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Practices and Challenges of Road Traffic Management in Ethiopia

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Abstract

The study was conducted to assess practices and challenges of road traffic management in Oromia, Amhara, Sidama, Addis Ababa and Dire Dawa City Administrations. Data were collected through questionnaires, focus group discussions and key informant interviews. The collected quantitative data were analyzed using descriptive statistics and qualitative data were analyzed using thematic analysis technique. The study found that the federal government and regional states have separate systems for managing road traffic. The existing rules and regulations are not well integrated in a way to track drivers who have two or more driving licenses and cars with two or more plate numbers. Road traffic management relies heavily on the proactive steps taken by federal city administrations and regional authorities. They usually make campaigns so as to create awareness on the causes and consequences of road traffic accidents. The study revealed that organizational integration between the federal city administration and regional states are not friendly. Therefore, both the federal government and regional states should endorse uniform road traffic management practices and they need to have strong organizational ties in their work.

Keywords: Road traffic management, Road traffic accidents, Practice and Challenge, Ethiopia

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Introduction

Road traffic management refers to the combination of measures that serve to preserve traffic capacity and improve the security, safety, and reliability of the overall road transport system. These measures make use of its systems, services, and projects in day-to-day operations that impact road network performance (Wallace & Speier, 2004). Road traffic accident refers to a collision involving one or more vehicles on the road, or a pedestrian and results in death, injury, or damage of property (Odhiambo et al., 2015).

According to WHO report on road safety in 2018, approximately 1.35 million people die annually in the globe. In developed countries, the burden is disproportionately borne by pedestrians, cyclists, and motorcyclists, in particular those living in developing countries (WHO, 2018). Road traffic accidents are a leading cause of injury-related deaths, with a profound disparity in fatality patterns between Ethiopia and the United States. In the USA, 60% of traffic fatalities are car drivers. Conversely, Ethiopia's traffic deaths are dominated by pedestrians and passengers, with only 5% of deaths involving drivers. This makes the per-crash fatality/injury rate in Ethiopia roughly 30 times higher than in the USA, primarily due to factors like, inadequate infrastructure, and higher vulnerability of passengers and pedestrians. In Ethiopia, the degree of road traffic accidents is very high due to poor road infrastructure; poor enforcement of traffic laws; and lack of awareness are few among many (Person, 2008).

One of the main challenges of meaningful collaboration with stakeholders is found in the very interaction between different road traffic enforcement bodies. To make a collaboration process meaningful, it is vital to invest time and effort into discovering rationales and contexts of the respective collaboration partners. Road safety stakeholders collaborate to achieve the goal of reducing road traffic accidents and their impact in Ethiopia (Getachew et al., 2023).

Road traffic injury is one of the persistent public health challenges in most countries of the world, representing substantial human and economic losses. Annually, about 1.25 million lives are lost, whereas 50 million suffer from road traffic injuries globally. Road traffic accidents are becoming the leading cause of hundreds and thousands of deaths and material casualties in Ethiopia annually (Mekonnen et al., 2021).

Despite government efforts in road development, road traffic accidents remain one of the critical problems of the road transport sector in Ethiopia. Regarding road traffic management's practices and challenges, Mekonnen et al, (2021) conducted a study entitled “Factors associated with risky

driving behaviors for road traffic crashes among professional car drivers in. The finding of this study indicated that over 60% of the reasons for traffic injuries are a risky driving behavior. As Anteneh (2015) indicated there are gaps in the management of road traffic due to lack of effective collaboration among key stakeholders. As the road traffic police department of Addis Ababa 2022 report indicated that the trend of road traffic accidents is not in a state of decline, but instead has continued to rise enormously.

Based on the aforementioned claim, the severity of the road traffic accident problem in Ethiopia is quite high. For this reason, traffic police departments in some parts of the country attempted to educate the public about traffic problems through programs in schools and other areas. As far as the researchers' knowledge is concerned, road traffic accidents continue to rise over time due to the growing population and expanding city sizes, which cause the demand for transport services to increase in line with the increase in mobility needs of the people. Therefore, the researchers believed it was time to study this topic, and the situation required the concerns of all stakeholders to develop an effective intervention mechanism for improved road traffic management in the selected study areas.

Hence, this study focused on road traffic management practices and challenges specifically based on gaps identified in Addis Ababa, Dire Dawa, Adama, Bahir Dar, and Hawassa. Hence, the study assesses the existing legal frameworks and practices in road traffic management and examines the practices of road traffic management. It also identifies the existing challenges in road traffic management practice and describes the role of integrating organizations in road traffic control and monitoring system.

Methods of the Study

For this study, the researchers employed a mixed research approach to describe, explore, and explain the practices and challenges of road trafficking management in selected areas of Ethiopia. Descriptive research design was used to capture the overall phenomena of the practice and challenges facing road traffic management. This study also used a cross-sectional research design. Target respondents for this study were drivers, road traffic police members, and road traffic management experts. For populations that are large and particularly for populations where the total population is unknown or infinite, Kothari (2004) developed the following equation to yield a representative sample for proportions of a large sample. Therefore, the researchers were

convinced at a 95% confidence level and 50% degree of variability. For this study, the researchers applied (Kothari, 2004) sampling size determination formula**:**

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

Where: P= precision (0.5), Q= 1-P, Z= confidence level (1.96), and Error level=0.05

n=384

Where: - "n" is the required sample size, "p" is the degree of variability, "z" is the core value of the z-table, "e" is the level of precision, and "q" is 1-p.

