

## Original Article

DOI: 10.22114/ajem.v0i0.341

## Factors Affecting Emergency Medical Technicians' On-Scene Decision-Making in Emergency Situations: A Qualitative Study

Meysam Safi-Keykaleh<sup>1</sup>, Davoud Khorasani-Zavareh<sup>2,3\*</sup>, Katarina Bohm<sup>3,4</sup>

1. Department of Health in Emergencies and Disasters, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
2. Workplace Health Promotion Research Center, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
3. Karolinska Institutet, Department of Clinical Science and Education, South General Hospital, Stockholm, Sweden.
4. Emergency Department, South General Hospital, Stockholm, Sweden.

\*Corresponding author: Davoud Khorasani-Zavareh; Email: davoud.khorasani@gmail.com

Published online: 2020-04-14

### Abstract

**Introduction:** To save lives and reduce the disability and death of the patients, emergency medical technicians (EMTs) must make timely decisions in complex and, sometimes, life-threatening situations. Since the pre-hospital decision-making is a continuous and important process.

**Objective:** The present study aims to identify the factors affecting EMTs' on-scene decision-making in emergency situations.

**Methods:** A qualitative approach using in-depth semi-structured interviews and field observations was employed to explore the factors influencing EMTs' on-scene decision-making in emergency situations. Purposeful sampling was performed with 19 participants including 12 EMTs, 3 dispatchers, 3 medical directions physicians and one EMS manager as a policy maker. Interviews were conducted from October 2018 to March 2018 and the data were analyzed using Graneheim and Lundman's content analysis approach.

**Results:** Eight categories and 18 sub-categories emerged to describe the factors effective in emergency medical technicians' on-scene decision-making. they were cultural context (community's culture and organizational culture), interactions (malingering, threat and violence and considerations), competencies (acquisitive and intrinsic); personal feeling (positive feeling and negative feeling), authority (structural and in processing), education (public and professional), special conditions (patient's clinical situation, weather conditions, mission's time and mission's location), and organizational resource (facility and equipment, and human resources).

**Conclusions:** To facilitate EMTs' on-scene decision-making, it is recommended to clarify the EMTs' responsibilities, promote the community's culture, modify people's expectations, police monitoring and control and value the star of logo on EMTs' uniform. The EMTs' on-scene decision-making process should also be explored.

**Key words:** Decision Making; Emergencies; Emergency Medical Services; Emergency Medical Technician; Qualitative Research

**Cite this article as:** Safi-Keykaleh M, Khorasani-Zavareh D, Bohm K. Factors Affecting Emergency Medical Technicians' On-Scene Decision-Making in Emergency Situations: A Qualitative Study. *Adv J Emerg Med.* 2020;4(\*):e\*.

### INTRODUCTION

The main goal of emergency medical services (EMS) is to save lives and reduce disability and death (1-3). To achieve the goal, emergency medical technicians (EMTs) must make timely decisions in complex and, sometimes, life-threatening situations (4, 5). Emergency medical decision-making is a dynamic and multi-factorial process which is undeniably influenced by different factors such as EMTs' knowledge and experience, patient's needs and awareness, access to health facilities and physicians, scene conditions and cultural context (6, 7). Prompt and appropriate

on-scene decision-making can be effective in different ways. It, for example, leads to timely medical intervention and emergency care and consequently, to stakeholders' satisfaction. In addition, the adequate pre-hospital cares resulting from accurate on-scene medical judgment prevent the transportation of all cases to the hospital and as a result, the hospital emergency unit overcrowding (8, 9). They also help manage the patients with acute emergency conditions including those with respiratory distress, pre-shock phases, cardiovascular emergencies, and bleeding (10, 11).

The medical judgment, especially in dealing with two or more patients, is difficult and requires prioritization (12). Because of frequent changes in some patients' status, the clinical judgment, prioritization and medical interventions are basically accomplished under stress conditions (3, 13, 14). Based on the studies, stress and anxiety are two main causes of excessive transport of patients to hospitals (15-17).

