

# Research in Traffic Injuries Data With Emphasis on Motorcycle in Dezful, Iran

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## ABSTRACT

**Background and Aim:** Traffic injuries are a big problem in the world. Because Dezful has many motorcyclists, the decision was made to plan a comprehensive study on motorcycle-related injuries in which this study was part of this extensive research. **Material and Methods:** The purpose of this study was to identify existing information resources for planning about motorcycle events. To gather initial information, a participatory meeting was set up and asked the relevant organizations to provide information about the traffic injuries. In the following, referring to the relevant organizations, the data were collected and analysed. **Results:** One of the main findings of the study, a serious problem was with the management of information systems related to road traffic injuries, which revealed conflicting information. The results also showed that deaths from traffic accidents decreased but injuries were increasing. The percentage of motorcyclists in the incident is more than other vehicles and most accidents occurred in the 15-35 age group. The highest percentage of education accounted for injuries related to diploma and lower diplomas that include of three-quarters of the total incidents. **Conclusion and suggestion:** The existence of accurate, practical and available information is one of the key requirements for promoting programs to reduce traffic injuries and the resulting complications; therefore its lack is an important barrier to the success of the programs. The formation of a planning team with fixed members, with formal announcements and efforts to complete the problem, can also be considered.

**Keywords:** traffic injuries, vehicle, motorcycle, Dezful

## Introduction

Traffic injuries deaths are that occur during traffic injuries or within 30 days after the injury due to traffic injury<sup>[1]</sup>. Traffic injuries caused by road injuries are a major but neglected problem in world public health. The number of deaths worldwide is 1.2 million per year and the number of injuries is 50 million. The predictions show that in the absence of intervention and prevention, this number will increase by 65%

worldwide and 80% in low-income and middle-income countries 2000-2020<sup>[2]</sup>. In Iran, before the implementation of the fourth development plan, twenty-seven thousand people were killed in road injuries annually, and despite a 15.5% decrease in 2007, the rate of death due to injuries was still high.<sup>[3]</sup> Most of these deaths worldwide were in vulnerable people including pedestrians, cyclists, and motorcyclists<sup>[2]</sup>. In Iran, motorcycles play a major role in traffic injuries<sup>[4]</sup>. Various studies have investigated the causes of motorcycle injuries and have concluded that various factors including sex, young age, using a motorcycle for a job, shift work, type of safety cover, drug use, and alcohol affect these injuries. Rahmani et al. Identified factors influencing the rate of road injuries as age, education, rationality, fatalism, normative system, job satisfaction, and certification method<sup>[5]</sup>. Pakgohar et al. reported the impact of the human factor in injuries as being 64.5% for not paying attention to regulations, 24.3% for alcohol and drug use, and 3.9% for fatigue and drowsiness<sup>[6]</sup>. In addition to the high rate of motorcycle injuries, the lack of protective equipment and

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disobedience of technical requirements and safety standards by manufacturers and the relatively long time to reach the treatment centers, increase the death rate of motorists in an injury <sup>[7]</sup>. Numerous factors are affecting injuries according to the culture of society. The high number of crashes in the country, especially the high rate of motorcycle injuries, leads to employing effective methods to identify the causes and involved factors. Motorcyclists' behaviors can also be involved in injuries, and behaviors have different natures and causes in different societies which vary from human to human. Qualitative researches are useful for describing and understanding these behaviors and their causes <sup>[8, 9]</sup>.

Traffic injuries are the ninth leading cause of death in the world and the first leading cause of death among young people aged 15 to 29 years <sup>[10, 11]</sup>, which were predicted to be recognized as the seventh leading cause of death in 2030 <sup>[12]</sup>. In the past decade, traffic injuries have increased by 13% in 18 developing countries <sup>[13]</sup>. The increasing number of vehicles and trips in and out of the city has resulted in an excessive increase in the number of injuries in the city, which is a negative consequence of security and sustainable development. Also, it causes many problems including time-wasting, casualties, losses, congestion and traffic. Economically, the annual cost of injuries in the countries of the Middle East and North Africa is about 1.5% of their gross domestic product. This cost is about 1% for other Asian countries. The causes of reduction of injuries in these countries are the analysis of injuries and road injuries, employing crash prediction models and efforts to improve the safety of transport <sup>[14]</sup>. It seems that identifying the facilitating factors of urban injuries and trying to eliminate these factors can help reduce injuries in the country <sup>[15]</sup>. Dezful has many motorcyclists and there have been no studies in this field so far. Therefore, it was decided to do an extensive study in planning to reduce motorcycle injuries. This article was part of the initial actions of this extensive program in Dezful.

