

# Investigating Epidemiology of Trauma caused by Traffic Accidents and Relief Operation by EMS Personnel in Valiasr Teaching Hospital in Southwestern of Iran

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**Abstract - Introduction:** Mortality, injuries, and disabilities caused by the traffic accidents are among the important challenges affecting the health of society, so that the traffic accidents are the most important cause of the death, disability, and hospitalization with significant economic and social consequences. The objective of this study was to evaluate the causes and frequency of the trauma caused by the traffic accidents and relief operation by the EMS (Emergency Medical Service) personnel of Valiasr teaching hospitals in Fars province in the southwestern of Iran in 2019.

**Methodology:** This was a descriptive-analytical study in which all victims who were transferred to hospital during the year 2018 were studied. Checklist and medical records of the patients were used to collect the data. The data were analyzed by SPSS-22 software and descriptive statistics and independent t-test.

**Results:** 65% of the subjects were male and 35% of them were female. Independent t-test showed a significant relationship between the sex and frequency of the traffic accidents, so that its rate was higher in the males than that in females ( $P < 0.001$ ). In terms of age group, most accidents occurred in the age group of 25-19 years old. Head trauma and spinal cord injuries were the leading cause of the death among the victims. Sixty percent of the victims had been transferred to the medical centers by the EMS personnel and the cervical and lumbar spines

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*immobilization was well done by the personnel. Forty percent of the victims were transferred to the hospital by the personal vehicle. The highest number of the deaths occurred at the accident site.*

*Conclusion: As the age group of below 30 years old was the highest age group in the traffic accidents, it is necessary to take necessary steps in the area of education and development of culture in the use of the vehicles and observing the driving rules.*

**Keywords:** Trauma epidemiology, Traffic accidents, Emergency Medical Service.

## **I. Introduction**

Traffic accidents are one of the most important health problems in developed and developing countries. Human casualties are the worst consequence of the accidents, especially traffic accidents. Unfortunately, the obtained statistics and data suggest a dramatic increase in the rate of the traffic accidents in the developing and even the developed countries (1, 2). With 6 million deaths and 52 million disabilities each year, especially at a young age, trauma is one of the most common causes of death in the world (3). The trauma caused by the traffic accidents is one of the major causes of death and one of the major health care challenges in the world (4) so that WHO has introduced it as the subject of further studies, since it will result in many mental health problems, high medical costs, and legal problems in addition to death and disability. According to this organization's report, if no preventive measures are taken to reduce the current trend of the accidents, the rate of the death caused by the driving accidents will increase to more than 67% in 2020 (5, 6). Studies indicated that traffic accident injuries will become the third cause of the disability adjusted life years (DALYs) by 2020 (7, 8). The traffic accident injuries lead to death of more than 1250000 people around the world each year and 20 and 50 million injured people. It also strongly affects the health and economic system of the countries (9). According to the World Health Organization's report in 2013, in the middle-income and the low-income countries, young people in the age group of 15 to 30 years old account for the highest proportion of the deaths caused by the traffic accidents. In these countries, more than 30% of the traffic deaths occur in this age group (10).

Based on the studies conducted in recent years, the traffic accident injuries in Iran are ranked first in terms of the disability adjusted life years due to early death (11, 12). According to studies conducted between the years of 2006 and 2016, traffic accident injuries have accounted for 35.47% of all deaths in Iran, which is significant compared to other countries (13, 14).

As traffic accident injuries are ranked first in Iran and due to the high prevalence of these accidents and as the relief operation of the EMS personnel can play a major role in reducing the number of injured people, the present study was conducted to evaluate the epidemiology of the traumas caused by the traffic accidents and the relief operation of the EMS personnel in a teaching hospital in Fars province in southwestern of Iran in 2019.

## **II. Materials and methods**

This research is a cross-sectional and descriptive study conducted to evaluate the frequency of the trauma caused by the traffic accidents and the relief operation by the EMS personnel. In this study, all traffic accident victims and relief operation provided for them by the EMS personnel in all urban and road bases in 2018 were included into

study. A checklist and a triage system and the patients' medical records were used to collect the data in the hospital emergency. The data were analyzed using SPSS version 22 software using the descriptive statistics and the independent t-test.

### III. Results

A total of 1450 accidents were recorded during one year. Out of these accidents, 60% belonged to males and 35% belonged to females. In terms of age group, the highest number of the accidents occurred in the age group of 19-25 years old. Investigation of the frequency of traffic accident site and the injuries caused by these accidents revealed that the highest number of the accidents belonged to the suburban traffic accidents (60%), followed by intra-city accidents (40%). Motorcycle was involved in the highest number of these traffic accidents, followed by car accidents. In 60% of these accidents, the victims were transferred to the hospital by EMS personnel and 40% were transferred to the hospital by personal vehicles. The highest number of the deaths (54%) occurred at the accident site, 26% occurred during the patients' transferring to the hospital, and 20% occurred in the hospital. The cause of the death was head trauma and spinal cord injuries in 68% of the cases, chest trauma in 48% of the cases, and abdominal trauma bleeding in 33% of the cases. Cervical and lumbar spine immobilization was performed in all trauma patients who were transferred to the hospital by the EMS personnel. Most of the deaths belonged to the patients that had been transferred to the hospital by the personal vehicle and had not been contacted with the EMS Center and have not been transferred to the hospital by EMS personnel In (Table 1) and (Table 2).

