

Analysis of Traffic Accidents in Vietnam

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Abstract

Understanding the causes and solutions of road traffic accidents is important for developing road and action plans in a country. In Vietnam, awareness of traffic participants is the main cause of serious traffic accidents. In recent years, the number of road traffic accidents in Tuyen Quang province with deaths has decreased, but the number of accidents has increased significantly. The article uses data on traffic accidents in Tuyen Quang over the (2016-2023) has been analytically reviewed. From there, analyze accident characteristics and causes of traffic accidents in Tuyen Quang province, and propose solutions to improve traffic safety in Tuyen Quang, Vietnam. The findings can be information for managers and researchers interested in studying the province of Tuyen Quang, Vietnam road traffic safety. Additionally, the findings have led the government to achieve national targets in reducing the number of accidents and serious injuries.

Keywords

Traffic Safety, Accident Cause, Driver Behavior, Human Factor, Traffic Safety Policy

1. Introduction

In recent years, the situation of traffic accidents has become increasingly complicated and has left dire consequences for families and society as a whole. Based on the statistics reported in the World Health Organization (WHO) report regarding the global status of road safety (WHO, 2015), every year, approximately 1.3 million people die and 50 million are permanently disabled each year as a result of road traffic accidents [1].

Road traffic injuries are the leading cause of death for children and young adults aged 5 - 29 years. More than half of all road traffic deaths are pedestrians, cyclists, and motorcyclists. 93% of the world's fatalities on the roads occur in low- and middle-income countries, even though these countries have approx-

imately 60% of the world's vehicles. According to the statistics of Vietnam, the impact of traffic accident costs accounts for 3% of GDP [2].

In recent years, having understood the serious effects of traffic accidents on society at large, scientific researchers and traffic engineers in Vietnam have developed many projects and conducted research in traffic safety. The human factor is also considered to be the central element in the whole system. Traffic participants are considered one of the biggest causes of traffic accidents. From the causes of traffic accidents, it is proposed to reduce traffic accidents in Vietnam [3]-[10].

The article uses traffic accident data of Tuyen Quang province, Vietnam from 2016 to 2023, Vietnam to analyze the causes and propose solutions to reduce traffic accidents caused by human factors participating in traffic. The final goal is to organize a traffic environment that is convenient and safe for road users.

2. Current Status of Road Traffic Accidents

According to the National Traffic Safety Committee in Vietnam, on average, an estimated 30 - 35 people die every day due to traffic accidents, mainly road traffic accidents. Causes of road traffic accidents include a high increase of registered vehicles, irrelevant infrastructure (as the mobility demand increases at a rapid pace), dangerous mixed traffic flow, traffic safety education and training without expected results, and irregular enforcement. It is reported that many serious accidents are caused by mixed traffic flow (with participants of different types of vehicles of varying sizes), in which drivers drive in the wrong lane, causing delays in average traffic flow speed as well as reducing road traffic capacity. Among those factors, driver behavior is reported to be the main cause of traffic accidents. Road user error includes speeding, unsafe overtaking, drunk driving, poor road observation, misuse of lanes, and pedestrian behavior.

Tuyen Quang is a mountainous province located in Northern Vietnam, about 165 km from the capital Hanoi. The North borders Ha Giang province, the East borders Bac Kan and Thai Nguyen provinces, the West borders Yen Bai province and the South borders Vinh Phuc and Phu Tho provinces. With this geographical location, Tuyen Quang province holds an important position in the socio-economic development strategy of the Northern mountainous region. The annual growth rate of means of transport has been about over 10%, as of June 2023, the whole province has 649,968 motor vehicles. However, to reduce the number of serious traffic accidents, there are still many difficulties such as slow development of traffic infrastructure, rapid increase in vehicle speed, and poor traffic awareness [11].

This article presents the main results of an in-depth analysis of traffic accident data and accident characteristics in Tuyen Quan province. Accident patterns and causes are analyzed based on several key factors, time of occurrence, location, type of vehicle involved, driver age, and driver gender. Based on the results, the

article proposes some solutions to improve traffic safety in Tuyen Quang province. The results of the article help provide solutions to improve traffic safety and awareness of traffic participants in Tuyen Quang province.

