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Original Article

Epidemiological study of motorcycle accidents in Gonabad in 2018-2019

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Abstract

Introduction: Motorcycle accidents are among the deadliest road traffic accidents, and the prevention of road traffic injury is a daunting challenge in numerous countries, including Iran. The present study aimed to investigate the motorcycle accidents that occurred in Gonabad, Iran.

Methods: This cross-sectional descriptive study was conducted using all standard pre-hospital emergency reporting forms related to motorcycle accidents registered in a software-based pre-hospital information management system (called ASAYAR in Persian) between March 2018 and 2019. The motorcycle accidents were assessed in terms of urban and rural settings, time and mission results of accidents, and demographic characteristics of injured people. Descriptive statistics (mean, standard deviation, frequency, and frequency percentage) were used for data analysis.

Results: A total of 1,555 traffic accidents were recorded in the ASAYAR system, out of which 746(48%) accidents were related to motorcycle accidents, and out of 746 cases in the county, 431 cases had occurred in Gonabad. The majority of motorcycle accidents (49%) took place in the age group of 15-25 years. The time analysis of accidents demonstrated that the majority of accidents had happened in the spring with 34% (n=147) and in June with 11.86% (n=51). Moreover, 77% of the injured were motorcycle riders, and 82% of all the injured have been taken to hospital.

Conclusion: As evidenced by the obtained results, nearly half of all road accidents are caused by motorcycles. Given that most of the injured in motorcycle accidents are adolescents and young people, it is necessary to take practical measures to control and manage this major health threat.

Keywords: Motorcycles, Accidents, Epidemiology

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Introduction

Human scientific development brought relative prosperity to countries, especially in the second half of the twentieth century, nonetheless, it has posed a new problem called Road Traffic Accidents(RTA)(1). According to the World Health Organization(WHO), road traffic injuries are the eighth leading cause of death globally (2).

Today, one of the most important threats to public health and sustainable development is the increase of traffic accidents, claiming the lives of numerous people each year (3). In general, road accidents are a major and vital challenge in high-, middle-, and low-income countries. Moreover, they are the eighth leading cause of death in young people aged 15-29. Road accidents are responsible for more than 1.2 million deaths and 50 million injuries annually. In general, 3.6% of deaths in the world are caused by road accidents (4).

The number of reported traffic accidents varies across countries. In developing countries, 65% and 90% of road accidents lead to death and disability, respectively. In addition, 25% of abnormal deaths are caused by road accidents. It is estimated that 220,000 people lose their lives due to road accidents every year (5). According to the WHO, pedestrians, cyclists, and motorcyclists, account for half of the world's road casualties in low-income countries and are considered the most vulnerable road users (6).

The increasing number of vehicles has led to the widespread use of motorcycles, and motorcycle drivers are currently among the most vulnerable traffic users (6). The increase in the number of motorcycles has resulted in a sharp rise in accidents and disabilities. In developing countries, motorcycles are the preferred vehicle due to their low cost, as well as easy usage and maintenance (7). In Asian countries, including Iran, motorcycles are one of the most important means of transportation (8). The effects of motorcycle injuries in low- and middle-income countries are twice as high as high-income countries (7). The most dreadful accidents leading to motorcyclist deaths and injuries have occurred on the roads of Golestan, Gilan, Isfahan, Mazandaran, Kerman, and Fars provinces (9).

In Iran, the deadliest road accidents are related to motorcycle crashes since these vehicles are inherently unsafe and increasingly used by young people. It is estimated that about 30% of motor vehicles in Iran are motorcycles which are 30 and 9.3 times more likely to be involved in accidents and deaths than other vehicles driver (10). These accidents can bring about adverse social, cultural, and economic consequences in human society (11). The economic cost of accidents is estimated to be as much as $ 1 billion per year (12). The factors which contribute to the occurrence of accidents are divided into three general headings: road, vehicle, and human factors.

The results of related studies demonstrated that 98% of accidents can be prevented (13). It is evident that the first and most basic step in the prevention and control of accidents is the identification and evaluation of the current situation and problems to take necessary preventive measures (3). Describing the demographic characteristics and details of accidents is of utmost importance for the prevention, management, and analysis of road accidents (10). In light of the aforementioned issues, the present study aimed to assess the epidemiological characteristics of accidents caused by motorcycles in Gonabad.