With regard to sampling techniques, a simple random sampling technique was employed to select respondents from drivers, and road traffic police members for the quantitative data. Whereas, the qualitative data were collected through purposive sampling involving 25 informants selected from key stakeholder groups, including higher officials in road traffic management, bus station officials, transport bureau experts and strategic leaders in the road traffic police. Both primary and secondary data sources were utilized. Primary data were collected using questionnaires, and key informant interviews, and focus group discussions with the target stakeholders. The questionnaires were designed using a five-point Likert scale.

The qualitative data were collected using key informant interviewees with Addis Ababa, Dire Dawa, Hawassa, Adama, and Bahir Dar road traffic management higher officials, bus station officials, transport bureau experts and strategic leaders in the road traffic police. The researchers conducted around four focus group discussion with road traffic police members, bus station experts and urban residents. The interview sessions were conducted in Amharic and Afan Oromo, and then the data were subsequently translated into English for analysis. While, secondary data were cultivated in pertinent documents (legislation, various national and international reports, and different published and unpublished documents). For data triangulation and augmentation, annual reports, published articles, annual plans, and daily road traffic accident reports were analyzed.

Reliability and validity are key components to be considered when evaluating a particular instrument. Reliability is concerned with the consistency of the instrument, and an instrument is said to have high reliability if it can be trusted to give an accurate and consistent measurement of unchanging values. The validity of an instrument refers to how well an instrument measures the particular concept it was supposed to measure. One of the most commonly used indicators of

internal consistency is Cronbach's alpha coefficient. The Cronbach's alpha coefficient of scales should be at least 0.70, and the higher the better off (Singh, 2006).

Therefore, the researchers measured the reliability of the study by using Cronbach's Alpha throughout the SPSS output. Following, the result indicated that the reliability test of Cronbach's Alpha Coefficients is 0.855 which was above 0.7. Therefore, it was possible to conclude that each variable was reliable. First, the quantitative data were analyzed using descriptive statistics via the Statistical Packages for the Social Science (SPSS) version 25. The results were then presented in tables, frequency distributions, and line graphs. Prior to analysis, data editing, coding, and cleaning tasks were performed to make user-friendly for SPSS. Depending on the coding, the mean value for each item was computed. To achieve the study's objectives, the data were analyzed using descriptive statistics. This process involved classifying, tabulating, and calculating the data to form the basis for the conclusions. However, qualitative data were examined through thematic analysis techniques.

Findings of the Study

This section presents the findings of the study. It begins by outlining the socio-demographic profile of the respondents. It then addresses the existing legal frameworks and practices in road traffic management, examines the practices of road traffic management, identifies the challenges faced in road traffic management practices, and describes the level of integration among road traffic organizations in control and monitoring efforts.

Table 1 .Socio-Demographic Profile of the Respondents

	Item	Frequency	Percent
Sex composition of the respondents	Male	230	67.3
	Female	109	31.9
	Missing	3.00	0.90
	Total	342	100.0
	Item	Frequency	Percent
Age range of the respondents	18-30	167	48.8
	31-50	149	43.6
	>50	5.00	1.50
	Missing	21.0	6.10
	Total	342	100.0

Item		Frequency	Percent
Educational Qualification of the respondents	Primary School	13.0	3.80
	Secondary School	24.0	7.00
	Diploma	89.0	26.0
	BA/BSc	174	50.9
	MA/MSc	37.0	10.8
	PhD	4.00	1.20
	Missing	1.00	0.30
	Total	342	100

Source: Field Survey, 2022

As revealed in the above Table 1, the majority of respondents were male (n=230, 67.3%), while 109 (31.9%) were female. The sex of three participants 3 (0.9%) did not select and overlooked the question. Concerning the age composition of respondents, the majority of respondents, 167 (48.8%), were grouped in the age category of under 30 years; 149 (43.6%) respondents were categorized in the 31-50 age group; 5 (1.5%) of them were above 50 years old; and 21 (6.1%) were missing age group. This indicates that almost all our respondents were at a young age. Regarding the educational status of sample respondents, 1 (0.3%) did not fulfill the response. 13 (3.8%) completed primary school, 24 (7%) followed secondary school, 89 (26%) completed a diploma, 174 (50.9%) hold a BA/BSc degree, 37 (10.8%) graduated with an MA/MSc, and the remaining 4 (1.2%) are PhD holders. It is possible to say that the majority of the respondents completed a first degree program.

Existing Legal Frameworks Practices in Road Traffic Management

In this section, the legal framework for managing road traffic safety encompassing traffic management, road engineering, public awareness and enforcement against breaches has been analyzed.

Table 2 . Fragmented Implementation of Road Traffic Legislation

Response Category	Number of Respondents	%	M	SD
Strongly Disagree	40.0	11.7	3.48	1.41
Disagree	71.0	20.8		
Neutral	24.0	7.00		
Agree	100	29.2		

Strongly Agree	107	31.3
Total	342	100

Note: M = mean; SD = standard deviation. Source: Field Survey, 2022

As revealed in Table 2, regarding the fragmented implementation of road traffic legislation, 107 respondents (31.3%) strongly agreed, 100 (29.2%) agreed, 71 (20.8%) disagreed, 40 (11.7%) strongly disagreed, and 24 (7%) remained neutral.

The data show that there are inconsistencies in the presence of a legal framework, despite addressing similar road traffic issues. On top of its inconsistency, the legal frameworks are highly fragmented, contrasting with the holistic nature required for road traffic management. The data indicated that the existing legal framework in the country is not consistently applied in the regional state, federal city administration and is not aligned with each other to manage road traffic, which poses devastating challenge causing death, injuries, and loss of properties every year. The study further identified that deficiencies within the existing legal frameworks –namely inconsistency, fragmentation, misalignment, a lack of comprehensiveness, and inadequate coordination among the implementing entities have fostered conditions conducive to criminal activity and road traffic accidents resulting in casualties.

