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Road Traffic Accident Patterns and Safety Policies Suggestions in Ho Chi Minh City

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Abstract: Although the number of road traffic accidents, fatalities, injuries has been slightly reduced in recent years, HCMC (Ho Chi Minh City) would still face challenges in reducing and restraining road traffic accidents in the future. This paper presents the results of road traffic accident data analysis over the past 3 years that we collected from the Road-Railway Police Bureau in HCMC. Based on the results, we could be able to deeply understand trends, characteristics, and causes of road traffic accidents. Such a deep understanding is a scientific basis to study and formulate synchronous strategy along with specific solutions to solve road traffic accident problems more effectively in the future.

Key words: Traffic safety, safety policies, accident patterns.

1. Introduction

Traffic crashes cause great damage to people, property, and socio-economy, particularly in low-income and middle-income countries. It is estimated that annual traffic crashes cost the world between 1% and 3% of the GNP (gross national product) [1].

Vietnam is classified as a middle-income country by the World Health Organization (1,740 USD/capita), with the proportion of deaths due to traffic crashes per 100,000 people being 24.5 and traffic crashes cause annual losses accounting for 2.9% of GDP (gross domestic product) [2, 8]. Thus, traffic crashes clearly affect not only individuals but also the whole society. Nearly 54% of deaths due to traffic crashes are related to pedestrians (23%), bicycles (3%) and motorbikes (28%) [3].

Traffic crashes in HCMC (Ho Chi Minh City) in recent years have seen positive changes including the number of accidents and the number of deaths and injuries (Table 1). In 2020 in HCMC, traffic crashes decreased under all three indicators (641 accidents, 560 deaths, 141 injuries) when compared to 2019, all of these indicators tend to decrease with the corresponding 5.74%, 11.67%, 13.5% [4, 5].

However, until now, it is still significantly complicated and there has been no research on deep analysis of road traffic accident patterns and cause systematically to understand deeply the trends, characteristics, and causes of road traffic accidents and specific solutions to solve road traffic accident problems more effectively.

The framework of this article will focus on analysis of road traffic accident data over the past 3 years that we collected from the Road-Railway Police Bureau in HCMC. The results of this analysis will be able to deeply understand trends, characteristics, and causes of road traffic accidents. Such a deep understanding is

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a scientific basis to study and formulate synchronous strategy along with specific solutions to solve road traffic accident problems more effectively in the future.

2. Methods of Data Collection & Analysis

In-depth analysis was carried out on the data collected from the Road-Railway Police Bureau in HCMC for 3 years (2018-2020). Traffic accident information is collected according to form 45/GT under Decision 1093/2000/QD-BCA and form 02/TNDB issued under Circular 58/2009/TT-BCA replacing form 45/GT from December 12, 2009. According to these two forms (45/GT; 02/TNDB), the amount of accident information collected is quite detailed, with nearly 60 items of information. However, due to various reasons (such as delay in reporting the accident to the traffic police or a change in the scene), the amount of reliable information collected was reduced to about 17 items. In this article, the author focuses on data analysis based on the above 17 items. In addition, based on summary reports and thematic reports of HCMC Traffic Safety Committee, the author reviews and preliminarily evaluates the effectiveness of traffic safety policy solutions in the city in the period 2018-2020 (Fig. 1).

There is a standard national procedure for crash investigation, governed by Vietnam's MOPS (Ministry of Public Security) circulars in Vietnam, in which crashes are classified as:

Table 1 Summary of traffic crashes data in HCMC for 4 years (2017-2020).

Year	Number of cases/percentage change in comparison with previous year	Number of deaths/percentage change in comparison with previous year	Number of injuries/percentage change in comparison with previous year
2017	788	714	216
2018	743/6.19%	691/3.89%	197/7.51%
2019	680/11.46%	634/10.96%	163/18.91%
2020	641/5.74%	560/11.67%	141/13.5%

Source: HCMC TSC [4-7].

