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Risk Factors and Implications of Road Traffic Accidents in Oromia Special Zone Surrounding Finfinnee, EthiopiaYetimgeta Shiferaw Woldeamanuel¹, Dejene Gemechu Chala^{2*}, and Nega Jibat Gemed³

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Abstract

Road Traffic Accident (RTA) is a serious problem in Ethiopia in general and Oromia in particular. This article deals with the risk factors and implications of road traffic accidents (RTAs) in Oromia Special Zone Surrounding Finfinnee (Addis Ababa) in Oromia National Regional State, Ethiopia. The study was exploratory, cross-sectional, descriptive in its design, and qualitative in its approach. We (researchers) used interview and observation to collect data. We organized 24 interviews and two FGDs with traffic police, transport authority experts, health experts, and social affair experts, drivers and administrative organs. We used case analysis of victims of road traffic accidents. The findings of the study show that failure to give priority to pedestrians, to drive over speed, to estimate poorly distance between vehicles in motion, and to drive while taking drug/drinking alcohol were the major behavioral risk factors. Further, poor road quality and improper use of the roads were the major road and environmental factors. Poor mechanical services, poor safety equipment, and inappropriate use of them were among vehicle-related factors. There were also gaps in rules and regulations on road safety. The system of offering driving licenses was untrustworthy, and the system of controlling drivers was weak. The finding also shows that the major socio-economic implications of RTAs are negative health effect, family breakdown, economic dependency and difficulties to develop coping strategies. We concluded that multifaceted and interconnected environmental, mechanical, behavioral and legal factors have contributed to RTAs in the study area. Finally, we gave recommendation based on the findings.

Key terms: /Ethiopia/Implications of road traffic accidents/Risk factors/Oromia/Road traffic accident/

¹ Department of Sociology, Debre Marikos University, Ethiopia. Email: yetimgeta2005@gmail.com

² *Corresponding Author, first co-author PhD, Associate professor in Social Anthropology; Department of Social Anthropology, Jimma University, Ethiopia; P.O Box 378, Jimma Ethiopia; Email: sachekebo@gmail.com or dejene.gemechu@ju.edu.et

³ PhD candidate, associate professor in sociology; P.O,Box: 378, Jimma, Ethiopia;Email: negajibat@gmail.com

1. Introduction

Road Traffic Accident (RTA) is a crash that entails at least one road vehicle in motion on public or private road, which is accessible to the public (WHO, 2009a). In history, the first road traffic accident occurred in Great Britain in 1896 in which it caused the death of two persons. Since then, appalling stream of deaths, injuries and property damages have followed (Norman, 1962). Every day, thousands of people lose their lives and encounter injury on roads (Teye-Kwodoso, 2011). On average, nearly 3,242 people die daily by RTAs (WHO, 2009a). RTAs are predicted to become the third largest contributor to global disease burden by 2020 (Peden, Scurfield, Sleet, Mohan, Hyder, Jarawan and Mathers, 2004). The WHO (2018) report shows that the number of fatalities on the world's Roads is 1.35 million people per year. It is the eighth leading cause of death for all age groups, while it is number one cause of death for children and youth aged 5 to 29 years. More people die in road traffic injuries than from HIV/AIDS, tuberculosis, and diarrheal.

Ninety percent of the traffic crashes is more prevalent in low and middle-income countries. The fatality rate of the Sub-Saharan countries is the highest (28.3 per 100,000 population) which is significantly higher than any continent in the world (UNECA, 2009). The death rate from road traffic damages in Europe is 13.4 per 100,000 populations. This is lower than the global rate of 18.8 per 100,000 populations (WHO, 2009b). This shows if the countries are high-income, they have better road and vehicles qualities, better training of the drivers and more efficient driving rules and regulations.

UNECA (2009) shows that in 2007/08 the rate of a traffic accident in Ethiopia was 95 deaths per 10,000 motor vehicles. In sub-Saharan African region, Nigeria is responsible for over one in four deaths occur due to RTA. Other six African countries: South Africa, Democratic Republic of Congo, Ethiopia, Kenya, Tanzania and Uganda are accountable for 64% of RTAs in the region. Since Road Traffic Accidents cause deaths, injuries, disabilities, grief and loss of productivity and material damages, they directly contribute to poverty (Komba, 2006, p.1). Road Traffic Accidents cause a major health, economic, and developmental challenges of Africa, especially in sub-Saharan African Countries (Chen 2009). For instance, RTAs cost Ethiopia at least 400 million Birr each year (Guyu, 2013).

In terms of vulnerability, the highest victims in developing countries are shared among pedestrians and passengers of buses and minibuses. In Ethiopia, the distribution of death in a traffic accident by category of road user shows 55% pedestrians, 37% passengers, 6% drivers and 2% motor riders (WHO 2009c). Ethiopian Road Authority report shows that in 2007/8, 15,082 RTAs occurred in the country; out of these 2,161 people died while 7,140 experienced non fatal injuries (ERA 2007). Despite its appalling nature, researches on RTAs in Ethiopia are not many. Besides, these few studies on RTAs focused on Finfinnee/Addis Ababa and Amhara National Regional State⁴. The studies show that the level of RTAs has been increasing rapidly and is becoming more serious in the primary, secondary, and tertiary towns of Ethiopia (Tewolede, 2007).