Table 3. Weak Road Traffic Legislation Enforcement

Response Category	Number Respondents	of%	M	SD
Strongly Disagree	6.00	1.80	4.04	0.95
Disagree	9.00	2.60		
Neutral	86.0	25.1		
Agree	106	31.0		
Strongly Agree	135	39.5		
Total	342	100		

Note: M = mean; SD = standard deviation. Source: Filed Survey, 2022

As depicted in Table 3, regarding the weakness of road traffic legislation enforcement procedures, 135 respondents (39.5%) strongly agreed, 106 (31.10%) agreed, 86 (25.1%) disagreed, and 6 (1.8%) strongly disagreed. Road traffic guideline has been issued to organize transport associations and organizations engaged in improving transport services. The revised directive No. 680/2013 issued to members of the public who need special support in public transport services in federal level. This study found that the Oromia regional state relies on

administrative and violated legal frameworks, including the road traffic management regulation number 194/2009. Traffic enforcement in the Oromia region, specifically at Adama city, is done by police, while the transport agency focuses on the bus stations. The region generally uses an old road traffic safety management style; the legal framework is not exhaustive and fragmented into different organs and components; and are poorly aligned and correlated with fragmented federal laws in its contents of the legal frameworks.

This study further shows that the Amhara regional state uses road traffic safety management proclamation No 1074/2018 which is found to be a newly enacted regulation. For example, the new regulation fines the transport vehicles for carrying excess passengers, regardless of the number. It was 100 birr in the old decree for a single excess passenger while the new one imposes a flat fine of 150 birr without considering the number of excess passengers.

The Implementation Practices of Road Traffic Management

Road traffic accidents have had an enormous impact on the national economy, damaging invaluable property, and killing and disabling the productive age group of the population. In the implementation phase, there were inconsistencies and a lack of uniformity in rules and regulations at the national level, which led to differences in practice across regions. The absence of interregional information sharing may contribute to the occurrence of serious road traffic accidents across Ethiopia, particularly within the selected regional states. In the following section, road traffic management practices are discussed based on the data gathered from Addis Ababa, Adama, Dire Dawa, Bahir Dar, and Hawassa.

Road Traffic Management Practice in Addis Ababa City Administration

An informant from the Addis Ababa City Transport Bureau emphasized that safe and acceptable transport is crucial for resident mobility, and for facilitating economic and social activities. As a strategic police officer from the Road Traffic explained, the Addis Ababa City Administration Traffic Management Agency has adopted five pillars of traffic management: data and knowledge, engineering and technology, enforcement, parking management, awareness, and education. Following the development of strategies, informant noted that the agency has launched several awareness creation programs like street education, incorporating traffic management education within the curriculum; and delivered traffic management training at religious institutions.

In terms of engineering and technology, the Addis Ababa Road Traffic Management Agency has improved the geometry of the road based on car clash and implanted safety mirrors to create inter

feasibility; deconstructed five road esquires; and installed LED lights through identified areas of high traffic accidents; enforced speed limit rules and speed bracers; and initiated Global Positioning System (GPS) for motorcades. The Agency has also introduced new parking systems in the city like ground plus four automated parking systems; and enforced the rules on not to sell on the street. Moreover, within five years the Agency has initiated the registration of 65% of cars in Addis Ababa. In Addis Ababa, the duties of handing over painting roads and monitoring and controlling road traffic management are not yet demarked between traffic police and Addis Ababa Traffic Management Agency.

Table 4. Inadequate Parking Spaces

Response Category	Number of Respondents	%	M	SD
Strongly Disagree	27.0	7.90	3.43	1.27
Disagree	75.0	21.9		
Neutral	41.0	12.0		
Agree	121	35.4		
Strongly Agree	78.0	22.8		
Total	342	100		

Note: M = mean; SD = standard deviation. Source: Field survey, 2022

As depicted in Table 4 above, in response to the issue of limited parking spaces in urban areas, 121 respondents (35.4%) agreed, 78 (22.8%) strongly agreed, 75 (21.9%) disagreed, 41 (12%) of respondents were neutral, and 27 (7.9%) strongly disagreed. In spite of the fact that road traffic management officers stated during interviews that the agency is expanding parking spaces, the respondents who strongly agree around 35.4% (121) confirmed that there was inadequate parking space across the city. A strategic police official further explained that they have deployed volunteer civilian traffic officers from the community. This initiative, which was carried out in collaboration with the Addis Ababa Mayor's Office, aims to strengthen the proper implementation of road traffic management practices. Apart from these, a road traffic police informant revealed that they do not know who is responsible for painting pedestrian crossings and other areas and this would be very challenging to practice road traffic management in the city. Meanwhile, a road traffic police participant has also admitted the problems posed by outdated traffic lights and their effects on traffic management practices.

Table 5. Numbers of Road Traffic Accidents in Addis Ababa City 2016-2020

Accident type	Number of Accidents by Year					
	2016	2017	2018	2019	2020	Total
Death	439.0	463.0	456.0	458.0	450.0	2266
Severe injury	1924	1996	1466	1926	1673	8985
Light injury	1165	973.0	753.0	1143	938.0	4972
Collateral damage	19411	23510	18740	26019	29338	117018

Source: Addis Ababa Traffic Management Agency, 2022.

The above Table 5 indicated that even though the death toll fluctuated across the years, on average 453.2 lives were lost in each year in the Addis Ababa City Administration.