Materials and Methods

The present cross-sectional descriptive study was conducted to assess motorcycle accidents in Gonabad between March 2018 and 2019. The community covered by this study consisted of motorcycle accidents in Gonabad. This study was performed in the pre-hospital emergency center of Gonabad in eastern Iran. Gonabad University of Medical Sciences provides the population of Gonabad and Bajestan County with healthcare services. The strategic location of Gonabad Emergency in the eastern region of the country has made it an extremely suitable center for the provision of pre-hospital services to trauma victims in the northeastern region of the country. The Gonabad Emergency Center received 55,939 calls in 2018, 14,190 of which led to ambulance calls. Out of these, 3,464 calls were related to trauma missions.

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Other calls that did not result in dispatch included repeated calls, non-emergency calls, failed calls, harassment, and counseling.

The inclusion criterion was all motorcycle accidents that led to calling 115 and sending an ambulance to the scene of the accident. On the other hand, the exclusion criterion was accidents that did not call 115 for any reason. In the current study, all the data related to motorcycle accidents were extracted and recorded separately from the standard electronic pre-hospital emergency reporting forms related to each accident from the pre-hospital information management system (software-based that called ASAYAR in Persian).

After obtaining the necessary permissions and the Code of Ethics (IR.GMU.REC.1398,162), all data and demographic characteristics of motorcycle casualties, including the time of the accident (separately day and night), age, gender, and mission result, were extracted from the pre-hospital information management system. Data collected from Excel 2013 software was carefully entered into the SPSS software (Version 13) (SPSS Inc, Chicago, IL, USA), and descriptive statistics, including frequency distribution tables (for qualitative data), as well as mean and standard deviation (for quantitative data), were used for data analysis.

Results

As evidenced by the results of the present study, 3,141 accidents have been registered in the emergency automation system of Gonabad University of Medical Sciences, out of which 1,771 cases are traffic accidents. The type of vehicle was not registered in the mission form of 216 traffic accidents. It can be stated that 1,555 traffic accidents happened in the population covered by Gonabad University of Medical Sciences, out of which 746 (48%) cases were caused by motorcycles, and out of 746 cases in the county, 431 cases occurred in Gonabad. The Accident rate of motor accidents in Gonabad was estimated at 10.4 per thousand people (based on the population in 2018). The frequency distribution of accidents by vehicle is depicted in (Figure 1).

The results of the present study indicated that the highest (49%) and lowest (4%) number of motorcycle accidents occurred in the age group of 15-25 and 45-55 years, respectively. The frequency distribution of motorcycle accidents by different age groups is displayed in (Table 1).

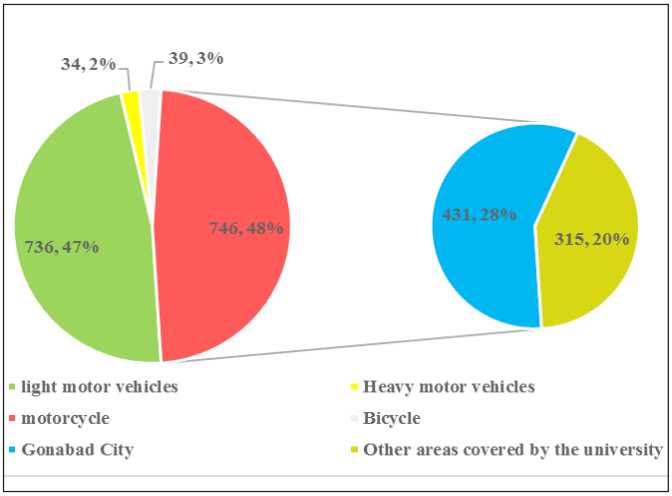

Figure 1. Frequency distribution of road accidents by Vehicle

Table 1. Distribution of motorcycle accidents by different age groups

Age group	Frequency (percentage)	Cumulative percentage
<15 years	52 (12)	12
15-25	209 (49)	61
25-35	80 (19)	80
35-45	44 (10)	90
45-55	19 (4)	94
>55 years	27 (6)	100

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As illustrated in (Table 1), in general, 61% of motorcycle accidents occurred in the age group of under 25 years, and the number of accidents decreased with age. Moreover, based on the results of the current study, most motorcycle accidents (94%) involve males, and only 6% of accidents are related to females. The analysis of accidents by season showed that most motorcycle accidents had happened in spring and summer, respectively. The highest frequency of motorcycle accidents occurred in June (n=51), while the lowest number of accidents occurred in December and February (n=13). The frequency distribution of motorcycle accidents by season is illustrated in (Figure 2).

