

# Challenges of Scene Management in Traffic Collisions from the Perspective of Road Emergency Responders in East Azerbaijan, Iran, 2017

Javad Babaie (✉ [javad1403@yahoo.com](mailto:javad1403@yahoo.com))

Tabriz University of Medical Sciences <https://orcid.org/0000-0001-6155-5606>

Reyhaneh Mostafanejad

Tabriz University of Medical Sciences

Ali Janati

Tabriz University of Medical Sciences

Homayon Sadeghi Bazargan

Tabriz University of Medical Sciences

---

## Research article

**Keywords:** Scene Management, Road Traffic Accidents, Emergency

**Posted Date:** February 29th, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-15460/v1>

**License:**  This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

---

## Abstract

**Background:** Annually thousands of traffic collisions occur on the roads of Iran. The present study aimed to investigate the challenges of car crash Scene Management (SM) in East Azerbaijan, Iran.

**Methods:** In this qualitative study, data were collected using in-depth semi-structured interviews with road accidents responders and analyzed using content analysis coding, and merging. Then, subcategories and themes were extracted from the integration of similar codes. The participants were selected using the purposive sampling method, and the interviews were continued until reaching data saturation.

**Results:** Totally 20 participants were interviewed, out of which 167 challenges, 28 subcategories, and 9 themes were identified including: infrastructural problems, lack of preparedness, challenges of triage, deficiencies and limitations, management of special (hazardous) incidents, communication problems with the casualties, lack of coordination, lack of psychosocial support of responders, cultural and social challenges.

**Conclusion:** Every road crash requires an immediate and effective response, but because this process is an inter-sectoral issue, it is faced with several challenges. The most important of them is the lack of coordination between different responders. Therefore, it is necessary to address these challenges by formulating a comprehensive plan, designating a lead organization, assigning a single phone number for requesting emergency services, eliminating deficiencies and shortcomings, training and empowerment of emergency staff and conducting participatory exercise.

## Background

Traffic collisions are not only a major health problem in the world, but they are also a social challenge for communities too (1). Globally, thousands of road crashes occur every day, as a result of them many die, become injured and disabled, and even sustain lifelong disabilities (2, 3). The World Health Organization (WHO) estimates that more than 1.35 million die each year from traffic collisions and more than 50 million suffer some form of injury (4, 5), and millions of dollars of economic damages are imposed by these accidents.

They consume 3% of countries' Gross Domestic Products (GDP). This figure even reaches 5% of GDP in some countries (5). These accidents affect the quality of life of survivors sustaining an injury and those around them.

Iran is one of the countries with the highest number of traffic collisions, casualties, and fatalities (33 per 10,000 vehicles) (6). In 2010, more than 153,000 traffic collisions occurred on the outskirt roads of the country (on average 419 traffic collisions per day). In 2013, 162,140 traffic collisions resulted in 17,994 fatalities and 283,602 casualties (7, 8).

Every traffic collision is a medical, security, and social emergency and requires immediate and appropriate response (9). Traffic collisions because of their characteristics, are attractive scenarios for everyone's. In addition to causing death and injury, they block the flow of traffic, attract the attention and rush of many people to the accident scene, which in some cases, worsen the situation and even lead to secondary accidents (10).

One of the main reasons for the increase in casualties is the lack of proper management at the scene of traffic collisions. For some experts, scene organizing and management is the most effective and important stage of RTAs management (11).

Different individuals and organizations must play a role in responding to traffic collisions (11). After a traffic collision, the first people present on the scene are usually drivers and passersby (12). They ask for aid and emergency services. After that, the responsible organizations such as the police, emergency medical services, fire department, traffic authorities, etc. present to the scene (9).

The speed and quality of the presence of emergency organizations and how they operate together on the scene play a decisive role in reducing the number of fatalities and casualties. In such circumstances, the scene must first be secured (damaged vehicles be secured and if there is a car fire, immediate action must be taken to extinguish the fire), the people trapped in the

vehicle must be rescued, triage must be performed, first aid must be provided, and then the injured must be transferred to more equipped medical centers (9, 12).

In addition, the scene should be cleared, blocked roads must be opened, damaged facilities and sites must be repaired, and traffic should be guided to prevent traffic congestion and increased damage (9, 12). Above all, the safety of the responders and the persons present at the scene must be ensured and the actions needed to prevent secondary accidents must be undertaken.

Inadequate SM in some cases leads to long and stressful traffic congestions that, in addition to the economic impacts caused by the congestion of the country's roads, also have other psychological effects (13).

