

# Determinants of Road Traffic Accidents in Hadiya Zone: The Case of Hosanna Town

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## Abstract

The objective this study is to identify the major determinants of the traffic accidents in Hosanna town. The primary investigator used primary and secondary data sources for this research. The primary data was collected from 298 households' survey and was analyzed by employing stat. Qualitative data was also gathered from focus group discussion and key informants interview to investigate the extent of accident and related impacts. Traffic accident documents, who served as secondary data sources, were also reviewed, compiled, organized, summarized and interpreted in light of the research objective. For this research binary logistic regression model was used to analyze the relationship between multiple explanatory, categorical variables. The study revealed that major factors behind road traffic accident were: Motor Cycle, Bajaj Motor, Minibus-taxies, Carts, Pedestrians, Age of the victims, Gender of the Victims, Deriving Experience, Helmet Use, Deriving Speed (at the time of accident), Availability of Multi-directional Way, Presence of Institutions or Organizations in the area of accident, Pedestrian Sideway, and Enforcement or Exercising the Law was significant. It was concluded from the research that it needs building pedestrians lane, alternative way for carts, assigning car parking space, broaden road safety education in regular class, controlling the level of implementation of the existing traffic law, equipping and empowering responsible sectors of road safety, strengthening coordination between responsible sectors and stockholders as well as using minibus-taxies were forwarded as to how to reduce the phenomenon of traffic accidents and to minimize its consequences in case of Hosanna town.

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## 1. Introduction

### 1.1. Background

Transportation system is essential for rapid economic, industrial and cultural growth of a country. Road transportation is the nearest to people and has major advantage compared to others transport modalities due to its flexibility, in using also door-to-door service over short distances at the most affordable prices [1]. More than 80 percent of goods and people transportation service in Africa depends on road transportation. In Ethiopia, however transport accounts for over 90 percent of all the inter-urban freight and residents activities in the country (Ibid). In other words, transportation is one of the basic requirements for the proper functioning of societies as its demand is highly related to the movement of people from one place to another. Therefore, transportation has a direct impact on the day-to-day activities of people [2].

Despite its importance in economic development, road transport has its own negative consequences. These include environmental pollutions, road accidents, and others socio-economic [3]. About 1.2 million individuals died by road accidents; its economic cost of road traffic accident was estimated \$518 billion dollars; cause injuries to 20–50 million people, and per year road traffic injuries becomes the 11<sup>th</sup> leading cause of death, and accounted for 2.1 percent of all deaths [4]. The report also shows globally only 4 percent of vehicles registered in Africa, but it accounts for 10% of the total road deaths in the world. Developed countries reduced road traffic accidents fatality by more than 25 percent in period 1968 -1998, and as per their strategic plan it will be reduced by 30 percent in 2020 (Ibid).

Arthur Kennedy in year article “Perishing on the road” that “many of our prominent politicians have been involved in accidents including the Former Presidents of Ghana; Rawlings and Kufour and many other prominent politicians and members of the parliament in Ghana” [5]. Over 3000 Kenyans lost their live due to road accident every year and the majority of victims were between the productive age group (15 and 44 years) [6].

Road transport remains to be the mode of transport that Ethiopia heavily relies on for both domestic as well as for international services. This initiates number of private cars to increase annually by 8%.and which coupled with weak road management Ethiopia stands as one of the worst countries with respect to road safety performance in terms of traffic accident fatalities per 10,000 vehicles (95 in 2007/8) [7]. Also 56 percent fatalities during 1987/8-1996/7 were pedestrians, which is higher than the corresponding average for African countries (40%) and the average for some developed countries (20%) in the period. The pedestrian fatalities in Addis Ababa are much higher, 88 % of fatalities in 1987/8-1993/4. An assessment of road accidents made in Ethiopia highlighted that the country has one of the world’s worst accident records, 170 fatalities per 10,000 vehicles. The accident cost analysis made during the study gave an estimate economic cost of traffic accident between 340-430 million ETB which is 0.8-0.9 % of the gross domestic product in 1999(Ibid). The study further noted the worsening and the likely more severe situation due to under reporting.

Ethiopia road traffic fatality accounts for 51% of pedestrians. A pedestrian in urban environment is expected to be much greater than that of in rural areas. The sum of passengers and pedestrians represent over 80% of all road deaths [8]. Similar to the above facts, another research verifies that Ethiopia is a country with the largest number of traffic accidents and mortality rate. In addition to human life and bodily harm (injury) costs, the seriousness of the situation in socio-economic terms is also very alarming. Addis Ababa lost more than 25 million Birr annually because of traffic accidents [9]. To sum up in Addis Ababa the number of accident increasing from 2,016 in 2010/11 to 3,003 in 2013/14 and it was reported by Addis Fortune [10].

In case of Hosanna administrative town, road traffic accident imposing burden on economic, social and health are very serious and the current hot issue. Though much has been said about the traffic accident, little has been done on the determinants of road traffic accident and its consequences coping mechanisms.

## 1.2. Objectives of the study

The general objective of this study was to investigate the major determinants of the traffic accident and its consequence in Hadiya Zone, Hosanna town.

