



Prevalence of Road Traffic Accidents and Associated Factors in Chuko Town, Southern Ethiopia, 2017

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Abstract

Background: A road traffic accident is an incident on a way or street open to public traffic, resulting in one or more persons being killed or injured, and involving at least one moving vehicle. The purpose of this study was to present the prevalence and factors associated with road traffic accident in Chuko town , Southern Ethiopia

Materials and Method: Community based cross sectional study was done in Chuko Town with a total sample size of 422 from March 27 to April 4, 2009 E.C Questionnaire consists of demographic characteristics like age, occupation, level of education and cause of RTA. The study employed chi-square analysis. Data from qualitative was analyzed manually then triangulated with the quantitative one. The result is presented using descriptive statistics using tables and graphs.

Result: A total of 422 respondents participated in our study with 100% respondent rate. Among the participants, 99(23.5%) of them had previous history of RTA. Concerning the causes of RTA, 141(33.4%) majority of them were caused by poor road condition followed by 119(28.2%) by over speed. The results from FGDs and interviews showed that the Town has traffic flow and motor bikes were most common causes of the accident.
Conclusion: The study found out that RTA is big problem of the Town The most common cause of RTA is poor road condition and Motor Bikes are most commonly involved in the accident.

Keywords: Traffic Accidents, Motor Vehicle, Ethiopia.

Introduction

Road traffic injuries (RTIs) are considered a serious public health problem worldwide [1]. They are a significant public health challenge and predicted to be the 5th leading contributing factor to the global burden of diseases by 2030 [1-4]. Although road deaths and injuries are preventable, they are among the leading causes of premature deaths, hospitalizations, disabilities, and socioeconomic losses [5-7]. RTAs rank as the 11th leading cause of deaths and account for 2.1% of all deaths globally [8]. Pedestrians, cyclists, two-wheeler riders, and public transport passengers are the most vulnerable road users [9]. RTA-related deaths are predicted to increase by 83% in

developing countries and to decrease by 27% in the developed ones [8]. In addition, it is estimated that RTAs will cost billions of rupees globally and nationally. Accordingly, an RTA-related injury is an economic burden falling on the health care budget [10].

In Ethiopia, the situation has been worsened as the number of vehicles has increased due to the increased traffic flow and conflicts between vehicles and pedestrians [11-13]. Despite governmental efforts in road developments, road crashes remain one of the critical problems of the road transport sector in Ethiopia [14]. Every year, many lives are lost, and a huge amount of assets is destroyed due to road traffic accidents in this country. It has experienced an annual average of

8,115 road accidents over the past 11 years [15]. In financial terms, Ethiopia, being one of the poorest world countries, loses at least 400 million Ethiopian Birr each year due to road accidents, which was 12 million Birr per year on average 15 years ago and was the third killing factor in this country [16]. Presently, the financial property damage, excluding human deaths and injuries, is estimated at 15 million Ethiopian Birr annually on average [15]. According to the UNECA (2009), the rate of traffic accident deaths in 2007-2008 was 95 per 10,000 motor vehicles, which put the country on the dangerous side of international road safety scenes. In the same year, a police report revealed that 15,086 accidents caused losses of 2,161 lives, and over 82 million Birr, equivalent to 7.3 million USD, was the estimated cost of the assets damaged (1 USD = 11.34 Ethiopian Birr). In addition, by 2005 and 2006, the traffic accidents and fatalities increased by 17% and 10% per year, respectively, yet there was a decreasing trend in this respect. Besides, there were 2.84 road accident fatalities per 100,000 individuals of the population in the same year [14]. Therefore, understanding road traffic accidents and identifying black spots are integral to working

out solutions for these problems. Against this background, this research tries to assess information on road traffic accidents and to determine black spots in Sidama Zone in Southern Ethiopia, particularly in Chiko Town.