Given the foregoing issues and the shortcomings that some authors have cited in their writings, and the fact that the challenges of SM in traffic collisions, despite their importance, have been underestimated and the researchers did not obtain reliable sources, this study was designed to address the challenges of SM in traffic collisions in the East Azerbaijan Province, Iran, from the views of the staff of Red Crescent emergency stations and road emergency stations who deal with accidents on a daily basis.

## Methods

This qualitative study was conducted in 2016–2017. Participants were pre-hospital emergency staff working in road emergency stations of the East Azerbaijan Red Crescent Society who were selected using the purposive sampling method. Data were collected using in-depth semi-structured interviews. An interview guide was developed for the interviews. Data collection continued until reaching data saturation.

During the sessions, the interviews were recorded with the consent of the participants, and simultaneous movements and the verbal and behavioral reactions of the participants were also recorded. In case of lack of consent to record the interviews, the participants' statements were noted. Interviews were carefully listened to several times and then transcribed verbatim and repeatedly studied to obtain immersion in the data. Reflection and feedback were used to ensure consistency and accuracy of the data, and to enhance the vigor and consistency of the data, rich participant experiences were evaluated.

The data were analyzed by the content analysis method. After entering the data in terms of phrases or paragraphs, the data were coded. Sub-categories were formed by merging similar codes, and themes were extracted by thematically classifying similar sub-categories.

## Results

In this qualitative study, we interviewed 20 staff members of the road emergency and Red Crescent emergency stations. Of these, 14 (70%) had an associates' degree, 5 (25%) had a bachelor's degree, and 1 (5%) had a master's degree. Nine of them (45%) had 10 to 14 years of road emergency experience. The same number had degrees in medical emergency or road crash rescue. The details of the level of education, work experience, and education of the study participants are given in Table 1.

Table 1: Interviewees' characteristics by education, work experience and field of study

The analysis of 20 interviews resulted in the formation of 247 initial codes. Then, the same codes were merged and 167 final codes were obtained. From the juxtaposition of similar codes, 28 sub-categories were obtained, and the integration of the similar sub-categories resulted in nine main categories as follows:

1. Infrastructural problems

2. Lack of preparedness of the emergency responders

3. Challenges of triage on the scene
4. Shortcomings, deficiencies and limitations
5. Management of special accidents and accidents caused by hazardous substances
6. Difficulties in dealing with victims
7. Lack of coordination
8. Lack of psychosocial support for the emergency responders

#### Cultural and social challenges

The details of the codes, subcategories, and themes are presented in Table 2.

### **1- Infrastructural problems**

From the participants' perspective, due to problems in infrastructure such as freeways, main and rural roads, telecommunication, as well as some unavoidable geographical and environmental constraints, traffic collision SM is problematic. Many of the roads are bi-directional, non-standard and narrow, that slowing down ambulances speed.

In freeway, there is no U turn, underpass or overpass. As a result, when crashes occur on opposite lanes, rescue teams have to travel a long distance. With the exception of some roads and freeways near the cities, other roads lack proper lighting, making it difficult to find the crash scene and rescue at night. The overcrowding and heavy traffic on the roads leading to the mega cities cause ambulances and emergency vehicles to get held up on their way.

On many roads, there are no signs indicating the distance to the cities. As a result, when accidents occur, those asking for rescue cannot provide the exact location of the accident to the emergency organization, causing them to be misled and delayed. Here are some examples of interviewees' statements in this regard:

"... There are points on the road that are blind spots, there is no phone service and the two-way radio doesn't work". "... Our station is in an area that the two-way radio doesn't have much signaled..." "... In this ... there is nowhere to turn around. I have to go and ... turn around from... and come back ..." "... The road we took was two-way and very crowded, I could not overtake maybe for more than ten minutes ..." "... our roads, except the... road, none of them have lights ..."

### **2- Lack of preparedness of the emergency responders**

Some emergency staff, especially in the Red Crescent, does not have relevant education. Knowledge and skills of these staff are also not continually evaluated, and naturally, the training programs that are designed are not based on their basic needs. In some cases, such courses are not generally held. The interviewed staff said:

"... We have not studied emergency. We are volunteers ..." "... our training is not practical at all, and it is just theoretical. For example, they do not simulate our training, for example what to do with such a situation you face ..." "... during the time I have been a paramedic, no one has taken a test from us ..."

### **3. Challenges of triage at the RTAs scene**

One of the most important measures that must be taken on traffic collision scenes, especially when there are a large number of casualties, is triage. But according to the participants, many emergency staff lacks the skills and expertise to do so. On the other hand, the injured and those around them also do not allow prioritizing the injured and, on the contrary, the noisy ones get more attention. Comments from some participants include:

"... We have been taught triage in our courses, but they have not allowed us ..." "... Once I wanted to prioritize the injured, but it didn't end well and I was about to get beat ..." "... I haven't done any triage so far ..."