The specific objectives are

- To identify the major determinants of road traffic accidents and to estimate their magnitude in Hosanna Town.
- To investigate and describe the extent of road traffic accident in Hosanna town.
- To examine the consequences of road traffic accidents in Hosanna town.

## 2. Methods

### 2.1. Study Design

It describes how and why the techniques were used as well as the extent to which they fit to the research objectives. The research is to search or investigate in-depth [11].

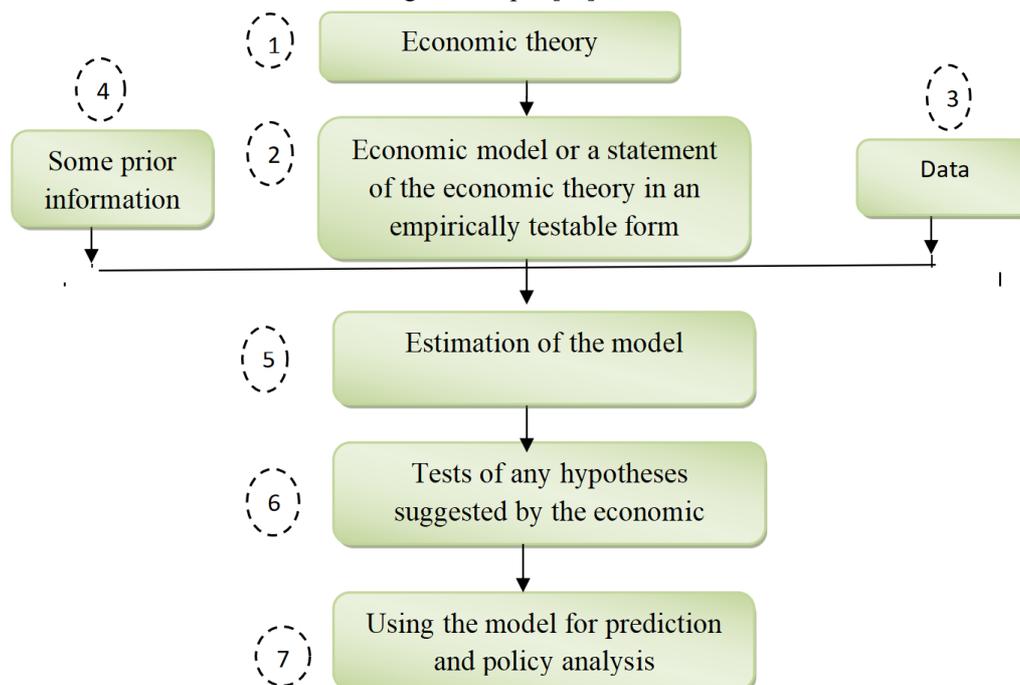


Figure 1: research Design [12]

The primary investigator used primary and secondary data sources for this research. The primary data was collected from 298 households' survey and was analyzed by employing stat. Qualitative data was also gathered from focus group discussion and key informants interview to investigate the extent of accident and related impacts. Traffic accident documents, who served as secondary data sources, were also reviewed, compiled, organized, summarized and interpreted in light of the research objective.

## 2.2. The study area

This research was conducted in SNNPR, Hadiya Zone, and Hosanna Town. Hadiya Zone has ten woredas and two towns (Hosanna and Meseraq-Badawacho). From these two towns Hosanna was selected for this research, because Meseraq-badawacho is a new town and the data for this research is not available. Hosanna is a town and separate woreda in Hadiya Zone and is also administrative center of Hadiya Zone. It is surrounded by Lemo Woreda which was previously part of it. Population in Hosanna was 75,963 CSA (2012) and it has a latitude and longitude of 7°33'N 37°51'E coordinates: 7°33'N 37°51'E with an elevation of 2177 meters above sea level.