Materials and Methods

This research was conducted in Sidama Zone, Chuko Town, Southern Ethiopia. SNNPR has 13 zones and 508 special weredas (districts), among which, Sidama extends in a cone-shaped area in the middle of Southern Ethiopia. Sidama Zone borders Arsi Oromo in the north and in the west, Gedeo, Burji, and Guji Oromo in the south, Guji Oromo in the west, as well as Wolayita and Kambatta in the east. It has the geographic coordinates of latitude, North: 5'45" and 6'45", as well as longitude, East, 38' and 39'. Chuko town is located 76 km from Hawassa, the capital of the region. This town has a population of 22,953, including 11,252 males and 11,701 females [17]. This study was conducted during the time period of March 27-April 4, 2009. In this study, a community-based cross-sectional design was utilized.



Fig. 1. Chuko Town map
Source: Chuko Town munic

For the qualitative study, some governmental officials and traffic police officers were selected as the study population. The respondents aged 18 and above. The inclusion criteria were living in the study area for six months and being willing to participate in the study. The exclusion criteria included having hearing and speaking problems, being severely ill, and having psychiatric problems. The sample size was calculated using a single proportion formula as follows:

$$n = \frac{z^2 (p)(1-p)}{w^2}$$

The confidence interval was set at 95%, so the Z value was 1.96, and the margin of error (W) was 0.05.

The P value, in this study, was set at 0.5 because no study has been done in this area or in another place with its socioeconomic status being similar to that of Chuko Town. Thus, the sample size was calculated as follows:

$$n = \frac{1.96^2 (0.5)(1-0.5)}{0.05^2} = 384$$

Where,

Z= confidence interval N= total population
n= sample size W= margin of error
P= proportion of the population in the previous study

Having included a non-respondent rate of 10%, the final sample size reached 422. One kebele (group) was randomly selected by lottery from the two kebeles, and the households were selected by the systematic sampling technique. In addition, every household was selected by constant value K, to be obtained as follows:

$$K = \frac{N}{n} = \frac{5646}{422} = 13$$

Thus, every household was recruited from among 13 households. The first household was randomly selected by lottery from among the first 13 households. For the qualitative data, convenient sampling was utilized where some stakeholders were selected purposively. Reliability analysis, in this study, showed that the Cronbach's alpha of the variables was 0.883, which indicated the questionnaires had high internal consistency.

In this article, semi-structured questionnaires were used for the qualitative study, and structured ones were used for the quantitative study. The questionnaires were adopted from similar studies and modified according to the study context. About 3 FGDs were held with each of them having contained 8-12 members. In addition, an in-depth interview was conducted with the head of the Roads and Transport Office of Chuko Town. Besides, secondary data were obtained from the Roads and Transport Office.

Data were collected by public health students. The students were divided in two groups to collect data from different groups of the communities.

The quality of the data was assured by pretesting the questionnaire on 5% of the population. Data were collected by trained interviewers who were public health students. The interviewers conducted structured interviews as supervised by the investigator. Each day, a total of 5% of the questionnaires were randomly selected and checked for completeness and consistency. In addition, some meetings were held to discuss problems if any, before the data collectors went back home. The quantitative data were checked, edited, and entered into SPSS software version 20. The study employed a chi-square analysis test as well. Data from the qualitative section were analyzed manually and then triangulated with the quantitative part. The results were presented using descriptive statistics by tables, graphs, and charts.

Definitions;

Accident casualties: it refers to road crash victims and includes injuries and fatalities.

Accident frequency: it is a measure of the relative

magnitude of a specific type of accident in relation to all accidents for a specified time period, such as one year or three years.

Accident rate: it is a measure of the occurrence rate of accidents in relation to time; for example, 10 accidents per year.

Fatal accident: this term is used when at least one person is killed, or when deaths occur within 30 days from an accident.

Property damage: it refers to the physical damage of vehicles or properties, but not of individuals.

Road traffic accidents: it is defined as a rare, random, and multiple-factor event, which is always preceded by a situation in which one or more road users fail to cope with the road and its environment.

Severe injury: It refers to a situation in which at least one person is injured and admitted to a hospital, but no deaths occur.

Slight injury: It refers to a situation in which at least one person requires medical care, but there are no fatalities or injuries requiring hospitalization.

Traffic accident: It refers to accidents occurring between vehicles on a public highway (i.e. originating with, terminating with, or involving a vehicle).

An ethics code was obtained from the Rift Valley University Hawassa Campus. In addition, confidentiality of this study was maintained by keeping the respondents' names anonymous. Oral informed consent was received from the respondents concerning their willingness to participate in this study, and they were announced to be free to participate in this study.