Figure 1. Trends in Severe and Light Injuries in Addis Ababa City Administration

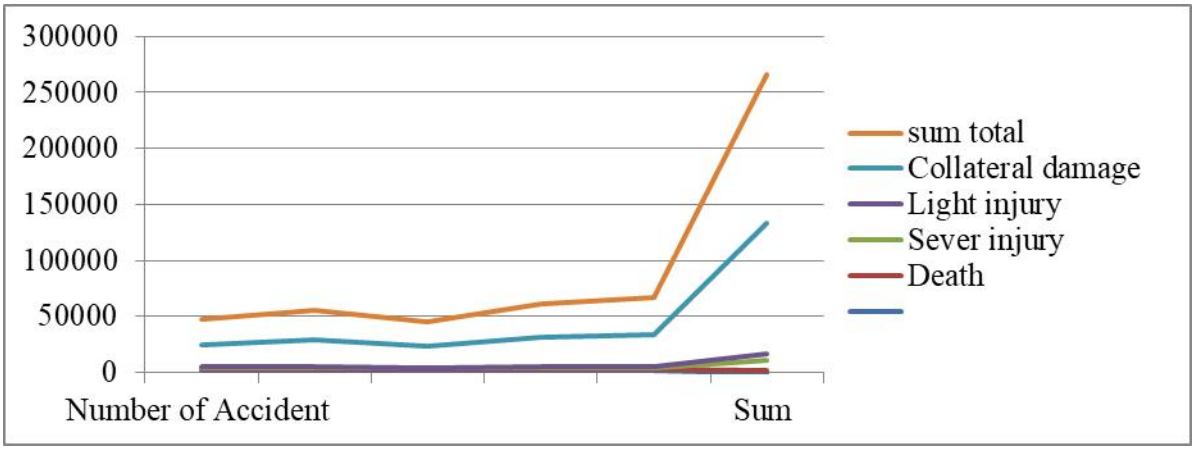

Figure 1 shows that severe and light injuries were an increment in the Addis Ababa City Administration.

Table 6. Driving Experiences Aligned with Accidents Types

No.	Driving Experience	Accident type			Total
		Death	Severe injury	Light injury	
1	No driving license	8.00	13.0	28.0	49.0
2	Below 1 year	115	122	67.0	1691
3	1-2 years	81.0	312	200	5426
4	2-5 years	102	550	364	9822
5	5-10 years	61.0	463	241	6320
6	Above 10 years	44.0	354	134	4349
7	Unknown	48.0	89.0	40.0	429

(Source: Addis Ababa Traffic Management Agency Road Traffic Accident Report, 2022).

As revealed in Table 6, above, the driving experience of drivers involved in accidents ranged from less than one year to more than 10 years. The data show that drivers with more than ten years of experience accounted for 4,349 accidents, whereas those with two to five years of experience were involved in 9,822 accidents. The occurrence of 327 accidents involving drivers with no formal driving experience, and an additional 429 cases where experience level was unknown, suggests a breakdown in the controlling and monitoring mechanisms intended to provide support. Informants of road traffic police leaders in Addis Ababa asserted that eight thousand driving licenses were illegally delivered to the users and this was due to a lack of a tracking system and a lack of friendly integrated platforms across sub-cities of Addis Ababa. As a result, Addis Ababa Police Commission, in its 2022 report of drivers, charged 27,000 drivers for their alleged offences. A high-ranking official from Addis Ababa Road Traffic Management Agency further noted that a single car might have two different plate numbers; one from the Bole Sub-City and another from Arada Sub-City. Consequently, these accidents have led to tragic consequences in the city, including fatalities, permanent disabilities and significant property loss.

Table 7. Eight Months' Traffic Accident Comparison Report

Incident type	2021 budget year (8 months)	2022 budget year (8 months)	Difference	
			Number	Percentage
Death	256.0	270.0	+14.00	+5.0
Severe injury	1209	1249	+40.00	+3.0
Light injury	662.0	782.0	+120.0	+18
Collateral damage	19,058	18,909	-149.0	-1.0

(Source: Addis Ababa Police Commission Road Traffic Accident Report, 2022).

The above Table 7 shows that the death toll had increased by 5% in 2022; severe injury had also increased by 3%; and light injury by 18% in the same year. Whereas, collateral damage had decreased by -1%. As compared to the 2021 budget year, for the last 8 months, in the 2022 budget year, the number of accidents registered increased by 25 (0.11%). In detail, the number of deaths increased by 14 (5%); Severe injury by 40 (3%); light injury by 120 (18%); and collateral damage by 149 (1%).

Table 8. Road Traffic Accident Report Sub-Cities of Addis Ababa 2022 Baseline

Sub-Cities	2022 baseline	2022 plan to reduce incident		2022 expected registry accident	2022 actual of registered accident	Difference from baseline	
		#	%			#	%
Lideta	1055	106	10	949.0	1451	+396	+38
Kirkos	2463	246	10	2217	2879	+416	+17
Gulele	769	77.0	10	692.0	977.0	+208	+27
Yeka	1913	191	10	1722	2403	+490	+26
Bole	3579	358	10	3221	4976	+1397	+39
Kolfea Keraniyo	1433	143	10	1296	1451	+18.0	+1.0
Addis ketema	778.0	78.0	10	700.0	897.0	+119	+15
Arada	1440	144	10	1296	1816	+376	+26
Nefas silk lafto	2625	263	10	2362	2967	+342	+13
Akaki Kality	1315	132	10	1183	1393	+78.0	+6.0
Lemi kura	-	-	-	-	-	-	-
Total	17371	1737	10	15634	21210	+3839	+22

(Source: Addis Ababa Police Commission Road Traffic Accident Report, 2022**).**

The above Table 8 reveals traffic accident across sub-cities of Addis Ababa. The data were gathered before the creation of Lemi-Kura Sub-City in Addis Ababa City Administration. As indicated in the above Table 8, all sub-cities of Addis Ababa have registered an increment of accidents from 1% to 39% from their respective baselines of the 2022 budget year. The highest traffic accident was registered at Bole Sub-City by 139(4936) difference in the baseline. Kolfe Keraniyo Sub-City was the lowest traffic accident registered (+1) from baseline. Overall, a high traffic accident was registered as compared with the baseline by +3839(+22%) across the sub-cities of Addis Ababa.

