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Road Safety Measures: Their Effects in Improving Road Traffic Accident in Addis Ababa

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Abstract

Road traffic crashes now represent the eighth leading cause of death globally. They claim more than 1.35 million lives each year and cause up to 50 million injuries and developing countries take the larger share. Therefore, this study sought to assess the effects of road safety measures in reducing road traffic accidents in Addis Ababa. Cross-sectional descriptive study design wasemployed for this study and data was collected using structured questionnaire. The study engaged 384 respondents which include 204 pedestrian and 180drivers. Also 10years road traffic accident data from 2010 to 2019 was used from Addis Ababa police commission crime and traffic accident prevention department. Quantitative data was analyzed using SPSS Version 21+ software, while qualitative data was organized and analyzed thematically. The traffic data analysis result shows that the number of traffic accident in Addis Ababa is increasing for the last 10 years. But, using the standard accident measurement index which considers increase in human as well as vehicle population, the fatal accident/100.000 population of the city for the same year is nearly constant but fatal accident per 10,000 vehicles shows reduction from 2015 to 2019. The result also shows that comprehension of traffic signs and signals by drivers and pedestrian is 58.38% and 53.93% respectively. Comprehension of traffic safety rules and regulation by both road users; drivers (51.1%) and pedestrian (55.54%) are low. Based on the result, the study recommended that road safety campaigns should be frequently organized to aware road users about the major and important traffic signs, rules and regulations. Since road safety is a multifaceted problem, stakeholders should work together to improve road safety in the city.

Keywords: Comprehension, Disobeying, Drinking, Safety, Speeding

Background

Road transport plays a significant role in the development of the country's economy. It has the lion's share in transporting passengers and goods within the country (90-95%). The sector shows improvement in the road construction and maintenance in 19 years from 1997 to 2018.

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Road network length increased from 26,500km to 121,171km and Road Density from 24.1 to 102.8km/1000sq.km respectively. Vehicle growth is exceeding road expansion index. Its average annual growth is 15% as compared to average road growth of 10% in the country since 2004. There are around 1.2 million vehicles in the country and the share of Addis Ababa is

around 52.5% (Fenta, 2014). Although road transport system is the most important means of transport in developing countries and particularly in Ethiopia, the government and the public are concerned about the safety of the system. Road traffic accident (RTA), definedas "an accident that occurs on a way or street open to public traffic; resulting in one or more person's being killed or injured, and at least one moving vehicle is involved (Hailemichael, Suleiman, and Pauolos, 2015).

According to WHO (2018), annual road traffic deaths have reached 1.35 million. Road traffic accident is now the leading cause of death for children and young adults aged 5-29 years. More than half of global road traffic deaths are amongst pedestrians, cyclists and motorcyclists who are still too often neglected in road traffic system design in many countries. Road traffic accidents cause damage and destroy assets and human capital, increase stress to health facilities, and death of family members and societal and communal settings without strategies to stem the causes (Asiyanbola, Osoba, and Adewale, 2012). In terms of traffic safety, even though Ethiopia is at a least status of vehicle ownership (density), the fatality per vehicle in other side is among the highest in the world (fatality of 4352 persons/year; which is 26.7 persons per 100,000 population) (WHO, 2018).

Death and injuries resulting from road traffic crashes remain a serious problem globally and current trends suggest that this will continue to be the case in the foreseeable future. Accelerating progress can, however, be achieved through an integrated approach that includes putting in place and enforcing effective measures such as safety standards for roads and vehicles, legislation to mitigate high- risk behaviors such speeding as well as insuring timely access to professionalemergency care. Key to this approach is the availability of comprehensive and reliable data on the burden and risk of traffic crashes, injuries and deaths to target and monitor progress (WHO, 2018).

Ethiopia is facing huge road safety problems. Each year thousands of road users are killed and injured and majority of them are economically active population. According to the estimate of the WHO (2016), the incidence of road traffic fatality in Ethiopia was 26.7 per 100,000 populations and the rate is among the highest in the world. Addis Ababa, the capital city of the country is experiencing an average of 400 fatalities per year and 88% of the fatalities from 2010-2015 were pedestrians (Molla, 2017). According to the same document, the following were depicted as major causes of road traffic accident: driver's error, pedestrian error, car conditions, road condition, and other. Nearly 74% of the accident was attributable to the driver's error. Addis Ababa which has around 70% of the country's vehicle is a city who carries the majority of the road traffic accident.