Persson (2008) discusses the degree of prevalence of road traffic accident in terms of drivers' age and sex. According to this author, male drivers caused 91.1% of a road traffic accident in Ethiopia, 55 % of the accidents were by adolescent drivers. In terms of the age of the vehicles, this author shows that 42.2% of RTAs was caused by old vehicles. Similarly, Fesseha and Sileshi (2014) reports that errors committed by drivers are the main causes of the accidents that account for 83.8% of all RTAs. Haile and Demeke (2014) shows that whether drivers give priority for pedestrian, pedestrian's manner while crossing the road, and drivers' usage of seat belt have a statistically significant impact for the occurrence of RTAs. Studies by Atsebeha (2014) and Mohamed, Aklilu, Fekre and Engeda (2015) show that male drivers, pedestrians and passengers are more affected by RTAs. Most researchers studied RTA in Ethiopia using pure quantitative

⁴ Amhara National Regional State is one of the federal units in the Ethiopian federal state structure.

methods, mainly surveys. Their research findings show that RTAs occurred by driver's behaviors with few contributions of pedestrians. Still, it is imperative to analyze deeply the behaviors of road users using qualitative study as human behavior factors, including how the drivers and the pedestrians use roads need in-depth understanding.

The second gap was the former researchers did not investigate the socio-economic implications of RTAs from the sociological point of view. Their studies also lack theoretical frameworks. Using theories in such studies creates the possibility to understand better actors' perspectives, variables, and implications of RTAs. Finally, former researchers did not cover the current research site, Oromia Special Zone Surrounding Finfinnee. Hence, this research intends to fill the stated gaps by identifying and describing risk factors and socio-economic implications of RTAs in Oromia Special Zone Surrounding Finfinnee.

2. Theoretical Framework

This study applies two theories in social and behavioral sciences: system theory and risk theory as its theoretical guides.

2.1. System Theory

The principal theoretical approach of this study is the System Theory also known as the Systems Approach. Systems theory, that Niklas Luhmann prefers to call system theory, is historically Marxist oriented theory developed from Immanuel Wallerstein's the Modern World System Theory. Buckley adapted the world system theory to explain relationships among sociocultural systems, mechanical systems, and organic systems. The theory was later further adapted by Luhmann to develop a sociological approach that he refers to the General Systems Theory. The key to understanding what Luhmann means by a system is in the distinction between a system and its environment (Ritzer, 2008).

The system theory focuses on the interactions among the components of pertinent systems. It assumes that road traffic crashes result when the components of systems cannot function properly or go wrong (Muhlrad & Lassarre, 2005). RTAs result from combinations of human, vehicle as well as physical and socio-environmental factors. The components of this theory are, therefore, the road and environment, the means of transport (vehicles) and the human behavior (WHO, 2015). The environmental component includes the natural conditions, the built environments, the social and transport networks. The human behavior elements include demographic attributes of road users (age, sex, educational and socio-economic statuses), people's perceptions of risk and people's general behavior on the streets or pedestrians' behaviors (WHO, 2004). System theory contributes to the development of models for RTAs.

A model for RTAs is relevant to the ecological model of a disease. Jorgesen and Abane (1999), who conducted an empirical analysis focusing on a man-environment adjustment and maladjustment model to fit into RTA analysis developed it. The model focuses on three main components: the vehicle, the environment, and the behavior of the population. First, the vehicle is analogous to a vector in disease ecology that can be seen in terms of its age, technical conditions, and safety equipment such as seat belts. Second, the environment refers to the road system including the entire wider physical and built-up environment. The physical environment has different aspects including road conditions such as quality and topography of the road, weather condition, and settlement pattern and traffic signs. Third, the behavior of the population includes the behavior and attributes of road users in terms of age and sex ratio as well as attitudes and general traffic behavior. It also entails driving style like over speed driving and risky driving behavior under the influence of alcohol and drug.

There are three different levels regarding the application of system theory in understanding the topic under consideration. First, the theory helps to identify the system of traffic laws, regulations, and mode of enforcement designed to ensure traffic safety in the study area. Second, the model helps to identify the interactions of the multiple causes in risk factors and prevention of traffic accidents that occur in the study area. Third, the model helps to identify and describe the three major contributing factors to RTA including human, mechanical (vehicle) and environmental.

2.2. Risk Theory

Breakwell (2007), quoted in Teye-Kwadjo, 2011, p.26) defines risk as “the probability of a particular adverse event occurring during a stated period of time”. The author understands the term “probability” as the potential hazard to happen and the potential that someone is under the risk of suffering the adverse event. This event could be road traffic accidents that might result from being exposed to a hazard.

Komba (2006) states that in RTAs, risk is the function of four elements. The first is the exposure - the frequency and extent of travel, within the system by different users or a population density. The second is the underlying probability of a crash, given an exposure. The third is the prospect of harm, if there is a crash. The fourth element is the result of injury. The second main theoretical approach of this study entails an explanation of the implications of RTAs. This study mainly focused on the fourth element of the risk theory.