Table 9. Traffic Accidents Registered for the Last 8 Months in the 2022 Annual Year

Sub-cities	Death	Severe injury	Light injury	Collateral Damage	Total
Lideta	13.0	75.00	66.0	1,297	1451
Kirkos	18.0	129.0	71.0	2,661	2,879
Gulele	17.0	58.00	47.0	855.0	977.0
Yeka	30.0	95.00	30.0	2,248	2,403
Bole	50.0	236.0	94.0	4,596	4,976

Kolfea	37.0	113.0	67.0	1,234	1,451
Addis ketema	19.0	103.0	31.0	744.0	897.0
Arada	12.0	141.0	88.0	1,575	1,816
Nefasilk	41.0	156.0	215	2,555	2,967
Akaki	33.0	143.0	73.0	1,144	1,393
Total	270	1,249	782	18,909	21,210

As indicated in Table 9, for the last eight months of the 2022 budget year, Bole Sub-City had the highest number of traffic accidents (4,976). Nefas Silk Lafto was the second sub-city with 2,967 registered, and Kirkos was the third with 2,879. Bole Sub-City also recorded the highest number of fatalities, with 80 deaths, followed by Nefas Silk Lafto with 41 and Kolfea with 37. The sub-cities with the lowest number of deaths were Lideta and Arada, recording 12 and 13 fatalities, respectively. Overall, in the last eight months, the following casualties were registered: 18,909 cases of collateral damage (89%), 1,249 severe injuries (6%); 782 light injuries (4%); and 270 deaths (1%).

Table 10 . Statistical Presentation of Accidents in Time Space and Days in Addis Ababa in 2022

No.	Day	# ofTime accident		# ofTime accident		# ofTime accident		# of accident
1	Monday	4626	0100-02000	600	0900-1000	1799	1700-1800	1605
2	Tuesday	4416	0200-0300	512	1000-1100	1772	1800-1900	1408
3	Wednesday	4172	0300-0400	520	1100-1200	1851	1900-2000	1361
4	Thursday	4114	0400-0500	622	1200-1300	1657	2000-2100	1239
5	Friday	4559	0500-0600	788	1300-1400	1603	2100-2200	1061
6	Saturday	4366	0600-0700	1142	1400-1500	1703	2200-2300	667
7	Sunday	3295	0700-0800	1596	1500-1600	1784	2300-2400	428
Total		29548	0800-0900	1751	1600-1700	1771	2400-0100	308

As indicated in Table 10, Monday recorded the highest number of traffic accidents (4626), followed by Friday (4,559) and Tuesday (4,416). In terms of time, in the morning from 07:00 to 08:00, the highest traffic accident was recorded (1596); and during 11:00 to 12:00 am, 1851 traffic accident were registered. Finally, around 5:00-6:00 pm was the time that recorded 1605

traffic accidents in the city based on the compiled data the Addis Ababa Police Commission recorded.

Implementation of Road Traffic Management Practice in Oromia Regional State

Road traffic police officers have been practicing road traffic management schemes in Adama City. The use of obsolete traffic monitoring and control systems by traffic police in Adama City is failing to manage road traffic effectively, potentially leading to an increase in road accidents.

According to the 2022 Oromia Road Transport Bureau Road Traffic report on monitoring and control of road traffic management matters, officers' have conducted surveillance in different parts of the region by themselves to collect reliable information. However, the officers controlling mechanism in public and government transportation was weak, but the officers' control of the private transportation service was so strict. In terms of manpower and materials, the report revealed that there is a lack of traffic police officer deployment and there are limited motorcades. Even the existing motorcade is not compatible with traffic flow and road traffic accidents in the city. Urban community group discussants stated traffic police officers and organizations did not utilize modern technology for monitoring and controlling road traffic fatalities and accidents in Adama City.

In terms of awareness and penalty, the penalty scheme did not correct offenders but rather aggravated the occurrences of road traffic accidents in the city. Furthermore, drivers who violate traffic laws are officially classified as "violators," a designation that acknowledges their failure to comply with regulations. Even passengers were not cooperative whenever they paid out of the tariff. The media coverage is not enough to teach the public about the implementation of road traffic management in the city. The Agency has neglected the issue, ignoring the potentially devastating effects of road traffic accidents on both the city and its people. According to the observation of a traffic police official, there are insufficient traffic signals to provide road information for taxi drivers and pedestrians. Even the existing road traffic signs were not maintained timely to convey necessary information.

Road Traffic Implementation Practices in Dire Dawa City Administration

According to the Dire Dawa City Administration report, from 2020 onwards, various organizations have taken responsibility for the assurance of the proper implementation of road traffic management in the city like the Dire Dawa Police Commission and the Transport and Logistics Bureau. Their joint efforts included raising awareness, monitoring traffic accidents and

flow, and enforcing rules and regulations. Further, the Transport and Logistics Bureau is comprised of three core divisions: the awareness raising division, the monitoring and control division, and the system study division.