## Materials and Methods

The study was designed to collect data for a larger study on an intervention to reduce motorcycle injuries in 2015 in Dezful. The purpose of the study was to identify the available information

sources to better understand the motorcycle injuries occurring in the city for planning. At first, the necessary settlements were made and a list of relevant persons was prepared and an invitation was issued in cooperation with the traffic police. Participants in a variety of 7 sessions were comprised of expert, experienced and relevant individuals from various departments of Dezful including Traffic Department, University of Medical Sciences, Municipality and other relevant departments were invited to access information (of the initial type) and their experiences. During the initial sessions, members were asked to complete a list of 31 items for collecting information as needed.

For the final collection of data, we went to relevant departments and data were collected and analyzed in each department format. Organizations that had various documented traffic injuries comprised of Central Iran Insurance, Medical Emergencies 115, and Health Deputy of the University of Medical Sciences, Traffic Department and Legal medicine Department. It should be noted that the data were collected manually and following the format of each organization, then classified and plotted and finally analyzed.

## Results

As stated in the materials and method section, of all the departments invited to participate in the meetings, five departments simultaneously published traffic injury information with different formats and variables. The results of the information obtained for each department were as follows:

1. **Central Insurance of Iran:** The data in this department were very limited and related to the people who applied for compensation. The statistics of the 2013 and 2014 showed that the total number of traffic injury victims was 1923, in which 746 of them were motorcyclists. No more information was obtained from insurance statistics.
2. **Emergency Medical Service 115:** This unit was one of the management departments of the health deputy of the Dezful University Medical Sciences. The missions that this center performed were collected with a software called EMS. The results of analysis of the output of this software are presented in Figures 1-2.

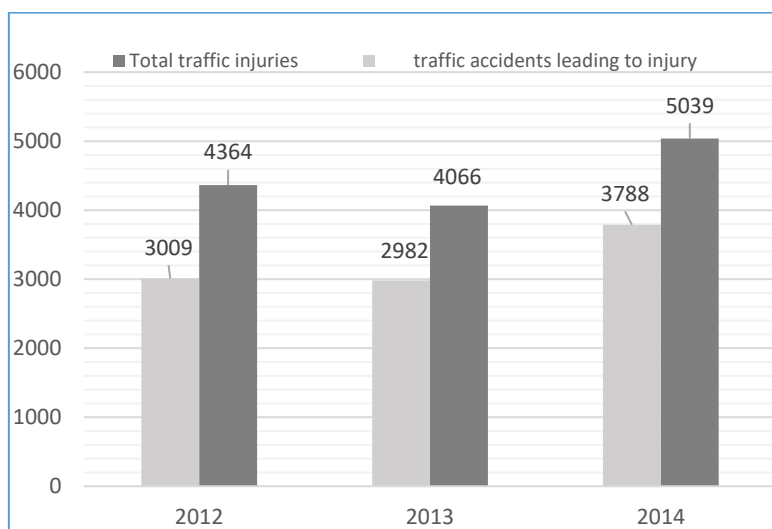


Figure 1- Total traffic injuries that occurred during 2012-2014 – 115- EMS data

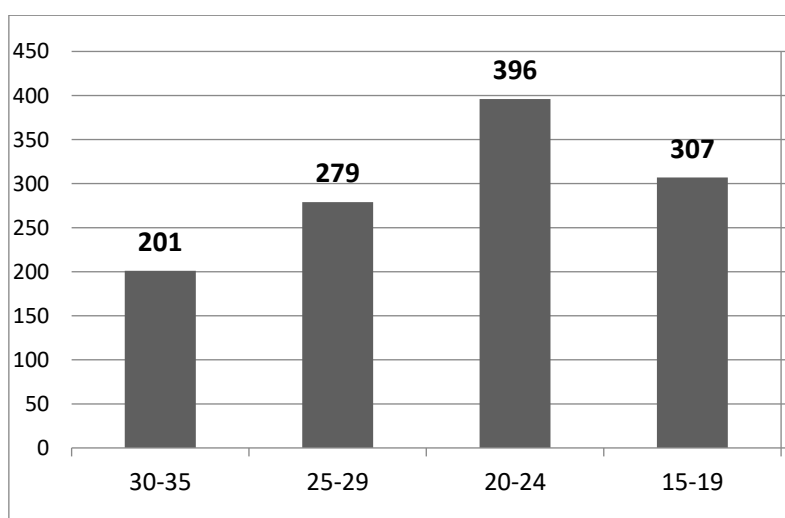


Figure 2 - Number of motorcycle injuries in different age groups in the years 2017-2015 –EMS data

3. **Health Deputy of University of Medical Sciences:**

This department collected monthly statistics of injuries from urban and rural health and Dezful grand hospital (the only government hospital in Dezful) in specific forms. The

results of the available years are presented in Figure 3. It should be noted that according to the program manager, statistics were underreported in 2013 due to problems such as lack of manpower.