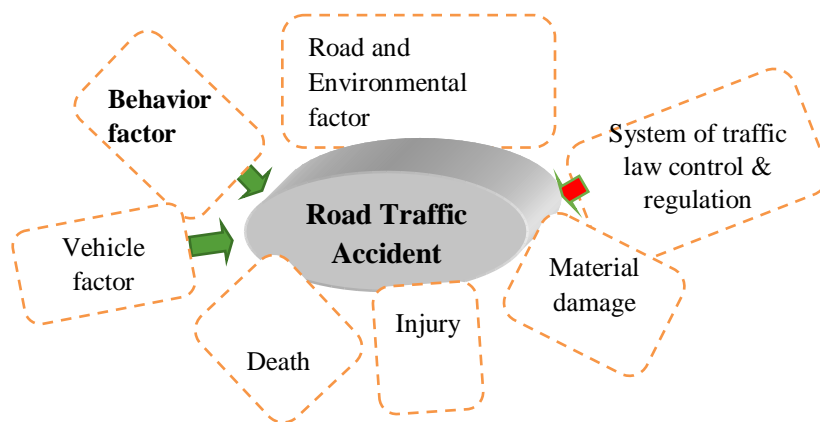


Figure 1: Conceptual framework of the study adapted from Jorgesen and Abane (1999) model for RTAs risk factors. The researchers restructured the model by adding implication factors and core study theme.

3. Methods and Materials

This section provides a brief description of the study area, particularly the three towns where we generated our data. It also explains the methods of data collection, analysis, data collection tools and ethical consideration.

3.1. Overview of the Study Area

Data for this study were from three tertiary towns—Dukam, Sululta and Sebeta. According to EDRI and GGGI (2015), the Ministry of Urban Development, Housing and Construction define and provide categories of the Ethiopian cities and towns in 2014. The hierarchy of the urban centers takes into consideration sizes, types

of activity, and levels of service provision. As per this definition, these three towns are tertiary. Berhanu, Chen, Zhang and Niyogi (2020) show that in 2017 Sululta, Sebeta and Dukam towns had a population of 55,358, 167,127 and 40,180 respectively.

These towns are located in the Oromia National Regional State, Oromia Special Zone Surrounding Finfinnee. Sebeta is located at 25 km southwest of Finfinnee on the main road towards the southwestern part of the country. Sululta is located at 23 km away from Finfinnee through the North direction. This town is the main gate to the northern route of Ethiopia. Dukem is found along the Finfinnee – Djibouti highway in the southeast of Finfinnee. It is located at 37 km away from Finfinnee and the main gate to eastern and southern Ethiopia.

The reports from the Oromia Special Zone Surrounding Finfinnee show that these towns are among the fast-growing towns, ever increasing in human and vehicle population. Because they are on the main routes to and from Finfinnee, traffic congestion and RTAs have become increasingly problematic in these towns. Every day, quite a lot of cars cross these towns to and from Finfinnee. Absence of adequate pedestrians' road together with other behavioral and environmental factors (the road system with all the wider physical and built up environment) has exacerbated the RTAs.

3.2. Methods

This study was exploratory, cross-sectional and descriptive in its design, and qualitative in its approach. We collected data through case study, FGDs, interviews and non-participant observation. For this research, we collected the primary data by using quota sampling by stratifying the population into six groups (the traffic police officers, health experts, road and transport authority experts, the drivers, the pedestrians and the victims). We (the researchers) interviewed 24 informants from different social categories of the three towns (Dukem, Sululta and Sebeta). We used purposive sampling technique to select the study participants in which four traffic police, three health experts of risk prevention, one Road and Transport Authority officer, five pedestrians, six drivers, and five victims of RTAs participated in the study. We had to stop the interview when we reached data saturation, when more additional new information ceased to come. However, we continued to interview after data saturation point for a negative case analysis. Based on this, we interviewed one traffic police, one driver, one pedestrian and one Road and Transport Authority officer. We also conducted two FGDs, with seven participants in each.

We conducted interviews and FGDs using semi-structured interview and FGD guides. The interview and discussion guides were originally in English and then translated to Afaan Oromo and Amharic. The questions related to road use targeted pedestrians and drivers. On the other hand, the Road and Transport Authority officers and traffic police were key informants to investigate experience on road use management and response to RTAs. Verbatim transcription and then translation into English were conducted by the first author and reviewed by the co-authors. Emphasis was given to understand how the social contexts influence conditions of RTAs and how individuals behave in those contexts.

We analyzed our data from the different sources using thematic analysis to identify and describe risk factors and implications of RTAs and narrative analysis for individual cases of victims. We used thematic analytical approach because it enabled us to identify major risks and implications of RTAs. We applied the narrative approach for it is more convenient in examining contexts that shape people's behavior of road use, its management, and experiences of victims. It also enables the researchers to discover similarities in the social interactions pertinent to RTAs. The data analysis also involved theoretical reflections to situate the empirical evidences in explanatory frameworks. The researchers considered ethical issues for which the funding organization provided ethical clearance. Informed consent was secured from all the informants.