Results

A total of 422 respondents participated in this study with the response rate of 100%. From among the participants, 244 (57.8%) were male and the rest, 178 (42.2%), were female. The respondents' age ranged from 18 to 66, and the mean and standard deviation of their age were 31.66 and 10.12, respectively. The majority of the respondents, i.e. 157 out of 422 (37.2%), had attended only primary school, 144 (34.1%) up to secondary school, 78 (18.5%) had a degree above grade 12, and a small number of them, i.e. 43 (10.2%), had no formal education. Besides, 125 (29.6%) of the respondents were merchants, whereas 78 (18.5%), 77 (18.2%), 53 (12.6%), and 39 (9.2%) of them were students, private sector employees, office workers, and unemployed individuals, respectively. In addition, 50 (11.8%) had other occupations.

Table 1. Sociodemographic characteristics of the respondents, Chuko Town, 2009

Variable		Frequency	Percent
Age	18-30	245	58.0
	31-42	113	26.8
	43-55	53	12.6
	≥56	11	2.6
	Total	422	100
Sex	Male	244	57.8
	Female	178	42.2
	Total	422	100
Occupation	Private sector worker	77	18.2
	Unemployed	39	9.2
	Student	78	18.5
	Office worker	58	12.6
	Merchant	125	29.6
	Other	50	11.8
	Total	422	100
Educational level	No formal education	43	10.2
	Only primary school	157	37.2
	Up to secondary school	144	34.1
	Above grade 12	78	18.5
	Total	422	100

Causes of RTAs in the study area: Concerning the causes of RTAs, 141 (33.4%), i.e. the majority of them, were caused by poor road conditions, 119 (28.2%) by high speed, 50 (11.8%) by the large number of vehicles, 33 (7.8%) by lack of driving experience, 23 (5.5%) by not giving priority to

pedestrians, and 22 (5.2%) by driving while intoxicated (DWI). However, according to the FGDs held with the Road and Transport Office workers, the most common cause of RTAs was lack of awareness among the community.