Particularly, the situation is very serious in Addis Ababa. When we see the data from traffic police, road traffic accident every year is not showing a significant reduction. For example, the number of fatal accidents, heavy injury, Light injuryand property damage in 2013 was 367, 1336, 1263, and 12849 respectively but after five years in 2018 it becomes 459, 1903, 1074 and 24928 respectively; whichshows an increase in the total RTA. At the same time the city transport office in collaboration with different stakeholder is working to improve the road environment and reduce road traffic accident. Measures like speed limit, child restraint, drink-driving, seat-belt, helmet use, infrastructure design change and many more were undertaken to improve the situation even though the result is not pleasing.

Ministry of transport has approved transport policy of Ethiopia in 2020 to address problems seen in the transport sector of the Country. One of the problems that initiate the ministry to coin the policy is high rate of traffic accident. And to reduce the situation traffic management is considered as a road safety measure which includes addressing issues related to engineering, education, enforcement and

incident management (Ministry of transport, 2020). In the same way, Addis Ababa city administration in collaboration with Addis Ababa transport officeprepared a road safety strategy which is being implemented from 2017-2030 (Molla, 2017). The strategy has a target to halve the number of deaths and injuries from road traffic crashes by 2023 and to provide access to safe, affordable, accessible and sustainable transport systems for all by 2030. Also, Addis Ababa transport office is working with different NGO‟s like World Resource Institute, and develops sustainable measures for road safety, like traffic calming measures, mass transport corridors, good footpath and safe crossing and also land use transport integration to reduce the need for vehicle travel.

Materials and Method

Research Approach

This research uses mixed approach to be able to use the benefits of both quantitative and qualitativeapproaches. The qualitative approach to research is concerned with subjective assessment of attitudes, opinions and behaviors while quantitative involves generation of data in quantitative form which can be subject to rigorous quantitative analysis in the formal fashion (Kothari, 2004). In this respect by using the mixed approach the research benefits to reach to a better result by collecting data which are numerical as well as behavioral.

Research Type

Descriptive and explanatory research design is employed to suit the phenomena under study. Some of the research questions are addressed descriptively whereas explanatory research type is used to deal with some of the research questions that focus on why RTA is not reducing even though different measures were taken by concerned offices. In this case user‟s opinion is measured, and also before and after traffic data is compared and contrasted.

Population of the Study

This study is significant as it analyzes traffic data to understand the traffic accident trend of Addis Ababa for the last 10 years. And also collect and analyze data from road users (drivers and Pedestrians), to know their adherence to traffic laws and their understanding of different traffic rules and regulations as it is believed by the researcher that knowing the problem is a route to the solution. And to understand the problem, the study answered the research questions such as (1) what does traffic accident in the city looks like? (2) To what extent do road users comprehend road signs, signals and markings, (3) to what extent do road users know traffic rules and regulations? and (4) What are the effects of road safety measures on road traffic accident?

Population is defined by Polit and Beck (2004) as the aggregate or totality of those conforming to a set of specifications. In this study the population is road users in Addis Ababa which includes passengers as well as drivers and it is assumed that daily there are around 3.4 million trips in Addis Ababa and the total vehicle population in the city is assumed to be around 500,000 (Fenta, 2014)

Sampling Technique

Sampling refers to the process of selecting a portion of the population that conforms to a designatedset of specifications to be studied. A sample is a subset of a population selected to participate in the study (Polit& Beck 2004). Creswell (2003) states that purposive sampling refers to selection ofsites or participants that will best help the researcher, understand the problem and the research question, they must be willing to reflect on and share this knowledge. Purposive sampling is used inselecting samples from Traffic Polices, Addis Ababa transport office officials as they will be best source of rich and valuable information regarding their experiences in managing law enforcement, driving and travelling. . Even though there are many other road users, for this study road users have been classified as pedestrians and drivers,

since pedestrian are the vulnerable road users in the city and drivers are responsible for higher portion of traffic accident. Simple random sampling is employed in selecting samples from drivers and passengers who are the major data sources of this study. And different questions were prepared for both types of road user.