4. Results and Discussion

This article emphasizes two major themes of findings which are separately presented in this section. The first theme identifies risk factors of RTAs from different dimensions and the second one examines the consequences or implications of the accidents on victims and their associates.

4.1. RTAs Risk Factors

As literatures reveal, different risk factors operating at different levels contribute for RTAs. Categories of the risk factors include behavior, road and environment, vehicle, and the system of traffic laws and regulation. The following section presents the ways how each of these factors manifest in this study area.

RTAs: Behavioral Factors. Behavioral factors for RTAs identified in this study include speedy driving, failure to maintain the standard distance between vehicles on drive, denial of priority for the pedestrians, competitions among the drivers of public buses and minibuses to generate more money, use of alcohol and substance, and overloading.

A key informant, chief inspector of the Oromia Zone Surrounding Finfinnee, reported that most of the accidents resulted because of over speed driving that disregards the characteristics of the road, the road environment, and characteristics of the vehicle. It is common to see drivers driving faster than the expected speed limit, whereas, they cannot control the vehicles in case of any obstacle. Any simple track of an obstacle may lead to an accident whereby drivers have options of either directly turning over or pulling over the vehicle or colliding with surrounding objects. According to our key informant, drivers drive beyond the standard speed because they are in a hurry or drive under the influence of stimulant. Further, people sometimes take driving fast as a sign of driving excellence and confidence, while they consider the opposite as a marker of skill gap.

The FGD participants also revealed that passengers are partly responsible for over speedy driving for they often put pressure on the drivers to drive with high speed to arrive early at their destination. In some cases, passangers complain when a driver drives with a safe speed while others drive faster. For example, Figure 2 below shows an accident that happened in Sululta town in 2016 because of failure to control speed and to keep the distance between the vehicles on moving. Reportedly, three people died in this RTA.



Figure 2: Road traffic accident occurred due to collision between vehicles
Source: Sululta town traffic Police 2016

Refusal of priority for pedestrians by drivers is among the most reported accusation against the drivers as a cause of RTAs. A 28-year-old pedestrian stated that he always worries while crossing roads. According to this informant, pedestrians are not safe even on a zebra crossing for the drivers do not give priority to them. Our key informant, traffic police officer gave us similar report. Paradoxically, accidents are common on a zebra crossing area of the road where pedestrians have always a priority. The drivers must reduce their driving speed and even stop to give way to the pedestrians. However, according to our key informant, who was a police officer, the drivers do not observe this rule. He witnessed from his fresh memory that an incident happened on a zebra crossing where a minibus killed a pregnant woman at the spot.

Complaints regarding the misuse of a zebra crossing also refer to the behavior of pedestrians. Pedestrians' failure to use the zebra crossing, and the misuse of the zebra is also worth emphasized as a behavioral dimension of factors for RTAs. Some pedestrians do not use zebra crossing at all, while others misuse it. Primarily, on a zebra crossing the pedestrians are not careful because of wrong assumption and overconfidence that the drivers give a priority to the crossing pedestrians. They may not also walk straight across the road, and often fail to make sure that both directions are safe. They cross the road talking on mobile phones or slowly walking. Drivers complain that the pedestrians suddenly appear at the center of the road. A 34-year-old driver said: "Some pedestrians occupy the roadway of the vehicles and chat with their friends or communicate via mobile phones. I don't know why they do this; perhaps they forget that a car can kill them."

Data from the field suggested that wrong use of the road by pedestrians and drivers increases the frequency of RTAs. Lack of proper control against misuse of the road and lack of guidance on drivers and pedestrians' risky behaviors further contributes for occurrence of the accidents.

An officer of transport authority also emphasized that most of the time collision of vehicles happens because of drivers' failure to keep the standard distance between vehicles in motion. The drivers also fail to estimate the safe distance in holding the brake of the vehicles they are driving when they need to stop. This obviously depends on the experience of the driver, the speed of the car, and the quality of the brake. According to our key informant (a traffic officer), drivers fail to maintain minimum distance between moving vehicles in the same traffic path. Problems related to traffic obstruction and lack of driver's skill is among the causes of RTAs. Front-end collision often happens by lack of experience and serious traffic jam that denies relaxed space to the drivers.

A key informant, traffic police officer, underscored that drivers of business cars compete to generate more income. This partly contributes to speedy driving and RTAs. This is particularly the case among minibus public transport drivers who contract from vehicle owners to offer a fixed amount of money on a daily income basis. In this contractual agreement, the more frequent trips a driver makes, the more he gains per day, and the more he generates extra money for himself. Hence, time is an important factor and the number of trips depends on how fast he drives. This sense of getting more money also compromises the reasonable time to break from driving including the time to sleep. It also compromises the time as well as the interest to visit a garage to check and maintain a mechanical well-being of the vehicles.

According to our key informant traffic police, brake failure is among the commonly mentioned mechanical problems that cause drivers to lose control of their vehicles. This partly happens from absence or poor mechanical and preventive maintenance service. Coupled with the over speed driving, the absence of proper maintenance of the cars results in catastrophic accidents. The local expression referring to this kind of driving behavior is '*ajjeesi fidi*' (in Afaan Oromo) and '*gelleh amta*' (in Amharic) literally defined as 'kill and bring money'. This fits to the common saying "the end justifies the means". The emphasis is on the amount of money earned, rather than how to earn it.