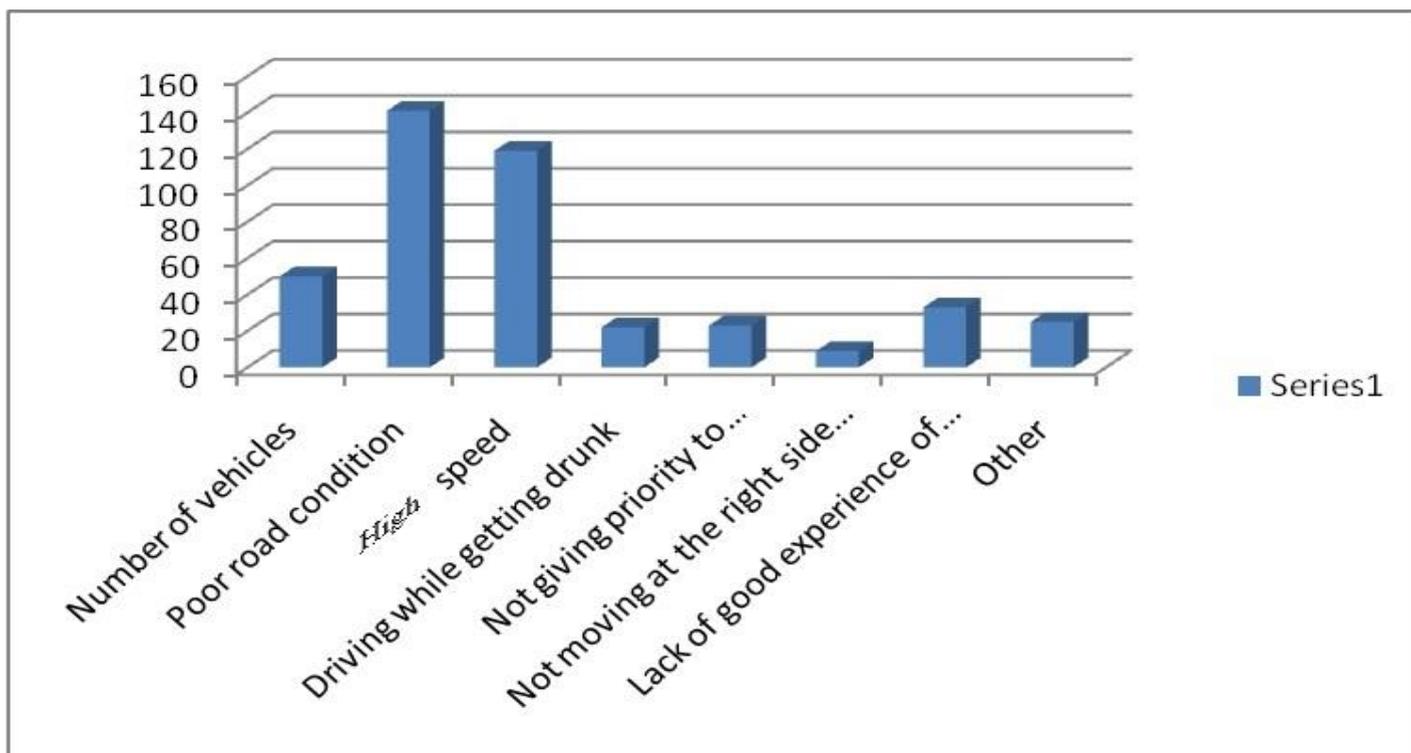


Fig. 2. Causes of road traffic accident reported by passengers in Chuko town, 2009 E.C

Based on the RTA experience in the town, 369 out of 422 respondents (87.4%) expressed that Chuko Town was a town experiencing RTAs, but the rest, 53 (12.6%), did not believe in that. Regarding the place for crossing the roads, 248 (58.8%) of the respondents crossed roads at any points, 91

(21.6%) crossed roads at junctions, and 83 (19.7%) crossed roads at mid-block crosswalks. A total of 366 (86.7%) of the respondents believed that lack of traffic signs and pedestrian behavior could cause RTAs.

Regarding difficulty in crossing the main road in the town, 220 (52.1%) of the respondents expressed that it was very difficult to cross it, 95 (22.5%) said it was difficult, 77(18.2%) said it was not that difficult, and 25 (5.9%) replied it was easy.

Concerning the sources of knowledge, 142 (33.6%) of the respondents got it from media, 103 (24.4%) from schools, 92 (21.8%) from their own knowledge, 66 (15.6%) from the traffic police, and the rest, i.e. 9 (2.1%), from their parents.

Table 2. Sources of knowledge about road safety rules of passengers in Chuko Town, 2009

Variable	Percent	Frequency
Media	33.6%	142
School	24.4%	103
Themselves	21.8%	92
Traffic police	15.6%	66
Parents	2.1%	9
Other sources	2.5%	10

In addition, 189 (44.8%) of the respondents disagreed with traffic police commitment to their duties, 150 (35.5%) agreed, 40 (9.5%) considered them indifferent, 25 (5.9%) strongly disagreed, and a small number of the respondents, 18 (4.3%), strongly agreed. Regarding the use of roads, 270

(64.0%) of them were used to traveling when facing oncoming vehicles, 95 (22.5%) were used to traveling with oncoming vehicles coming from their back, and the rest, 57 (13.5%), were used to traveling on both ways when traveling on the main road.

Table 3. Passengers' perception of the level of RTAs in Chuko Town, 2009

Respondents' perception	Frequency	Cumulative Freq.	Percent
Big problem	262	262	62.1
Moderate problem	144	406	34.1
Not a problem	16	422	3.8
Total	422		100.0

From among the participants, 287 (68.0%) identified traffic signs, signals, and road marks when moving on streets and crossing roads, while the rest, 135 (32.0%), did not.

The level and prevalence of RTAs in the town: From among the participants recruited for data collection, 323 (76.5%) had no previous history of RTAs, while the rest, 99 (23.5%), had a previous history of RTAs.

