Strongly Disagree**
Q 501	Seat belt is not really necessary if I drive carefully					
Q 502	Seat belt doesn't reduce risk in accident					
Q 503	I feel less comfortable when wearing belt					
Q 504	There is risk of being trapped by belt in case of emergency					

SECTION 6: Attitude on mobile phoning while driving: To what extent do you agree with the following statements about the potential safety risks from using a mobile phoning while driving.

QUESTIONNAIRE –ID	VARIABLE	CODE OF RESPONSE				
		1.Strongly Agree	**2. Somewhat Agree**	**3.Somewhat Disagree**	**4. Not Agree**	**5.Strongly Disagree**
Q 601	It is not easy for someone to tell if their driving has been affected (detectability)					
Q 602	I would need a lot of convincing to believe it is dangerous (Danger threshold)					
Q 603	The effects on driving ability are likely to be only very minor (Severity)					
Q 604	The only people at risk are those who use a mobile while driving (Equitability)					

SECTION 7 : Attitude on drink-driving

QUESTIONNAIRE –ID	VARIABLE	CODE OF RESPONSE				
		1.Strongly Agree	**2. Somewhat Agree**	**3.Somewhat Disagree**	**4. Not Agree**	**5.Strongly Disagree**
Q 701	It is quite safe for me personally to drive after one or two drinks					
Q 702	The only person who could be affected by my drinking and driving is me					
Q 703	Speeding is a much more serious problem than drink-driving					
Q 704	Nothing will stop me from drinking and driving.					

SECTION 8: Advice or warning from family/ friends/ passengers/ Owner/ Boss on avoiding or minimizing risk behavior of driving

QUESTIONNAIRE –ID	VARIABLES	CODE OF RESPONSE	SKIP
Q 801	Thinking about recent occasion, was any one give you an advice or warning on avoiding or minimizing un safe manner of driving?	1. Yes…….1	
		2. No……..2	To section 9
Q 802	If the answer to Q801 yes, what was his/ her/ their relationship to you(read list if necessary)	1. Spouse…….1	
		2. Parents…….2	
		3. Friend……..3	
		4. Owner/ Boss...…….4	
		5. Other ,specify……..5	
Q 803	What type/s of un safe driving behavior/s did you do?(Record all that apply)	1. Speeding……1	
		2. Drinking-driving….2	
		3. Un fasten seat belt…3	
		4. Mobile phoning……4	
		5. Other, specify…..…5	
Q 804	Did they ask/ tell you to stop driving like that?	1. Yes……..……1	
		2. No……2	To Q 806
Q 805	Did you do what they asked?	1. Yes……..1	
		2. No……...2	
Q 806	If they had asked you to drive differently, do you think, you would have done what they asked ?	1. Yes……..1	
		2. No……2	
		3. Not sure……3	

SECTION 9: Car Accident Experience			
QUESTIONNAIRE –ID	VARIABLES	CODE OF RESPONSE	SKIP
Q901	Have you been in a vehicle crash in the past two years?	1. Yes……..1	
		2. No……2	To Section 10
		3.I don't know……98	To Section 10
		3.Refuse…….….99	To Section 10
Q902	If Q901 answer is yes, How many times has this happened to you (in the past two years)?	_____Number	
		I don't know……...98	
		Refuse……99	

SECTION 10: Evaluation Drivers Behavioral Risk factors

QUESTIONNAIRE –ID	VARIABLES	CODE OF RESPONSE	SKIP
Q1001	Do You use seat belt while driving within the last 12 months?	1. Yes	
		2. No	
Q1002	If to Q1001 yes, why?	3. because I perceive it is important ……..1	
		4. because Traffic police enforced me ……2	
		5. Other, Specify …….3	
Q1004	If to Q1001 answer is no, why?	1. because I don't see its importance ……...1	
		2. It creates me discomfort…….2	
		3. Other, Specify ……..3	
Q1005	D0 You use mobile phone while driving in the past 12 months?	1. yes……1	
		2. No…….……2	

		3. I don't know..……98	
		4. Refuse……..…….99	
Q1006	If Q 1005 is yes why?	1. I am confident enough in my capacity of driving……1	
		2. because I perceive it is important for my business ……2	
		3. Other, Specify …….……3	
Q1007	If to Q1005 answer is no, why?	1. Because It distracts my driving…..…….. ……1	
		2. Because it expose me to accident ……..2	
		3. Because Traffic police enforced me not to use	
		4. Other, Specify…….……..4	
Q1008	Do you drink alcohole?	1. yes ……..….1	
		2. Recently I stopped ……..2	
		3. Morthan one year since I stopped….3	To 10012
		4. No I don't totally drink……...4	To 10012
		5. Other, specif……5	
Q1009	Did you drive after drinking alcohole in the past 12 months?	1. Yes……..……..1	
		2. No…….2	
Q10010	If Q1009 answer is yes, why?	1. If I took alcohole it makes me alert…….1	
		2. I am confident enough in my capacity of driving ……..2	
		3. Other, specify……..3	
Q10011	If Q 1009 answer no, why?	1. Because It distracts my driving…..…….. ……1	
		2. Because it expose me to accident ……..2	
		3. Because Traffic police can punish me…….....3	
		4. Other, Specify……4	
Q10012	Did You follow Traffic Speed limit (35 km /h) within the past 6 months ?	1. Yes…….1	
		2. No……...2	
		3. I don't know..……98	

		4. Refuse……..……99	
Q10013	If Q1012 answer is yes, why?	1 .to prevent accident	
		2.To avoid from police punishment	
		3. Because the road is not convienet	
Q10014	If Q1012 answer is Never, why?	1. I am confident enough in my capacity of driving……1	
		2. I don't see its importance.....2	
		3. Other, Please Specify_____3	

SECTION 11. Measure taken from authorities/Traffic Police for minimizing risk behaviors

QUESTIONNAIRE –ID	VARIABLES	CODE OF RESPONSE	SKIP
Q 1101	In the past twelve months have you been STOPPED by the police for any traffic-related reason?	4. Yes……1	
		5. No…..……2	To final suggestion and give thank
		6. I don't know..……98	Same to the above
		7. Refuse……..…….99	Same to the above
A1102	How many times have you been stopped by the police in the past 12 months (traffic related)?	_____ __Number of Times	
Q 1103	What were you stopped for?/ **Code all that apply/**	1. Excessive speed……..…1	
		2. Un fasten seat belt……..2	
		3. Drinking-driving……3	
		4. Mobile phoning……..4	
		5. Other, specify……5	
Q 1104	Did you receive a punishment ticket or warning (on any of those occasion)?	1. Yes…….1	
		2. Neither……2	
Q1105	**If Q1012 answer is yes,**	1. Ticket……..1	
		2. Warning……2	
		3. Ticket and warning……3	
Q 1106	Did you change your driving behavior as a result of receiving the ticket?	1. Yes……..1	
		2. No……2	
Q 1107	**If answer Q1014 is no, why?**	_____	

Finally what suggestions and comments do you have that would helpful to minimize the Road traffic accident.

_____

That completes our interview

Thank you for your assistance.

ANNEX 2: INTERVIEW GUIDE QUESTIONS FOR A FOCUS GROUP DISCUSSION (FGDs)

ASSESSEMENT OF BEHAVIORAL FACTORS FOR ROAD TRAFFIC ACCIDENT AMONG DRIVERS IN MEKELE TOWN, TIGRAY, ETHIOPIA, 2011.

JIMMA UNIVERSITY COLLEGE OF PUBLIC HEALTH & MEDICAL SCIENCE POSTGRADUATE SCHOOL DEPARTMENT OF HEALTH EDUCATION AND BEHAVIORAL SCIENCE

FGD Guides, for Drivers

Region: Tigray, Town: Mekelle,

1. How do you Perceive Road traffic accident? (probe its danger, consequences etc.)
2. Is Road traffic accident a Serious Problem in Mekelle? Yes----No(If yes; Who are the Main Victims/Vulnerable of Road traffic accident in Mekelle?(Probe Drivers, Pedestrians, Pedal Cyclist, Children, Mothers, Students, etc) Why?
3. What risk behaviors do you observe
4. What are the possible causes for the risk behaviors
5. Do you think that enough traffic signs are posted in most and important parts of the town? If yes mention some places? If no Why?
6. Do you feel that the available Traffic Rules and Regulations reduce road traffic accidents in Mekelle? If no Why?
7. Are drivers and community members aware of the regulation on road safety
8. Do you think giving advice or warning from family, friends, owner of vehicle can have impact in RTAs reduction.
9. Who is mostly responsible for the Road traffic accident in Mekelle? (driver, pedestrians)
10. What do you suggest to improve the situations of Road traffic accident in the town?