Reckless driving motivated by such sense of getting more money contributes for injuries of serious accidents. A 25-year-old driver said, “There are competitions among the drivers for picking up passengers. If someone is not fast and smart, he/she cannot get any passenger to transport and will return home empty-handed.” Our FGD participants also informed that there is a problem of driving irresponsibly because of unregulated competitions among drivers. To take precedence of a turn at the bus stations and to get extra passengers along the street, drivers are always hurried. The result is obviously speedy driving and a consequent RTA.

Moreover, FGD participants reported that some drivers also use khat⁵. Khat is a stimulant substance that some drivers use to energize themselves from fatigue. Drivers claim that khat keeps them alert and energetic. However, the study participants mentioned that chewing khat exposes drivers to RTAs by stimulating them to drive with high speed and recklessly. Some vehicles passing through the study areas start their journey from a long distance in all directions to Finfinnee. Drivers arrive in Oromia Zone Surrounding Finfinnee by the time they are tired and in the state of fatigue.



Figure 3: An accident due to driving while fatigued (3 people died).
Source: Traffic police accident report (2016).

Report from drivers and their assistants show that overloading the vehicles is another behavior risk factor for RTAs in the study area. Both the public transport vehicles and the Lorries load beyond their carrying capacities. The researchers witnessed this through practical observation from the field. The drivers and assistants call the extra load ‘*Jaaffii*’ meaning ‘extra load’. They know the negative impact of overloading. Yet, because of their intention to get additional income, *jaaffii* is common.

⁵ Khat, *catha edulis*, is a flowering plant whose twigs are chewed to get stimulated all across the Horn of Africa .

Road and Environmental Factors for RTAs . Regarding road and environmental factors of RTAs, our research participants complained that roads are poorly constructed, wrongly used and improperly managed. The study participants emphasized poor conditions of the road as important factors for RTAs. For instance, information obtained from the FGD participants shows that road construction has taken huge budget of the country, but poorly constructed. The roads begin cracking right after the completion of the construction projects or even before. Likewise, key informant, traffic police officer, complained that damaged roads remain without any proper maintenance for a long time.

Evidences obtained from FGD specified that there is a problem related to a safe road crossing on a zebra. The zebra crossing lines have to be visible to the drivers and pedestrians. However, there is no regular renewal of the painting. Therefore, the zebra crossing itself disappears after sometimes and the lines are not visible for drivers and pedestrians. This poor condition of the road increases probability for RTA.

A key informant from transport authority focused on the carrying capacities of the roads. According to him, the imbalance between the number of vehicles and the capacity of road worsen the problem of RTAs. There is a serious congestion of vehicles in the urban centers of the study area. It is difficult to cross the road for pedestrians at peak hours, especially when many people are to or from workplaces or schools.

In addition, the existing inadequate roads serve improperly for different purposes other than for vehicles. These include keeping construction materials like gravels and sand on the roads, parking vehicles, and street vending. Via field observation, we confirmed that the drivers use pedestrians' way or part of the main road for parking their vehicles. Particularly, the long trucks carrying fuels and other materials use the roadside for parking and occupy a large area of the road for a long time.

Some use the roads to store construction materials. Data obtained from FGD revealed that there have been ever flourishing construction of new buildings along the main streets. Leaving construction materials like sand, stone, gravel, wood, and reinforcement metals on the roadside has become very common. Those materials occupy the pedestrians' pavement, which is inadequate from the very outset and unsafe. The materials also share the narrow roads for the vehicle.

Likewise, the street vendors use the roads for street vending. This left very narrow space for the moving vehicles and passing people that increases the chance of RTAs. Due to these reasons, the pedestrians lack the space to step; they use the main vehicle ways to move and cross that exacerbate pedestrians' vulnerability to RTAs.

The vehicles' mechanical problems are other factors contributing to RTAs. A 34-year-old driver said that absence of regular mechanical inspection exposes some vehicles to RTAs. Our key informant from the transport authority underscored that most motorbike and car drivers do not use helmets and safety belts, respectively. Most safety belts are not functional and drivers do not consider them important for maintenance like other vehicle parts. Some drivers use the belt only to escape from punishment when they are close to traffic police or when they are under traffic police close monitoring.

Some of our informants also complained the lighting system of cars and the way drivers use the lights. Whether the lighting system is properly functioning and the drivers correctly use them have direct impacts on RTAs, because appropriate use of the different lights helps the drivers to drive properly and to communicate with other drivers in the same traffic lane. However, our key informant, a traffic police officer, complained that the lighting system of some vehicles for lights and signals are not functional. For instance, the officer underlined the importance of reflectors. According to him, "absence of a reflector is one of the serious risk factors during nighttime, because parked vehicles are not visible." A 25-year-old driver focused on the proper use of lights during nighttime driving. The informant said:

During nighttime, some drivers use high beam lights wrongly, regardless of the presence of other cars that the lights might adversely affect. In normal circumstance, a driver has to use high beam headlights only when he/she is sure that there are no other cars in front of the light producing car, whether they are moving in the same direction or to the opposite direction. Inappropriate use of excessive lights blinds pedestrians and other drivers in front of the lights. As a result, pedestrians can be confused, and drivers can lose the right roadway.