Method of Data Collection

Questionnaires

Questionnaire is distributed to randomly selected pedestrians and drivers as it is relatively easy to collect data from large number of respondents with in short period of time. Hence survey questionnaire which is designed to extract specific information is distributed to respondents. The questionnaire that is used to collect data then analyzed using SPSS and EXCEL software.

In-Depth Interview

In-depth interviewing is a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program, or situation. The interviewer encourages participants to freely discuss theirfeelings and opinions, and probes on questions to gain insight and depth to responses. Therefore, it permits the interviewer to encourage participants to talk at length about the study topic, hence to increase insight into people's thoughts, feelings, and behaviors. This method is used to interview theTraffic Police, drivers and transport office officials. It also provides the opportunity to probe answers, to build on the interviewees responses and to address the sub problems under study.

Document Review

In this study the documentary review is used as a source of secondary data. Several documents are reviewed form published and unpublished documents, strategies, reports and online resources. The purpose is to generate concepts and theoretical knowledge available, to prepare research instrument and to understand the problem in depth and also to forward effective recommendations.

Sample Size

In order to determine sample size, the researcher use Kothari formula (Eq. 1) to consider the type of research, the desired level of confidence, accuracy and characteristics of the population (Kothari, 2004). Since the population of the study is greater than 10,000, the sample size is determined as follows:

$$n = \frac{z^2 pq}{e^2} \quad \text{Eq. 1}$$

Where n = sample size, z = the value of standard variant at a given confidence level = (1.96) taken from Z statistics tablep = estimated characteristics of the study population 50% = (0.5), e = given precision rate or acceptable error 5% = (0.05)q = 1-p =1-0.5=0.5. According, the total sample size is 384.

Validity and Reliability

To ensure validity of instruments, initially the instruments were prepared by the researcher and validated by some experts in the field to ensure that the instrument contains all the aspects of the subject matter. Reliability is improved by writing items clearly, making test instructions easily understood, and training data collectors and making the rules for scoring as explicit as possible. To check reliability, before the distribution of actual questionnaire for collecting reliable data which is important for the study the researcher conducted a pilot test from 20 drivers who are not participate in the final data collection process. Moreover, reliability is tested using Cronbach Alpha coefficient and the result show a coefficient of more than 0.8 for all factors which indicated the reliability of the instrument.

Method of Data Analysis and Presentation

The study uses statistical analysis. To do this the quantitative data collected from respondents is coded and fed to computer and cleaned. The cleaned data is analyzed using SPSS and EXCEL and presented using tables, charts, percentages etc. The qualitative data is first transcribed and then read and reread to get the sense of the whole data and then presented in the form of narration and text.

Result and Discussion

Characteristics of Traffic Accident in Addis Ababa

As it can be seen from Figure 1 above, in the last 10 years (2010-2019), the number of traffic accident is increasing. In 2010 the number of fatal accidents was 318; it progressively increased each year and in 2019 it reaches 458 which is an increase of 140 deaths. The number of heavy injuries, light injury and property damage is also increasing for the last 10 years. In 2010 it was 626, 652 and 4689 respectively but after 10 years it reaches 1875, 1115 and 2600 which is an increase of 1249, 463 and 21311 correspondingly. There was variability in some years where there was decrease in fatality, heavy injury and light injury, but the variations are not large. Heavy injury has shown decreasing trend since 2017.

Change in Population and Traffic Accident

As can be seen in table 1 above, in 2010 the population of Addis Ababa was population was 3,126,000 and there were 315 fatal accidents but after 10 years in 2019 the population increases to 4,592,000 and the fatal accident at the sametime increases to 458.