_____

_____

_____

Thank You!

Annex 3: ASSESSEMENT OF BEHAVIORAL FACTORS FOR ROAD TRAFFIC ACCIDENT AMONG DRIVERS IN MEKELE TOWN, TIGRAY, ETHIOPIA, 2011.

JIMMA UNIVERSITY COLLEGE OF PUBLIC HEALTH & MEDICAL SCIENCE POSTGRADUATE SCHOOL DEPARTMENT OF HEALTH EDUCATION AND BEHAVIORAL SCIENCE

Guides, for Community Representatives

Region: Tigray, Town: Mekelle,

1. How do you Perceive Road traffic accident? (probe its danger, consequences etc.)
2. Is Road traffic accident a Serious Problem in Mekelle? Yes----No(If yes; Who are the Main Victims/Vulnerable of Road traffic accident in Mekelle?(Probe Drivers, Pedestrians, Pedal Cyclist, Children, Mothers, Students, etc) Why?
3. What risk behaviors do you observe (prob mobile phone, excessive speed, unfasten seat belt alcohol)
4. What are the possible causes for the risk behaviors
5. Do you think that enough traffic signs are posted in most and important parts of the town? If yes mention some places? If no Why?
6. Do you feel that the available Traffic Rules and Regulations reduce road traffic accidents in Mekelle? If no Why?
7. Are drivers and community members aware of the regulation on road safety
8. Do you think giving advice or warning from family, friends, owner of vehicle can have impact in RTAs reduction.
9. Who is mostly responsible for the Road traffic accident in Mekelle? (driver, pedestrians)
10. What do you suggest to improve the situations of Road traffic accident in the town?

THANK YOU

ANNEX 4: INTERVIEW GUIDE QUESTIONS FOR AN IN DEPTH INTERVIEW

ASSESSEMENT OF BEHAVIORAL FACTORS FOR ROAD TRAFFIC ACCIDENT AMONG DRIVERS IN MEKELE TOWN, TIGRAY, ETHIOPIA, 2011.

JIMMA UNIVERSITY COLLEGE OF PUBLIC HEALTH & MEDICAL SCIENCE POSTGRADUATE SCHOOL DEPARTMENT OF HEALTH EDUCATION AND BEHAVIORAL SCIENCE

In-depth Interview Guides, with Traffic Police

Region: <u>Tigray</u>, Town: <u>Mekelle,</u>

1. How do you Perceive Road traffic accident? (probe its danger, consequences etc.)
2. Is Road traffic accident a Serious Problem in Mekelle? Yes----No(If yes; Who are the Main Victims/Vulnerable of Road traffic accident in Mekelle?(Probe Drivers, Pedestrians, Pedal Cyclist, Children, Mothers, Students, etc) Why?
3. What risk behaviors do you observe and
4. possible causes for the risk behaviors
5. Do you think that enough traffic signs are posted in most and important parts of the town? If yes mention some places? If no Why?
6. Do you feel that the available Traffic Rules and Regulations reduce road traffic accidents in Mekelle? If no Why?
7. Are drivers and community members aware of the regulation on road safety
8. Do you think giving advice or warning from family, friends, owner of vehicle can have impact in RTAs reduction.
9. Who is mostly responsible for the Road traffic accident in Mekelle? (driver, pedestrians)
10. What do you suggest to improve the situations of Road traffic accident in the town?

Thakn You!

Annex 5: Ten Knowledge Assessing Traffic Signs conducted during the study

1. **Crossroad. A four-way intersection is ahead. Watch for cross traffic.**

2. **Pedestrian crossing**

3. **Students ahead, slow down your speed**

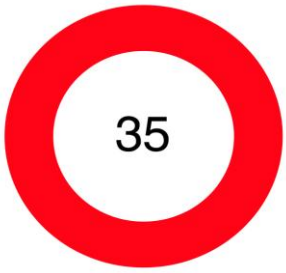
4. Automobiles no overtaking

5. Closed to automobiles

6. No parking. Which means you can park to pick someone or to drop someone

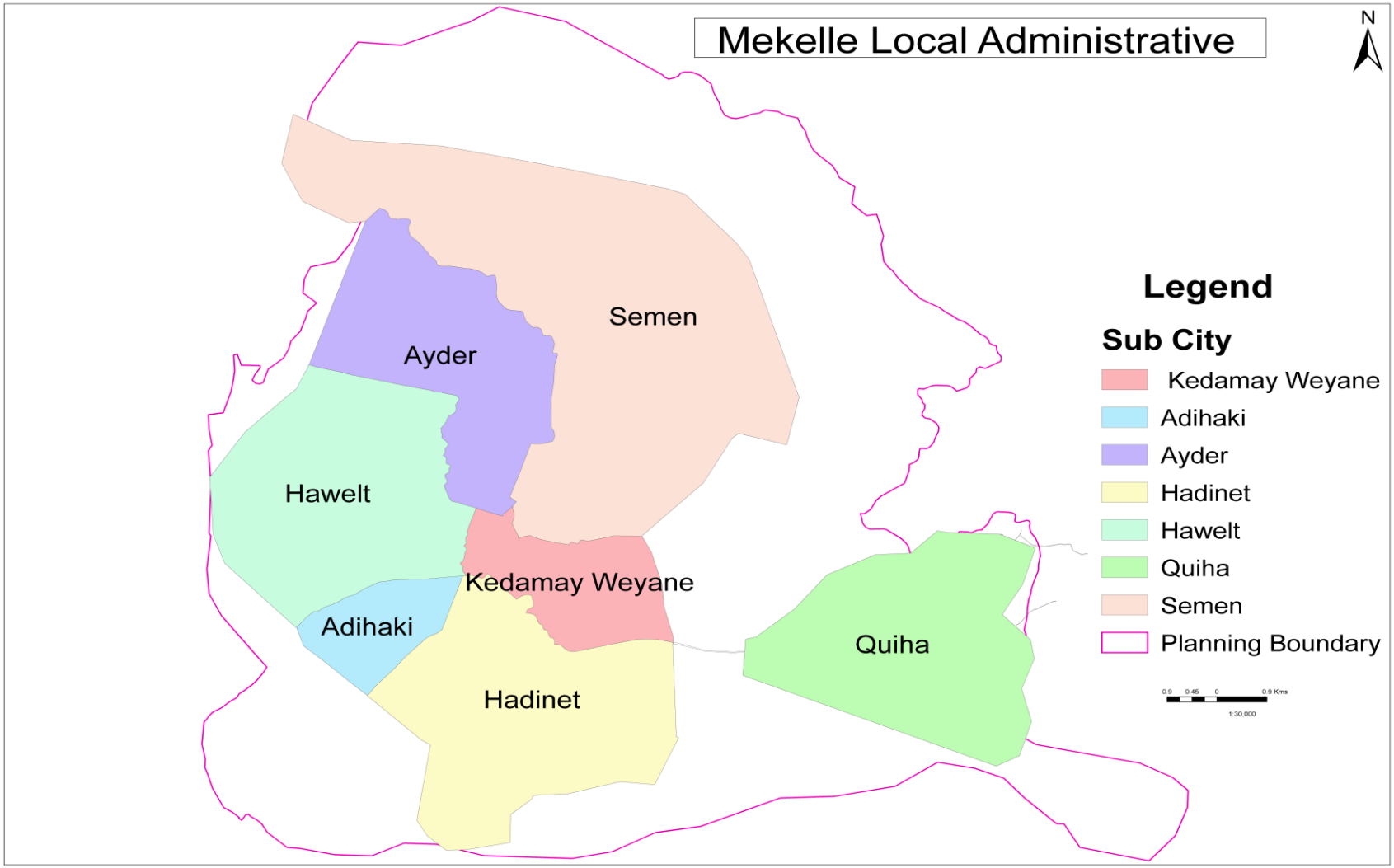
7. No entry. Applies to vehicles facing to the sign.