#### **4. Deficiencies, shortcomings and limitation**

The emergency staff attributes that an important part of their daily challenges related to lack of supplies, equipment, and amenities. They stated that their medicines were limited or had no medications, ambulances were not equipped and had difficulty in transporting of the injured. Even in some cases there is a shortage of ambulances. Inside the ambulance, there are no fire and ventilation facilities and no emergency equipment.

Some ambulances are old and have repeatedly broken down during operations and are in need of assistance themselves. There are no fire stations on the roads, and if there is a fire, we should use city fire stations, which is also a problem. The stations are in short supply, and sometimes have to be on duty two days in a row. The interviewees had detailed discussions, some of which included:

"... The ambulance is not standard ..." "... These ambulances are such that the patients feel sick in them and their height is so much that their back is..." "... In this ambulance, we have no rescue equipment. There is a small capsule for ourselves ..." "Our ambulances are outdated and out of order ..." "... we don't even have the primary medicines ..." "... The ambulance doesn't work every other day, and makes us look so bad..."

#### **5. Management of special accidents and accidents caused by hazardous substances**

Vehicles carrying smuggling loads are usually speeding and when they perceive they are being followed, they perform dangerous actions causing many accidents. They may cause problems for the emergency team while receiving help. Sometimes the loads of these cars are dangerous and require special management.

On the roads and freeways, hundreds tons of fuel and hazardous chemical materials are shipped daily, their accidents can be very dangerous. The management of such accidents is tremendously difficult and should be handled with extreme caution. Another problem with the SM of such accidents is the clearing of the scene from these substances. These are extremely dangerous and can cause secondary accidents due to slippery road condition in addition to irreparable damages to the environment. Some of the interviewees' statements in this regard are:

"... this is a smuggling route ..." "... the one who smuggles acid, for example, does not say that my load is acid or oil ..." "... he never gives the right information and our job is like is like someone who is driving in the dark with his eyes closed..." "... they tell the operator that it is like the previous one, but then we go and see the car has been smuggling hazardous substances and has had an accident, and the driver has lied that he has had a heart attack, we ask why did you lie, he says otherwise you wouldn't have come ..." "...the cargo is dangerous and when we burn and die it will be discovered..."

#### **6. Difficulties in communicating with accident victims**

People who are involved in a traffic collision or passersby seek help from an emergency organization as soon as they encounter the scene. Timely asking for help and with the right information can help emergency services in timely response. However, there

is still no single number in the country for asking emergency services and every organization has its own number so the caller is confused as to what number to call. Some emergency organizations are focused on responding to their own calls that are centralized in the province.

Provincial operators are not fully familiar with the details of the addresses and cannot quickly locate and report to emergency services. Those asking for rescue often give incomplete information and quickly disconnect. Lack of information can delay arrival to the scene and even provision of rescue advice. Interviewees argue:

"... People who call to report an accident are often passersby and don't know the exact address or sometimes there is a similarity between the names of two places which are completely different in route ..." "... One of the most important reasons for delayed arrival of the force to the scene is giving incorrect, incomplete or even unreal addresses to the operator ..."

## 7- Lack of coordination

Traffic collision SM is a team work, and many organizations are involved in them. The greater the number of organizations and individuals involved, the harder they are to coordinate. Interviewees stated that they had many problems in this regard. In their view, the task of clearing the scene is not specified and as a result, the scenes are usually not cleared. There is no rule on how to manage the scene.

The organization in charge of fatalities is not specified, and sometimes it is observed that bodies remain on the scene for hours. No one is responsible for keeping their valuable belongings until the police arrive. There is no center to coordinate and guide the operation. Organizations enter the scene without coordination and take action. This will cause some actions to be repeated and some necessary activities not to be performed at all. Although the commander is the police, they do not arrive on time and cause many problems upon arrival, including that they insist to transfer the injured without triage and providing first aid. They also do not fulfill their primary task of securing the scene and establishing security. Electricity, fire and road departments operate very slowly and uncoordinated.

