



Road Accidents and Safety Measures: A Diverse Study of Ethiopia

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ABSTRACT

Road accidents are a major public health concern causing an estimated 1.35 million deaths and 50 million injuries each year. They are the leading source of death for people aged 15-29 years, and the second leading cause of death for children aged 5-14 years. The goals of this research include analyzing the causes of road accidents, evaluating the effectiveness of existing safety measures, and proposing evidence-based recommendations for enhancing road safety. Through a thorough literature review, statistical analysis, and empirical data collection, this study sheds light on the serious aspects of road safety. The findings of this research provide deep insights for policymakers, local authorities, and the public to implement corrective measures that mitigate the risks associated with road accidents.

Keywords: Road Accidents, Safety Measures, Fatal accidents, Severe Injuries

1. INTRODUCTION

Ethiopia is the second most populous country in Africa and has an estimated population of 113.3 million (United Nations, 2019), out of which 20 % live in cities. It is one of the fastest-growing economies, with a mean of 9.9 percent GDP growth rate each year until 2016 in the region (The World Bank, 2019). Roads are the most important infrastructure in providing access to rural and urban areas in Ethiopia. To address limitations in the road sector, the Government formulated the Road Sector Development Programme (RSDP) in 1997 which has so far been implemented over a period of twenty-three years and in four successive phases (Ethiopian Roads Authority, 2015). RSDP targets to increase road infrastructure and reliability and strengthen institutional planning in road sector management. The road network increased from 26,550 kilometer (about 16497.41 mi) to 1,26,773 kilometer (about 78773.09 mi) starting from 1997 through 2018 (Ethiopian Roads Authority, 2018). As a result, road density per 1,000 sq. kilometer increased significantly, from 24.1 kilometers (about 14.98 mi) in 1997 to 115.2 in 2018. Also, considerable improvement has been registered in the condition of the country's road network, with the road networks in pleasing condition increasing from 22 % in 1997 to 72 % in 2017 (Ethiopian Roads Authority, 2018). The Vehicle population in the country and kilometers traveled have increased substantially. In 2007, the vehicle population was 244,257 (WHO, 2009) and increased to 1,071,345 in 2018 (Federal Transport Authority, 2019). The World Health Organization (WHO) evaluates that road traffic injuries are a leading cause of death and disability globally, particularly among young men, women, and children. Considering this, the study of road accidents and the identification of constructive safety measures are supreme to mitigating this penetrating issue.

2. LITERATURE REVIEW

Globally, road traffic crashes bring about 1.3 million preventable deaths and an estimated 50 million injuries each year – making it the major killer of children and young people worldwide. Road accidents are a compound and diverse issue that demands a comprehensive interpretation of their causes, contributing factors, and the fruitfulness of safety interventions. This literature review integrates existing knowledge to provide a foundation for the study. Recognizing the significance of the problem and the need to act, governments from all over the world declared unitedly — through UN General Assembly Resolution 74/299 — a Second Decade of Action for Road Safety 2021–2030 with the direct target to reduce road deaths and injuries by at least 50% during that period. The Sustainable Development Goals (SDGs) were adopted by the United Nations in 2015 as a universal call to action to end poverty, save the planet, and ensure that by 2030 all people relish peace and prosperity. The 17 SDGs are integrated—they recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability. Two targets address road safety: Sustainable Development Goal target 3.6 on halving the number of worldwide deaths and injuries from road traffic crashes; and Sustainable Development Goal target 11.2 on providing ingress to safe, affordable, accessible, and sustainable transport systems as well as enhancing road safety for all. The 5 E's of Road Accident studies fostering a safe transportation system needs a holistic approach considering education, engineering, enforcement, emergency response, and equity. Safe Roads integrates a '5E' approach; Engineering, Enforcement, Education, Engagement, and Evaluation into one framework to maximize key assets.

Causes of Road Accidents: Preceding studies have identified several major factors contributing to road accidents, including human mistakes, impaired driving, road infrastructure shortages, adverse weather conditions, and vehicle-related problems. Understanding these problems is important for developing targeted safety measures.

Effectiveness of Safety Measures: Research has examined the usefulness of safety measures such as seat belt laws, speed limits, and public awareness campaigns. Evaluating the impact of these interventions provides awareness of their efficacy and identifies areas for improvement.

3. METHODOLOGY

The methodology section discusses the approach and techniques used in conducting the study of road accidents. This research employed a mixed-methods approach, integrating both quantitative and qualitative methods to diversely address the research objectives.

Research Design: A mixed-methods design was used to capture a broad gamut of data, merging quantitative analysis of statistical records with qualitative insights. This approach facilitated an overall understanding of road accidents.

4. DATA COLLECTION

Quantitative data was collected from official records, accident reports, and statistical databases to study the frequency and patterns of road accidents.

Table 1. Road traffic Injury victim distribution among the Regional States in Ethiopia (2016–2018).