In Iranian EMS centers, nurses with academic education and some technicians with short-term non-academic courses provide per-hospital emergency cares and transport patients to hospitals (2, 18). Although the EMTs are required to constantly make decisions, they are encountered with many problems due to the lack of sufficient knowledge, capacity, authority and legal support (6, 19, 20). Pre-hospital and mainly clinical decision-making have been investigated in a number of studies, but no comprehensive study can be found on the factors affecting EMTs' on-scene decision-making. Previous studies often explored dispatch and transport decisions (21-23). Since the pre-hospital decision making is a continuous process, the present study aims to identify the factors affecting the process in order to improve patients' safety as one of their important rights (24-26).

## Methods

### Study setting

In Iran, national EMS system provides free services for patients and injured people on the scene and during their transport to hospital. In provinces and cities, EMS centers are supervised by the related universities of medical sciences and national EMS systems. They are established based on urban population and distance from road and rural areas. The EMTs including those with diploma (basic), nurses with associate degree (intermediate), and the technicians with bachelor's and master's degree (advanced/ paramedic) render services in dispatch centers or on scene. There is a dispatch center in the capital of each province or in each city which responds to calls, provides counseling services, dispatches EMTs and coordinates the dispatched ambulances.

Two EMTs in each ambulance are dispatched to the scene. They should get advices from general physician as medical directions physicians (MDPs) of dispatch in the provinces' EMS center. In the cities' EMS centers, EMTs typically operate independently due to the lack of MDPs and accordingly, communication challenges.

General physicians do not attend the ambulance

and mostly, as a medical director or the head of emergency centers provide online, radio or telephone counseling services to EMTs at provinces' EMS centers. However, no general physician is stationed in the cities' EMS center.

### Study design

A qualitative approach using content analysis was applied in the present study (27). Based on this method, collected experiences from participants were derived as meaning units, condensed meaning units, codes, sub-categories, and categories in an inductive process. It should be noted that the study was conducted in EMS centers of Iran.

### Participant selection and data collection

The participants were selected using purposive maximum variety sampling (28). To have Maximum variation, the samples were selected from among EMTs, dispatchers, MDPs of dispatch and EMS managers as policymakers. Inclusion criteria were the practical experience in participating or consulting in on-scene decision-making process and the willingness to participate in the interviews. Data saturation was archived after 19 interviews with EMTs, dispatchers and MDPs, but an additional interview was conducted with a policymaker to make sure that all concepts were developed (Table 1).

Data were collected through interviews and observation. Initially, three in-depth semi-structured interviews were conducted to explore the participants' experiences. Then, other semi-structured interviews were performed with well-experienced and/or knowledgeable key persons including EMTs, dispatchers and MDPs of Dispatch and policy makers. The interviews began with general questions "What is your experience of on-scene decision-making?" and "What problems have you encountered during your on-scene decision-making?" When the basic concepts were developed, interview questions were formed based on the identified gaps in the previous interviews and, hence, different questions were asked in various interviews. Interviews which lasted between 45-75 minutes were conducted from October 2018 to March 2019 in Persian and were recorded after obtaining the consent of the participants. To confirm the codes extracted from interviewees, develop new codes and concepts, and collect data in the real setting, after 3 interviews, ten direct observations lasting 13 hours were applied in EMS centers of Hamadan and Tehran, simultaneously with the next interviewees from November 2018 to March 2019. In order to do that, principal investigator (PI) participated in the EMS'

mission as the participant as observer and tried to take notes in relation to the study questions. Therefore, all EMTs' communications, relations and interactions were taken as filed notes by PI.

#### **Data analysis**

The data were analyzed using content analysis method. To synchronize the data, each interview was listened several times within the first or second day after interview. The key sentences of the text were extracted and then, transcribed in Microsoft Word. Interviews continued until saturation was reached. To make the written text and the relevant statements consistent, the researchers compared transcribed interviews with recorded digital audio files. To analyze the data, Graneheim's content analysis approach was used (27). All sentences were extracted from the participants' experiences as meaning units. Based on the study questions, the data were summarized as condensed meaning units and finally, labeled as codes. Sub-categories and categories were formulated based on the similarities and differences of the codes. The categories were discussed by MSK and DKZ (the 1st and 2nd authors) and revised to obtain the final concepts. The same analysis process was followed for written notes extracted from observations.