The hospital staff treats the Red Crescent staff very harshly and do not deliver their consumables. In some cases, the emergency department does not inform the hospital. In recent years, the use of air emergencies has also been made possible, but coordination between these two emergencies is usually difficult. Coordination is a problem when there is a need for more than one station or more than one city. In this regard, interviewees stated:

"... based on our principles, we don't take any dead bodies at all, but people ask us to take care of the person who does not have any vital signs and transfer him to the hospital more quickly..." ". "...even once a police officer came to me and said if a riot occurs, you are the one responsible for it, so come on take him to the hospital quickly..." . "...the police have repeatedly insulted us and our colleagues ..." "... A colleague of mine had transferred a body out of humanity and respect, and then his son came to claim that he has had a gold denture but it was stolen ..." "... in recent years, they make staged accidents to claim for car insurance money ..." .

## 8. Lack of mental and physical security for paramedics

Traffic collision scenes are always hectic and dangerous for everyone present there and emergency staff are no exception. Numerous hazards always threaten them. The likelihood of transmission of contagious diseases, explosions, occurrence of secondary collisions, aggression and beatings by spectators and companions, exposure to the injured from hazardous substances, etc. are events that may affect paramedics at any time. Seeing injured children, severed limbs, crushed limbs, and so forth are not pleasant scenes for any human being and will certainly affect the minds and souls of anyone who has seen them for days and weeks. Emergency staff faces these scenes every day.

On the one hand, they see these scenes, on the other hand they have to act rationally, scientifically and professionally, and this is a contradiction that always bothers them. As a human being, they are always influenced by these scenes and in the long run, these things will definitely irritate them. Some of the interviewees' statements in this regard are as follows:

"... sometimes the injured is drunk and he is not feeling well. He may start a fight..." "... One of our own safety concerns is exposure to injuries and the likelihood of disease transmission..." "... Our work is very stressful such that most of our colleagues have hypertension due to stress ..." "... due to occupational stress and difficult working conditions we often have hypertension and problems with our lumbar spine..." "... Sometime after my corneal transplant, I was attacked by a relative of an injured in an operation and my eye was injured ..."

## 9- Cultural and social problems

The cultural and social characteristics of people involved in traffic collisions were among the challenges that were recurrently mentioned in the interviews. One of the challenges is the companions' insistence on the immediate transfer of the injured to hospital and the companions' entry into the ambulance. Many people are unaware of the rescue process, which can cause them both to lose time and to complain about not receiving timely service, and in some cases, they behave with aggression toward the employees for a variety of reasons. About the loads, especially if it is among the socially prohibited loads, usually the right information is not given and this can endanger the health of paramedics.

In the Iranian culture, many people are interested in stopping and watching the scene closely. This causes congestion at the scene and, while causing secondary accidents, also impedes rescue. Some of these spectators intervene in the process and, in some cases, assist with the movement of the injured and relocating the victims, which makes the situation worse and more severe. Some of these viewers, even though the situation is dangerous, do not follow the initial precautions. Some drivers do not give way to ambulances on the roads and delay the arrival of ambulances. There are also obstacles to the assessment of injuries by paramedics (all paramedics are male). Some of the interviewees' statements are as follows:

"... Unfortunately, people do not have the necessary knowledge, but because they want to help, they sometimes cause more harm ..." "... that they will not give way ..." "... companions of the injured may even attack the station ..." "... they say just come on take him. They have often come and taken the stretcher from us and put it in the ambulance. Some of them provoking..." "... As we arrive at the scene, the insured's relatives insist on transferring him to the hospital as soon as possible, not allowing us to provide first aid and thinking these actions on the scene are a waste of time ..."

## Discussion

Given the high incidence of traffic collisions in the Iran and that every accident needs to be managed as soon as possible, this study was designed to identify the challenges of SM in RTAs from the perspective of emergency staff who deal with this problem daily. In this study, using the qualitative approach and content analysis method, we identified 167 challenges (codes), 28 subcategories, and 9 categories regarding SM challenges in traffic collisions, which included:

Infrastructure problems such as deficiencies and problems in the technical structure of the roads, deficiencies in communication facilities, imprecise reporting of the location of the accident and constraints due to geographical and weather conditions are challenges that emergency services face in providing timely and effective services.

Khorasani Zavare et al. in their study, pointed to the deficiencies and constraints in infrastructure. In this study, deficiencies of the roads were one of the categories (8). Ismaili et al. mentioned the lack of a single contact number, roads' problems in cell and communication signaling coverage, and lack of position signs to better determine the location of the accident (13), all of which were reported by our interviewees as well. Meng et al. also cited the type of road, climate, and lighting as the challenges addressed by their interviewees (14) that were also mentioned in the present study.