Table 4. Transportation modes used by passengers in Chuko Town, 2009

Transportation mode	Frequency	Percent
Motor cycles	204	48.3%
Pedestrians	160	37.9%
Three-wheelers	25	5.9%
Private cars	33	7.8%

Concerning the transportation modes used by the participants, 204 (48.3%) of them often used motor cycles, 160 (37.9%) were pedestrians, 25 (5.9%) used 'Bajaj' (three-wheelers), and 33 (7.8%) used private cars.

Concerning drivers giving priority to pedestrians, 175 (41.5%) of them believed drivers poorly gave priority to pedestrians as required by laws, 146 (34.6%) considered it very poor, 64 (15.2%) regarded it good, 25 (5.9%) considered it very good, and 12 (2.8%) considered it excellent.

In case of penalizing drivers failing to observe traffic rules and regulations, 271 (64.2%) of them believed drivers failing to observe traffic rules and regulations at the presence of traffic police

sometimes got penalized effectively, 91 (21.6%) of them believed they always got penalized, while the rest, 60 (14.2%), believed they never got penalized.

In terms of education received by concerned officials about road safety rules, 259 (61.4) of the respondents had never received education from concerned officials, while the rest, 163 (38.6%), had received education.

Regarding solutions suggested by the respondents for the problem, 187 (44.3%) of them believed the solution for existing RTAs was creating awareness among the society, 107 (25.3%) believed it would be repairing roads and increasing road capacity, while the rest suggested solutions as adopting

marking rules and regulations (26 (6.1%)), punishing drivers disobeying rules and regulations (25 (5.9%)), fighting corruption (17 (4.0%)), limiting and controlling vehicle speeds (15 (3.6%)), giving priority to pedestrians (9 (2.1%)), erecting traffic signs on the streets (7 (1.7%)), assigning identification numbers to vehicles (6 (1.4%)), promoting cooperation with traffic police (6 (1.4%)), avoiding alcohol while driving (6 (1.4%)), reducing

the number and types of vehicles (3 (0.7%)), as well as qualifying drivers and restricting those driving without a license (2 (0.5%)).

Results from the chi-square test showed that there was a statistical significant correlation between age and RTAs at $p < 0.05$ (Pearson Chi-Square = 68.675, $DF=3$, $X^2_{calculated} > X^2_{tabulated}$, so the null hypothesis was rejected).

Table 5. The statistical test for the association between age and RTAs among passengers in Chuko Town, 2009

Age	RTA		NO RTA		Pearson Chi-Square
	Frequency	Percent	Frequency	Percent	
18-30	26	6.1%	219	51.89%	Pearson Chi-Square = 68.675 DF=3
31-42	50	11.84%	63	14.92%	
43-55	20	4.73%	33	7.81%	
>56	3	0.71%	8	1.89%	

FGDs held with Road and Traffic Office Workers; Date: 04/08/09; time: 4:30-5:30; Place: Restaurant

According to police officers at the Road and Traffic Office, Chuko Town is an area with a lot of RTAs because the community uses many types of transportation vehicles, especially motorcycles, three-wheelers, minibuses, and Isuzu trucks for transportation purposes.

Chuko Town has four entry and exit roads, including roads from Chuko to Hawasa, from Chuko to Dilla, from Chuko to Alata Wondo, and from Chuko to Nekebas.

RTAs in Chuko Town mostly occur for the following reasons:

1. Lack of awareness of RTAs among the community
2. Lack of experience and negligence among the drivers
3. Poor road conditions
4. High speed

Focused group discussions (FGDs) at Chuko health center: A total of 10 people, who expressed they perceived transportation in Chuko Town, participated in group discussions. They enumerated some factors, such as the number of people riding motor vehicles being more than acceptable and traffic police not taking responsibility for their role correctly as some causes of RTAs.

They also said that the magnitude of road traffic accidents was increasing day by day, especially among motor vehicles. Male adolescents were introduced as the majority of RTA victims. In addition, they enumerated common causes of RTAs as high speed while driving, lack of experience among drivers, driving while drunk, and poor road conditions.

Discussion

This study was conducted aimed at assessing the prevalence of RTAs in Chuko Town as well as its

associated factors. In this study, 99 (23.5%) of the respondents had a previous history of RTAs, which is comparable to the study conducted among adolescents and children in the referrals to the hospitals of Amhara National Regional State, Ethiopia [18].