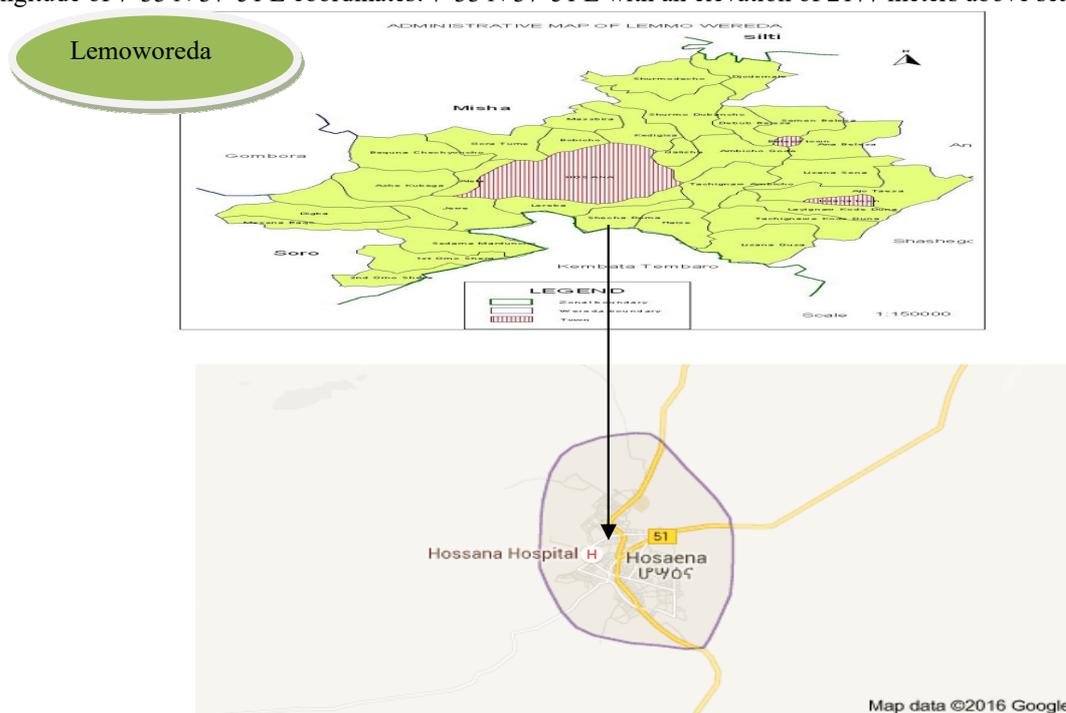


Figure 3.2: Geographical map of Hosanna [13].

## 2.3. Population of the study

Target populations of the study area 1,321 households of Gofer-Meda Sub City residents (Bobichokeble = 330, Jallo-Naremo Keble = 665 and HetoKeble = 326) of Hosanna town.

## 2.4. Sample size

In Hosanna town we have three sub towns and one of these (Gofer-meda sub town), was taken randomly, because the distribution of RTAs in each sub town was nearly similar. But the sample from each Keble was taken not randomly because the household number in each Keble was heterogeneous and so, samples from households were taken by using systematical stratification method. Then, the actual sample size was determined based on statistical method and 298 households were taken from total population.

## 2.5. Sample size determination

Sample size determination is the basic task prior to conducting a research work based on a sample of the selected population. In order to have a maximum sample size, objective of the study, design of the study, cost (budget) consideration, appropriate use of statistical analysis, degree of precision required for verifications and level of confidence used for conclusion has to be taken into the work. Based on the above issues, there are different formulas developed for sample size calculation that conform to several research situations. Therefore, the sample size determination formula adopted for this study is:  $n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$ , as the sample is from a finite population the

sample size calculated as  $n_0 = \frac{Z^2 pq}{e^2}$  [14]. Where  $n_0$  is unadjusted sample size,  $Z = Z_{\alpha/2}$  is the test statistic of

standard normal distribution at significance level of  $\alpha$ .  $e$  is the margin of error,  $P$  is the estimated proportion of an attribute that is present in the population, and  $q = 1-p$  estimated proportion of an attribute that is absent in the population.

## 2.6. Binary regression model

The basic limitation of linear regression is that it cannot deal with dependent variable's that are dichotomous and categorical. Logistic regression dose not assume a linear relationship between dependent and independent variable. The dependent variable must be dichotomy and the categories (group) must be mutually exclusive and exhaustive; a case can only be in one group and every case must be a member of one of the group.

The Binary Logistic regression model has ability to predict the relative likelihood of being effect in a road accident. One may choose Binary Logistic model rather than log linear models, when the main focus is describing effects on that response. The goal of Binary Logistic regression is to identify the best fitting model that explains the relationship between a binary dependent variable and a set of independent or explanatory variables. The response variable is the probability ( $p$ ) that, the resulting outcome is equal to 1. Coefficients obtained from analysis for the independent variables can be used to estimate odds ratios for every independent variable in the model. For the binary response variable  $y$ , represent its categories by 1 and 0. It uses the generic term success and failure for the two outcomes. Binary Logistic regression is the most preferred where the independent variables are categorical or mix of continuous and categorical [14]. In this study  $y=1$  represents fatal (serious problem) and  $y = 0$  represents non-fatal (not a serious problem).

However, the Binary Logistic transformation model is:

$$\text{Logit (P)} = \ln \left( \frac{P}{1-P} \right) = \beta_0 + \sum_{i=1}^n \beta_i X_i \dots\dots\dots 3.8$$

The quantity to the left hand side is called a Logistic and it is the log of the odds that an event occurs. These methods support researchers to rank the relative importance of respondent variables; to assess relation effects; and to estimate the impact of covariate control variables. Therefore, Binary Logistic regression model was used to analyze the relationship between multiple explanatory variables and the occurrence of traffic accidents. Where  $\beta_0$ : The model constant.

$\beta_i$  : The parameter estimates for the independent variables.

$X_i$ : The set of independent variables ( $i = 1, 2, \dots n$ )

$P$ : Probability ranges from 0 to 1

$\ln \left( \frac{P}{1-P} \right)$ , The natural logarithm ranges from negative infinity to positive infinity.