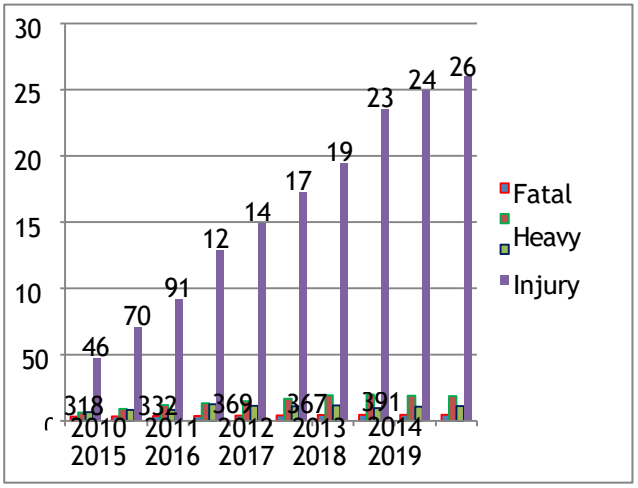

Figure 1 Road Traffic Accident in Addis Ababa by

Table 1: Fatal Accident per 100,000 Populations.

Year	Population	Fatal Accident	Fatal Accident/100,000 Population
2010	3,126,000	318	10.17
2011	3,263,000	332	10.17
2012	3,405,000	369	10.84
2013	3,554,000	367	10.33
2014	3,709,000	391	10.54
2015	3,871,000	416	10.74

2016	4,040,000	439	10.86
2017	4,216,000	463	10.98
2018	4,400,000	459	10.43
2019	4,592,000	458	9.97

When we see the raw data, it shows an increase of 140 fatalities; but we have to compare it with an increase of population in that same time using standard accident measurement index. In general, Addis Ababa city population increases by 1.466.000 from 2010 to 2019 and the fatalaccident/100.000 population of the city for the same 10 years is nearly constant, but shows a slight reduction in 2019.

Change in vehicle population and Fatal Traffic Accident in Addis Ababa

Table 2: Fatal Accident/10,000 Registered Vehicle

Year	Vehicle Population	Fatal Accident	Fatal Accident/10,000 Registered Vehicle
2010	348927	318	9.11
2011	350756	332	9.46
2012	359493	369	10.26
2013	372169	367	9.86
2014	388111	391	10.07
2015	410529	416	10.13
2016	447669	439	9.8
2017	510343	463	9.07
2018	553938	459	8.28
2019	596034	458	8.27

As illustrated in table 2 above, from 2010-2019 the number of vehicles in Addis Ababa increases from 348,927 to 596,034 with addition of 247,107 and in the same time range fatal traffic accident increases by 140. To measure the realincrease in the number of fatal traffic accident compared to increase in the number of vehicles in the city, it is important to calculate Fatal Accident/10,000 RegisteredVehicle. The computed result in the above table shows that even though there is an increase in the number of vehicles within 10 years, the fatal accident per 10,000 vehicles shows reduction from 2015 to 2019 which can be a result of different measures taken by government and different stakeholders.

Table 3: Item Wise Traffic Signs Comprehension (Drivers)

No	Sign	Correct		Incorrect	
		Count	Percent	Count	Percent
1	 No right turn	120	66.7	60	33.3
2	 Maximum speed limit	129	71.7	51	28.3
3	 No overtaking	87	48.3	93	51.7
4	 No U turn	34	18.9	146	81.1
5	 Roundabout	62	34.4	118	65.6
6	 Dangerous double bend	141	78.3	39	21.7
7	 Road Hump/ Uneven Road	109	60.6	71	39.4
8	 Two Way Traffic	120	66.7	60	33.3
9	 Parking	120	66.7	60	33.3
10	 Give way a head	93	51.7	87	48.3
11	 Pedestrian crossing	105	58.3	75	41.7
12	 Ready to stop or move	141	78.3	39	21.7

As can be seen in table 3 above out of 12 traffic sign test-of-knowledge questions 9 signs and signals; No right turn (66.7%), Maximum speed limit (71.7%), Dangerous double bend (78.3%), Road Hump/Uneven Road (60.6%), Two Way Traffic (66.7%), Parking, (66.7%) Give way a head (51.7%), Ready to stop or move (78.3%) and Pedestrian crossing (58.3%) are understood by more than average respondents. But for the rest 3 signs and signals No overtaking (48.3%), No U turn (18.9%), and Roundabout (28.3%) are understood by small (below average) number of respondents. Generally (58.38%) of the respondents comprehended signs, signals and marking correctly whereas (41.63%) do not comprehended.