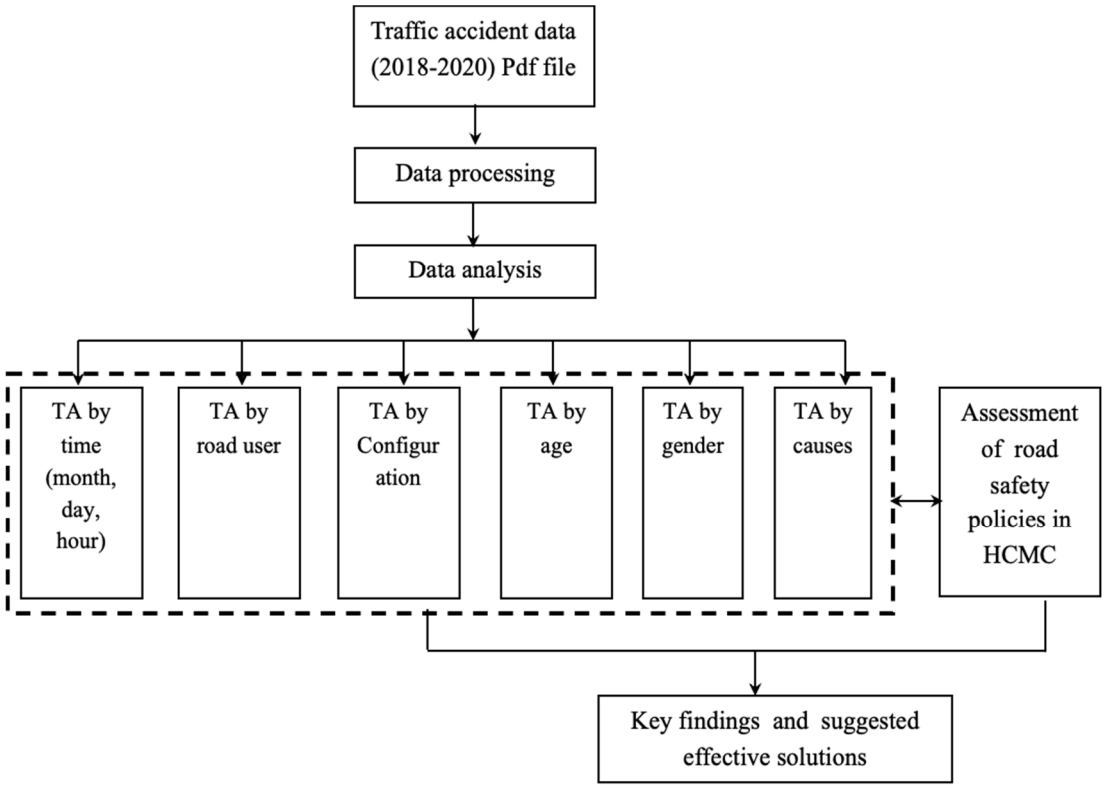

Fig. 1 Research framework and data analysis.

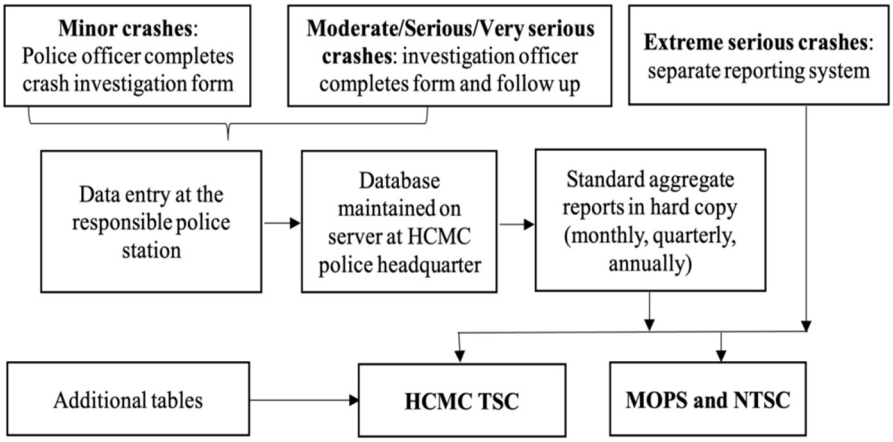

Fig. 2 Road traffic accident data procedure in HCMC.

- class 1 = minor (property damage only);
- class 2 = moderate (at least 1 person injured);
- class 3 = serious (1 death);
- class 4 = very serious (2 deaths);
- class 5 = extremely serious (3 or more deaths).

The road traffic accident data have been done following up the flowchart of the police crash reporting system (Fig. 2):

3. Results

In 3 years (2018-2020), there were 2,064 road traffic accidents, 1,885 deaths, and 501 injuries in the city. Their patterns' distributions by time, location, age, gender, etc. are presented below.

3.1 Deaths Distribution by Time

The number of deaths tends to increase slightly during festivals, traditional New Year and weekends (Figs. 3 and 4). The deaths occurred mainly at off-peak hours. They occurred mainly from 02 PM to 03 PM, and from 08 PM to 01 AM the next morning, of which the highest time was at 10 PM-11 PM (9.8%) (Fig. 5).