There are two important reasons that make logistic regression strong

1. The range of the Logistic function is between 0 and 1; that make it suitable for use as probability model, representing individual accident.
2. The Logistic regression curve has an increasing s-shape with a threshold; that makes it suitable for use as statistical model, representing road traffic accident due to exposure.

The odd that shows what function of the probabilities results in a linear combination of parameters is:

$$\text{Ln} \left\{ \frac{\text{prob}(\text{event})}{1-\text{prob}(\text{event})} \right\} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \dots \beta_k x_k \dots\dots\dots 3.9$$

## 3. RESULT AND DISCUSSIONS

### 3.1. Descriptive statistics

Road traffic accident in this study was a dependent and dichotomous variable fatal (serious issue) vs non-fatal (not serious issue) and this section discusses all available information of road traffic accidents.

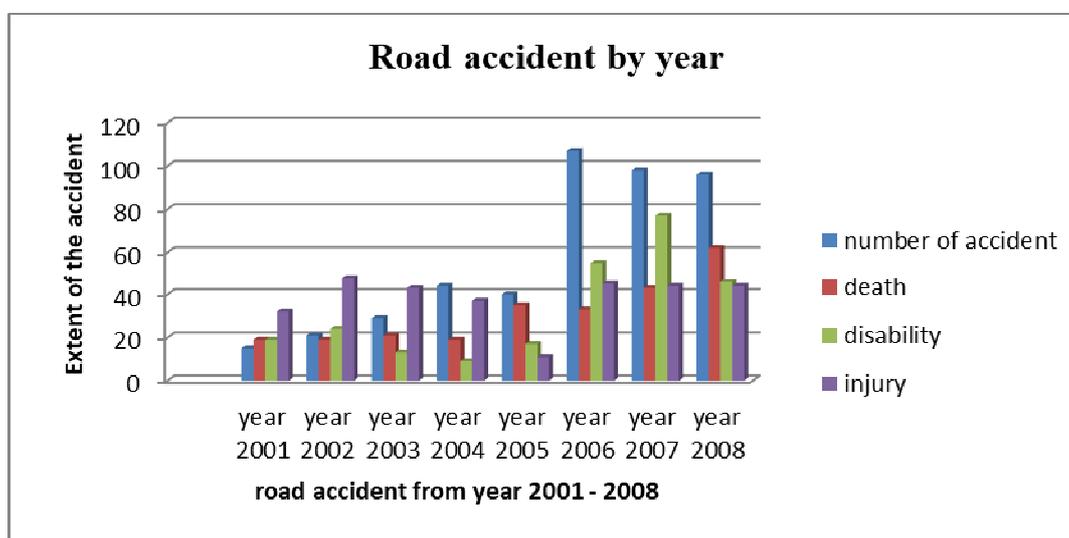
#### 3.1.1. Trend and type of the traffic accident

Based on Hadiya Zone Road Safety Core Process's records on road traffic accident in Hosanna Town between EFY2001-2009, 316 accidents were recorded and 950 people were victims of the accidents. Out of the 950 accident victims, the number of death, disability and injury were 268(27.15%), 313(33%) and 379(39.9%) respectively.

**Table 1: Trends of traffic accident in Hosanna town (EFY 2001 - 2009)**

Year	number of accident	Type of accident			material loss	Remark
		Death	Disability	injury	Birr	
2001	15	19	19	32	166,100	
2002	21	19	24	48	227,300	
2003	29	21	13	43	220'000	
2004	44	19	9	37	380,860	
2005	40	35	17	11	639,000	
2006	107	33	55	45	2,025,000	
2007	98	43	77	44	1,763,400	
2008	96	62	46	44	871,000	
2009	17	17	53	75	826,500	The first six month report
<b>Total</b>	<b>316</b>	<b>268</b>	<b>313</b>	<b>379</b>	<b>7,119,160</b>	

Source: Hadiya Zone Transport and Road Development Sector (2017)



**Figure-1: Road traffic accident between EFY 2001 and 2009**

The Bar Chart above (Figure.1) and Table 1 together display the trend and extent of traffic accident in Hosanna Town from EFY2001 –2008including death, disability and injury, as well as material loss over those years (taking note that that figures of EFY 2009 was only a half-year report).The figures also tell us that death, disability, injury and material loss were increasing over the years. Evidences collected from in-depth interview respondents were also strongly agree with the facts described above.

**Table 2: Seriousness or fatality rate of road traffic accident (as per the responses of the research subjects)**

Type of variable	Yes		No	
	Frequency	percent	Frequency	Percent
Road traffic accident an issue	263	88.3	35	11.7
Motor cycle	260	87.2	38	12.8
Bajaj	186	62.6	112	37.4
Minibus	73	24.5	225	75.5
Pedestrians	211	70.8	87	29.2
Deriving experience	237	79.5	61	20.5
Helmet	243	81.5	55	18.5
Deriving speed	118	39.4	180	60.4
Multidirectional way	145	48.7	143	53.3
Parking space	244	81.9	54	18.1
Organization	152	51	146	49
Carts	241	80.9	57	19.1
Type of variable	Yes		No	
	Frequency	percent	Frequency	percent
Gender	239	80.2	59	19.8
Age				
<19	89	29.9	-	-
>19 and <48	174	58.4	-	-
>48	34	11.4	-	-
Pedestrian side way	260	87.2	38	12.8
Garaging location	237	79.5	61	20.5
Capacitating the community	227	76.2	71	23.8
Exercising law	241	80.9	57	19.1