Emergency services require specialized knowledge and clinical skills. Each scene is different from the other, and the injuries have different types and spectra, so assisting the casualties requires scientific insight and clinical skills. Some paramedics lack the scientific background and only work by passing some courses, which is problematic in two respects; first, in providing proper assistance to the injured and second because of the risk of injury to the paramedics themselves. MC Domont et al. in their study also highlighted this challenge; they pointed to technical and diagnostic errors and delayed diagnosis (13, 15).

Triage on the scene, especially when the number of casualties is high and all of them cannot be dealt with at the same time, is the main focus of the scientific literature. However, the results of this study showed that it is very difficult and sometimes impossible in traffic collision scenes in Iran. However, previous studies did not address this problem or the authors of this article failed to identify them.

The existing shortcomings, deficiencies and limitations that make paramedic work difficult. These include lack of ambulances and shortage of human resources, supplies and equipment, and drugs. Shortcomings were also mentioned in previous studies. For example, Elm Kuwait et al. mentioned the shortage of equipment (16). Ismaili et al. and Khanke et al. pointed to the lack of fire stations on the roads and the lack of responsiveness of the city fire departments to road traffic collisions (13, 17). Mohammadi et al. also noted deficiencies such as inadequate pre-hospital emergency services, lack of supplies, lack of ambulances, and the shortage of emergency bases, all of which were also mentioned by the interviewees in our study (18).

Today's industrial life has led to the extensive use of crude materials, in particular, chemicals and radioactive materials. The bulk of these materials are transported by the road transport fleet, and numerous accidents occur to them on the roads. Management of these accidents is different from other types of accidents and is somewhat difficult. In previous studies, this issue has been less explored, but the challenge of clearing the scene was highlighted by Amiri et al (12).

People who have an accident on the road need to report it to the emergency services. The faster and more complete this information is, the faster the response will be. But interviewees pointed to numerous challenges in this regard. Some of these challenges, such as the number of emergency calls, were identified by Ismaili et al (13). The lack of a developed satellite navigation system and inadequate information by the calls were discussed by Soltani et al (8, 18).

There are many organizations involved in managing a traffic collision scene. Each of these organizations has their own structure, rules, hierarchy, literature, and characteristics, and naturally, performing their own tasks is their top priority. In the meantime, these organizations may not pay much attention to the importance of the tasks of other organizations. There are many tasks that organizations should do collectively to avoid doing parallel work and rework or missing some processes and actions. Here are some of the re-workings between the Red Crescent and the emergency medical services.

Under Iranian regulation, the police are the scene commander. Some studies also evaluated the role of the police as very effective and positive (13). But according to the study participants, the police themselves are causing a number of challenges and putting pressure on other organizations (19). They usually arrive later than others and tend to leave sooner. There are many cases that they not only do not manage the crowd present on the scene, but also provoke them against others. Even within an organization, subsets are sometimes inconsistent and present some challenges. Berlin et al. stated that organizations only cooperate and listen to each other at an early stage, but later, they work in parallel and push each other back (19).

Soori et al. pointed out the shortcomings in coordinated policy making, the lack of unified management, and the lack of precise description of the tasks of the organizations (providing a practical model) (20) that were also addressed in this study. Khorasani Zavare also considered the lack of coordination as very important (10). Mohammadi et al. have also mentioned the lack of coordination between organizations and parallel processes (18). Anderson et al. noted that usually every organization focuses only on its own tasks and is less cooperative with other organizations (21). The overall findings of this study, which corroborate the findings of previous studies, confirm that disorganization among organizations is one of the most effective challenges in SM in Iran.

Those suffering injuries, their companions, spectators, passersby, and drivers present another set of challenges in SM that were categorized as socio-cultural challenges in this study. On the one hand, they are interested in helping the emergency personnel,

on the other; their presence and involvement in the tasks of the organizations create complications. These problems have been discussed in previous studies, including Mohammadi et al. study of issues such as involvement of ordinary people, cultural factors, inadequate information, and secondary injuries due to the involvement of unskilled individuals, people's curiosity, and organizational cooperation (18).

## Conclusions

Traffic collisions are the most common events in Iran. Every traffic collision requires an immediate and effective response. However, because this process is cross-sectoral and requires a large number of organizations on the scene and there are numerous shortcomings and deficiencies, they face several challenges. In this study, 167 of these challenges were identified in the form of 28 subcategories and 9 themes, perhaps the most important of which was the lack of coordination between the organizations in charge. Therefore, it is necessary to develop a comprehensive response plan, to designate responsibilities, train and empower paramedics, improve infrastructures, and practice the designed plan to address these challenges.