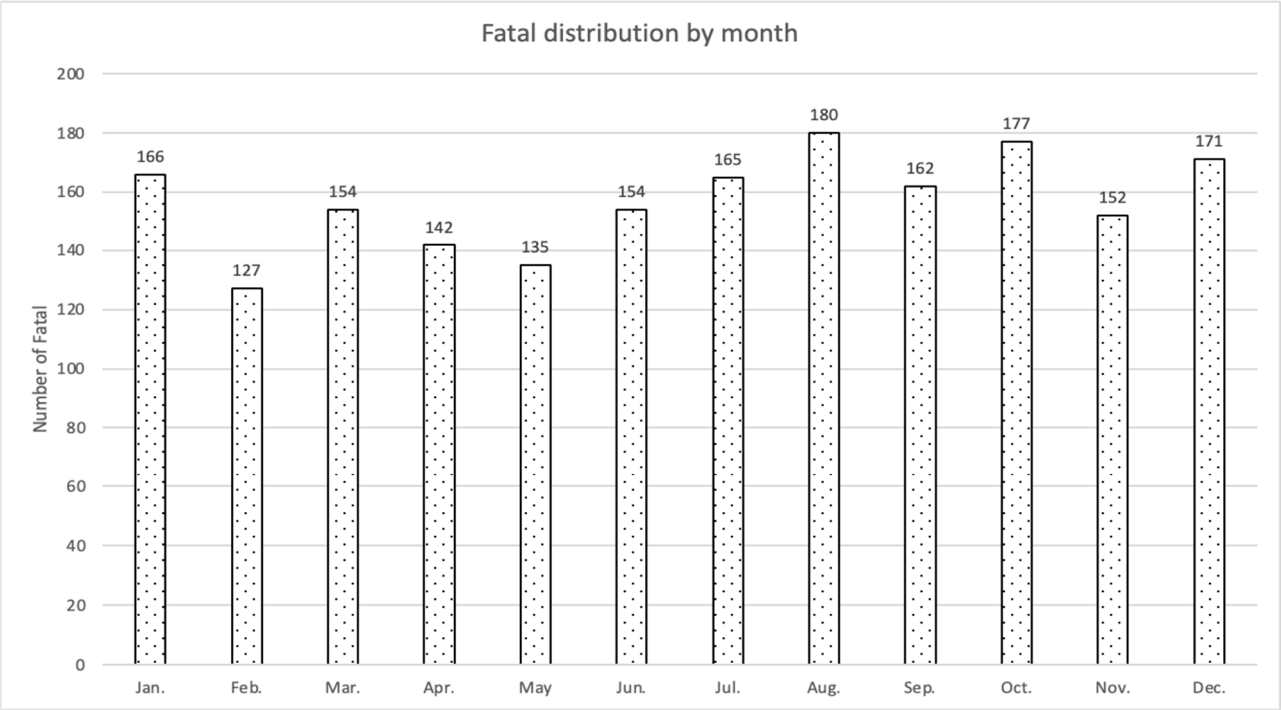

Fig. 3 Fatal distribution by month in HCMC.