Traffic law control and regulations factors. System of controlling traffic laws and regulations are the fourth main risk factors for RTAs in the study area. The study participants complained at the weaknesses and the abusive enforcement nature of the existing relevant regulatory systems. Though they appreciate some contents of the provisions, they severely complained against their defective implementation and consequently their weak and deterrent effects. Lots of mischiefs and corruptions characterize the use of the existing laws and regulations for road safety control. A traffic police chief inspector complained that mainly there is lack of the logistics to implement the laws and regulations. He stated that the laws and regulations are the best ones which if implemented would enable road safety control. For instance, there are rules preventing over speeding and driving under the influence of drug and alcohol. However, in the absence of radar and alcohol tester, it is difficult to execute the rule. Complaint of the informant goes beyond lack of logistics. It also entails the commitment of the personnel and officials in the field. For instance, a female driver of 32 years complained of the skill of the drivers and the legality of their driving licenses. She reported that, some drivers use fake driving licenses, which is contributing to the occurrence of fatal RTAs.

Traffic police officer also confirmed this complaint that they often encounter drivers with forged driving license in their areas of operations. The police officer also emphasized the inconsistency of driving license provision among the different regional states of Ethiopia. Different regional states have different driving licenses that make controlling very challenging. Because of such differences, it would be very difficult to differentiate between the forgery and the legal driving licenses. Sometimes, it requires forensic machine investigation.

4.2 Socio-Economic Implications of RTAs

RTAs imply several negative social and economic consequences against victims, victims' family members, and drivers and their families, vehicle owners, and agencies or corporations working in areas related to road transportation. The following sections focused on RTAs' implications on victims and their immediate associates.

Social Implications of RTAs. This sub-section assessed the social implications of RTAs from the victims, health experts, traffic polices, FGD participants, drivers, and pedestrian's points of view. Among others, implications of RTAs on health, family stability, job security and social networks of victims are points in focus.

Health effect of RTAs on Victims. The study participants pinpointed several health implications of a traffic accident in terms of fatality and disability it causes to victims and the pressure it causes on service provision. The health experts emphasized lack of rescue for RTA victims in the area. Most of the time, victims reach health facilities very late after the accident. Only local people where an accident happens and passengers from other vehicles provide first-aid support to victims. This is very serious for recovering, because of poor health management at the early stage and inappropriate transporting of the victims from the accident site to the healthcare centers. The victims often reach at health facilities with any accessible commercial vehicles in a confined situation. This worsens the cases and puts the life of the victims under serious risks. Traffic congestion in the study areas is also one challenge to transport victims to hospitals for standard care.

The traffic police officers also confirmed the problem. They underscored first aid support to victims is usually done by non-professionals and handling of the victims is most likely inappropriate. The informants appreciate that everybody at the place of accident participates to save life with no reservation. However, such efforts hardly contribute to save the lives of the victims.

A traffic police officer pointed that inappropriate handling has complex health impact on both the caregivers and the victims. People around usually try to save lives of the victims without using any protective materials, like, gloves. They use any available materials including plastic to care for the victims, though it is inappropriate. Sometimes they take the victims to health facilities with open wounds, while the victims are bleeding. Health experts emphasized that these may expose the victims to different diseases and the improper handling of the victims may also expose the caregivers to different contagious diseases. Cross-contamination between caregivers and victims is more likely.

Information from victims' side also complains against health centers for their inappropriate handling and treatments of victims. A 25-year-old female RTA victim complained that she did not receive proper care and follow-up in a hospital after she experienced vehicle accident injury. Victims of RTAs further complained the unaffordable high treatment cost they incur. Case 1, 2 and 3 below show some health-related challenges faced by victims of RTAs. A female health expert expressed that proper medication could be helpful to cure the victims from injuries; however, it is less likely that the victims get appropriate treatment and back to their earlier health status. A petty accident may expose victims to fatal and permanent or minor disability or leave scars on their body.

Experience of a vehicle accident also results in psychological problems regardless of seriousness of the accident. A health expert key informant stated that victims who suffered any kind of health problem including a minimum scratch on their body feel psychological stress and mental illness while they recall their earlier body condition compared to the current one. All in-depth interviews with victims consistently showed that victims observe their new situation that they have joined a category of people with disabilities. They cannot easily convince themselves to accept their new body form like being with one leg or having other physically deformed body and skin scar because of damages in the accident. For some of them, life after the accident becomes meaningless. They feel that they joined people with disabilities and the consequent stigmatized treatment in the society. The following case from Sululta shows how a young man with vision to be an excellent athlete turned to be a one-legged person due to car accident.