8. No parking until you get another sign inscribed end

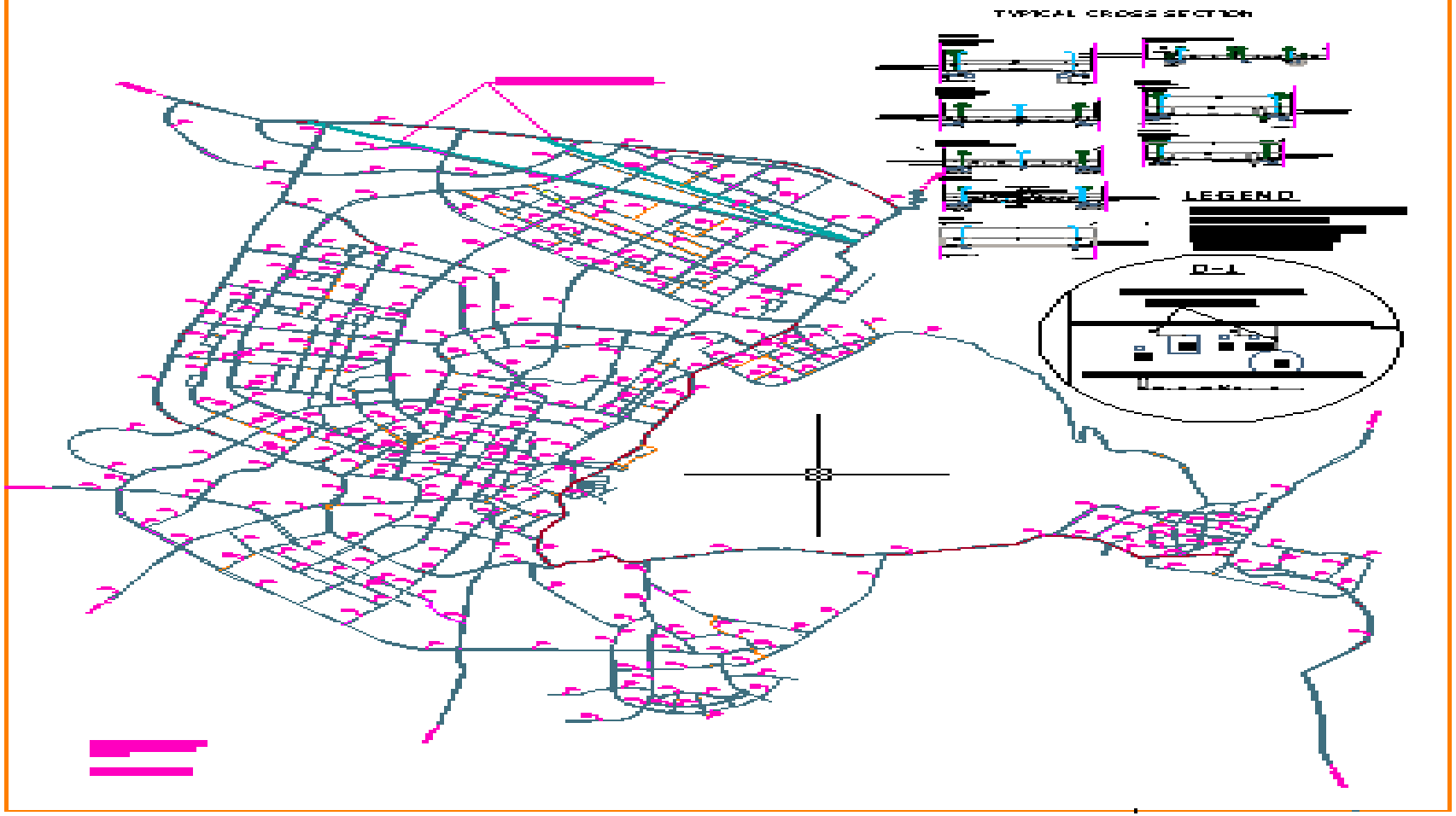


9. Maximum speed is 35 kms per hour

10.Stop and give way


Mekelle Local Administrative
N
Semen
Ayder
Hawelt
Kedamay Weyane
Adihaki
Hadinet
Quiha
Legend
Sub City
Kedamay Weyane
Adihaki
Ayder
Hadinet
Hawelt
Quiha
Semen
Planning Boundary
0.9 0.45 0 0.9 Kms
1:30,000

PROPOSED ROAD NET WORK



Tigrigna questionare

ካብ ሽፈራት መረዳእታ መአከቢ ዝተዳለወ ቃለ መሕተቲ ቅጥዒ

ጂማ ዩኒቨርሲቲ ህብረተሰብ ጥዕናን ሕክምና ሳይነስን ኮሌጅ ድህረ ምረቃ ትምህርት ቤት ዲፓርትመንት ጥዕና ትምህርትን ስነ ባሕሪ ሳይንስን

አብ ተሽከርከርቲ ምሽፋር ዝረአዩ ጎዳእቲ ባሕሪታትን መበገሲኦምን ሓደጋ ትራፊክን ከተማ መቐለ ትግራይ ኢትዮ□ያ

መእተዊን ንተሓታቲ ዝንበበሉ/ላ ናይ መተአማሚነ ቅጥዒን

ቁፅሪ ቃለ መሕተቲ_____

ዳሓን ዶ ሓዲሮም/ረን ዳሓን ዶ ዊዒሎም/ዊዒለን (ክም ኣድላይነቱ). ሽመይ _____ ይባሃል ኣነ ሓደ ካብቶም ካብ ጂማ ዩኒቨርሲቲ ድህረ ምረቃ ናይ ምርምር መረዳእታ/ዳታ ዝእክቡ ዘለው ጉጅለ እየ. እነ ፅንያ ዘለና ፅንዓት ድማ አብ ከተማ መቐለ አብ መንነ ሽፈራት ንትራፊክ ሓደጋ ንክብአአስ ምክንያት ንዝኮኑ ሓደጋኛ ባሕሪታት መበገሲኦም ምፍላይ ኮይኑ ፅላምኡ ደማ ሓደጋ ትራፊክ ምቅናስ እዩ.

እዚ ፅንዓት ዝተፈላለዩ ኣካላት ዝሓትት ኮይኑ ካብአቶም ድማ ዝተወሰኑ ክፋል ህብረተሰብ ሽፈራትን ፖሊስ ትራፊክን ይርከብዎም

እዚ ቃለ መሕትት ብተአማንነት ንክንውድእ ኮይኑ ዝወስደና ጊዜ ድማ ካብ 15 እስካብ 20 ደቓይቅ ጥራሕ እዩ

እዚ ቃለ መሕትት ጊዜካ/ኪ ወሲድካ/ኪ ንምውዳኣእ ፍቃደኛ ምካንካ/ኪ ብጣዕሚ ነድንቅ ኮይኑ ግን ክፍለጥ ዘለዎ እዚ ሓበሬታ ነምሃብ ምንም ዘገድደካ ነገር የለን ብድልየትካ/ኪ ዝምላእ እዩ. አብ እንገብሮ ምይይጥ ቅድሚ ሀዚ ዘይሰማዕካዮን/ዘይሰማክዮን ወይ ድማ ዘይበርሑልካ/ኪ ነገራት እንተልዮም ነፃ ኮይንካ ንክበርሀልካ መሕታት ይካኣል

ዝዋበና ሓበሬታ ወይ መረዳእታ ፍፁም ብሚስጢር ዝታሃዝን ንማንም ዘይግለፅን ኮይኑ ብክሲ መልክዕ ናብ ሕጊ ዘይቀርብ እዩ.ሽም ተሓታቲ አብዝ ኮነ ቦታ አይፃሃፍን. አብዚ ኮነ እዋን እዚ ፅንዓት ወይ ዳህሰሳ ጠጠው ምባል ይካኣል እዩ.