**Table 1.** Frequency distribution of the accident victims based on the type of the injury

Sex	Male		Female	
Type of injury	N	%	N	%
Head and face injury	392	45	133	23
Upper extremity fracture and injury	70	8	47	8
Lower extremity fracture and injury	61	7	58	10
Abdomen and pelvis injury	130	15	105	18
Chest injury	174	20	162	28
Injury in two parts of body	26	3	46	8
Injury in more than two parts of body	17	2	29	5
Total	870	60	580	40

**Table 2.** Frequency and Rate of Important Variables Regarding Sex and Age in Trauma Victims

Age Group	Male (Rate)		Female (Rate)		P Value
	N	%	N	%	

<15	174	20	145	25	P < 0.001
15-30	522	60	290	50	
30-60	114	13	116	20	
>60	60	7	29	5	
Total	870	100	580	100	

#### IV. Discussion

Road transportation as one of the most important modes of transportation is a key factor in the development of a country. However, many accidents occur annually in the roads that not only endanger the human lives, but also impose high costs and damages on families, government, and society. It is obvious that these accidents cause many financial, psychological, and social damages. Traffic accidents are among the most important causes of the deaths and severe personal and financial injuries that have serious social, cultural, and economic impacts on the human societies. The number of the road accidents in the developing countries is increasing and its direct and indirect costs are higher than those in the developed countries. According to the results of the present study, head and neck injuries are the most common cause of death in the traffic accidents. The results of the study conducted by Montazer (2019) showed that the head and neck trauma was the most important cause of death in the traffic accidents, which is in line with the results of the present study (15).

The results of a study conducted by Roshanfekr (2018) also showed that the youngest age group, compared to other age groups, experienced the most disabilities and severe injuries as a result of the traffic accidents. These results are consistent with those of our study (16). The results of a study carried out by Zangoeei Dovom (2013) also revealed that most people at the age group of 20-30 years were affected by the traffic accidents (17). The results of a study conducted by Sadeghi-Bazargani (2019) also indicated that the head and neck injuries accounted for most of the injuries and spinal cord injuries were the main cause of death and disability (18). In this regard, the results of the study conducted by Ahn (2012) revealed that spinal cord injuries are the most important cause of death and disability in the traffic accidents (19). Bener (2009) argues that the rate of death and disability are lower in the victims transferred by EMS personnel and their cervical vertebrae immobilized compared to those who are not transferred by EMS personnel and transferred by ordinary people to the hospital. Thus, public education should be provided to community members to contact with EMS Center in the event of a traffic accident and to avoid personal transfer of the victims, since any negligence and irrational transferring of the victims can lead to the death or complete disability of the victims due to severe spinal cord injuries (20). In this regard, the results of the study conducted by Bijani (2018) et al. showed that the timely presence of EMS personnel and their skills and speed of action in the relief operation can play a key role in reducing the deaths and serious complications. It is essential to

provide the necessary information to community members in this regard (21). According to the results of the present study, the cervical and lumbar vertebrae immobilization was well performed in the victims who were transferred to the hospital by the EMS personnel, indicating that EMS personnel have an adequate level of knowledge on the importance of immobilization and correctly transferring of the traffic victims. Thézard (2019) and Underbrink (2018)) also emphasize the importance of immobilizing the cervical vertebrae in the trauma patients and suggest that EMS personnel should have knowledge of the last clinical guidelines in the field of scientific and rational immobilization of the trauma patients (22, 23). Based on the results of the present study, motorcycle was involved in most of the accidents. In this regard, Mahdian (2015) and Sayyed Hadi Sayyed Hoseinian (2019) claims that motorcyclists account for the highest number of the accident victims in urban and rural streets of Iran and endanger the life of themselves and others by their risky behaviors (24, 25).

## **V. Conclusion**

Traffic accidents are the leading cause of deaths and irreparable injuries in developing countries. Unfortunately, Iran is one of the countries that Has the highest death toll in traffic accidents. Statistics on car crashes in Iran, double and fatalities Traffic is about five times the global average. The high number of motorcycle and car accidents can indicate ignoring the traffic rules and regulations and lack of a compliance to these rules. Without doubt, teaching the culture of driving rules through the mass media, especially in childhood and adolescence, can play a key role in enhancing the people knowledge and preventing many accidents and many physical and psychological injuries. Additionally, adequate education and information should be provided on the ways of transferring the victims for people to contact with EMC center in the event of a traffic accident and to avoid arbitrary and irrational transferring of the accident victims. Education and culture are one of the most effective ways to reduce traffic accidents. An important issue that must be learned from childhood is to instill a proper culture of driving and respect for the rules in the minds of individuals. This will be a very important factor in reducing traffic accidents and their consequences.

## **VI. Acknowledgement**

This present article was extracted from a research project approved by Fasa University of Medical Sciences (grant number: 97249).The authors are indebted to Fasa University of Medical Sciences for their financial support of this research.

## **VII. Conflict of interest**

The authors declare that they have no conflicts of interest.

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