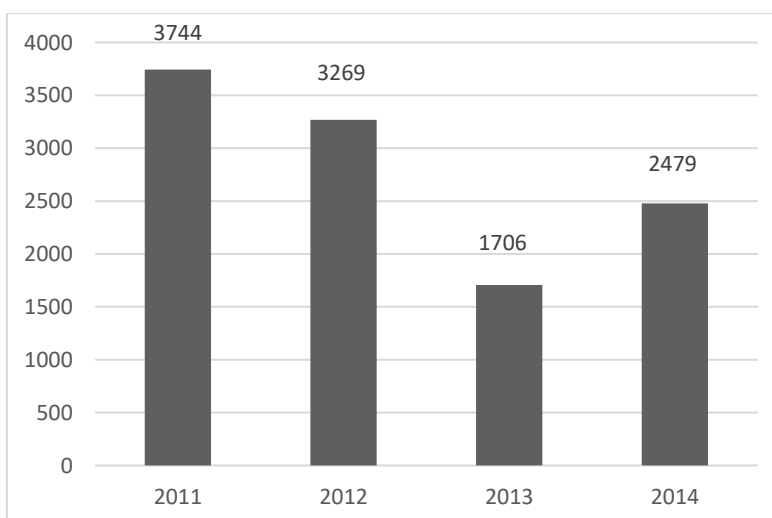


Figure 3 - Statistics of motorcycle injuries during 2011-2014 - Health deputy data

Health deputy statistics also indicated that the share of motorists in injuries was 60%, 65%, 50% and 59% in 2011, 2012, 2013 and 214, respectively. More than half of all injuries were for motorcycles. Moreover, the age groups of injured motorists demonstrated that about one-quarter of them (about 25%) were in the 20-24 age group. 25-29 age group with 22% and 15-19 age group with 14% were in subsequent rankings. According to available data, the majority of injuries (80%) occur in urban areas and the rest occur in rural areas.

4. **Traffic Police (RAHVAR):** Diagram 4 demonstrates the injuries during 2012-2014. In the case of the age group of the responsible drivers for the injuries, the age group of 18-25 years with 23% comprised approximately one-quarter of

the total injuries. The age groups of 30-35 years with 17% and 25-30 years with 16% were in subsequent rankings. Regarding the time of the injuries with injuries, 12:00-14:00 had the most injuries followed by 18:00 -20:00 (17% and 15%, respectively). The highest percentage of education degrees of culprits of the injuries, was a diploma, middle school, and lower degrees, accounting for about three-quarters of all injuries. In more than a quarter of all injuries, the motorcycle was the main culprit. The most common cause of injuries with injuries was two things: lack of attention to the right of priority with 40% and lack of attention to the front with 24% of total causes.

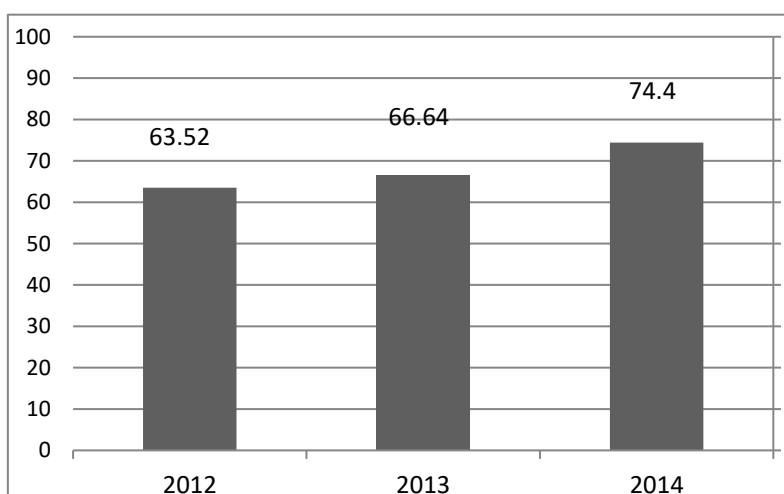


Figure 4 - Ratio of traffic accidents leading to injury with total traffic injuries in 2012-2014- Traffic Police data

5. **Legal medicine:** The number of deaths from motorcycle injuries is shown in Figure 5. The number of deaths resulting from motorcycle injuries in comparison with total traffic injuries was determined which was 45% and 53% of total traffic injuries in 2014 and 2015, respectively. Other information obtained from this department is the age group of the dead, which is shown in Table 1.