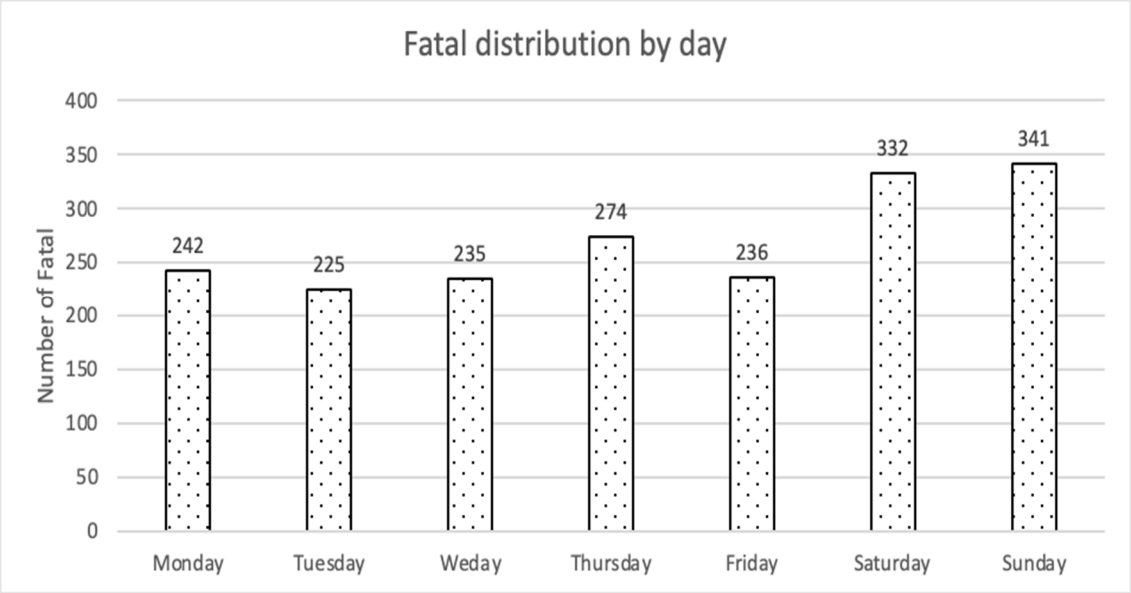

Fig. 4 Fatal distribution by day in HCMC.

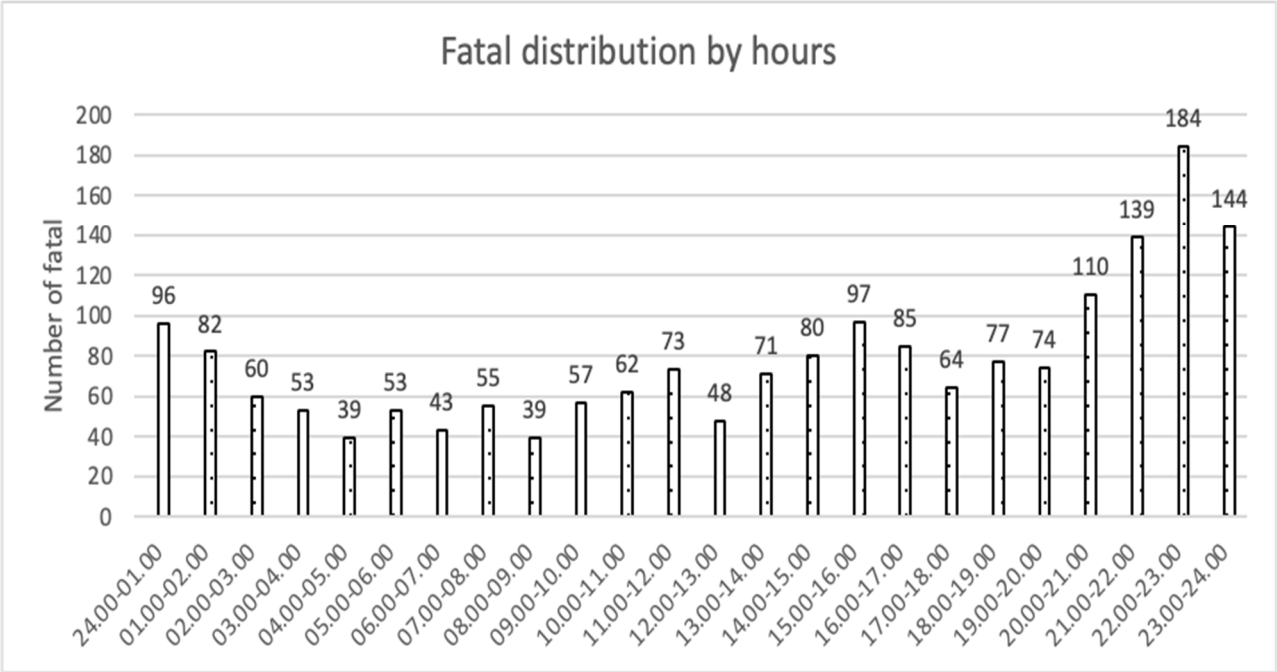

Fig. 5 Fatal distribution by hours in HCMC.

3.2 Fatalities Distribution by Subject Leading to Accident

Fig. 6 shows that the age group causing the highest fatalities in the city is the 31-40 years old group (17.2%), followed by the 19-24 years old group, accounting for 31.6% of the two groups. This is an immature age, very eager, especially, easily stimulated by alcohol. Group of 16-18 years olds accounts for a significant proportion (nearly 5%). This is a group of subjects who are in high school and have not been allowed to use motorbikes. Traffic safety policy should pay more attention to this target group.

Fig. 7 shows that the majority of fatalities victims are men (78%). This is easy to learn deeply as they usually are drivers and involve most trips with their family.