## Abbreviations

Gross Domestic Products

GDP

Road Traffic Accidents

RTAs

Scene Management

SM

World Health Organization

WHO

## Declarations

### Ethics approval and consent to participate

This study reviewed and approved by Tabriz University of medical Sciences research ethical committee. Ethical code: 5D970482

### Consent for publication

Not applicable

### Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request

### Competing interests

There is no conflict of interest

### Funding

This study has been funded and supported by school of management and medical informatics, Tabriz University of Medical Sciences.

### Authors' contributions

JB contributed in designing, analyzing data, and finalizing the paper. RM contributed in data collection through semi structured interviewees, and transcription of interviews, AJ analyzed and interviewees. HS has critically revised the manuscript for important intellectual content. All authors read and approved the final version of the paper.

## Acknowledgements

This study was part of an MSc thesis/dissertation supported by Tabriz University of Medical Sciences.

## References

1. Másilková M. Health and social consequences of road traffic accidents, in Kontakt. 2017. p. 43-47.
2. Larsson EM, Martensson NL, Alexanderson KAE. First-aid training and bystander actions at traffic crashes – A population study. *Prehosp Disast Med*. 2002; 17(3): p. 134-141.
3. World Health Organization. Global status report on road safety: time for action. 2009, Geneva: WHO.
4. (World Health Organization. Global status report on road safety: time for action. 2009, Geneva: WHO.
5. World Health Organization. Road traffic injuries World health organization, Geneva2009.  
<http://www.who.int/mediacentre/factsheets/fs358/en/>. Accessed 10 September 2018.
6. Mahmood Bakhtiyari, M.R.M., Seyed Mohammad Riahi, Mohammad Ali Mansournia, Majid Sartipi, Ayad Bahadorimonfared. Epidemiologic Pattern of Fatal Traffic Injuries among Iranian Drivers; 2004–2010. *Iranian journal of public health*, 2016. **45**(4): p. 503-514.
7. Iranian Legal Medicine Organization, IM. Necrology and injuries from traffic accidents referral to the Iranian legal Medicine Organization. 2015. [cited 2016 30 Jun 2016]; Available from: [http://www.lmo.ir/uploads/1\\_72\\_38\\_tas9412.pdf](http://www.lmo.ir/uploads/1_72_38_tas9412.pdf).
8. Soltani G, Ahmadi B, Pourreza A, Rahimi A. Investigating Prevalence of deaths from Traffic Accidents and Factors Associated with it in Yazd in 2009. *SSU\_Journals*. 2014; 21(6):831-9.
9. Kardgr I, Nodehi, Rahmati Nodehi R, Fazel Hashemi MT. Investigating the role of traffic in managing the scene of road accidents and its impact on the insurance industry. *European online journal of natural and social sciences*. 2014; 3(3):729-38.
10. Khorasani-Zavareh D, Khankeh H, Mohammadi R, Laflamme L, Bikmoradi A, Haglund B. Post-crash Management of road traffic injury victims in Iran. Stakeholders' views on current barriers and potential facilitators. *Injury prevention*. 2012; 18(Suppl 1):A209-A10.
11. Sabouri E, Naderi MM, Saburie O, Mohammadi Y, Tavakkoli F. The evaluation of prehospital emergency performance indicators in birjand, 2015. 2017.
12. Amiri MSH, Khankeh HR, Momeni A, Ayni A. Factors affecting the management of the scene accident: a grounded theory study in the Islamic Republic of Iran. *Journal of management studies*. 2014; 3(11):11-30.
13. Esmaeili AR, Zahiri M. Evaluation of the role of the Traffic police in the management of the scene of road accidents: a case study: Ardabil province. *Traffic management studies quarterly*. 2010; 5(17):1-24.
14. Meng Q, Weng J. Uncertainty analysis of accident notification time and emergency medical service response time in work zone traffic accidents. *Traffic injury prevention*. 2013; 14(2):150-8.
15. Saburie ENMM, Saburie O, Mohammadi Y, Tavakkoli F. The evaluation of prehospital emergency performance indicators in Birjand, 2015. *Iranian journal of emergency care*. 2017; 1(1):61-8.
16. Elmqvist C, Brunt D, Fridlund B, Ekebergh M. Being first on the scene of accident–experiences of 'doing 'prehospital emergency care. *Scandinavian journal of caring sciences*. 2010; 24(2): 266-73.
17. Khankeh HR, Khorasani-Zavareh D, Masoumi G. Why the prominent improvement in prehospital medical response in Iran couldn't decrease the number of death related road traffic injuries? *Trauma & treatment*. 2012; 2012(1):e103.
18. Mohammadi M, Martiniuk ALC, Ansari-Moghaddam A, Rad M, Rashedi F, Ghjasemi A, et al. Police response time to road crashes in south-east of Iran. *JPMA: Journal of the Pakistan medical association*. 2013; 63(12):1523-7.