Reason for number of RTA deaths is clearly related to both population and motorization level [15]. In the same way, findings seen above agree with WHO's report. Results of Focus Group Discussion strongly stressed that there was a remarkable increase of road traffic accident in Hosanna Town mainly due to increased migration of people from rural to urban, inappropriate drivers' behavior such as over speeding, lack of law enforcement, poor traffic management (like vehicles, carts, pedestrians share the same road or one way), unsafe road environment (lack of pedestrians side way, lack of parking space, running small businesses on the road sides, deep drainage/sewerage lines that were left open on the road sides, and high traffic volume on the high way), alarmingly increase of vehicles without significant enhancement of the road facilities (especially motorcycles and Bajaj's) and poor & inconsistent road design.

The Hadiya Zone Road Safety Core Process stressed that the marginal rate of traffic accidents were increasing from year to year and in there were many other accidents which were not reported. One of the challenges that underestimate the actual number of accidents and victims has been the norm of handling such issues by community elders without being officially registered by police or other legal entity. Unfortunately, majority of such cases that were resolved by community elders were not recorded or reported as accident. Another challenge regarding this was the trend of rushing and hiding selves after accident—particularly motorcyclists. That has a lot to do with ignorance and fear of the remedial measures that can be taken by justice bodies. These are the typical instances showing the magnitude of the accidents was not well documented.

### 3.1.2 Socio-economic cost of road traffic accident

Road traffic accident cost analysis involves two steps. First: quantifying physical impacts, such as the number of accidents that occurred, the number and severity of vehicle damages, human injuries, disabilities and deaths. Second: measure in monetary values these impacts or monetize these impacts.

**Table 3 Estimated materials loss**

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009 (Half year)
Material loss (ETB)	166,100	227,300	220,000	380,860	639,000	2,025,000	1,763,400	871,000	826,500
Total 7,119,160ETB									

Source: Hadiya Zone, Transport and Road Development Sector (2017)

The table above (Table 3) shows that only the estimated materials loss for EFY2001 through the first half of 2009 but related *suffering of victims and their families of road traffic-related injuries (psychological trauma, financial expenses, time, loss of job, etc.) is incalculable. There are endless repercussions: families break up; no income for a family if a breadwinner is lost; and thousands of Birr to care for injured and paralyzed people.* These are the socio-economic impact of road traffic accident at micro level.

The Ethiopia Third Party Insurance Proclamation Articles 16 and 27(1), Proclamation No. 799/2013 indicate that insurance cover should be obtained for death, bodily injury, damages to property and Emergency Medical Treatment (EMT). As a result, cover be obtained for death (ETB5000 to 40,000), for a bodily injury/ person up to ETB40, 000, for EMT ETB2, 000 and for property damage up to ETB100, 000 [16]. Therefore the accident cost for data in Table 4.1 above can be calculated as following: for death10, 720,000ETB, disability-12,520,000ETB and injury 758,000ETB total cost including the material loss is 31,117,160ETB.

Also some of the costs of road traffic accident (such as lost output, and administrative cost) can be directly measured in terms of money while others (such as pain, grief, and suffering due to the accident) can't be directly valued due to their nature. At individual and/or family level, road traffic accident affects social, economic, and psychological aspects of victims and their families. The effect could be time spent in taking care of the victim, medical expenditure, property damage, funeral expenses and a loss of an active household member as well as incalculable costs related to pain, grief, and suffering. All of these costs of road traffic accidents drive many families into deeper poverty because of the loss of main source of income (income earner), or high costs of extended medical care, or the additional burden of caring for a family member who is disabled due to a road traffic injury.

The finding of WHO was consistent with this research findings, and support that the above information and it says "active people in age between 15–44 years old account for more than half of all road traffic deaths, and 73% of the people fatal are male[4]. People of that age are in their most productive earning years"-, so their families suffer financially when they are killed or disabled."In addition, WHO noted that the impact of RTA on poor people is greater than the rich and they represent the higher risk group such as passengers, pedestrians and motorcyclists. Therefore, RTA affects strongly both household income and GDP of the country.