እዚ ፅንዓት ዝምልከት ሕቶ ኣለካ/ኪ ዶ? ሀዚ ቃለ መሕትት ምጅማር ይክእል ድየ? <u>እወ</u>_____ ሕቶ ምጅማር ይካኣል <u>አይካኣልን</u> _____ቃለ መሕትት ምክያድ አይካኣልን

ናይ ስምምዕነት ቅጥዒ (ብመረዳእታ ኣካቢ)

ዕላማ እዚ ፅንዓትን ተሓታቲ እዚ ቃለ መሕትት አብዚ ኮነ እዋን ናይ ምቁራፅን ጠጠው ምባልን ሙሉእ መብቲ ከም ዘለዎ ብዝግባእ ገሊፀ እየ እዚአቶም ኩሎምን እዚ ተአኪቡ ዘሎ መረዳእታ ትክክል ምካኑ በዚ አብ ታሕቲ ተቀሚጡ ዘሎ ክፍቲ ቦታ ብፊርማይ የረጋግፅ.

ዕለት_____ ፊርማ መረዳእታ ኣካቢ_____

ካብ ሕድ ሕድ ሽፌር መረዳእታ መአከቢ ዝተዳለወ ቃለ መሕተቲ ቅጥዒ

ክፍሊ ሓደ:ሓፈሻዊ ኩነታት

መፍለይ ቁፅሪ	ሕቶታት	ዝተዋቡ መልስን ኮድ እቲ መልስን	ናብቲ ዝቅፅል
Q101	ዕድመ	_____	
Q102	ፆታ	1. ተባዕታይ.....1	
		2. ተነኽተይቲ.....2	
Q103	አብዚ ሀዚ እዋን ምስ ዝነብርሉ ስድራ ዘለዎም ዝምድና	1. ስብኣይ/አቦወራ.....1	
		2.ሰበይቲ.....2	
		3. ወዳቶም.....3	
		4. ጎላቶም.....4	
		5. ካሊእ እንተኮይኑ ይገለፅ_____5	
Q104	ሓይማኖት	1. ኦርቶዶክስ.....1	
		2. ፕሮቴስታንት.....2	
		3. ካቶሊክ.....3	
		4. ሙስሊም.....4	
		5._____ 5	
Q105	ኩነታት ሓዳር	1.ዘይተርመዐወ/ት.....1	
		2.ዝተመርዐወ /ት.....2	
		3.ዝተፋተሐ /ት.....3	
		4. በዓልቲ ሓዳሩ/ራ ዝሞተቶ/ዝሞታ 4	
		5.ካሊእ ተኮይኑ ይገለፅ.....5	

Q106	ብሄረሰብ	1.ትግራይ……..1	
		2.ኢሮብ……2	
		3ኩናማ……3	
		4.አምሓራ……4	
		5. ካሊእ እንተኾይኑ ይገለፅ…....5	
Q107	ኩነታት ትምህርቲ	1.ምንባብን ምፅሃፍን ዘይክእል ወይ ዘይትክእል…….1	
		2. ምንባብን ምፅሃፍን ዝ□እል ወይ ት□እል……..2	
		3. 1-4 ብርኪ……..3	
		4.5-8 ብርኪ……..4	
		5. 9-10ብርኪ……5	
		6.11-12ብርኪ……6	
		7.10+1 እስካብ 10+3……7	
		8.ኮሌጅ ወይ ዩኒቨርሲቲ……8	
Q108	በዚ ሀዚ ዘለ ጠቅላላ በዝሒ ስድራ		
Q109	ወርሓዊ እቶት ቤተሰብ ክንደይ ይ□ን		

SECTION 2: ተሞክሮን ልምድን ምዝዋር ዘድሀበ ቃለ መሕትት

ሕቶታት መፍለይ ቁፅሪ	ሕቶታት	ዝተዋቡ መልስን ኮድ እቲ መልስን	ናብቲ ዝቅፅል ሕለፍ
Q201	እንታይ ዓይነት ተሸከርካሪ ትዝውር/ ሪ	1. ገዛ መኪና……..1	
		2.ታክሲ……2	
		3.ባጃጅ……3	
Q202	ባዓል ዋና እዛ ተሸከርካሪ ዲካ/ ኪ	1.እወ……1	
		2.አይኮንኩን……2	
Q203	ልምዲ ምዝዋር		
Q204	ካብ ዞም ዝቅፅሉ አይኒኡ ይገልፀካ	1.መንጃ ፍቃድ ወይ ናይ ምዝዋር ፍቃድ የብለይን…1	
		2.መንጃ ፍቃድ ልምውሳዕ አብ ልምምድ ይርከብ …….2	

		3. መንጃ ፍቃድ ወይ ናይ ምዝዋር ፍቃድ አለኒ……..3	

SECTION 3: ፍልጠት: ሓደ ተሓታቲ 10 ናይ ትራፊክ ዘጠንቅቁ ምልክታት ንክርኢን እቶም ምልክታት እንታይ ከምዝውክሉ ክገልፅ ብምግባር ፍልጠቱ ምልካዕ

ሕቶታት መፍለይ ቁፅሪ	ሕቶታት	ዝተዋቡ መልስን ኮድ እቲ መልስን	ናብቲ ዝቅፅል ሕለፍ
Q 301	መስቀለኛ መንገዲ ስለዘጋጥመካ ተጠንቂቅካ አሽከርክር::	1.	
		2.	
Q 302	እግረኛ ዝበገዘሐሉ አከባቢ ስለዝኾነ ተጠንቂቅካ አሽከርክር::	1.	
		2.	
Q 303	ተምሃሮ ዝበገዘሐሉ አከባቢ ስለዝኾነ ፍጥነት ብምቅናስ ተጠንቂቅካ አሽከርክር::	1.	
		2.	
Q 304	ንኣውቶሞቢል ምቅዳም ዝተከልከለ እዩ::	1.	
		2.	
Q 305	አቅቶሞቢል መሐላፍ ክልክል እዩ::	1.	
		2.	
Q 306	ንነዊህ ሰዓት መኪና ጠጠው ምባል ዝክልክል ኮይኑ ሽፈር እንተይ ወረደ ሰብ ምውራድን ምፅዓንን ይካኣል::	1.	
		2.	
Q 307	ምልክቱ ብዝረአየሉ ሸነ□ ምሕላፍ ዝተ□ልከለ እዩ::	1.	
		2.	
Q 308	ናይቲ ምልክት መጨረሻ ዝብል እስካብ ትረክብ መኪና ጠጠው ምባል ክልክል እዩ::	1.	
		2.	
Q 309	አብቲ ምልክት ካብ ዝተቀመጠ መጠን ፍጥነት ንላዕሊ ምሽከርካር ዝተ□ልከለ እዩ::	1.	
		2.	
Q 3010	ጠጠው ኢልካ ቅድሚያ ሃብ::	1.	
		2.	

SECTION 4 :አብ ፍጥነት ዘሎ አመለካክታ ወይ ዝንባለ: ደቂ ሰበት ብዛዕባ ምዝዋር ዝተፈላለየ አመላካክታ እዩ ዘለዎም. አብዞም ቀሊሎም አብ መዝዋር አምልኪቶም ዝቀርቡ ሕቶታት አዝየ ብጣዕሚ ይስማዕማዕ ብመጠኑ ይስማዕማዕ ብመጠኑ አይስማዕማዕን አይስማዕማዕን ወይ ድማ አዝየ ብኣዕሚ አይስማዕማዕን ዝበል መልሲ ክትህበኒ ወይ ክትህብኒ ይደሊ..