The situation of road traffic accidents in the province from 2016 to 2023 is shown in **Figure 1**. Accordingly, the number of cases, deaths and injuries are gradually decreasing each year from 2017 to 2023. Traffic accidents decreased sharply from 2019 to 2020 and increased again in 2022. This is due to the impact of the COVID-19 pandemic in 2020-2021, so traffic demand decreased sharply and traffic accidents also decreased.

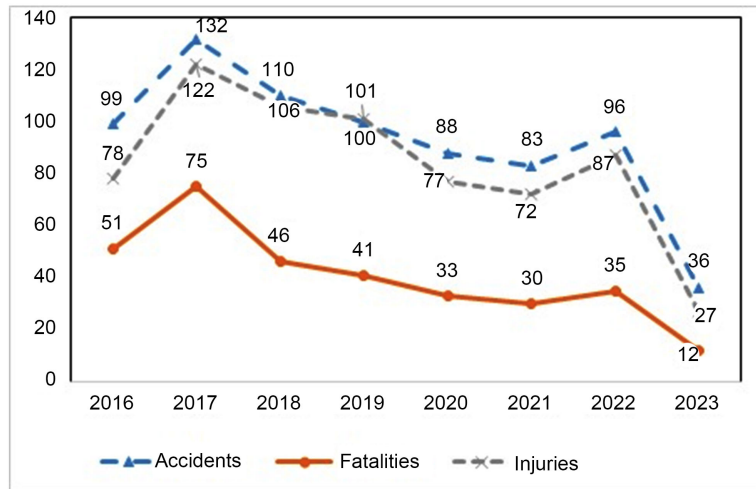


Figure 1. Traffic accidents in Tuyen Quang, 2016-2023. Source: Traffic Safety Committee of Tuyen Quang province.

Based on the province’s traffic accident statistics, road motor vehicles mainly include cars and motorbikes, thereby determining relative traffic accident indices related to 1000 people and 1000 vehicles. Conveniently, as shown in **Figure 2** and **Figure 3**. These indexes tend to decrease each year.

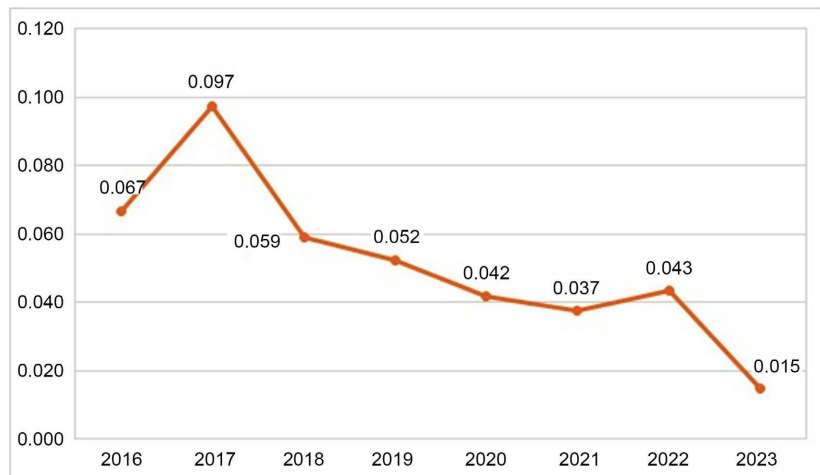


Figure 2. Number of road fatalities per 100,000 population, 2016-2023. Source: Traffic Safety Committee of Tuyen Quang province.