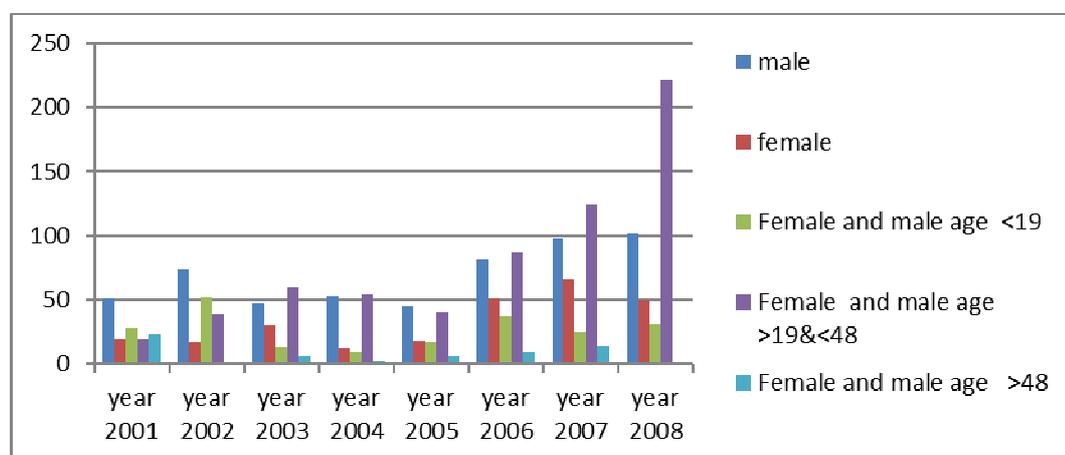
### 3.1.3 Accident by gender and age groups

The variables Age and Gender are significant at the 5% level of significance. Table 4. below shows the distribution of injured and killed by sex and age from year 2001 to 2008 in Hosanna Town. The age and sex distribution of victims have the same pattern for injury and death. The constitution of Ethiopia indicates that the age less than 18 is a child, minimum age for an Ethiopia to apply for a vacancy and be employed in formal sectors is the age of 18 and other scripts show an average life expectancy of low income or developing countries is around 47years. Depending on these evidences the researcher categorized age in three groups. First age less than 18, second age greater than 19 and less than 48, and third age greater than 48. For these three age groups, Qualitative data indicates more males,552(68%) were injured compared to females 263(32%). In the age group (according table 4.4), age greater than 19 and less than 48 years was 645(79%) affected by injuries for both sexes. Similarly, between EFY2001 and 2008 data showed that the highest number of those who died was male aged above 19 and less than 48 years. The general observation was that males were more involved in road accidents because they travel more in their daily duties compared with females who usually stay at home doing domestic duties. Similarly WHO Global status report on road safety shows Ethiopia is one of the 10 countries with the highest number of deaths [17]. This report shows that road traffic fatalities in (-2006-) to be,2517 (78% males, 22% females.

**Table 4. The trend of accident by gender and age**

year	Gender		Age		
	male	Female	Female and male <19	Female and male >19&<48	Female and male >48
year 2001	51	19	28	19	23
year 2002	74	17	52	39	0
year 2003	47	30	13	60	6
year 2004	53	12	9	54	2
year 2005	45	18	17	40	6
year 2006	82	51	37	87	9
year 2007	98	66	25	125	14
year 2008	102	50	31	221	0

Source: Hadiya Zone Transport and Road Development Sector (2017)



**Figure 2: Bar chart showing the trend of accident by gender and age**

It is evident that labor force is one of the essential inputs in production of output and growth of an economy. The study on the other hand disclosed that 645 (67.9 percent) of economically active and very productive groups (with their ages between 19 and 49) are the main victims of RTAs. Losing active and productive human capital because of traffic accident not only affects an individual or a family but also the socio-economic burden will be left on the community and the country at large. A hospital based study in India also indicated that the majority of the victims were in the age group of 15-50 years. The conclusion from the Indian hospital-based study was similar: RTAs highly affect the most active and productive part of the population which leads the country to incur loss in its economy [18]

#### 3.1.4. Motorized traffic

The researcher could not find vehicle type data in Hadiya Zone Transport and Road Development Sector as data on vehicle type was not recorded in an organized ways after EFY2004 because of some mandate complexity between transport sector and police commission. So, the researcher was forced to depend on qualitative data that came through focus group discussion (FGD) and key informant interview (KII).

According to the findings of the FGD and KII, the cumulative number of vehicles in the town is more than five thousands and includes motorcycle, Bajaj, automobile, minibus, D4D, buses, Isuzu, Sino Track and others. The highest numbers of vehicles are motorcycle group followed by Bajaj. From these vehicle groups majorities of motorcyclist sand Bajaj motorists were reported to frequently violate the traffic law in their day- to- day duties. Motorcyclists drive more than two passengers at a time with high speed and neither motorist nor passengers wear helmets. Also they often transport unbalanced freights like chat in the town from one place to another. Some of these motorcycles were without plate code and the drivers were without driving licenses. Moreover, most of them lack driving experience.

Most of the issues rose about Motor Cyclists work also for Bajaj drivers—and the level of accident by them are comparable. Vehicles like Isuzu, Sino track minibus and D4D also significantly contribute to the traffic accident compared with the remaining vehicle groups in Hosanna Town.

In this study, all of the three vehicle groups were significantly related to traffic accident. Motorcycle and Bajaj motor were positively associated with the accident in Hosanna town and significant at level of 1%

significance. This positive relationship indicates that the odds ratio in favor of RTA as these vehicles number increases. If all other things are held constant, the odds ratio of 1064.4 and 72.8 for motorcycle and Bajaj motor implies that the accident was increase by a factor 1064.4 and 72.8 respectively. The Motor vehicle crashes are the leading cause of traffic related deaths in adolescents and young adults [19].