19. Berlin JM, Carlström ED. The 90-second collaboration: a critical study of collaboration exercises at extensive accident sites. *Journal of Contingencies and Crisis Management*. 2008;16(4):177-85
20. Soori H, Ainy E, Movahedinejad A, Mahfozphoor S, Vafaei R, Hatamabadi H, et al. A practical model of political mapping in road traffic injury in Iran in 2008. *Hakim research journal*. 2009; 12(3):1-9.
21. Andersson AD, Carlstrom E, Ahgren BM, Berlin J. Managing boundaries at the accident scene—a qualitative study of collaboration exercises. *International journal of emergency services*. 2014; 3(1):77-94.

## Tables

Table 1: Interviewees' characteristics

Educational Characteristics of Interviews participants		
Education	N	%
Technicians	14	70
Bachelor of science	5	25
MSc	1	5
Total	20	100
Job Experiences of study participates		
Experience years	N	%
0-4 years	1	5
5-9 years	6	30
10-14 years	9	45
15-19 years	2	10
20-24 years	1	5
25-29 years	2	10
Total	20	100
Field of study		
Study field	N	%
Paramedics	9	45
Anesthesia	3	15
Nursing	3	15
Operating room expert	1	5
Accounting	1	5
Law	1	5
Management	2	10
Total	20	100

Table 2: Categories and subcategories obtained from coding of interviews with emergency staff and roadside paramedic personnel

Codes	Subcategory	Category	Codes	Subcategory	Category	Codes	Subcategory	Category
Bidirectional roads and slow traffic Lack of U turns, underpasses and overpasses Non-standard and narrow roads Poor roadway lighting Absence of signs indicating the distance on the roads No warning signs on the roads Dangerous turns and road accident sites Traffic congestion	Road deficiencies	Infrastructure problems Unpreparedness of emergency staff	Difficulty of triage on the scene Lack of mastery of staff to do triage Prioritizing noisy casualties Uncooperativeness of people in doing triage	Limited skills of the staff in triage	Challenges of triage	Accidents caused by smuggler cars Threat to the security of staff in a traffic accident Difficulty in managing the spilled smuggle load	Accidents related to smuggler cars	Management of special accidents
Lack of cellular signaling in some parts of the road Lack of cars and mobiles equipped with GPS No emergency contact facilities on some roads	Communication problems	Shortage of emergency medicines	Shortage of medicines	Shortages, deficiencies and limitations	Accidents involving fuel vehicles High risk of fire in fuel accidents Risk of explosion in fuel accidents Crashes of cars with dangerous loads Difficulty in clearing the scene in special accidents	Accidents involving fuel and hazardous materials containers	Shortcomings, deficiencies and limitations Communication difficulties of accident victims	
Road surface frost and slipperiness in cold seasons Blizzards, snow and road closures Foggy weather and visibility restriction Lack of air emergency in	Geographical and environmental constraints	Improper height and lack of airbags in ambulances Ambulance shortage Lack of fire and ventilation facilities in ambulances Lack of rescue facilities in emergency ambulances Ambulance communication defects Lack of navigation equipment in ambulances Ambulances break down Inadequate Red Crescent ambulances	Shortage of ambulances and their lack of equipment		Ambulance speed limit Ambulance insurance limits for carrying more people	Limitations of laws and regulations	Lack of a single	Limitation of emergency

		Equipment shortages of Red Crescent paramedics		emergency rescue number Limited number of operators	calls	
adverse weather conditions Difficulty in providing emergency services to mountainous roads Difficulty in providing emergency services to fall crashes (valleys, cliffs, dams and rivers)		Lack of fire stations on the roads Long distance from urban fire stations to roads	Shortage of fire departments	Lack of position signs on the roads Landline interferences Centralized Red Crescent operator response		
Unrelated	Poor information and inadequate skills of the emergency staff	Low number of emergency and Red Crescent stations High workload and multiple working shifts Lack of support by the relevant organizations Lack of psychosocial support for the paramedic and emergency forces Background and family problems of staff Lack of debriefing sessions for staff	Shortage of human resources and lack of their support	Lack of knowledge of the passersby and drivers about the exact location of the accident The injured left on the scene due to delayed call Incomplete information provided to emergency services	Misinformation by those asking for emergency services	
education and unprofessionalism of some paramedics Lack of continuous Lack of ongoing training for staff or its insufficiency Failure to train staff to handle special situations such as chemical accidents Mismatch of theoretical training with the field needs Unpreparedness of personnel for special traffic accidents Low skill and speed of unexperienced staff in the field and ambulance				Detection and assignment of operations by the operator Operators' mistake in announcing the accident location Delay in accident detection and delayed notification by the operator	Lack of familiarity of the operator with the area	