Case 1: Sagni, Male, 24 years old, athlete

Sagni was a 24 years old single man who was an athlete and completed grade ten. On January 20, 2015, he was running for exercise from Sululta to Finfinnee/Addis Ababa. He knew of a vehicle coming from the front side, but he did not realize that another vehicle was following him from his back. When the vehicle from the front side was passing by him the one at his back suddenly knocked him down. He found himself in a nearby hospital where he stayed and received medication for more than a month. He lost one of his legs; one of his hands became permanently impaired. Sagni suffered from headache even after the entire medication was over. At the time of this data collection, he was suffering from general health problems and nightmares; he could not significantly get rid of the effects of the accident. His families worried about his health situation and he sadly told that it was difficult to accept being handclapped. Besides, his mother sold her land that was the only property she had to cover his prolonged medication cost. Yet, Sagni is thankful to God for surviving the accident. He said, "I am thankful to God, who saved me despite the entire complexities my families and I have encountered. My family lives in very poor living conditions; they are also worried about me as I am in a very poor health condition".

Effect of RTAs on familyLife. Consequences of the RTAs on stability of family relationships are visible in family breakdown and divorce that need attention. We witnessed these from field data. Divorce and family breakdown happened in the victim's family because of RTAs. This problem entails the victim, the driver or the offender side. The driver who survived an accident is usually detained for legal measures that results in his family's loss of income. Case 2 is a typical representation of these problems though there are other related negative implications.

Case2

Meti was married, and a mother of three children. She had lived 8 years in marriage with her husband before she encountered RTA. She was supporting her family working as a daily laborer as "off farm activity" in Sululta town. It was on a certain Monday, while she was walking on the roadside to cross the road to the direction of her workplace, when two vehicles on high speed suddenly came to pass each other on opposite directions. Meti detected the one on her right side but not the other on the opposite side, which knocked her down. After that, she could not know what happened for hours. The accident seriously damaged her left hand, ribs and leg. Even though she got treatment at a hospital, unfortunately, her left hand and leg are permanently disabled. She lost not only her hand and leg but also her husband who could stay in the marital relations only for four months after the accident. Even if we are not sure about the actual cause of the divorce, Meti directly attributed the cause of the divorce to the disability she incurred. According to her, her ex-husband was not willing to live with a woman who is permanently disabled. The fate of her children also rested on her family of origin. Now she is in a serious social and financial problems. She got compensation fee for her life sustaining. However, she has used it for daily consumption and clothing for her children, and she does not have any permanent income. Meti sadly said, "God knows about tomorrow".

Case 3:

Alemu, 34 years old, was a driver. He was a hard worker, and he had supported his family by income he used to generate from driving a commercial minibus between Dukem and Finfinnee/Addis Ababa for years. However, sometimes he used to go outside this usual route to other areas for a contract work, which let him earn relatively more money. The day was Saturday; he was driving from Finfinnee/Addis Ababa to Dukem and left with only two kilometers to reach his destination. Unfortunately, a long truck vehicle had lost its direction and drove to Alemu's way. The case was not controllable, and suddenly the long vehicle collided with Alemu's vehicle. In the accident, one passenger died from Alemu's vehicle while he himself experienced a serious injury on his face, hand and leg. After medication, he remained permanently disabled in his left hand, left leg, and his face became deformed. Alemu cannot drive a vehicle anymore, because of the serious damage that happened to him. During this fieldwork, Alemu was working in a bus station to regulate the order of public transport. Yet, his income is not enough to support his life; he earns by far less than what he used to.

Despite the various contributing factors, we have seen above, some still associate occurrence of RTAs with fortunes or predestination of a divine plan. A driver aged 42 who had experienced accident believed that RTA is the pre-determined destiny of someone that he or she was born to face. This implies that nothing can prevent RTAs and their consequences. He believes that there is no way to alter the situation, and he advises that we should trust God and pray to Him for our fate. He concluded that there was nothing wrong on his side for the occurrence of the accident. A victim of age 24 also said, "I believe that the accident was God's will, and I did not want to fight with vehicle owner for compensation because it could also happen to anybody; it is 'Yearba ken idile new'" roughly translated as it is "predestined." A number of people share similar views of associating occurrence of accidents with God and their survival with divine intervention.

For instance, Cases 1-3 relate their survival with the help of God. They are thankful for the mercy of God to save their lives; they also trust in God about their future and pray for others not to encounter RTA.

Beyond affecting the family organization and marital relationships, RTAs also influence victims and drivers' relationships with their friends. Eventually the ill health conditions which occurred because of the accident cause loss of friends and negatively affect the broader social network beyond family relations. As a result, disabled RTA victims abstain from different activities they used to practice before the accident. They drop some of their former friends with whom they shared the activities. This might include going out for entertainment like drinking and watching football games. A 25-year-old victim woman's response shows that she lost most of her former friends. She did not blame her former friends because, as she said, it is normal for anyone to prefer someone who is healthy and competent as one's colleague.

The RTA victims attribute the reason for dropping some of their former friends to the accident they encountered. However, the explanations seem to go beyond mere disability of the victims. It is economic when the victims cannot afford the expected expenses for the former joint activities. It is also psychological when the victims lose their confidence to join their former friends despite no sign of restraint from the other side. Further, it could be medical and physical when the victims are restricted from some of their former activities, like the former athlete who could not run anymore and therefore, detached from his former friends who are still athletes and keep on running.