ሕቶታት መፍለይ ቁፅሪ	ሕቶታት	ዝተዋቡ መልስን ኮድ እቲ መልስን				
		1.አዝየ ብጣዕሚ ይስማዕ ማዕ	2. ብመጠኑ ይስማዕማዕ	3.ብመጠኑ አይስማዕማ ዕን	4. አይስማዕማዕ ን	5. አዝየ ብኣዕሚ አይስማዕማዕ ን
Q 401	ብፍጥነት ምዝዋር የሕጉሰኒ::					
Q 402	ብፍጥነት ብዝዘወርኩ እዋን ንቅሃት ይስመዐኒ::					
Q 403	ቀስ ኢሎም ንዝዝውሩ ዘወርቲ ወይ ገናሕቲ ትዕግስቲ					

	የብለይን::					
Q 404	ናብ ዝሓሰብክዎ ቦታ ብፍጥነት ክበፅሕ ይደሊ::					

SECTION 5 :መኪና አብ ዝዝወረሉ እዋን ናይ መኪና ቀበቶ አብ ምግባር ወይ ምህንጋጥ ዝህልው አመለካክታ ወይ ዝንባለ:

ሕቶታት መፍለይ ቁፅሪ	ሕቶታት	ዝተዋቡ መልስን ኮድ እቲ መልስን				
		1.እዝየ ብጣዕሚ ይስማዕማዕ	2. ብመጠኑ ይስማዕማዕ	3.ብመጠኑ አይስማዕማዕን	4. አይስማዕማዕን	5. እዝየ ብኣዕሚ አይስማዕማዕን
Q501	ናይ ምዝዋር ክእለተይ ፅቡቅ እንተኮይኑ ናይ መኪና ቀበቶ ምግባር አድላይ አይኮነን::					
Q502	ናይ መኪና ቀበቶ ምግባር ሓደጋ ይቅንስ ምባል አይካአልን::					
Q503	እንድሕር መኪና ቀበቶ ዘይገይረ ንእሽተይ ምቾት ይስመዐኒ::					
Q504	ናይ መኪና ቀበቶ ጌርካ ተፀኒሕካ እሞ እታ መኪና ሓደጋ እንተ ኣጋጢምዋ በቲ ቀበቶ ስለ ስለ ዝተአሰርካ ወይ ስለ ዝተሓንገጥካ ካብ ሓደጋ ክተምልጥ ኣይትክእልን::					

SECTION 6: መኪና አብ ዝዝወረሉ እዋን ሞባል ምዝርራብ ዝህልው ሳዕቤን አመለካክታ

ሕቶታት መፍለይ ቁፅሪ	ሕቶታት	ዝተዋቡ መልስን ኮድ እቲ መልስን				
		1.እዝየ ብጣዕሚ ይስማዕማዕ	2. ብመጠኑ ይስማዕማዕ	3.ብመጠኑ አይስማዕማዕን	4. አይስማዕማዕን	5. እዝየ ብኣዕሚ አይስማዕማዕን
Q 601	እናሽፈረካ ሞባይል ምዝርራብ ነቲ ጉዕዞ አሉታዊ ሳዕቤን እንተልይዎ ሓደ ተጎዓዛይ ንክዛረብ ቀሊል እዩ:: (detectability)					
Q 602	እና ሽፈርካ ሞባይ ምዝርራብ ሓደጋ ዘስዕብ ምካኑ ንክአምን ብዙሕ ጭብጥታት ወይ መረዳእታት የድልዩ:: (Danger threshold)					
Q 603	እናሽፈርሞባይል ምዝርራብ					

	አብ ምዝዋር ብቅዓት ዝህልም አለ.ታዊ ሳዕቤን አዝዩ ውሕድ እዩ:: (Severity)					
Q604	ንሓደ.ጋ ክ.ጋለፀ ዝክእሉ እናሸፈሩ ሞባይል ዝዛረቡ ጥራሕ እዮም:: (Equitability)					

SECTION 7 : አልኮል ሰቲካ መኪና ምሽፋር ክህልው ዝክእል ሳዕቤን አመልኪቱ ዝቀረቡ ናይ አመለካክታ ወይ ዝንባለ ሕቶታት::.

ሕቶታት መፍለይ ቁዕሪ	ሕቶታት	ዝተዋቡ መልስን ኮድ እቲ መልስን				
		1.አዝየ ብጣዕሚ ይስማዕማዕ	2. ብመጠኑ ይስማዕማዕ	3.ብመጠኑ አይስማዕማዕን	4. አይስማዕማዕን	5. አዝየ ብኣዕሚ አይስማዕማዕን
Q701	ብውለቀይ ሐደ ወይ ክልተ መስተ ሰቲካ ምሽፋር አብ ደህንነተይምንም ዘምፅኦ አለ.ታዊ ሳዕቤን የለን::					
Q702	አነ መስተ ሰቲየ ብምሽፋረይ ክህልው ዝክእል ሳዕቤን ዝጉዳእ አነ ጥራሕ እየ::					
Q703	ካብ መስተ ሰቲካ ምሽፋር እቲ ዝክፍአ ፀገም እዩ ዝብሎ አነ ብፍጥነት ምሽፋር እዩ::					
Q704	ዝኾነ ኣካል ካብ መስተ ሰቲካ ምሽፋር ጠጠው ክብለኒ አይክእልን::					

SECTION 8: ሐደገኛ ዝኾነ ምሽፋር ባሕሪ ንምዕላይ ወይ ንምቅናስ ተባሂሉ ካብ ቤተሰብ ፣ዓዕረ□ቲ፣ ተሳፈርቲ ፣በዓል ዋና ወይ ሓላፊ ዝተውሃበ ምክሪ ወይ መጠንቀቅታ እንተልዩ ዝቀረበ ሕቶ

ሕቶታት መፍለይ ቁዕሪ	ሕቶታት	ዝተዋቡ መልስን ኮድ እቲ መልስን	ናብቲ ዝቅዕል ሕለፍ
Q 801	አብ ቀረበ ካብ ዘጋጠመካ/ኪ ነገራት ብምስትዋስ ዝኾነ ሰብ ሓደገኛ ሳዕቤን ዘለዎ አሸፋፍራ መኪና ንምቅናስ ወይ ንምእላይ ተባሂሉ ዝተውሃበካ/ኪ ምክሪ ወይ መጠንቀቅታ ነይሩ ዶ?	3. እወ ነይሩ.....1	
		4. አይነበረን.....2	ክፍሊ 9
Q 802	ሕቶ 801 መልሱ እወ እንተኮይኑ ምስቲ ምክሪ ዘሃበ ሰብ ዘለኩም ዝምድና ወይ ርክብ እንታይ እዩ አድላይ እንተኮይኑ ይነበበሉ/ላ	5. በዓል ሓዳረይ.....1	
		6. ወላድየይ.....2	
		7. ዓርኪይ.....3	
		8. በዓል መኪና/ ሓላፊየይ...4	
		9. ካሊእ እንተኮይኑ ይገለፅ...5	
Q 803	እቲ አሸፋፍራካ/ኪ ፀገም አሸፋፍራ ነይርዎ ማለት እዩ?(ካብ ሓደ ንላዕሊ መልሲ ምሃብ	10. ፍጥነት.....1	
		11. መስተ ሰቲካ	

	ይካኣል)	ምሽፋር……2	
		12. ናይ መኪና ቀበቶ ዘይምግባር…3	
		13. ሞባይል ምዝርራብ……4	
		14. ካሊእ እንተኮይኑ ይገለፅ…5	
Q 804	ከምዚ ዓይነት አሽፋፍራ ጠጠው አብል ኢሎም ሓቲቶምካ/ኪ ዶ?	1. እወ……1	
		2. አይሓተቱንን……..2	ናን 806
Q 805	ከምቲ ዝበሉካ ተግቢርካየዶ?	3. እወ……1	
		4. አይተግበርኩን……. 2	
		5. እርግፀኛ አይኮንኩን……3	
Q 806	ካምቲ ንሳቶም ዝሃቡካ ምክሪ ወይ መጠንቀቅታ ክሸፍር ይገበኣኒ ነይሩ ዶ ትብል?	6. እወ……1	
		7. አይብልን……. 2	