But Minibus-Taxis transport service related with accident negatively and significant at 1% level. Thus, increasing the number of minibuses (at the expense of motorcycles and Bajaj) can decrease an accident significantly by 1 percent. This result contradicts with the finding “in Addis Ababa, taxis responsible for 26 percent of injuries” [20]. This indicates that the minibus-taxis are relatively more adoptable in Hosanna town than motorcycles and Bajaj motor.



**Figure3: Illegal (Commercial service providers) motor cyclists in Hosanna town (2017)**

### 3.1.5. Non-motorized traffic

This group includes pedestrians' mistake and carts for this study. The secondary source data or out of the total accident victims recorded data 216(22.7) percent victims were pedestrians. Also pedestrians' mistake and carts were significant at 5% and 10% level significance and their odds ratios are 25.3 and 9.5 respectively. As emphasized during the focus group discussions (FGD) the trip of non-motorized traffic was ambiguous. Given a remarkable increase of migration of people from rural to urban, using a single road in common for pedestrians, bicyclists, carts and animals has not been comfortable to all road users. In such condition trying to control traffic accident was also very difficult.

### 3.1.6. Location

The area where traffic accident occurred and variables like multi directional way, parking space and institutions or organizations on the road side were considered under this category. The known and the marked accidental traffic corridors/ locations mentioned by focus group are Naramo Condominium Site, Boicho Taxis Station, Gomboro Hotel Area, Jerusalem Bar Area, Mobile Fuel Gas Station, Orthodox - Church Area, Electric Power Station (Hosanna Branch), Synod's Church location, Wachamo University Area, and Batena and Shelansha Rivers Sidewere reported to be the most accidental locations. The highways from Addis Ababa via Butajera to Hosanna and from Wolkete to Hosanna both cross these locations and that made the area even more vulnerable to frequent traffic accidents.

As mentioned by both informants and focus group members the major focus of traffic polices in their day-to-day activities was managing motorized traffic and non-motorized traffics in multi-directional locations—but infrastructural limitations mentioned above limit them to do their jobs effectively. The analysis result of this study also indicated negative relationship in between accident and multi directional locations which was a bit unexpected. However, the researcher understands that this may have something to do with the practical fact that traffic polices give much attentions to such sites that the others. The garaging location with highest mean (0.79) followed by institutions and multi-directional way with mean 0.50 and 0.48 respectively.

### 3.1.7 Stockholders contribution

In this category predictor variables; helmet use, pedestrians sideway, driving speed and exercising law are significant at 5% significance level and their marginal effects were 8.5%, 1.4%, 1% and 0.3% respectively. The consistante research suggests that “uneducated and unlicensed drivers and riders, reckless driving, carelessness, drunkenness, lack of knowledge on road safety rules, driver's age, fatigue, low practicing government policies, failure in law enforcement and unsafe road system are the leading cause of death globally” [21].

So, what can stockholders do? The following response was derived from key informants discussion and respondents about the contribution of stockholders in minimizing road traffic accidents. The FDG members believed that coordinating the stockholders has a great impact in reducing the level of accidents in the town and can improve the transport system. Key stockholders like traffic policies, transport sector leaders and officials,

public transport cars unions, insurance organizations, drivers teaching and training institutions, operators and others concerned governmental and non-governmental organizations as well as all road users should be mobilized so that they coordinate to mitigate the RTAs. They also admitted that the efforts made so far in this regard was not satisfactory. The study participants stressed that stakeholders should strive to enhance the road design, deploy more traffic polices, to fight against exaggeratedly high corruption in the sector and to enhance the level of awareness of the community.

In case of Helmet use, as per the respondents' explanation and witnesses, most of the motorcyclists would like to wear helmets but the problem was that there was no available market to purchase them. So, for further solution implementing three basic things would solve this problem. First: facilitating the way of the supplying helmet. Second: implement the existing rules motorcyclists to use helmet. Third: providing comprehensive education focus on behavioral change of the drivers and techniques of safe deriving. Consistent study showed legislation has not been enough on its own as failure to use helmets, use of nonstandard helmets and use of improperly secured helmets is common in many places, especially in low- income countries and calls on efforts to supplement these efforts with complementary prevention and educational strategies [22]

### 3.2. Logistic Regression

This is the most important model for dummy and categorical response data as mentioned in chapter three. In this sub section Logistic analysis considered explanatory variables found significantly associated with the dependent variable as per the p-values.