Pedestrian Traffic Sign Comprehension

table 4 below illustrates a total of 4 questions were asked for pedestrian respondents and 3 of the signs; Maximum speed limit (64.2), Zebra crossing (61.3%) and Ready to stop or move (75.5%) are understood by majority of the respondents. But 1 traffic sign; pedestrian crossing (14.7%) is comprehended by below average respondents. Generally (53.93%) of the pedestrian respondents comprehended traffic signs, signals and marking correctly whereas(46.07%) do not comprehended.

Table 4: Item Wise Traffic Signs Comprehension (Pedestrian)

No	Sign	Correct		Incorrect	
		Count	Percent	Count	Percent
1	 Maximum speed limit	131	64.2	73	35.8
2	 Zebra crossing	125	61.3	79	38.7
3	 Ready to stop or move	154	75.5	50	24.5
4	 Pedestrian crossing	30	14.7	174	85.3
5	 Pedestrian crossing	30	14.7	174	85.3

Comprehension of Road Safety Rules and Regulations by Various RoadUsers

Table 5 Comprehension of Road Safety Rules and Regulations by Drivers

No.	Item	Correct	%	Incorrect	%
1	Speed limit in central Addis Ababa is set at 30 km/hour	98	54.4	82	45.6
2	Drivers should use hand signals and blinkerswhile taking turns	135	75	45	25
3	Drivers should give way/wait for the pedestrians while crossing the zebra line	118	65.6	62	34.4
4	Use of mobile phone while driving is not possible	85	47.2	95	52.8
5	The maximum allowed alcohol level for drivers is 0.08g/dl.	92	51.1	88	48.9
6	Seat belt is used by person who seat at frontto reduce serious injuries	141	78.3	39	21.7

No.	Item	Correct	%	Incorrect	%
7	When traffic lights turn Red it means giveway for the pedestrian	27	15	153	85
8	Zebra crossing are markings obeyed by pedestrian anddrivers	88	48.9	92	51.1
9	Seat belt should be used always while driving	95	52.8	85	47.2
10	Children under 8years of age are not allowedto seat in front chair	147	81.7	33	18.3

As sown in table 5 above, among the 180 driver participants 147 (81.7%) recognize that children under 8 years of age are not allowed to sit in front chair whereas the 33 (18.33%) do not. 94 (52.2%) of the respondents understand use of mobile phone while driving is not possible in non-congested areas whereas 86 (47.8%) of the respondents don't. Only two traffic signs; When traffic lights turn Red it means give way for the pedestrian and Zebra crossing are markings obeyed only by pedestrian are found to be least understood by drivers with a percentage below average (15%) and (48.9%) respectively, Overall, drivers have shown average and above average level of understanding of traffic signs (51.1% to 81.7%) on rest of the questions.

As illustrated in table 6 below, out of these four questions, pedestrian crossing signs are only found near schools is understood by most (95.1%) respondents followed by zebra crossing are markings obeyed only by drivers (79.9%), foot bridge is specifically designed for passenger's road safety purposes (75.5%) andwhen crossing a road, pedestrian should use zebra crossing points (72.1%). When traffic lights turn green, it means give way for the pedestrian (15.7%) is among the least comprehended rules and regulations. Out of 204 pedestrian respondents, 55.54% respondents comprehended the traffic rules and regulations correctly whereas the rest 45.54% do not.

Table 6: Comprehension of Road Safety Rules and Regulations by Pedestrian

No.	Item	Correct	%	Incorrect	%
1	Pedestrian crossing signs are only found near schools	194	95.1	10	4.9
2	Use of mobile phone while crossing a road is possible	89	43.6	115	56.4
3	When traffic lights turn green, it means give way for the pedestrian	32	15.7	172	84.3
4	Foot bridge is specifically designed for passenger's road safety purposes	154	75.5	50	24.5
5	Zebra crossing are markings obeyed only by drivers	163	79.9	41	20.1

6	When crossing a road, Pedestrian should use zebra crossing points	147	72.1	57	27.9
7	Pedestrian always have to obey traffic lights	86	42.2	118	57.8
8	Pedestrian has to cross the road when vehicles are at a safe distance.	123	60.3	81	39.7
9	Pedestrian should always walk at the opposite direction of the traffic flow	57	27.9	147	72.1
10	While crossing the road passengers should always avoid talking/reading	56	27.5	148	72.5

Causes of Road Traffic Accident

Drunk Driving

There is very limited registered death caused by drink driving for the last 8 years (2010-1017); 3 deaths in 2018. Considering heavy injury, light injury andproperty damage which is caused by driving under the influence of alcohol, thedata shows fluctuation. In some of the years it increases and then decrease again and vice versa. But property damage in 2011 (750), 2012 (451), 2014 (608)and 2018 (170) shows very high increase. In general, the above table 4.11 depicts that even though there are fluctuations in the number of registered accident due to drink driving for the last 9 years, the absolute number of accidents is not reduced in all four types of traffic accident.