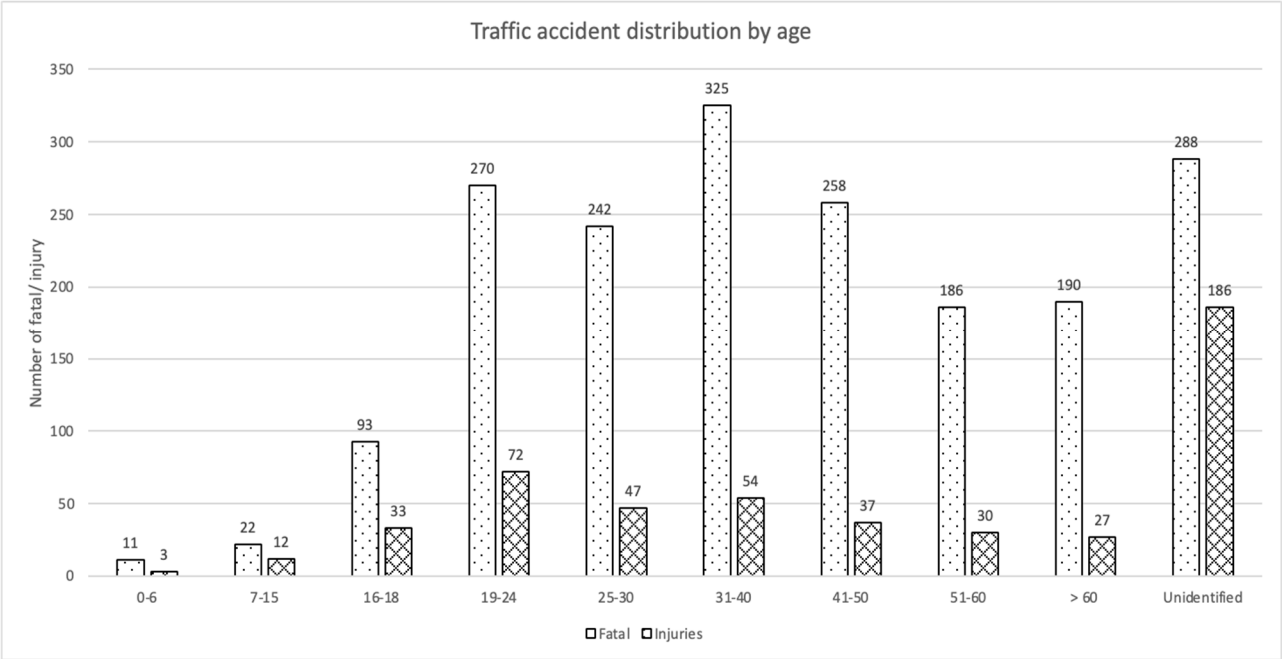

Fig. 6 Fatalities distribution by age in HCMC.

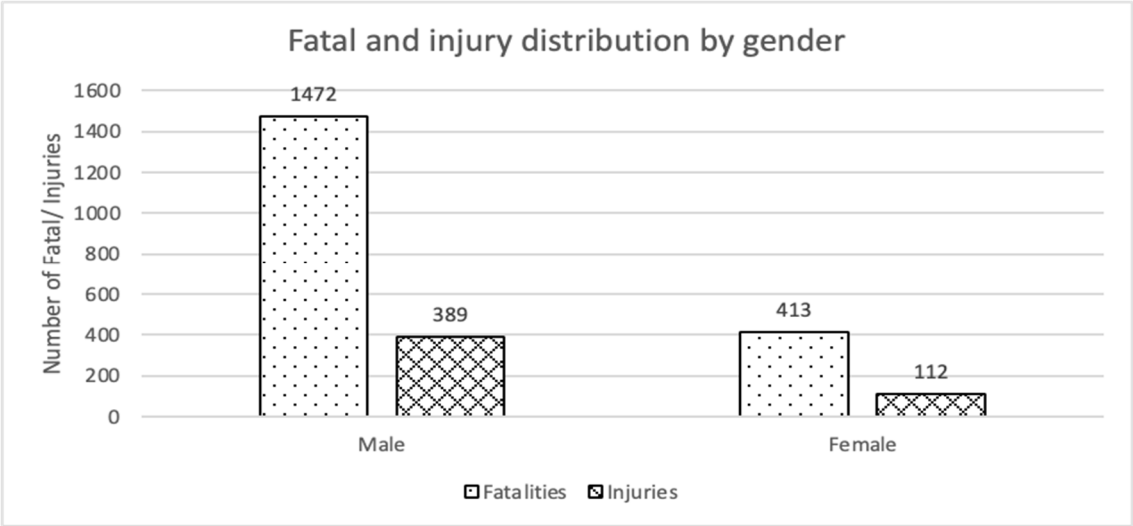

Fig. 7 Fatalities distribution by gender in HCMC.