Road traffic accident awareness-raising programs

The police and transport office co-host a weekly Amharic program, "Who is to be blamed?" on FM Dire and Dire TV to raise public awareness. In terms of promoting non-motorized transportation, the Dire Dawa City Administration celebrates a "vehicle-free road" weekly program on Sundays, from 12:00 am to 10:00 am, by making the streets free from vehicles. As a result, the public is encouraged to engage in mass sporting events on city streets, including cycling and jogging. In terms of rules and regulations, the city police have launched several awareness programs about the proper implementation of road traffic safety directive No. 694/2013, which obliges drivers and passengers to wear seat belts. Moreover, Road Traffic Safety Proclamation No. 799/2005 mandates that all vehicles be covered by the Third Party Insurance Fund before being driven. It also requires that proof of this insurance be displayed on the vehicle's windshield, with the sign written in several languages including Amharic, Afan Oromo, and Somali. Furthermore, messages circulated on the official social media pages of Dire Dawa City branch offices helped raise awareness among various community members. In religious institutions, marketplaces, and school centers, a considerable effort was undertaken to educate the public on the severity of traffic accidents and their impacts. Besides, various awareness creation programs were given for schools to protect students and children from road traffic accidents. To reach the school community, awareness programs were held early in the morning, using Amharic, Afan Oromo, and Somali. In this awareness creation program, 44 schools (30 urban and 14 rural schools in the city administration) were participated. Furthermore, volunteer student traffic officers have been recruited and trained to carry out road safety monitoring duty and established a road traffic safety club in every school to make the issue accessible to all students.

Road Traffic Implementation Practices in Amhara Regional State

According to the Amhara Regional State Police Commission 2017-2022 report, awareness creation training has been provided to diverse community groups across the city. For instance, training was given in 2017, for 13,818,116 community members; 6,538,339 students; 455,316 drivers; and 71,353 voluntary roads traffic assistant students. In the same year, the Regional

State delivered awareness creation programs using mass media for Zonal and Woreda-level community members. Further, training was delivered in 2018, for 14,748,750 community members; 8,504,455 students; and 88,730 voluntary road traffic assistant students. In the same year, the Regional State delivered ten munities awareness creation programs using mass media communication channels. Moreover, training was conducted in 2019, for about 13,818,116 community members, comprising 6,538,339 students, 455,316 drivers; and 71,353 voluntary traffic assistant students. In the same year, an awareness creation program was delivered using mainstream mass media for ten minutes.

Besides, an awareness creation program was given in 2020 for 13,369,766 community members, 5,302,391 students, 518,483 drivers, and 87,976 voluntary road traffic assistant students. In the same year, for ten minutes, awareness creation programs were launched for Zonal and Werda-level community members. Further, such program was offered in 2021, for about 11,369,766 community members; 4,891,834 students; 238,400 drivers; and 25, 450 voluntary traffic assistant students. In the same year, the commission delivered awareness creation programs for ten minutes. Finally, in 2022, the commission delivered awareness creation programs for 13,369,766 community members; 5,302,391 students; 518,483 drivers; and 87,976 voluntary road traffic assistant students. In the same year, the commission also launched awareness creation programs for Zonal and Wereda-level community members for ten minutes using mainstream broadcast media of Amhara Regional State.

Table 11. Traffic Accident Comparison from 2017 to 2020 Annual year in Bahir Dar City

No.	Types of traffic accident	2017	2018	2019	2020	Difference number	in Difference in %
1	Death	1035	1131	1109	1108	67.0	6.68
2	Serious body injury	1190	1135	11098	874	-279	-25.02
3	Light body injury	1990	1935	1269	1260	-62.0	-3.40
	Total	4215	4203	3476	3214	-272	-7.75
5	Property damage in ETB	366,748,848	121,190,511	97,499,920	164,769,465	-178,288,802	-135.94

As indicated above in Table 11, although the Amhara Regional State Police Commission, in collaboration with the Regional Education Bureau, had delivered awareness creation programs for a diverse group of the population, the numbers did not indicate a decrease in traffic accidents or related casualties. For instance, in terms of the death toll, the region has recorded 4,383

fatalities, 14,297 severe injuries, 6,454 light injuries, and -178, 288,802 collateral damage between 2017 to 2022.

In terms of technology, one road traffic police informant's noted that the region has deployed radar systems across the region to control and monitor traffic rules and regulations. Further, the region has also installed speed limit signals and pointed speed limit breakers. According to the traffic police officer, in spite of all these efforts, the mortality rate and collateral damage did not show any significant decrease in the region. The officer added that the lack of significant progress was due to a lack of coordination between traffic officers and crime scene investigators; insufficient trained manpower; improper enforcement of existing rules and regulations; and a failure by training centers to properly certify driving licenses.

The traffic police officer cited public areas and roundabouts as locations with frequent and severe accidents. The reasons behind the high degree of traffic accidents in the study area were attributed to several factors: poor drivers' behavior; failure to prioritize pedestrians; not wearing seat belts; overloading vehicles; speeding, the incompatibility of imported cars with local drivers' skills and the weather conditions; and a lack of proper maintenance.

Challenges Faced in Implementing of Road Traffic Management

A community group discussant stated several challenges to effective road traffic management. These include a shortage of qualified transport and traffic personnel and an insufficient number of traffic police officers, both of which have greatly contributed to the increase in traffic accidents. Furthermore, contributing factors to the high accident rate include a lack of pedestrian awareness, outdated technology, and insufficient traffic police control. This problem is exacerbated at night by a complete lack of proper inspection and enforcement.

Moreover, according to a traffic police leader from a regional state police commission, traffic management faces several challenges. These include an inability to adapt international best practices to the local context, poor public perception of traffic police, lax oversight of the driver's licensing system, a lack of appreciation for the demands of traffic work, insufficient funding and resources, and dangerous driving behaviors such as failing to adjust speed between urban and rural areas.

Besides, the budgetary issue has also brought challenges to them not to introduce updated technology that could minimize the death toll, material causality, and injury. Regional states and bus station officials noted that sometimes the traffic police also judged drivers in the same view.