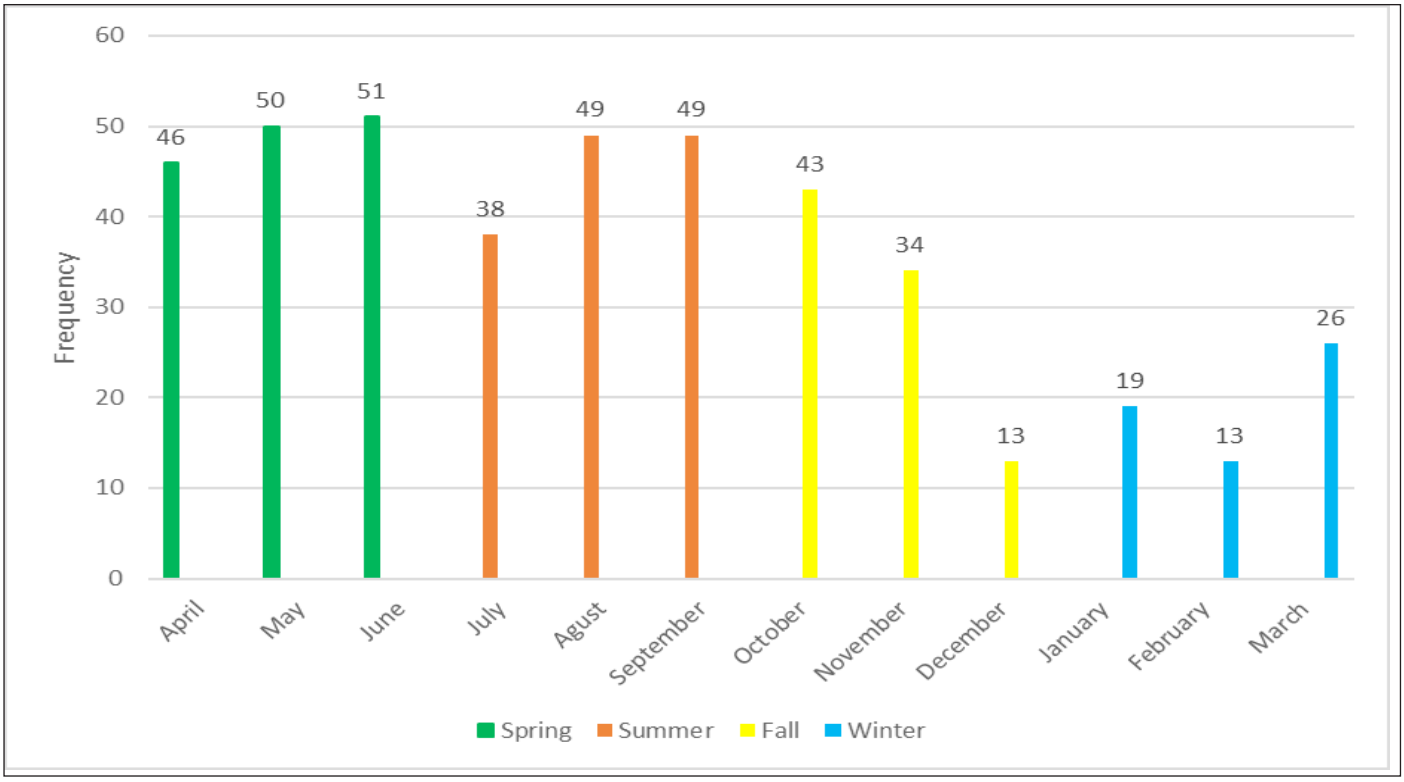

Figure 2. Frequency distribution of motorcycle accidents by seasons

Based on the results of the present study, 77% of the injured were motorcyclists, 21% were passengers, and 2% were pedestrians. In addition, most of the injured in motorcycle accidents were transmitted to medical centers. The frequency distribution of motorcycle accidents based on the condition of the injured and the result of missions is displayed in (Table 2).