The main group of vehicles causing fatalities is collisions with 2 or more than two vehicles, accounting for the largest proportion (70.6%), followed by single vehicles (19.3%), and pedestrians (8.4%) (Fig. 8).

Fig. 9 shows the distribution of fatalities by configuration type. Across the city, the most common form is the pair: car-motorcycle (40%), motorcycle-motorcycle (22.3%), and motorcycle-pedestrians (5.5%). Fig. 10 shows that the main causes of accidents are related to drivers (violating safety rules, wrong lane, lack of attention, self accident, exceeding speed limit, ...). Research in many countries shows that there are many different factors that lead to traffic accidents. The data may not reflect the actual situation. For example, in case the road maintenance and repair work is not good, the sign system, paint lines are not clear, the layout is not reasonable, the road surface does not guarantee grip in the rainy season, etc. occurs often attributed to the cause of the accident.

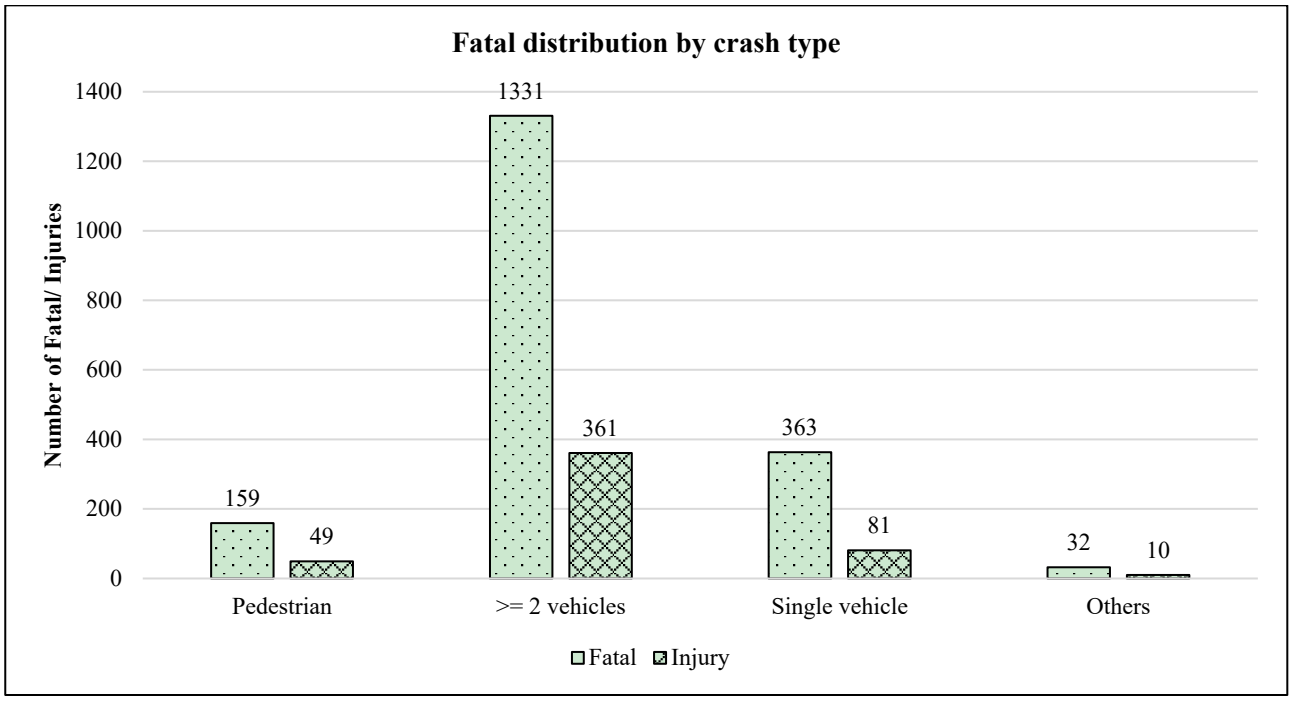

Fig. 8 Fatalities distribution by crash type in HCMC.