Traffic accidents are worsening due to inconsistent police control and monitoring, especially during peak hours. This problem is compounded by insufficient police deployment, particularly from 6:00-7:30 AM and 9:00-1:00 AM.

Road Traffic Management Agency officials noted that the nature of punishment varies from place to place as well as the degree to which the punishment is implemented is not proportional to the road traffic rule violation. According to a traffic police officer, common violations include overloading, ignoring traffic signals and police instructions, failing to prioritize to pedestrians, not wearing a seat belt, parking in restricted areas, speeding, trespassing, and general driver negligence.

Limited Coordination/Integration among/between Road Traffic Departments

Despite extensive road traffic management efforts, group discussants identified several challenges, most notably the absence of a unified system to connect traffic departments across regional and federal jurisdictions. Discussants added that many drivers buy a driver's license without proper driver's training. For instance, road traffic accident management is a neglected issue, but it is the leading cause of human deaths, injuries, and property damages resulting from crashes of road vehicles. Furthermore, it is difficult to control the various issues related to driving licenses. Lack of cooperation among states and poor relationship between states and the federal government, issues of driving license have not been managed. As a result, a person works with two or more driving licenses. When one's driving license is seized, he/she may use the other one. There was also insufficient media coverage to create public awareness. Furthermore, there is a notable lack of government officials' will to solve the problem. The poor awareness of the community and the weak documentation of accidents have made it difficult to identify trends and target interventions.

Limited level of Awareness of the Community

Concerning road users, people who come from rural to urban areas are often vulnerable to traffic accidents due to their limited knowledge and awareness of proper road use. This shows that despite extensive efforts on awareness rising, current initiatives remain insufficient and road traffic management continues to face big challenges. The punishment legislation does not educate violators who infringe traffic rules and regulations. As a result, drivers, who are also known as "violators," frequently commit traffic offenses. Meanwhile, a participant from the

Oromia Road Transport Agency stressed that passengers are often overcharged beyond the regulated tariff. Further, the traffic police officer did not inform the drivers why they are charged.

Limited Road Infrastructures

Road traffic police and bus station expert informants noted that when constructing new buildings, the design of the building does not consider footpaths and vehicle parking. Drivers who enter the construction center and those who get parking services on the road have great contribution to the occurrence of traffic jams. At the same time, there are situations where the construction of container houses on footpaths will cause pedestrians and vehicles to collide. There are several problems associated with road signs and signals. There are not enough and necessary signs and signals. Roads are not maintained on time. Traffic police informants also noted that roads are usually damaged during the installation of other infrastructure and are not repaired after the construction is completed another factor contributing to the increase in traffic accidents is the country's unique context. First, imported vehicles are often not suited to local weather and road conditions. Second, there is a failure to repair or avoid expired vehicles. Such problems have contributed to the increase in traffic accidents year after year.

Illegitimate Activities are practiced by Road Traffic Enforcers

According to informants, the law mandates that similar violations receive same penalties. However, this principle creates implementation difficulties for enforcers and exposes them to corruption. Additionally, repeat offenders often fail to learn from their mistakes, while potential and new drivers lack basic awareness of traffic rules.

Defied of Modern Technologies

Road traffic police officers do not have modern technological devices like modern radar or radio communication. Moreover, continuous training cannot be given to police officers. Due to inadequate budget and limited attention from officials, the adoption of modern technology in road traffic management remains well below the required level. Training is not provided to members on the introduction of new technology.

Integration of Organizations on Road Traffic Control and Monitoring Systems

Interviewees at the regional level identified the Regional Road and Transport Bureau as the authority tasked with overseeing road traffic control and monitoring. More importantly, the current Regional Transport and Logistics Bureau, Road Traffic Safety Verification and Traffic

Management, and Police Road Traffic safety are integrated with the education and health bureau and they tried to reduce road traffic accidents and fatalities in the regional states.

The Federal Transport and Logistics Ministry at the federal level is the responsible body for road traffic management control and monitoring systems. Furthermore, both Addis Ababa Traffic Police Officers and Addis Ababa Transport Bureau interviewees portrayed that the Federal Transport and Logistics Ministry integrated with the Addis Ababa Road Traffic Management Agency, Addis Ababa Police Road Traffic, safety, regionals' transport, and logistics bureau have tried to reduce traffic accidents and fatalities to some extent as compared with regional capital city.

Table 12. Organizational Coordination/Integration

Responses	No. of respondents	% of respondents	Mean	SD
Disagree	14.0	4.10	4.22	0.755
Neutral	26.0	7.60		
Agree	173	50.6		
Strongly Agree	129	37.7		
Total	342	100.0		

Sources: Field Survey, 2022

As described in the above Table 12, on organizational coordination, 173, or 50.6%, of respondents agreed; 129, 37.7%, of respondents strongly agreed; 26, 7.6%, of respondents were neutral; and the remaining 14, 4.1%, of respondents stated a clue of disagreement on the stated question. As depicted in table 12, the question of organizational coordination and responsibility had a mean value of 4.22. Based on the mean score, it is possible to say that there was no organizational coordination among concerned institutions on road traffic management systems. As this finding suggests, qualitative data are incompatible with quantitative data.

Discussion

Based on the findings of the study, the results revealed inconsistency, fragmentation, misalignment, incomplete coverage, and poor coordination among implementing parties in five city administrations: Bahir Dar, Addis Ababa, Adama/Nazereth, Hawassa and Dire Dawa. The cumulative effect of existing practical gaps and poor coordination created suitable settings for criminals, vehicle owners, and road traffic accident fatality escalations. However, Akbari et al (2024) stated that legislative intervention and road safety stakeholders' coordination effectively

reduced road traffic accidents by 26% and 16.7%, respectively. Further, Akbari et al (2024) study indicated that interventions and coordination in high-income countries were more likely to minimize road traffic accident than any other countries.