Table 2. Frequent distribution of motorcycle accidents based on the condition of the injured and the result of the mission

Condition of the injured	Frequency (percentage)	Cumulative percentage
Motorcycle riders	323 (77)	77
Passenger	90 (21)	98
Pedestrian	8 (2)	100
Result of the Mission		
Preliminary Measures	34 (8)	8
Transfer to Medical Centers	353 (82)	90
Lack of Cooperation	43 (10)	100

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The results of the current study demonstrated that most accidents occurred between 1 and 2 p.m. and in the early hours of the night (7-9 p.m.). The frequency distribution of motorcycle accidents in Gonabad based on accident time is shown in (Figure 3).

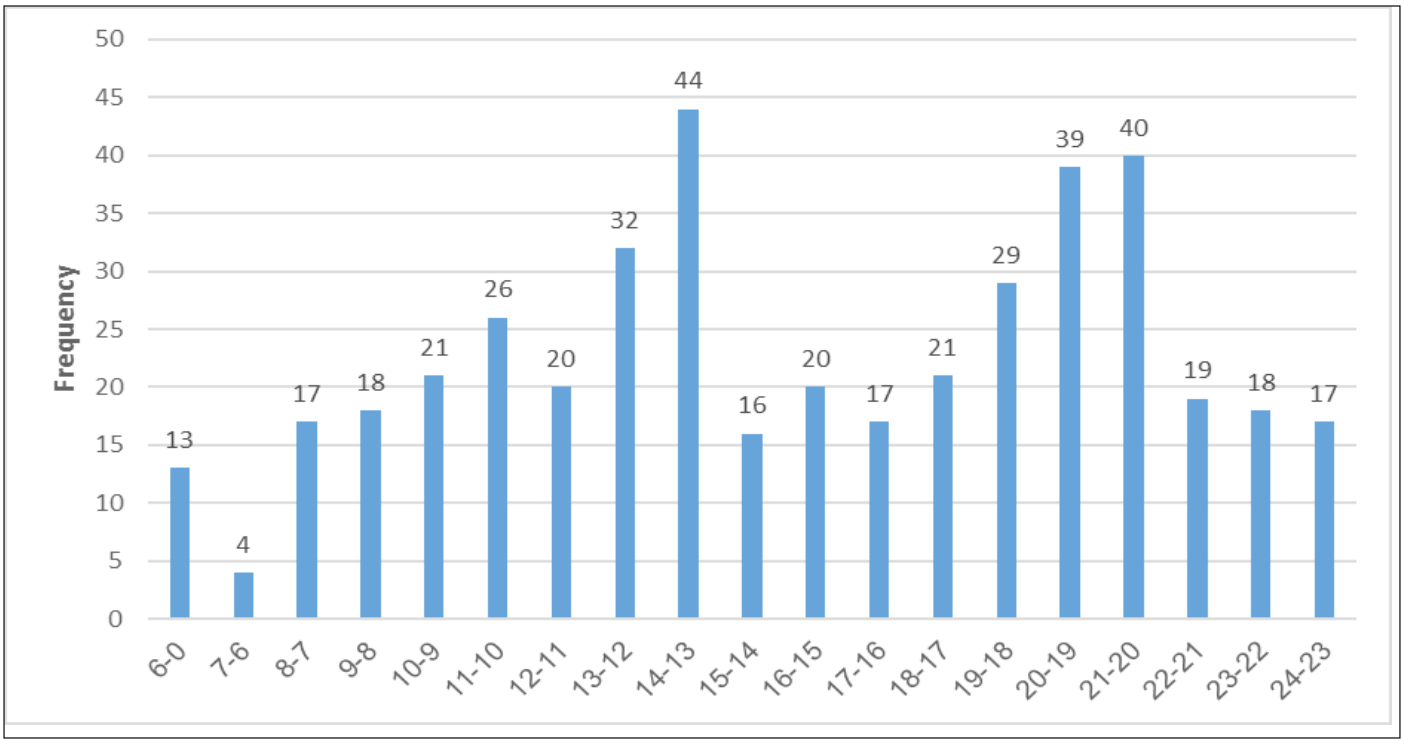

Figure3. Frequency distribution of motorcycles accidents based on the time of occurrence