**Table 5 Logistic analysis for road traffic accident**

RTA	Coef.	Robust Std.Err.	Z	P>/z/	[95% Conf. Interval]
Moc	6.97	1.84	3.79	0.000	3.37 10.57
Bmo	4.29	1.27	3.38	0.001	1.80 6.77
Minib	-2.24	1.11	- 2.01	0.044	-4.41 -0.06
Pedmis	3.23	1.06	3.04	0.002	1.15 5.31
Carts	2.26	1.32	1.71	0.087	-0.33 4.84

RTA	Coef.	Robust Std.Err.	Z	P>/z/	[95% Conf. Interval]
Age	1.22	0.49	2.46	0.014	0.25 -2.71
Gender	1.79	0.81	2.22	0.027	0.2 3.4
Derexp	2.42	0.86	2.81	0.005	0.73 4.11
Helmet	-4.64	1.15	-4.02	0.000	-6.9 -2.4
Derspe	4.28	1.43	3.00	0.003	1.5 7.07
MDW	-5.29	1.45	-3.66	0.000	-8.13 -2.53
Parksp	0.23	0.81	0.28	0.781	-1.37 1.82
Pedsway	-2.27	1.09	-2.09	0.037	-4.4 -0.14
INIOR	2.38	0.79	3.03	0.002	0.84 3.92
Garag	0.92	0.78	1.18	0.239	-0.61 2.46
Capcom	0.58	0.97	0.60	0.545	-1.30 2.47
Exclaw	2.12	0.92	2.31	0.021	0.31 3.93
Cons	-12.29	3.2	-3.84	0.000	-18.56 -6.02

### 4. Conclusion

This research examined the road traffic accident in Hadiya Zone, Hosanna Town. It employed both quantitative and qualitative analysis to come up with results and conclusions. This study applied Logistic Regression Technique to investigate the determinants of road traffic accidents (RTAs) in Hosanna Town using quantitative data. Seventeen predictor variables were employed in the model development to predict factors behind severe RTAs. Explanatory variables—Motor cycle, Bajaj motor, Minibuses, Pedestrians, Carts, Age, Gender, Driving experience, Helmet, Driving Speed, Multi directional Way, Institution or Organization, Road Side Maintenance Services or Garaging, Pedestrian Sideway, Capacity officials and Community in road safety, Enforcement or Exercising the Law—were examined in the model. All variables in the model except Garaging, Parking Space, and Capacity of Community were significantly associated with RTAs. Qualitative techniques including key informant interviews and focus group discussions were applied to further enrich and complement the quantitative data.

The analysis results in this study clearly also showed that the road traffic accident was increasing in the

town. The study has revealed that young males aged between 19 and 48 years that are economically active—are highly vulnerable to road traffic accidents. The road users who were always at risk of dying on the road were found to be passengers and pedestrians. The trend of accident occurrence was almost increasing almost every year in a period between 2008 and 2016 G.C (or between EFY 2001 and 2009) for which data were compared. Similarly, the property damage and other accident costs (death, disability and injury) estimate in Hosanna town, which were 166,100 ETB and 1,584,000 ETB respectively in 2008 G.C were escalated to 852,500 ETB and 2,950,000 ETB respectively in the year 2016 G.C. Unless tangible actions are in place and coordinated efforts are effected, the current trend showed that the traffic accident in the town would end up with persistent morbidity, mortality, economic and social consequences.

## 5. Recommendations

Based on the findings of the study, the researcher forwards the following key recommendations for responsible bodies.

A mechanism should be in place to document and report all road traffic accidents irrespective of whom (the justice body or the community elders) handle the legal or traditional resolution processes with the victims or their families. Failure to do so means failure to clearly show the problem that again highly underestimates the efforts towards mitigating the problem.

The road accident is significantly associated with pedestrians' behaviors on traffic roads. As such government needs to come up with meaningful measures to enhance the knowledge and practice of pedestrians. There have been regulation that included penalizing pedestrians of their improper use of traffic roads but the return on investment was unexpectedly low. Therefore, on top of the awareness creation efforts, it will be wise to include hands-on road traffic safety basics in education curriculum so that the new generation would grow with the right attitude regarding traffic safety precautions.

It was observed from the findings that motorcyclists would like to wear safety cloths (mainly helmets) but such apparatuses were not available at nearby markets. Concerning bodies should be creative enough and work with stockholders (mainly motorcycle importers or delegated sellers) to avail such safety clothes to motorcyclists. One of such mechanisms in this regard can be urging the motorbike vendors (distributors) to sell their bikes only along with safety wears. Given increasing number of motorbikes in the town, this sounds necessary.

The research findings have clearly shown that the minibus-taxies are relatively more adoptable to Hosanna Town context than motorcycles and Bajaj taxis. That is acceptable given the topography of the town (which is full of hills and mountainous looking). So, concerned bodies should work on availing more minibus-taxies or public buses of that kind for the public and limiting the number of motorbikes and Bajaj for the sake of safety of the residents. This of course requires a long term plan and step by step action over years.

In the long term, the Hosanna Town needs standard pedestrians sideway, alternative ways to animal carts as well as strong policy that enforces building with sufficient parking areas. The town administration should take the assignment of enhancing each feature as the town is growing fast.

Both Hadiya Zone's Transport department and Hosanna town administration should implement computerized data management system on key road traffic accident indicators for easy access and reference as well as action researches in the area.

The researcher encourages further comprehensive studies in the topic to further understand the magnitude and impact of road traffic accidents in Hosanna Town.

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