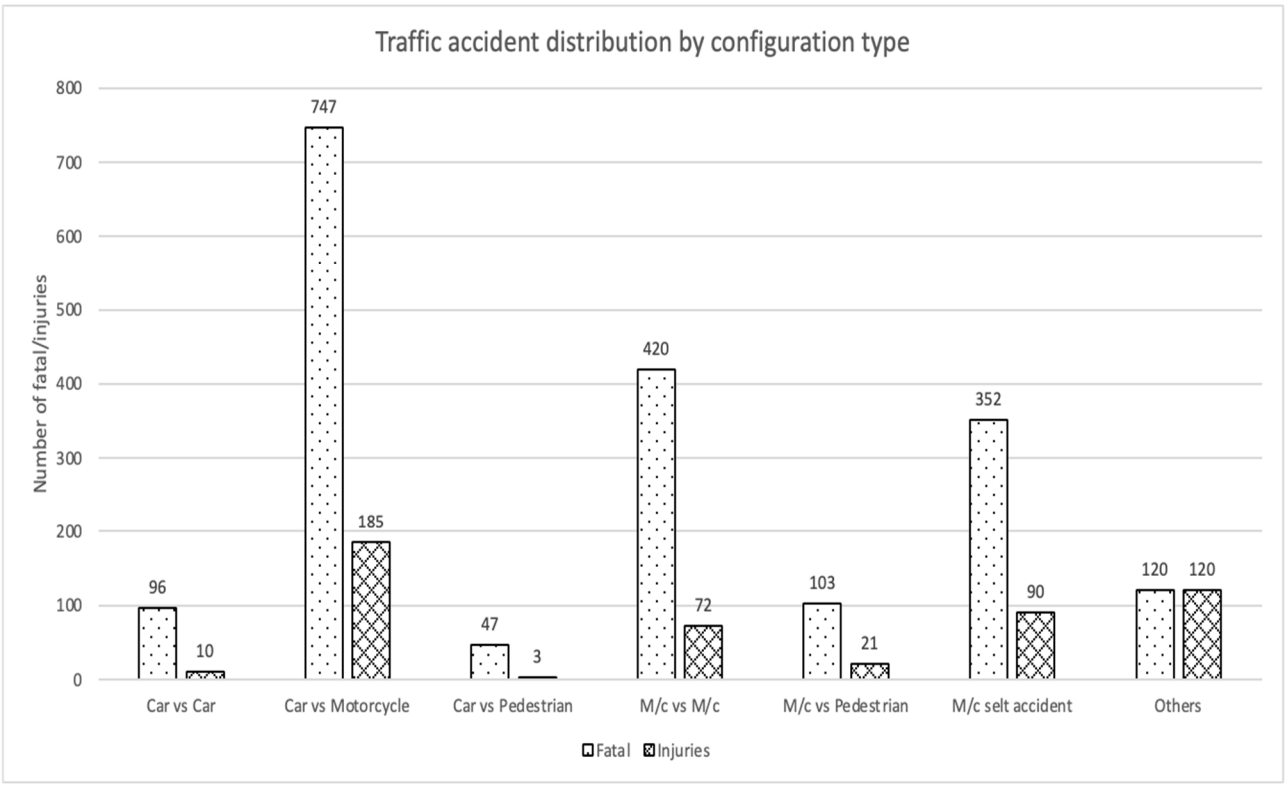

Fig. 9 Fatalities distribution by type of configuration in HCMC.