SECTION 9: Car Accident Experience			
ሕቶታት መፍለይ ቁፅሪ	ሕቶታት	ዝተዋቡ መልስን ኮድ እቲ መልስን	ናብቲ ዝቅፅል ሕለፍ
Q901	አብዚ ክልተ ዓመት ውሽጢ ምሽክርካር ሓደጋ አጋጢምካ ነይሩ ዶ?	1. እወ……1	
		2. አየጋጠመንን……..2	ናብ ክፍሊ 10
		3.አየስታውሶን…….98	ናብ ክፍሊ 10
		4.ንምምላስ ፍቃደኛ አይኮንኩን…….99	ናብ ክፍሊ 10
Q902	ሕቶ ቁፅሪ 901 መልሱ እወ እንተኮይኑ ጠቅላላ በዝሒ እቲ ሓደጋ አብዚ ክልተ ዓመት ውሽጢ ክንደይ ይኮን?	1. _____በዝሒ	
		2.አየስታውሶን…….98	
		3.ንምምላስ ፍቃደኛ አይኮንኩን…….99	

ክፍሊ 10: ግምገም ጎዳእቲ ባሕርታት			
ሕቶታት መፍለይ ቁፅሪ	ሕቶታት	ዝተዋቡ መልስን ኮድ እቲ መልስን	ናብቲ ዝቅፅል ሕለፍ
Q1001	አበ ዝሃለፉ 12 አዋርሕ ክትሽፍር/ሪ	1. እወ	

	እንተለካ/ኪ ናይ መኪና ቀበቶ ትጥቀም/ሚ ዶ ?	2. አየፋለን	
Q1002	ሕቶ ቁፅሪ 1001 መልሱ እወእንተኮይኑ ንምንታይ?	1. ምክንያቱም ጠቃማይነቱ ስለዝግንዘብ ……..1	
		2. ምክንያቱም ትራፊክ ፖሊስ ስለዘገድደኒ……..2	
		3. ካሊእ እንተኮይኑ ይገለፅ ……..3	
Q1003	ሕቶ ቁፅሪ 1001 መልሱ ፍፁም አይጥቀምን እንተኮይኑ ንምንታይ?	1. ምክንያቱም ኣድላይነቱ ምንም ስለዘይረኣየኒ……..1	
		2. ምቾት አይስመዐንን……..2	
		3. ካሊእ እንተኮይኑ ይገለፅ …..3	
Q1005	አበ ዝሃለፉ 12 ኣዋርሕ ክትሸፍር/ሪ እንተለካ/ኪ ሞባይል ስልኪ ትጥቀም/ሚ ዶ ?	1. እወ	
		2. አይፋለን	
Q1006	ሕቶ ቁፅሪ 1004 መልሱ አይፋለን እንተኮይኑ ንምንታይ?	1. አሸፋፍራ ብቅዓተይ ስለዝትአማመን ……1	
		2. ምክንያቱም ንስረሐይ አድላይ ምኮኑ ስለ ዝግንዘብ……..2	
		3. ካሊእ እንተኮይኑ ይገለፅ……3	
Q1007	ሕቶ ቁፅሪ 1004መልሱ እወ እንተኮይኑ ንምንታይ?	1. ምክንያቱም አሸፋፍራይ ስለዝርብሸኒ……..1	
		1. ምክንያቱም ናብ ሓደጋ ክጋልፀኒ ስለዝክእል…….2	
		2. ምክንያቱም ትራፊክ ፖሊስ ንክይጥቀም ስለዝእገደኒ……3	
		3. ካሊእ እንተኮይኑ ይገለፅ…….4	
Q1008	አልኮል መስተ ትሰቲ ዶ?	1. ኩሉ ጊዜ ……1	
		2. ሓሊፉ ሓሊፉ……2	
		3. መስተ ገዲፎየ እየ……..3	
		4. መስተ ዝባሃል ጭራሽ አይሰትን….4	
		5. ካሊእ እንተኮይኑ ይገለፅ…….5	
Q1009	አብ ዝሓለፉ 12 ኣዋርሕ አልኮል ሰቲካ ትሸፍር ዶ?	1. እወ	
		2. አይፋለን	
Q10010	ጥያቄ ተራ ቁፅሪ 1009 መልሱ እወ ተኮይኑ	1. ብመጠኑ አልኮል ተሰትየ ንቅሃት ስለዝህበኒ……	

	ንምታይን?	1	
		2. አሽፋፍራ ብቅዓት ስለዘለኒ ምንም ችግር የብሉን 2	
		3. ካሊእ እንተኮይኑ ይገለፅ.....3	
Q10011	ጥያቄ ተራ ቁፅሪ 1009 መልሱ ፍፁም አየሽከርክርን ተኪይኑ ንምታይ ለምን?	1. ናይ ምሽፋር ብቅዓት ስለዝርብሸ..... 1	
		2. ንሓደጋ ኪጋልፀኒ ስለዝክእል.....2	
		3. ትራፊክ ፖሊስ ክቅፅዐኒ ስለዝክእል...3	
		4. ካሊእ እንተኮይኑ ይገለፅ.....4	
Q10012	አብ ዝሓለፈ 6 ወርሒ ናይ ትራፊክ ፍጥነት ወሰን ትክተል ዶ?	1 እወ	
		2 አይፋለን	
Q10013	ሕቶ ቁፅሪ 1007መልሱ ፍፁም አይጥቀምን እንተኮይኑ ንምንታይ?	1. አሽፋፍራ ብቅዓተይ ስለዝትአማመን 1	
		2. አድላይነቱ አይረአየንን.....2	
		3. ካሊእ እንተኮይኑ ይገለፅ.....3	

ክፍሊ 11. ብፖሊስ ትራፊክ ወይ ብዝምልከቶ ኣካል ዝተወሰደ ስጉምቲ እንተልዩ ዝቀረበ ቃለ

መሕትት

ሕቶታት መፍለይ ቁፅሪ	ሕቶታት	ዝተዋቡ መልስን ኮድ እቲ መልስን	ናብቲ ዝቅፅል ሕለፍ
Q 1101	አብዝ ሓለፉ 12 ኣዋርሕ ውሽጢ ምስ ሽፋር ብዝተተሓሓዘ ጉዳይ ብፖሊስ ትራፊክ ጠጠው ንክብለ/ላ ዝተገበርሉ /ላ እዋን ነይሩ ዶ?	1. እወ.....1	
		2 አይነበረን.....2	ሕቶ የብቅፅ ስለዝኾነ አመስጊንካ ትሰናበት
		3.አየስታውሶን.....98	
		4.ንምምላስ ፍቃደኛ አይኮንኩን.....99	
Q 1102	ሕቶ ቁፅሪ 1101 መልሱ እወ ተኪይኑ ክንደይ ጊዜ ጠጠው ንክትብሉ ተገይሩ?	_____ በዝሒ	
Q 1103	ምክንያት ጠጠው መበሊ እንታይ ነይሩ ? /ካብ ሓደ ንላዕሊ መልሲ ምምላስ ይካኣል/	1. ካብ መጠን ንላዕሊ ፍጥነት.....1	
		2. ናይ መኪና ቀበቶ ዘይምግባር.....2	
		3. መስተ ሰቲካ ምሽፋር.....3	
		4. ሞባይል ምዝርራብ.....4	

		5. ካሊእ እንተኾይኑ ይገለፅ.....5	
Q 1104	ቅዕዓት ወይ መጠንቀቅታ ዶ ተዋሂብካ ?	1. እወ.....1	
		2. ምንም አይተውሃበንን.....2	
Q1105	ሕቶ ቁፅሪ 1104 መልሱ እወ ተኾይኑ ዓይነት ይገለፅ?	1. ገንዘብ ቅዕዓት.....1	
		2. መጠንቀቅታ.....2	
		3. ገንዘብ ቅዕዓትን መጠንቀቅታን.....3	
Q 1106	በቲ ዝተውሃበ ቅዕዓት ይኹን መጠንቀቅታ ምክንያት ባሕሪ አሸፋፍርካ ተስተካኪልዶ?	1. እወ.....1	
		2. አይስተካከለን.....2	
Q 1107	ሕቶ ቁፅሪ 1106 መልሱ አይተስተካከለን እንተኾይኑ ንምንታይ?	_____	

አብ መወዳእታ ሓደጋ ትራፊክ ንክቅንስ ይክእል እዩ ትብልዎ ሓሳብ ወይ ሪኢዮ እንተልይዎም/ወን.