Economic implications of RTA. RTAs involve enormous economic implications; it damages economic/material resources (vehicles, roadside objects including building, loaded materials/commodities) and productive human personnel. The economic implications of RTAs range from personal loss of income, family assets, and public resources to impairing GDP of the country. As reported by the study participant in Case 1, the victim's post-accident medication was covered by his family which made him dependent on them (refer also Case 4 below). Moreover, medication of traffic accident injuries costs much to the extent that it could consume all family assets. Dependency on family for financial support and routine physical care also exposes additional burden on the supporting family members and the entire family. As FGD participants witnessed, sometimes children of victims of RTAs have failed to continue with their education because of lack of school fees and related costs.

Another very crucial implication of RTAs on victims, victims' family and drivers is job insecurity or interruption of income generating sources. The RTA victims are out of workforce and become jobless. These problems deprive victims from economic self-reliance and compromise family's economic capacity. Disability or death would stop means of earning income on the victims' side and imprisonment results in drivers' loss of income sources. The RTAs also negatively affect employing organizations when their employees encounter injury or death. In-depth interview with a male victim of 45 years old revealed that the employer organizations have a uniform presumption that no disabled persons are active. All the interviewed victims informed that after RTA they were worried about losing jobs because of their disabilities or negative feeling of employers. All participants in the in-depth interview share the view that RTAs introduce a new problem on the earlier job of the victims and influences the families of the victims. Case 3 above is an instance. RTAs also complicate the life of the remaining family members, especially women and children. The following case from Sebeta Town shows how the wife of the deceased driver and her children suffer from loss of income.

Case 4: Bezi, female, 22 years old

Bezi, in her 22, was married and a mother of two children; her husband was a driver who supported his family with the income he earned from driving. However, Bezi's husband died in a car accident. The injury was serious; even though he arrived at the hospital alive and stayed under treatment for five consecutive days, he could not survive the accident. When he was hospitalized, Bezi spent much money for transport, medication, and other supporting costs from their saving. After his death, she faced different social and economic problems. For instance, she could not feed her children leave alone to send them to school. The compensation given for her was not enough even to start any business. As a last option, she purchased chips roasting machine by borrowing money from her relatives. During this fieldwork, she was preparing and selling chips and baking and selling '*buddena*' (local bread). This showed how RTA causes an abrupt change of lifestyle and loss of family income.

The findings of this study are in congruent with the System Theory, which assumes the inappropriate functioning of the components of the interacting system is the main cause of road traffic accidents. The theory underscores how the person-environment, physical, technical and legal factors are interacting and any maladjustment of the interaction cause RTA. Finally, the findings also showed the socio-economic implications of RTAs. These involve physical damage, psychological and mental stress, joblessness and economic dependence, family breakdown including divorce and family dissolution in the wider social network. Our findings collaborate with the risk theory that underlines the outcome or implication of RTA as an important point of analysis.

5. Conclusion

The findings of this article showed how complex and intermingled factors have contributed to RTA in the study area. These factors entail roads and environments (the natural conditions, the built environments, the social and transport networks), vehicles, human behaviors and system of traffic laws, control and regulations. The poor quality and low standard of the road and absence of timely maintenance are among the problems pertinent to road and environmental factors. Several vehicle-related problems also cause RTAs. These include the dysfunctional parts of the vehicle and the drivers' and owners' unwillingness and/or negligence to repair. Human behavioral factors are also among the major contributors of RTAs. Driving while drunk, driving over speed, driving without rest, denying of giving priority for the pedestrians, failing to maintain the standard distance between vehicles on move, competing among the drivers, and overloading are the common ones. Finally, system of traffic laws, control and regulations are among the contributing factors to RTAs in the study area. The problem related to traffic laws, control and regulations is not mainly the content of the laws, but its implementation and logistics and commitments to enforce the laws.

6. Recommendation

Based on the findings of the research, the researchers recommended that:

- The government has to provide road safety education in schools, work areas and via mass media. Relevant professionals from education and police officers should fix the content of the education.
- It is important to strengthening the activity of health extension services as part of government's road safety education provided by health extension workers to the community at a grass root level, including rural areas.
- Concerned body to assess problems of the existing policy, proclamations, rules, regulations, strategies and institutional settings related to RTAs and the capacity for RTA injury prevention as well as law execution.
- The medical institutions should be equipped with materials needed for life saving.
- To support victims of RTAs in the zone, the government and non-government organizations as well as the concerned bodies within the area ought to provide rehabilitation services and psychological therapy.
- Amending and executing driving skill trainings and licences of drivers to ensure more standardized services.

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Author details:

¹ M.A. advisee; Department of Sociology, Debre Marikos University, Ethiopia. Email: yetimgeta2005@gmail.com

² *Corresponding Author, first co-author PhD, Associate professor in Social Anthropology; Department of Social Anthropology, Jimma University, Ethiopia; P.O Box 378, Jimma Ethiopia; Email: sachekebo@gmail.com or dejene.gemechu@ju.edu.et

³ PhD candidate, associate professor in sociology; P.O,Box: 378, Jimma, Ethiopia;Email: negajibat@gmail.com

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