Age/Year	2015	2014
Under 15	zero	% 8/1
15-35	% 72/22	% 48/64
Over 35	% 27/77	% 43/24

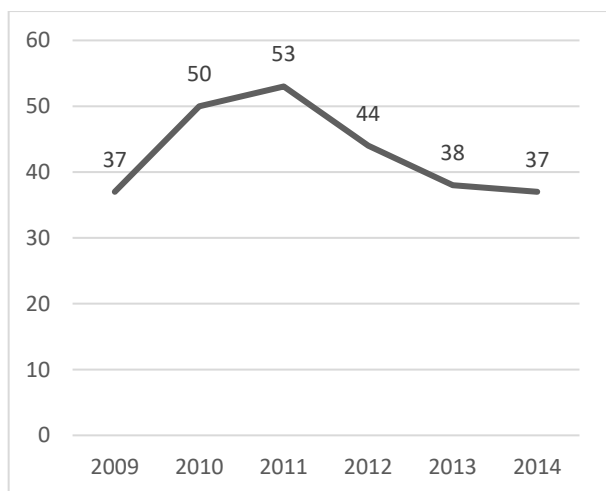


Figure 5 - Pattern of number of deaths caused by motorcycles during 2009-2014 - Legal medicine data

## Discussion

One of the most important findings of this study was the serious problem of road traffic injury information management system. As mentioned in the Materials and Methods section, different traffic information is collected by various organizations, particularly traffic police, health deputy, Legal medicine and Emergency Medical Service115. The evaluation of these statistics revealed that the reason for this variety was the duties of each organization. Legal medicine, the clients of traffic police who wanted to register the block sketch, registered missions at the Emergency Medical Service115, or those victims whose injuries were reported to the Health Deputy, can lead to such inconsistencies (such as decreasing and increasing injury statistics), although some of them are similar.

Analysis of the World Health Organization report for 2015 shows that despite the reduction of the number of deaths from

traffic injuries in Iran, unfortunately, Iran is 172nd out of 180 countries surveyed [16]. There are many reasons for this problem, for instance: numerous production of all types of vehicles regardless of the cultural and infrastructural requirements, such as neglecting the driver's license process, improper roads, inadequate culture of employing vehicles, inadequacy of the trainings, which led to higher death rates from injuries in Iran compared to developed and even developing countries. Studies have demonstrated that the current situation of death rate from traffic injuries in Iran is similar to that of the sixties in European countries [17]. From the World Health Organization perspective, reliable and accurate data for a variety of purposes is needed, including comprehensive support for road safety, identifying specific problems and hazards, setting goals, developing appropriate strategies, and monitoring the impact of programs. They also provide an appropriate conceptual framework for road safety management and required steps to assess the availability and quality of existing data [18].

An important point to note about the current registration of traffic injury data in Dezful county is that these data are continuously collected using special forms by Traffic Police, Health Deputy, Medical Emergencies, the Iranian Insurance Company, and Legal medicine. However, despite all the efforts, due to definition the lack of precise of some variables, the lack of registration of some essential information, the inconsistency of the input data and unit categorization and thus their incomparability and lack of a good software for entering data into a computer, the ability of these valuable data for epidemiological and statistical analyses to determine the causes of traffic injuries and consequently to develop interventional programs to reduce these types of injuries seems weak and makes it difficult for researchers and planners.

There was not much attention to designing and standardizing a traffic injury information system as one of the first essential steps in developing a traffic injury care system in Dezful as well as in the country. According to World Health Organization recommendations, in developing countries, especially in the eastern Mediterranean region, more attention is required for standardizing traffic injury data collection programs, including employing appropriate methods, precise definitions of variables and practical data production for investigating the causes of traffic injury's [19, 20]. This problem and its importance have been reported in other cities in Iran, such as the lack of links between the databases of drivers, passengers and pedestrians and the lack of a single database [21-23].

As identified in the results, many factors can be extracted from existing data, including the trend of deaths and injuries resulting from injuries, the share of culprits and age groups, all of which can have decisive applications in educational interventions.