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ሕቶና ዛዚምና አለና

ንዝገበሩልና /ንዝገበራልና ምትሕብባር አዝና ነመስግን.

ካብ ጉጅለ ምይይጥ መረዳእታ መእከቢ ዝተዳለወ ቃለ መሕተቲ ቅጥዒ /FGDs Guide/

ጂማ ዩኒቨርሲቲ ህብረተሰብ ጥዕናን ሕክምና ሳይነስን ኮሌጅ ድህረ ምረቃ ትምህርት ቤት ዲፓርትመንት ጥዕና ትምህርትን ስነ ባሕሪ ሳይንስን

አብ ተሸከርከርቲ ምሽፋር ዝረአዩ ጎዳእቲ ባሕሪታትን መበገሲኦምን ሓደጋ ትራፊክን

ከተማ መቐለ ትግራይ ኢትዮ□ያ, 2011

ጉጅለ ተመያየጥቲ: ሽፈራት

ክልል:ትግራይ ከተማ: መቐለ

1.ትራፊ ሓደጋ ክበሃል እንከለ ከመይ ትግንዘብዎ? ሓደጋኛነቱን ሳዕቤኑን ወዘተ

2. መንገዲ ትራፊ ሓደጋ አብ መቐለ ከም ዓቢይፀገም ምውሳድ ይካኣል ዶ? እወ----አይፋሉን (እወ እንተኮይኑ; መን እዩ አዚዩ ንሓደጋ ተጋሊዑ ዘሎ? (ሽፈራት, እግረኛታት, ሳይክል ዝገንሑ, ህፃናት, አደታት,ተምሃሮ, ወዘተ) ንምንታይ?

3አብ ሽፈራት ዝራአዩ ናይ ባሕሪ ፀገማትን

4መበገሰኦምን

5.አብዚ ከተማ እኩላት ዝኮኑ ናይ ትራፊ ምልክታት አብ አገደስቲ ቦታት ተዘርጊሆም አለው ምብል ይካኣል ዶ? እወ ተኮይኑ እስቲ እቶም ቦታት ይጠቀሱ? የለውን ተኮይኑ ንምንታይ ይመስለኩም?

6. እቶም ዘለው ናይ ትራፊክ ህግን ደንብን አብ መቀለ ዝረአዩ መንገዲ ትራፊክ ሓደጋ ንምቅናስ የክእሉ ዶ ትብሉ? መልሱ አይካኣልን ተተባሂሉ ምክንያቱ እንታይ እዩ ትብሉ

7. አብ መቀለ ንዝረአዩ ትራፊክ ሓደጋታት ንክጋደዱ ዝገብሩ ዘለው አገደስቲ መንስኤታት እንታይ እዮም?

8 ምክሪ ካብ ወለዲ አዕሮክቲ ወዘተ ከመይ ትርእዎ

9. አብዚ ከተማ ንዝረአዩ ዘለው ትራፊክ ሓደጋታት ብዋናነት ተሓታቲ መን እዩ ትብሉ?(ሽፈር ወይስ እግረኛ)

10. አብ መወዳእታ ሓደጋ ትራፊክ ንክመሃየሽ ይክእል እዩ ትብልዎ ሓሳብ ወይ ሪኢቶ እንተልይካቱም.

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ምይይጥና አብዚ ዛዚምና አለና

ንዝገበሩልና /ንዝገበራልና ምትሕብባር አዝና ነመስግን.

ካብ ጉጅለ ምይይጥ መረዳእታ መአከቢ ዝተዳለወ ቃለ መሕተቲ ቅጥዒ /FGDs Guide/

ጂማ ዩኒቨርሲቲ ህብረተሰብ ጥዕናን ሕክምና ሳይነስን ኮሌጅ ድህረ ምረቃ ትምህርት ቤት ዲፓርትመንት ጥዕና ትምህርትን ስነ ባሕሪ ሳይንስን

አብ ተሸከርከርቲ ምሽፋር ዝረአዩ ጎዳእቲ ባሕሪታትን መበገሲኦምን ሓደጋ ትራፊክን ከተማ መቐለ ትግራይ ኢትዮ□ያ, 2011

ጉጅለ ተመያየጥቲ: ህብረተሰብ ተወከልቲ ኣባላት ጥዕና ኮሚቴ መቐለ

ክልል:<u>**ትግራይ**</u>**, ከተማ: መቐለ**

1.ትራፊክ ሓደጋ ክበሃል እንከሎ ከመይ ትግንዘብዎ? ሓደጋኛነቱን ሳዕቤኑን ወዘተ

2. መንገዲ ትራፊ ሓደጋ አብ መቐለ ከም ዓቢይፀገም ምውሳድ ይካኣል ዶ? እወ----አይፋሉን (እወ እንተኮይኑ; መን እዩ አዚዩ ንሓደጋ ተጋሊፁ ዘሎ? (ሽፈራት, እግረኛታት, ሳይክል ዝገንሑ, ህፃናት, አደታት,ተምሃሮ, ወዘተ) ንምንታይ?

3አብ ሽፈራት ዝራአዩ ናይ ባሕሪ ፀገማትን

4መበገሰኦምን

5.አብዚ ከተማ እኩላት ዝኾኑ ናይ ትራፊ ምልክታት አብ አገደስቲ ቦታት ተዘርጊሆም አለው ምብል ይካኣል ዶ? እወ ተኮይኑ እስቲ እቶም ቦታት ይጠቀሱ? የለውን ተኮይኑ ንምንታይ ይመስለኩም?

6. እቶም ዘለው ናይ ትራፊክ ህግን ደንብን አብ መቀለ ዝረኣዩ መንገዲ ትራፊክ ሓደጋ ንምቅናስ የክእሉ ዶ ትብሉ? መልሱ አይካኣልን ተተባሂሉ ምክንያቱ እንታይ እዩ ትብሉ

7. አብ መቀለ ንዝረኣዩ ትራፊክ ሓደጋታት ንክጋደዱ ዝገብሩ ዘለው አገደስቲ መንስኤታት እንታይ እዮም?

8 ምክሪ ካብ ወለዲ አዕሮክቲ ወዘተ ከመይ ትርእዎ

9. አብዚ ከተማ ንዝረኣዩ ዘለው ትራፊክ ሓደጋታት ብዋናነት ተሓታቲ መን እዩ ትብሉ?(ሽፈር ወይስ እግረኛ)

10. አብ መወዳእታ ሓደጋ ትራፊክ ንክመሃየሽ ይክእል እዩ ትብልዎ ሓሳብ ወይ ሪኢቶ እንተልይካቱም.

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ምይይጥና አብዚ ዛዚምና አለና

ንዝገበሩልና /ንዝገበራልና ምትሕብባር አዝና ነመስግን.

ቁልፊ መረዳእታ ካብ ዝህቡ ውለቀ ሰባት መረዳእታ መእከቢ ዝተዳለወ ቃለ መሕተቲ ቅጥዒ / In-depth Interview Guides /

ጂማ ዩኒቨርሲቲ ህብረተሰብ ጥዕናን ሕክምና ሳይነስን ኮሌጅ ድህረ ምረቃ ትምህርት ቤት ዲፓርትመንት ጥዕና ትምህርትን ስነ ባሕሪ ሳይንስን

አብ ከተማ መቐለ አብ መንነ ሽፈራት ንትራፊክ ሓደጋ ንክብአአስ ምክንያት ንዝኮኑ ሓደጋኛ ባሕሪታት መበገሲኦም ምፍላይ ከተማ መቐለ ትግራይ ኢትዮ□ያ, 2011

አብ ቁልፊ መረዳእታ ተመያየጥቲ: ትራፊክ ፖ'ሊስ ከተማ መቐለ

ክልል:<u>ትግራይ</u> **ከተማ:** <u>መቐለ</u>

1.ትራፊ ሓደጋ ክበሃል እንከሎ ከመይ ትግንዘብዎ? ሓደጋኛነቱን ሳዕቤኑን ወዘተ

2. መንገዲ ትራፊ ሓደጋ አብ መቐለ ከም ዓቢይዐገም ምውሳድ ይካኣል ዶ? እወ----አይፋሉን (እወ እንተኮይኑ; መን እዩ አዚዩ ንሓደጋ ተጋሊዑ ዘሎ? (ሽፈራት, እግረኛታት, ሳይክል ዝገንሑ, ህፃናት, አደታት,ተምሃሮ, ወዘተ) ንምንታይ?