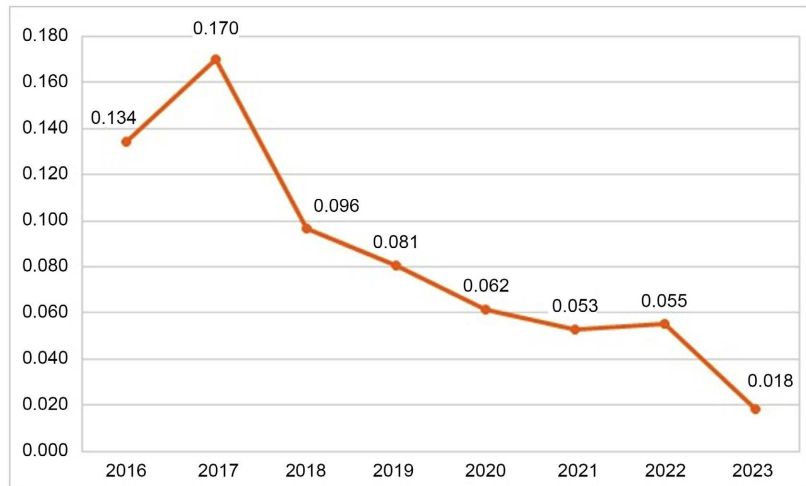


Figure 3. Road fatalities per 10,000 motorized vehicles, 2016-2023. Source: Traffic Safety Committee of Tuyen Quang province.

3. Causes of Road Traffic Accidents

Traffic accidents distribution by time is shown in **Figure 4** [11]. Accidents mainly occur in the time frame from 6:00 p.m. to 11:00 p.m., accounting for 36.1%, and the time frame from 6:00 a.m. to 12:00 p.m., accounting for 34.0%. During this time frame, the traffic volume on the road decreases, and drivers actively drive faster, so the risk of accidents is higher. Solutions to improve traffic safety.

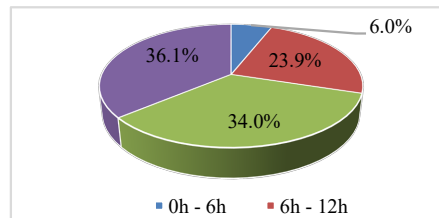


Figure 4. Traffic accident distribution by frame hour.

Accident distribution by road type in the province is shown in **Figure 5** [11]. Traffic accidents occur mainly on national highways, accounting for 67.5%. On national highways, vehicles often run at high speeds, with some vehicles exceeding the speed limit, causing high accident potential, while in the province, national highways do not separate lanes for cars and motorbikes.

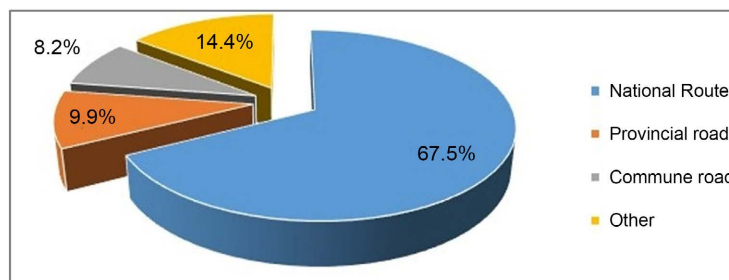


Figure 5. Traffic accident distribution on roads.

Accident distribution by vehicle type is shown in **Figure 6** [11]. Traffic accidents occurring between cars and motorbikes account for 44.3% and traffic accidents occurring between motorbikes and motorbikes account for 21.2%. Because the composition of the mixed vehicle flow is mainly motorbikes and cars, the risk of accidents with these two types of vehicles will be higher than other vehicles.

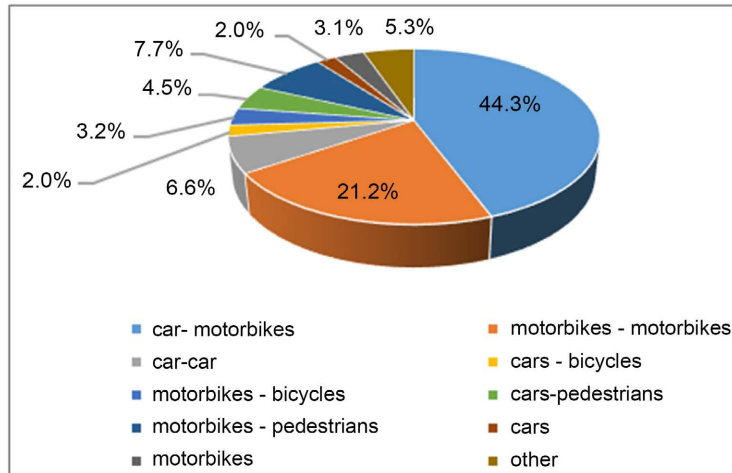


Figure 6. Traffic accident distribution by vehicle.