More importantly, the African Road Safety Charter (2016) states that formulating comprehensive road safety policies at the country level speeds-up implementation of national, regional, and continental road safety programs, contributes to the coordination of road safety in the continent, and enhances the harmonization of the collection treatment and dissemination of road safety data at all. Therefore, to enhance coordination and integration between regional states and city administrations, Ethiopia needs a holistic and compressive road safety policy at the national level. The findings of this study indicated that road traffic injuries significantly contribute to the disease burden, through lost in terms of disability-adjusted life years. As Tukela et al, (2021) finding indicated that road traffic accident is not only threatening the society but also the economy of the countries, especially Ethiopia. Road traffic accidents cost our country economically, ruin lives, create social dependencies, and cause widespread harm. Routine activity theory suggests that crime occurs when three elements converge: a motivated offender, a suitable target, and the absence of a capable guardian (Dastile, 2004). In the context of road policing, this theory suggests that traffic offenses are more likely when an opportunity coincides with an ineffective police presence.

To reduce traffic offenses based on routine activity theory, road policing agencies focus on increasing the presence of law enforcement officers on roads, implementing surveillance systems, and enhancing community engagement. By doing so, they aim to create an environment where potential offenders perceive a higher risk of being caught, thereby deterring them from engaging in traffic violations. This study finding confirmed the routine activity theory which means that road accident victims are victimized due to their contribution to traffic offenses and fatalities by different means. The results of this study revealed that the challenges to traffic management in the selected areas included: lack of coordination among organizations, limited awareness, inadequate road infrastructure, misconduct by traffic police officers, lack of modern technologies, and low media coverage. Supporting the above statement, the International Transport Forum (2020) described several challenges to road traffic management, including inappropriate speeding, driving under the influence of alcohol or drugs, driver distraction, sleepiness and

fatigue, weak enforcement of helmet and seat belt regulations, and a lack of integration and coordination between regional states.

Similar to this finding Federal Police Commission (2019) report indicated that road traffic accident and related deaths and injuries across regions of Ethiopia are unevenly distributed. For instance, three regional states and one city administration, namely the Oromia Regional State, the Amhara Regional State, the Sidama Regional State, and the Addis Ababa City Administration, accounted for almost 85 percent of the fatalities in the country. The spatial variation of serious injuries is similar across regional states, although the reliability of existing data is compromised by concerns of underreporting and misclassification.

According to the WHO global status report (2023) on road safety, it is highlighted that road traffic accidents cause immense human suffering and substantial economic burdens for individuals, their families, and governments. These financial losses include healthcare expenses such as rehabilitation and accident investigations, as well as the lost productivity of individuals who have died or become disabled due to injuries. Moreover, family members are often compelled to balance work or education with caregiving responsibilities for the injured. Addressing road traffic fatalities and injuries is crucial worldwide because they represent a significant public challenge that demands comprehensive and sustainable solutions.

Conclusion

Based on the findings above, poor road traffic management and the resulting accidents have had tremendous physical, emotional, social, and economic effects across the country. During the implementation stage, there was lack of uniform rules and regulations at the national level, leading to inconsistent enforcement across regions and an absence of inter-regional information sharing. Awareness creation programs were given periodically through mass media and on the street. Despite the fact that those rules and regulations are not user-friendly, all the regional states and city administration covered in this study have enacted their own road traffic management rules and regulations, meanwhile, this has led to specific malpractices, including individuals holding multiple driver's licenses and vehicle plate numbers.

Consequently, the absence of an integrated system to link road traffic management with road traffic police institutions, the road transport bureaus, and the licensed driving training centers has created significant challenges in practicing proper road traffic management Furthermore; there is a problem of holding fake driving licenses. As a result, drivers usually drive without legitimate

driving license in the capital city of selected regional states and in the federal city as well. This serious issue is neglected by road traffic accident management. This problem, however, become a leading cause of human deaths, injuries, and property damage.

Basically, a lack of cooperation among the regional states and the federal government hampers efforts to regulate driver-licensing effectively. The integration and harmonization of the regional transport bureau, road traffic safety verification, and traffic management, and police road traffic safety with the education and health bureaus contribute to reduce road traffic accidents and fatalities. Yet, road traffic accidents remain a challenge in the development of Ethiopia's regional and federal governments.

Implications and Recommendations

Road traffic accidents must be actively addressed across all communities, with both government and private media. In Addis Ababa specifically, the responsibilities for painting road markings and installing road traffic signals and signs must be vividly demarcated between the Addis Ababa Police Commission and the Addis Ababa Road Traffic Management Bureau. The federal government and regional states must either reach a common consensus on the issuance of driver's licenses and uniform car plate numbers, or jointly invest in modern technologies capable of tracking alleged offenses. Thus, we recommend that both the federal government and regional states endorse uniform road traffic management policies and strong organizational ties with friendly users of modern road traffic management systems. Both federal and regional governments must ensure the adoption of a standardized road safety curriculum in schools across the nation.

Finally, the Federal Police Commission should install a central data system to integrate the road management process across the country. In conclusion, the researchers believed that these findings will be useful to a broad spectrum of stakeholders. This includes the regional states of Amhara, Oromia, and Sidama; the city administrations of Addis Ababa and Dire Dawa; regional road traffic management bureaus; and the Ethiopian Police University for curriculum development. Moreover, the findings will serve as a valuable resource for future researchers and all stakeholders whose projects are related to road traffic management system.

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Conflict of Interests

The authors have declared that no conflict of interest exists.

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