Examination of the trend of deaths and injuries demonstrated that deaths of traffic injuries decreased whereas injuries increased. Numerous studies in the country confirm this conclusion. For instance, Moradi *et al.* reported that although deaths from traffic injuries were relatively lower than previous years, the measures of traffic injuries in our country were still poor compared to

many countries in the region and the world [24]. Mirzaei *et al.* showed that death from traffic injuries in Yazd decreased from 4.7 in 2006 to 3.37 in 2011 [25]. In a study of traffic injuries in Behbahan, Parvin *et al.* found that the number of deaths decreased from 46 per 100,000 people in 2006 to 18 per 100,000 in 2013, while the traffic injuries increased from 9.2 per thousand in 2006 to 20 per thousand in 2012 [26].

It should be noted that the available data are mostly on death rates and the sources of injury statistics and the number of injuries is limited; even the World Health Organization reports death rates in its documentation. If data in this field can be accessed in any region, it can be useful in designing valuable interventions to reduce the causes of the injuries by evaluating them. This will lead to the spontaneous reduction of the death rate.

The results demonstrated that motorcycles had a greater share of the injury than other vehicles. In many studies, including the study conducted in Isfahan, most of the victims were motorcyclists [27]. The same result was achieved in Yazd and Behbahan [25, 26]. The results of Naghavi *et al.* also showed that 51% of injuries with death or injuries in the country are among motorcycles [28]. Although Dezful seems to be a city of motorcycles and for many reasons this vehicle is very practical in this city, there are more or fewer problems in other cities of the country which can be attributed to the unique characteristics of the motorcycle (lightness, easy and convenient traffic). Therefore, with the presence of motorcycles, a solution must be developed for its proper use and drivers' attitude.

Other findings of the present study that can be of great importance to planners and educational intervention designers are the age group of motorcycle riders which showed that most injuries occur in the 15-35 age groups. This result has been mentioned in numerous studies [25, 26]. Marmor also showed it and the highest frequency of victims of traffic injuries due to disobeying the traffic regulations was in the under-30 age group [29]. Unfortunately, the mentioned age group is the young part of the community which is economically active and their death or disability can cause irreparable damage to the family and society. It seems that as people get older, the use of motorcycles and their risk-taking decrease, which is possibly due to increased experience, responsibility, and family formation.

The most frequent times of injuries with injuries in this study were 12:00-14:00 and 18:00-20:00, respectively. Some surveys have mentioned late-night, early-morning, and post-lunch which is called "black hour" [15, 30], and some highlight the hours between 18:00-13:00 as the busiest hours of injuries [31, 32] and in other studies, the hours between 16:00-17:00 are called "black time" of driving injuries [33, 34]. The reasons for these differences are the different climate conditions of each region. In Dezful County, due to the excessive warmth of the weather in eight months of the year, people generally do not come out of the house or use motorcycles during peak warm hours, which can justify the inconsistency of this study with other studies in different regions.

The highest percentage of education of culprits of injuries with injuries was diploma and lower degrees, with about three-

quarters of all injuries. Tavakoli *et al.* also found this fact in the ground force of the Islamic Revolutionary Guard Corps in Tehran and concluded that hiring drivers with a higher level of education than a diploma would reduce injuries<sup>[35]</sup>. Erfanpoor *et al.* in Khorasan Razavi<sup>[36]</sup> and Mirzaei *et al.* in Yazd<sup>[25]</sup> also achieved similar results<sup>[36]</sup>, but Haghdoost *et al.* in Kerman concluded that the rate of traffic injuries among faculty members with degrees higher than postgraduate, is 2.29 times higher than those with lower education<sup>[37]</sup>. However, these inconsistencies in the results of the Kerman study may be due to the easy sampling of the study, setting a filter for entrance (injury experienced in the last two years) and its questionnaire. They did not employ the registered information in the available resources of the city. Another reason for this inconsistency may be the difference in the classification of education levels. Since Kerman's study was conducted in an academic community, most of the individuals were highly educated, but in studies consistent with Dezful study, individuals were divided into under diplomas and above diplomas.

Finally, we suggest designing a single information system with the possibility of registering details for the relevant departments, in particular: traffic polis, E and Health Deputy, to allow the separation of injury statistics related to motorcycles with access to certain options. Also, monthly statistics should be reported to the departments which intend to design plans. Forming a planning team with permanent members and missive and efforts to fully resolve the problem can also be considered.

## Conclusion

The present study was able to highlight the important problem of an information registry system for traffic and injury management. Accurate, practical, and accessible information is one of the key requirements for upgrading traffic injury reduction programs and their consequences. Therefore, the lack of information is and will be an important obstacle for successful programs. Moreover, probably similar to most cities in the country, a comprehensive and scientific approach to planning and action for the reduction of traffic injuries has been neglected in Dezful.

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## Conflict of interest

The authors hereby state that there is no conflict of interest concerning the present study.

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