3አብ ሽፈራት ዝራአዩ ናይ ባሕሪ ዐገማትን

4መበገሰኦምን

5.አብዚ ከተማ እኩላት ዝኮኑ ናይ ትራፊ ምልክታት አብ አገደስቲ ቦታት ተዘርጊሆም አለው ምብል ይካኣል ዶ? እወ ተኮይኑ እስቲ እቶም ቦታት ይጠቀሱ? የለውን ተኮይኑ ንምንታይ ይመስለኩም?

6. እቶም ዘለው ናይ ትራፊክ ህግን ደንብን አብ መቀለ ዝረኣዩ መንገዲ ትራፊክ ሓደጋ ንምቅናስ የክእሉ ዶ ትብሉ? መልሱ አይካኣልን ተተባሂሉ ምክንያቱ እንታይ እዩ ትብሉ

7. አብ መቀለ ንዝረኣዩ ትራፊክ ሓደጋታት ንክጋደዱ ዝገብሩ ዘለው አገደስቲ መንስኤታት እንታይ እዮም?

8 ምክሪ ካብ ወለዲ አዕሮክቲ ወዘተ ከመይ ትርእዎ

9. አብዚ ከተማ ንዝረኣዩ ዘለው ትራፊክ ሓደጋታት ብዋናነት ተሓታቲ መን እዩ ትብሉ?(ሽፈር ወይስ እግረኛ)

10. አብ መወዳእታ ሓደጋ ትራፊክ ንክመሃየሽ ይክእል እዩ ትብልዎ ሓሳብ ወይ ሪኢቶ እንተልይካቱም.

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ምይይጥና አብዚ ዛዚምና አለና

ንዝገበሩልና /ንዝገበራልና ምትሕብባር አዝና ነመስግን.

1. መስቀለኛ መንገዲ ስለዘጋጥመካ ተጠንቂቅካ አሽከርክር

2. እግረኛ ዝበዝሐሉ አከባቢ ስለዝኾነ ተጠንቂቅካ አሽከርክር

3. ተምሃሮ ዝበዝሐሉ አከባቢ ስለዝኾነ ፍጥነት ብምቅናስ ተጠንቂቅካ አሽከርክር

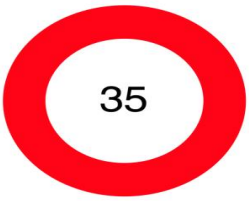
4. ንአውቶሞቢል ምቅዳም ዝተከልከለ እዩ

5. አቅቶሞቢል መሐላፍ ክልክል እዩ

6 ንነዊህ ሰዓት መኪና ጠጠው ምባል ዝክልክል ኮይኑ ሽፌር እንተይ ወረደ ሰብ ምውራድን ምፅዓንን ይካኣል

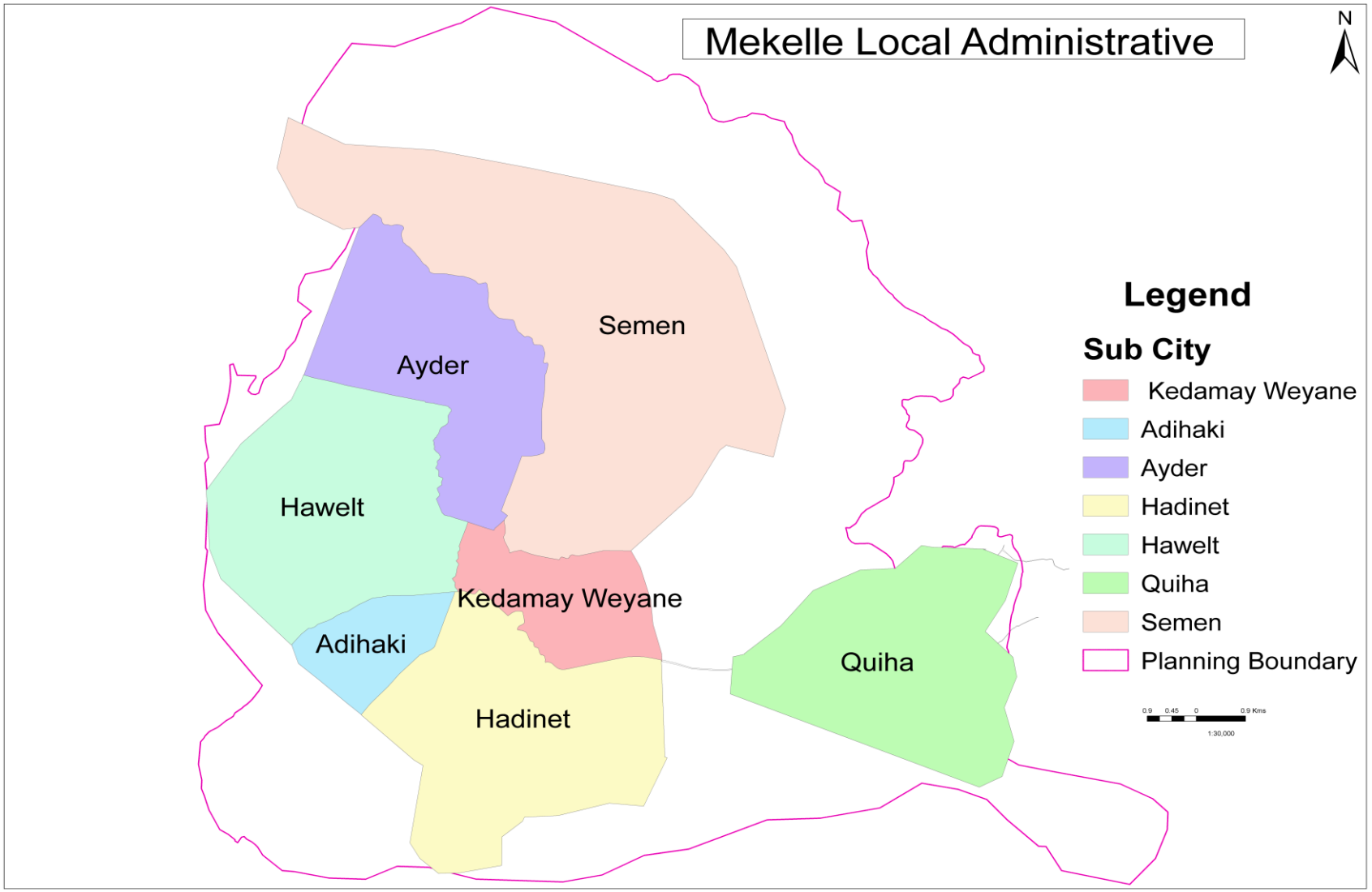
7. ምልክቱ ብዝረአየለ ሸነ□ ምሕላፍ ዝተ□ልከለ እዩ

8. ናይዚ ምልክት መጨረሻ ዝብል እስካብ ትረክብ መኪና ጠጠው ምባል ክልክል እዩ



9. አብቲ ምልክት ካብ ዝተቀመጠ መጠን ፍጥነት ንላዕሊ ምሽክርካር ዝተ□ልከለ እዩ

8. ጠጠው ኢልካ ቅድሚያ ሃብ


Mekelle Local Administrative
N
Semen
Ayder
Hawelt
Kedamay Weyane
Adihaki
Hadinet
Quiha
Legend
Sub City
Kedamay Weyane
Adihaki
Ayder
Hadinet
Hawelt
Quiha
Semen
Planning Boundary
0.9 0.45 0 0.9 Kms
1:30,000

PROPOSED ROAD NET WORK