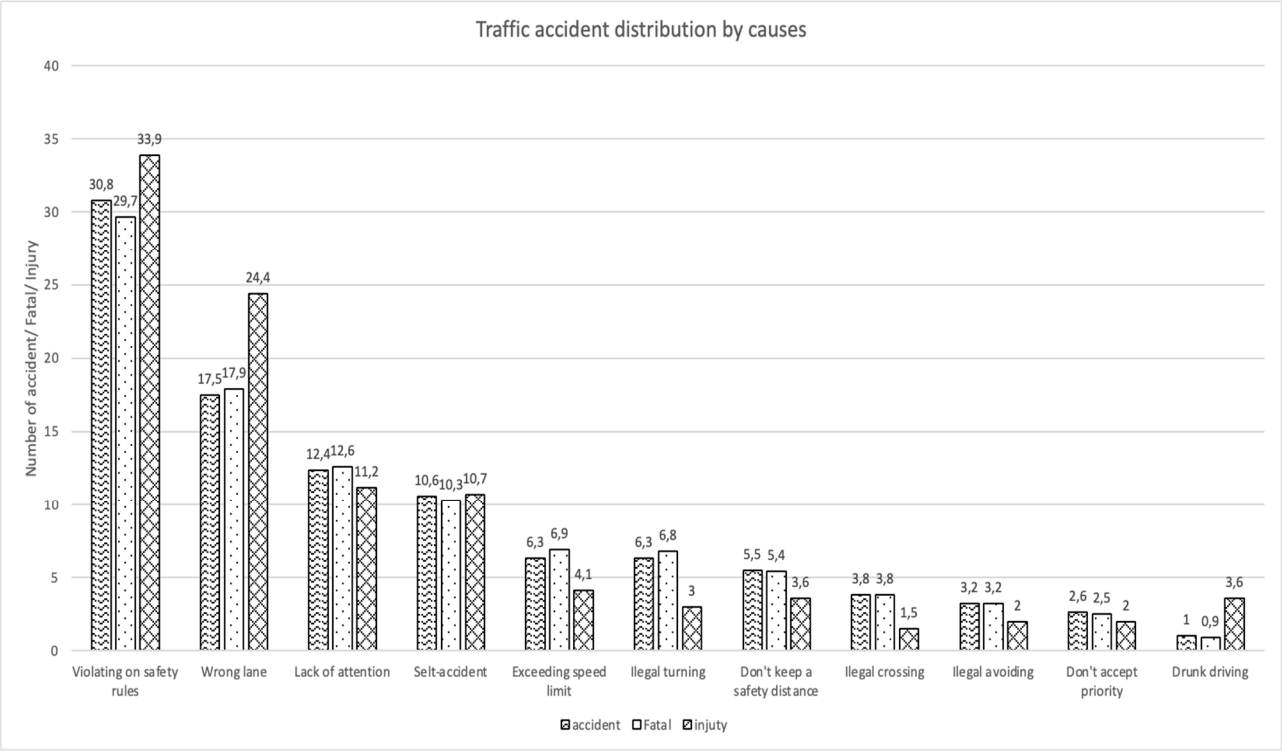

Fig. 10 Fatalities distribution by causes in HCMC.

4. Policy Solutions to Improve Traffic Safety in HCMC

During this period, the city government focused on implementing Directive 18-CT/TW and conclusion No. 45-KL/TW dated February 1, 2019 of the Central Committee on strengthening the leadership of the Party in ensuring traffic order and safety on roads, railways and inland waterways and overcome traffic congestion in 2020 and implementation direction in 2021.

This policy is divided into four main areas: (1) Group of solutions to improve infrastructure and applying science and technology in sanctioning administrative violations; (2) Group of technical solutions to control traffic flow; (3) Group of solutions on sanctions and legal coercion; (4) Group of solutions on education and propaganda, in which, the winning team must improve infrastructure (for example, improve technical standards of roads; invest in upgrading bridges and roads; improve and perfect the warning and indication system, ...) and technical measures to control traffic flow (for example, installing a median between motorized and rudimentary lanes; installing speed monitoring cameras, ...) are two groups of solutions that can be effective significantly in reducing traffic accidents.

The other two groups (sanctions and legal enforcement; education and propaganda) when implemented are still formal, and have not really gone to life, especially teenagers, so that they can have a positive impact. It is very important to change awareness and improve knowledge about traffic safety. The work of patrolling, controlling and handling traffic safety violations is not regular and at times, the force is too thin to leave the area empty, concentrating only on a few key routes.

Moreover, the city also focused on implementing the traffic infrastructure development project in HCMC in the period of 2020-2030, a project to strengthen public passenger transport combined with control of the use of personal motor vehicles in the city.

5. Conclusions

The interesting analytical results are summarized as follows. Firstly, the time of the fatalities mainly took place from 10 PM to 11 PM. Second, men, aged 31-40 are the main victims of accidents. However, it should be noted that the group of 16-18 year olds accounts for a significant proportion. Third, vehicles causing fatalities are collisions with 2 or more than two vehicles, accounting for the largest proportion (70.6%), followed by single vehicles (19.3%), and pedestrians (8.4%). Fifth, violating safety rules, wrong lane, lack of attention, self accident, exceeding speed limit are the main causes of traffic accidents.

In order to continue to improve traffic safety for the city, the author notes the city when implementing the following solutions:

- The propaganda to raise awareness and disseminate knowledge about traffic safety should pay special attention to the target audience male 31-40 years old;
- Traffic monitoring and patrol work should focus on the time from 10 PM to 11 PM. It is necessary to study and change the signal light system from flashing yellow at night to the daytime operating stage to ensure traffic safety;
- Continue to research appropriate solutions to separate truck and motorcycle lanes;
- Strictly handle those who use sidewalks for wrong purposes, especially in downtown to create favorable and safe conditions for pedestrians;
- It is necessary to study solutions (technically and with heavy penalties) to reduce the number of traffic violations (typically in the wrong lane, red light, speeding, etc.).

In addition, the author recommends that the city needs to carry out more in-depth analytical studies on the similarities and differences in socio-economic conditions and infrastructure between different zones and develop traffic safety policies for each separate area, contributing to improving the effectiveness of the city's traffic safety programs.

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