This finding indicates a higher rate of RTAs than the one conducted in Iran, which documented a prevalence of 16.4% [19]. However, it indicates a lower rate of RTAs than previous studies conducted in India, being 52.61% and 31%, respectively [20, 21]. This inconsistency could be due to differences in the study population between these studies. The other possible explanation for the differences between the two studies could be differences between the two countries in road development conditions. Accordingly, Ethiopia is one of the least developed countries with a poor road network [22]. In 2013, the WHO estimated that 25.3 road accident fatalities occurred annually per 100,000 population in Ethiopia [23.] A nationwide study conducted in Nepal that surveyed 2,695 subjects found out that the prevalence of RTAs was 2.7% [24].

Few studies have so far measured the incidence of RTAs according to community-based data [25–27]. The present study found out that RTAs are a big problem in the Town, for 262 (62.1%) of the respondents considered RTAs as a big problem. This rate is slightly higher than the study conducted in Bahir Dar (51%) and other studies [7-8,28-29], which could be due to poor road conditions in Chuko Town in comparison to Bahir Dar.

According to the findings of the present study, poor road conditions were the most common cause of RTAs (33.4%); however, according to a study conducted in Addis Ababa, it was found out that failure to give way to pedestrians was the most

common cause of RTAs (53.8%) [30-33]. This could be due to the absence of suitable pavement in Chuko Town, which is moreover poor road condition with ups and downs trapping flood when raining and having no 'zebra' markings for crossing roads, no traffic lights and signs, no way for pedestrians, and only a single lane.

However, according to the research conducted in Bahir Dar, the most common cause of RTAs was driving errors [30]. This could have been due to the fact the rate of failure to give way to pedestrians was high in Bahir Dar (10.7%) and in other studies [11, 34-36].

Regarding the perception of traffic signs, only 32 (36%) pedestrians indicated that they perfectly understood traffic signs in the previous study [32]; nonetheless, the rate was 68% in the present study, which could have been due to suitable education provided by traffic police and concerned officials.

According to this study, 175 (41.5%) of the respondents believed drivers would give insufficient priority to pedestrians as required by regulations. This number is comparable with the study done in Bahir Dar, Wolaita Zone, Addis Ababa City, and Sidama Zone, respectively [17, 37-39], which is probably due to the violation of rules and regulations by drivers.

Based on this study, 150 (35.5%) respondents agreed that the traffic police members were committed to their job. To compare this finding with the study done in Addis Ababa, [11], the rate was higher (20%), which could have been due to the better coordination of the traffic police with themselves and with the community. In the end, they made some recommendations about the future, including providing coverage of education for the whole community, cooperating with the government, giving priority to road construction projects rather than other infrastructures, and obliging the traffic police to take responsibility in their roles.

Focus group discussions (FDGs) with traffic police students: The majority of the participants perceived that there was a great traffic flow in Chuko Town because it is the center of different cash crops. The major causes of RTAs as listed by the students included high speed of motor cycles, poor road conditions, carrying more than two passengers on a single motor cycle, and lack of experience among the drivers. Interventions recommended to be made to fix the problem of RTAs included educating the community in creating awareness of RTAs, penalizing drivers violating road traffic rules and regulations, participating students as student traffic.

Interviews with the Road and Traffic Office: The most common RTA in the town was motor vehicle accidents (MVAs). Many of MVAs were not reported to the Road and Traffic Office, so the exact number of accidents was not known.

Secondary data from Chuko Police Office: Secondary data from Chuko Police Office about RTAs in the town indicated that there were 2 deaths, 3 severe physical injuries, and 6 mild physical injuries by the end of 2008. However, the six-month report in 2009 indicated that there were 3 deaths, 2 severe physical injuries, and 2 mild physical injuries.

Conclusion

The prevalence of RTAs was found out to be high in the town. The results from the chi-square analysis showed that there was a significant statistical association between age and prevalence of RTAs. The study also revealed that:

- RTAs were a big problem in the town.
- The most common means of transportation was motor cycles.
- The majority of the participants perceived traffic signs.
- The most common cause of RTAs was poor road conditions, and motorbikes were most commonly involved in accidents.
- It was very difficult to cross the main roads.

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Conflict of interest: None declared.

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