Region	2016			2017			2018		
	Deaths	Major Injuries	Minor injuries	Deaths	Major Injuries	Minor injuries	Deaths	Major Injuries	Minor injuries
Tigray	386	854	381	374	858	584	371	664	356
Afar	56	73	20	72	49	31	131	164	79
Amhara	1104	1032	1252	1152	1181	1924	1935	1190	1990
Oromia	1478	1448	1386	1882	1710	1586	1541	1459	1485
Somalia	132	127	134	204	533	447	157	408	396
Benishangul	91	136	266	36	126	215	33	224	395
Southern Nations	712	1152	725	720	1121	922	634	990	937
Gambela	19	43	81	18	20	48	16	38	101
Hareri	55	203	188	34	224	507	53	123	284
Addis Ababa	528	2210	1274	585	1804	1232	477	2087	1232
Dire Dawa	36	129	242	41	128	279	31	141	180
Total	4597	7407	5949	5118	7754	7775	4479	7486	7435

Table 1 shows the dispersion of road traffic crashes in the country is unequal, with road fatalities and injuries intensive on roads in the central part of the country (Table 1). For instance, 4 out of 11 Regional States, namely the Oromia Regional State (ORS), Amhara Regional State (ARS), South Nations Nationality People (SNNP), and the Addis Ababa City Administration are responsible for almost 85 percent of the fatalities in Ethiopia. Serious injuries have a similar spatial imbalance among the states, even though the reliability of existing data is compromised by concerns of misclassification across the states. Crash data for 3 years (2016–2018) indicates that consolidated efforts are required in these regions, particularly ORS and ARS. Then, SNNP and Addis Ababa City Administration could be considered to curb the present high level of road death in the country

Table 2. Percentage of fatal crashes by vehicle type

Description	Cycle and Motorcycle	Cars	Buses	Trucks	Special Equipment	Unknown	Total
Fatal Crashes	266	854	1324	1032	150	112	3738
Percentage	7.12	22.85	35.42	27.61	4.01	3	100

5. DATA ANALYSIS

Quantitative data was examined using SPSS to identify trends and patterns in road accidents. Some official announcements were also used for analysis. The Ethiopian Federal Police Commission's report declared that 2,161 road traffic deaths were registered nationwide in 2007 and this figure more than doubled in 2018, increasing to 4,597 (Federal Police Commission, 2019). Analysis of data on road traffic crashes shows that about 79 % of fatal crashes occurred on paved roads and only 19 % on earth and gravel roads, whereas paved roads make up only 13.87 % of the road network, while 13 % are gravel and 73.13 % on earthen. High and medium-traffic volume roads have been designed and constructed as paved road surfaces. It was also found that the number of fatalities was 2,541 in 2010 and the figure rose to 4,479 in 2018, increasing by 80 percent. However, the road fatality estimate made by WHO

for Ethiopia was 27,326 in 2016 which is very high compared with police data. The pedestrians formed the second most vulnerable road user group in Ethiopia, accounting for up to 33 % of fatalities. Pedestrian deaths accounted for the largest share of road traffic deaths in towns and cities compared with deaths of other categories of road users. For example, pedestrian fatalities rose from 80 % to 90 % of road traffic fatalities in Addis Ababa between year 2015 and year 2016 (Addis Ababa Transport Bureau, 2018) In nut and cell, the citizens die on the roads at a mean of 4,732 persons per year; or nearly 13 Ethiopians do not come back home due to being victims of crashes daily. Road traffic injuries mainly affect passengers and pedestrians. It is concluded that one person is killed on the roads every two hours.

6. CONCLUSION

The conclusions section assists as a summary of the key findings and implications obtained from the diverse study on road accidents and safety measures. The conclusions section summarizes the importance of the study's findings and provides insights that can drive positive change in road safety practices.

Key Findings:

With about 70% of the global population expected to live in urban settings by 2030, increased demand for urban mobility will surpass the capacity of road systems that rely largely on vehicles such as cars and motorcycles. Investment in public transport systems to enable safe and efficient movement of large and increasing populations is, therefore, the main way to address this issue. Public transport systems carry more people compared to private vehicles and are generally more economical and sustainable. They reduce exposure to crashes and are a major avenue to improve safety. Safe road infrastructure is crucial for reducing road trauma. Road infrastructure must be planned, designed, built, and operated to allow multimodal mobility, including paratransit, public transport, walking, and cycling. Vehicles should be designed to secure the safety of those inside and those outside them. To refine vehicle safety, different features can be added to vehicle design to avoid crashes. Overspending, driver fatigue, distracted driving, non-use of safety belts, child restraints, and helmets are among the key factors contributing to road injury and death. The design and operation of the road transport system take account of these issues through a combination of legislation, enforcement, and education. Post-crash care and survival is very time-sensitive: delays of minutes can make the difference between life and death. For this reason, integrated and coordinated care should be provided as soon as possible after a crash occurs. Capacity-building for road safety professionals working for the private sector, civil society and government research institutions should be given top priority, as the lack of specialist knowledge of creating safer roads.

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