Over Speeding

The number of deaths caused by over speeding increases from 2010- 2018; it was 1 death in 2010 but it reaches 70 deaths in 2018. In the same manner, even though there are fluctuations, it can be clearly seen in the above table that the number of light injuries, heavy injury and property damage has increased in the same time range; (from 2 in 2010 to 139 in 2018), (from 5 in 2010 to 112 in 2018) and (from 57 in 2010 to 2420 in 2018) consecutively. Subsequently it can be concluded that over speeding is the second major cause of trafficaccident in Addis Ababa and for the last 9 years (2010-2018), traffic accident caused by over speeding shows tremendous increase a total of increase from 65to 2741.

Not Obeying Traffic Signs, Signals and Regulations

Disobedience of traffic signs, signals and regulations is the main reason for traffic accident from 2010-2018. The number of deaths increases slightly except a drop in 2011 (207) and very high increase in 2012 (319). But it drops by more than half in2018 (156). Heavy injury, light injury and property damage caused by disobedience of Traffic signs, signals and regulations has the highest share of traffic accident and it also shows increase from 2010 to 2018. Heavy injury and property damage has shown a slight decrease in 2018. Generally traffic accident caused by disobeying traffic rules and regulations is the major cause of traffic accident in Addis Ababa and shows tremendous increase in the last 9 years, froma total of (2466) traffic accidents in 2010 to (9908) in 2018.

Reasons for weak improvement in the City's RTA

Most of the vehicles operating on the road are old as there is lack of maintenance and also most of the imported vehicles are used vehicles. The annual vehicle inspection is done only once in a year. And at that time of inspection, owners who have old cars will borrow some parts of the vehicle which have problem from friend's car and fix the problem when they go for inspection and then they will return the part back. And when those cars having parts which are not functioning well are used on the city roads, probability of being involved in car accident increases.

Poor quality drivers training and corruption exists in the city. In some cases, drivers obtain

their license without attending the proper training programs. Also, the existing speed control is very weak and limited to some parts of the city and due to this driver tend to drive above the assigned speed limit.

The road construction quality and maintenance are weak in most parts of the city for example newly constructed roads do not have quality pedestrian walkway and pedestrians are forced to enter to the main road that make them vulnerable for traffic accident. Moreover, pedestrian crossings are positioned at longer distance in major roads like ring road and LRT (light rail transit) lines and pedestrians will violate the rule to get short cut to crossings.

Implementation of traffic rules and regulations by traffic police is limited to the city center and disobedience of drivers to traffic rules and regulation in the absence of traffic police is visible.

Conclusion

For the last 10 years (from 2010 to 2019), generally, road traffic accident is increasing in Addis Ababa. But when the number of traffic fatality is compared and contrasted with the increase in human as well as vehicle within the same year using standard indexes (fatal accident/100,000population) is nearly constant and (fatal accident/10,000 vehicle) shows slight reduction. The result is the same with the report of WHO (2018) which states that the numbers of road traffic deaths continue to climb reaching a high of 1.35 million in 2016. However, the rate of death relative to the size of the world population has stabilized and declined relative to the number of motor vehicles in recent years. Despite the increase in absolute numbers, the rate of road traffic deaths has remained fairly constant around 18 deaths per 100,000 populations over the last 15 years.

Majority of the road users (58.38% drivers) and (53.93% pedestrians) understand road traffic signs, signals and marking correctly. This result is similar with the result of Ramya (2017) which concludes that majority of the study participants (99.2%) were aware of traffic signal rules. But in this study, the percentage of respondents who understand road traffic signs, signals and marking correctly is smaller than the study result of Ramya (2017).