Traffic accidents involving men are much more common than women, with men accounting for 80.8%. Traffic accidents are mainly in the age group of 27 - 55 years old, much higher than other age groups, accounting for 56.7%.

Traffic accident statistics due to the awareness of traffic participants are shown in **Figure 7** [11]. In particular, road and lane violations dominate the causes of accidents accounting for 38.66%.

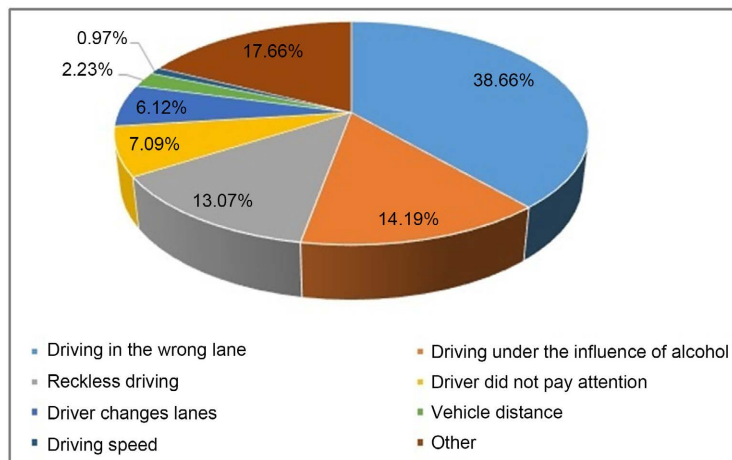


Figure 7. The cause of accidents is the awareness of traffic participants.

4. Solutions to Improve Traffic Safety

Through the traffic accident situation in Tuyen Quang province, we see that the

main cause is due to the awareness of traffic participants, mainly road and lane violations. Among the three factors of people, vehicles, and infrastructure, accidents are not caused by just one cause but by 2 or more factors. From the perspective of solutions to improve traffic safety based on engineering, education, enforcement, emergency and evaluation. To reduce traffic accidents in Tuyen Quang province, it is necessary to:

Accelerate completion of the road network according to approved plans and plans.

Control the increasing speed of personal vehicles (cars, motorbikes).

Gradually develop public transportation

The Traffic Inspectorate force increased patrols on national highways and roads to detect and propose to the authorities to promptly handle and overcome road defects that do not ensure traffic safety such as: Broken road surfaces. Cracks, signs being stolen, traffic safety corridors being encroached... adding and repairing the system of traffic markers, signs, signals and reorganizing traffic to effectively exploit the infrastructure traffic; At the same time, publish on the media the locations where traffic accidents often occur so that people can take precautions;

The traffic police force increased patrols and controlled speed-violating vehicles both day and night on roads and traffic accident black spots.

It is necessary to build a complete traffic accident database system including content such as: number of accidents, explanation of each accident, cause of accident, damage of the accident. That database system will help identify black spots on the road network accurately and promptly in order to propose measures to improve black spots to improve safety on the road network.

- The work of identifying and improving black spots on the current road network must be carried out synchronously and with specific prescribed procedures to improve the level of safety along the entire route.
- Promote education and propaganda about traffic laws to improve traffic culture.
- Need to improve training, testing, and issuance of driver's licenses.
- Periodically check the quality of vehicles when participating in traffic.

5. Conclusion

In developing countries such as Vietnam, the death rate from road traffic accidents is quite high compared to other countries in the region. Research on human factors in the causes of traffic accidents to develop traffic policies is increasing. Recognizing the serious effects that traffic accidents cause on the entire society, scientific researchers, traffic engineers and policymakers in Vietnam have developed many projects and implemented them. research in the field of traffic safety in recent years. The human factor is considered the central factor in the entire system. The ultimate goal is to organize a convenient and safe traffic environment for traffic participants.

The article is based on a traffic accident statistics database from 2016 to 2023 in Tuyen Quang province, analyzing the situation of traffic accidents, and characteristics of the causes of traffic accidents, as a basis for directions. on proposed solutions to ensure traffic safety in the future. The research results are useful documents for local policymakers, improving solutions to reduce the risk of traffic accidents, and a future where there will be no deaths from traffic accidents. The road designer is responsible for the level of safety throughout the system. Road users are responsible for compliance with road traffic laws.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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