Table 2: continuation

Codes	Subcategory	Category	Codes	Subcategory	Category	Codes	Subcategory	Category
Multiple musculoskeletal injuries of emergency staff Various hazards on the scene for the personnel Chance of car crash during scene stabilization Probability of ambulance accident while on the operation	The possibility of staff injury	Mental and physical security of the paramedics	The lack of a single emergency call number Inadequate equipment in hospitals and their lack of patient admission Lack of coordination and with air emergencies Lack of cooperation between emergency stations	Inter-Lack of inter-sectoral cooperation (within the Ministry of Health)	Lack of coordination between the organs responsible emergency services	Insurance problems at the scene Legal problems of carrying more casualties by the ambulance Employee Liability Insurance Ambiguity of the one responsible for clearance/ No scene clearance The lack of rules and enforcement mechanisms for scene management The problem of managing the valuables of the casualties Problems related to interrogation in staged accidents Ambiguity of the one responsible for fatalities Lack of a central unit to coordinate operations Failure of the organs to inform each other Interference of emergency organizations in each other's work	Lack of inter-sectoral cooperation	Lack of coordination of the organs responsible for emergency services on the scene
Inappropriate treatment of people with paramedics Increasing people's expectations of emergency organizations Drivers creating danger on the scene People's sensitivity to quick arrival of emergency services Blaming the paramedics for fatalities Negative feelings of the staff about people's harsh behaviors	Inappropriate treatment with paramedics		Lack of cooperation between cities Not paying for ambulance repair costs Lack of coordination between 115 emergency department and hospitals Lack of permanent presence of a medical consultant Not paying the costs of callers Limited authority of emergency personnel to perform therapeutic interventions Not having the right to prescribe medications without physician advice Confusion of paramedics due to lack of medical consultant					
Decrease in concentration of paramedics on the scene due to side issues Impact of companions' stress on paramedics Paramedics' mental engagement during operation Inappropriate mental state of the injured Confusion about some actions The influence of scene crowdedness on paramedics'	High stress on the scene and its impact on staff performance		Exposure to casualties who are drunk, addicted or drug consumers Fear of transmission of infectious diseases to paramedics Non-use of personal protective equipment	Transmission of diseases				
			The negative impact of excessive shifts Disruption of personnel's focus on the gory scenes The conflict between responding	Influence of excruciating scenes on emergency staff	Mental and physical security of the paramedics	Mental and Police mistreatment with other staff Police pressure to transfer the injured without		

decision-making Power Spectators' pressure on paramedics to quickly transfer the casualties	to emotions and deciding to provide services on the scene High impact of children's death or injury The severe impact of heartbreakng events on staff The long-term impact of the excruciating scenes Employee depression due to the painful scenes		observing the principles Lack of control of the spectators and their incitement against the y staff Inappropriate police deployment on the scene Absence of electricity departments when needed Lack of fire departments Improper treatment of Red Crescent staff by hospital staff Triage for Red Crescent emergency staff Lack of providing the required equipment for the Red Crescent	
---	--	--	--	--

Table 2: Continuation

Codes	Subcategory	Category	Codes	Subcategory	Category	Codes	Subcategory	Category
Losing golden time because of road traffic Dangerous driving behaviors by ambulance drivers Drivers not giving way to ambulances	Lack of cooperation to give way to the ambulance	Cultural problems in scene management	People crowding the scene is factor for subsequent accidents Crowding of people and spectators prevented the emergency work Not finding a space to park the ambulance Non-standard transportation of patients by personal vehicles in case of late ambulance arrival  Involvement of people in treatment and increase in injuries People not observing precautions on the scene like smoking Non-standard displacement of the injured by passersby	People crowding the scene	Cultural problems in scene management	Insistence of the relatives to accompany them on the ambulance Insistence of injured companions on quick transfer to hospital Lack of possibility to accommodate companions of the injured in the stations  Lack of awareness of people of the rescue process People's aggression towards emergency staff and not giving the right information Expecting the paramedics to the rescue work People keeping the truth about the car's load from the paramedics	Barrier of companions	Cultural problems in scene management
Assessment of the female casualties with the guidance of staff and their companions in case of cultural barriers	Religious problems						Insufficient awareness of people regarding the responsibilities of paramedics	