Traffic accident caused by disobedience of traffic rule and regulations has increased in the study period and the effect of the introduced traffic safety rules and regulations in reducing traffic accident is recognizable as it curbs the increase in traffic accident and makes it almost constant. The fatal accident/100.000 population of the city for the study period is nearly constant, but shows a slight reduction in 2019. Also, the fatal accident/10,000 vehicle shows slight reduction and is similar with the result of Abegaz et al. (2014, p.4) that the study found there is a statistically significant reduction in non- injury crashes and fatalities after the implementation of the improved road safety regulation in the Oromia regional state.

Traffic accident caused by disobeying traffic rules and regulations is the major cause of traffic accident in Addis Ababa and shows tremendous increase in the last 9 years, from a total of (2466) traffic accidents in 2010 to (9908) in 2018. And over speeding is the second major cause of traffic accident in Addis Ababa and for the last 9 years (2010-2018), traffic accident caused by over speeding shows tremendous increase a total of increase from 65 to 2741.

This study tries to examine only particular part of the RTA; which is contribution of safety measures in improving road traffic safety. Moreover, the study identifies the major causes of traffic accident in the city and the reasons why traffic safety is not improving as expected. Multiple causation theory explains that for single accident there may be many contributory factors (ILO, 2012). Also as explained by (Haddon, 1972) transportation is a system and needs comprehensive treatment to the whole system and once multiple factors associated with a crash are identified and analyzed, countermeasures can be developed. Similarly, (Underwood & Waterson, 2013) clarifies that understanding accidents and

defining the appropriate measures require the study of the system as a whole, rather than considering its parts in isolation. In this respect, the researcher suggests further research on pre-crash, crash and post-crash responses to road traffic accident, traffic law awareness creation to road users.

Finally, the findings indicate that to promote and enhance road safety in Addis Ababa, traffic laws should be more strictly enforced and continuous traffic education should be provided for all road users. Besides, traffic polices should be provided with the necessary equipment and materials that can strengthen their control of traffic law enforcement.

Findings from the present study would help Addis Ababa transport office and traffic authorities in better understanding causes of traffic accident in the city as well as identify areas where traffic enforcement should be strengthened. Moreover, it can indicate the need to continually educate all road users on the existing as well as newly introduced traffic rules and regulations.

In terms of future research, the researcher suggests research on pre-crash, crash, and post-crash responses to road traffic accidents, traffic law awareness creation to road users, and analysis of road infrastructures to investigate their quality to bring safety on the city roads.

Based on the findings, suggestions such as delivery of refresher traffic safety education and testing for drivers, conducting a road safety campaigns, provision of pedestrian facilities/sidewalks, support of traffic police control, separation of pedestrians from high-speed vehicles and utilization of speed cameras are forwarded.

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Conflict of interest

There is no conflict of interest on the publication of this manuscript

Authors contribution

Both authors have contributed in proposal writing, data collection, analysis and manuscript preparation

Reference

Asiyanbola, R.A., Osoba, S.B. and Adewale, S.S., 2012. Road traffic administration and management in the third World mega-city: Lagos, Nigeria. International Journal of Development and Sustainability, 1(2), pp.490-509.

Creswell, J.W., 2003. A framework for design. Research design: Qualitative, quantitative, and mixed methods approach, pp.9-11.

Fenta, T.M., 2014. Demands for urban public transportation in Addis Ababa. Journal of intelligent transportation and urban planning, 2(3), pp.81-88.

Hailemichael, F., Suleiman, M. and Pauolos, W., 2015. Magnitude and outcomes of road traffic accidents at Hospitals in Wolaita Zone, SNNPR, Ethiopia. BMC research notes, 8(1), pp.1-5.

Kothari, C.R., 2004. Research methodology: Methods and techniques. New Age International.

Ministry of transport. (2020). Transport sector ten-year perspective plan.

Molla D. Addis Ababa Road Safety Strategy (2017-2030). [PowerPoint Presentation] (2017). Addis Ababa City Administration, Addis Ababa.

Polit, D.F. and Beck, C.T., 2004. Nursing research: Principles and methods. Lippincott Williams & Wilkins.

World Health Organization. (2018). Global status report on road safety. Enviromental System Research, 1- 12.