Discussion

Motorcycle conspicuity and traffic accidents are among serious problems in communities, bringing about health, social, and economic consequences. The present study aimed to investigate the epidemiology of motorcycle accidents in Gonabad, Iran. The obtained results revealed that the highest number of motorcycle accidents took place in the age group of 15-25 years (49%), and the most injured (94%) were male. Consistent with the findings of the present study, the results of a study performed by Ghorbani suggested that 44.4% of the injured were in the age group of 15-24 years, and most of them (91.1%) were male (1).

In a similar vein, the findings of a study conducted by Hosseinian et al. showed that 49.4% of the injured were in the age group of 15-29 years and the most injured (88%) were male (10). The results of the present study are also in line with those obtained by Monsef Kasmayi et al. who reported that most of the injured were in the age group of 18-24 years (3). This age group includes young, active, and productive people; therefore, these accidents inflict irreparable damages to society and families. Furthermore, in agreement with the results of a study carried out by Monsef Kasmayi et al., the findings of the present study revealed that the most injured people were motorcycle riders (77%) and then passengers (21%) (3). This result can be attributed to the fact that most motorcyclists ride alone.

The results of the present study on the occurrence of accidents in different seasons pointed out that the highest number of accidents occurred in spring (34%) and summer (32%), while the lowest number of accidents (13%) took place during winter. The majority of accidents occurred in June (n=51), and the lowest number of accidents happened in February. This result is in accordance with a study conducted by Hosseinian et al. (2019) who reported that the most accidents took place during summer and July, while the lowest number of accidents occurred in winter and January (10), as well as the findings of a study performed by

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Zohrehvandi et al. (2014) who demonstrated that the majority of accidents took place during summer (9). Another study pointed out that the highest and lowest number of accidents occurred in summer and winter, respectively (8). This may indicate that young people's leisure time and their frequent use of motorcycles in hot seasons have maximized the prevalence of these accidents.

The analysis of accidents based on the time of occurrence pointed out that most accidents happened at noon (between 1 and 2 p.m.) and also in the early hours of the night (7-9 p.m.). A related study showed that most of the injured in motor vehicle accidents (cars and motorcycles) were transferred to Qazvin Shahid Rajaei Educational and Medical Center between 12 a.m. and 16 p.m.(14). Along the same lines, the findings of a study conducted by Khan Jani et al. (2016) demonstrated that the majority of accidents occurred between 12 and 2 p.m. and 6 and 8 p.m. (15). The results of studies conducted in Iran are consistent with the results of those performed in other countries. Nonetheless, in a study carried out by Khon Kaen in Thailand, most motorcycle accidents occurred between 8 and 10 p.m. (16).

This discrepancy can be ascribed to cross-cultural differences in the use of this vehicle and the traffic situation in Iran and Thailand.

Consistent with the results of the study by Monsef Kasmayi et al., the findings of the present study indicated that most of the injured (82%)were transferred to medical centers (3). Motorcyclists are the most vulnerable road users due to their lack of protection; therefore, they are more likely to be severely injured or killed in crashes. In this regard, management practices as antecedents of safety culture within the community and the enhancement of driving safety culture are necessary for the reduction of road traffic injuries.

The identification of accident hotspots is another factor that can play a peculiar role in the reduction of motorcycle accidents and can be of great help in the allocation of resources to improve road safety. Therefore, it is suggested that future studies assess the accident hotspots of motorcycles.

Conclusion

The results of the current study can be of great help in the development of practical traffic plans aimed at the reduction of traffic accidents. Moreover, the findings suggested that interventions should be focused on (but not exclusively confined to) younger drivers and effective methods should be devised to get safety messages across to younger more inexperienced riders. The provision of preventive measures, including training young people who are at risk of involvement in motorcycle accidents and detection of accident hotspots, might be beneficial for the reduction of motorcycle accidents and implications that could be the basis for future research.

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Conflicts of interests

There is no conflict of interest.

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