#### **Trustworthiness**

To achieve trustworthiness, the strategies of credibility, confirmability, transferability and dependability were employed in the study (29). Researcher's field of study, data collection triangulations including face-to-face interview and observational field notes as well as researchers' prolonged engagement with participants and data collection and data analysis were applied to achieve credibility. Moreover, member and peer checking were used to achieve credibility. In member checking, the primary findings were checked by participants and the reviewer was asked about possible misunderstandings during interviews. In peer checking, the data analysis process was monitored by a researcher who was not involved in the research process as investigator triangulation. Transferability was provided by a detailed explanation of the study process covering data collection, data analysis and interpretation. Finally, to achieve conformability, the PI tried to avoid his potential biases during interviews through bracketing, triangulation and peer-evaluation. Dependability was established by an audit trail, stepwise replication, code-recode strategy, triangulation and peer examination.

#### **Ethical considerations**

The study was approved by the ethics committee of

Shahid Beheshti University of Medical Sciences, Tehran, Iran (IR.SBMU.PHNS.REC.1398.002). In addition, participants' verbal and written consent was obtained before the study and they were informed of the goals of the research and the confidentiality of their names and private information in the related reports. Furthermore, they were assured that it is possible to leave the interview when they like.

#### **RESULTS**

The present study was conducted with 19 participants including EMTs, dispatchers, MDPs and a policy maker, whose characteristics are shown in table 1. Initial codes obtained from the interviews was 1253 codes which were placed in 8 categories (18 sub-categories) including cultural context (Community's culture and Organizational culture), interactions (Malingering, Threat and Violence and Considerations), competencies (Acquisitive and Intrinsic), personal feeling (Positive feeling and Negative feeling), authority (Structural and process), education (Public and Professional), special conditions (Patient's clinical situation, Weather condition, Mission's time and Mission's location), and organizational resource (Facility and Equipment, and Human resources) (Table 2).

#### **Cultural context**

##### **• Community's culture**

According to most of the participants, community's culture is an effective and important factor that affects the decision-making process. Some people expect EMTs more than their responsibilities. Some interfere in the relief and rescue operations. Not-understanding the importance of the EMTs' cares and approaches and asking for transportation of patients to a hospital is a cultural barrier for EMTs' decision-making.

*P2: "When we arrived at the scene, bystanders only wanted us to transport their patient to the hospital..., The patient's relatives and laypeople prevented us to take the proper action regarding the patients".* The interference of the patients' families in EMTs' operations was observed by the PI in the field observations. For example, when EMTs were assessing a patient suffering from apnea because of opium overdosing, the patient's mother interfered the process by rapidly requesting for transport, repeating the sentence "sir, what are you doing? Take him to the hospital".

##### **• Organizational culture**

According to the participants, some EMTs especially those with more than 25 years of work

**Table 1:** Demographic characteristics of participants of the study

Characteristics of the participants	Number (%)	Participants (No.)
<b>Emergency medical technicians</b>		
<b>Sex</b>		
Male	10 (83.3)	1,2,4,5,7,10,12,13, 16,18
Female	2 (16.7)	9,17
<b>Age</b>		
25-35	6 (50.0)	1,2,4,5,9,17
36-45	5 (41.7)	7,10,12,13,16
46-55	1 (8.3)	18
<b>Education</b>		
Ph.D student	2 (16.7)	2,10
Master's Degree	3 (25.0)	5,7,17
Bachelor's Degree	7 (58.3)	1,4,9,10,12,13,16,18
<b>Work experience (years)</b>		
1-10	4 (33.3)	1,4,5,10
11-20	5 (42.7)	2,7,9,12,17
21-30	3 (25.0)	13,16,18
<b>Emergency medical dispatchers</b>		
<b>Sex</b>		
Male	2 (66.7)	3,6
Female	1 (33.3)	15
<b>Age</b>		
25-35	2 (66.7)	3,15
36-45	1 (33.3)	6
<b>Education</b>		
Bachelor's degree	3 (100)	3,6,15
<b>Work experience (years)</b>		
1-10	2 (66.7)	3,15
11-20	1 (33.3)	6
<b>Medical directions physicians</b>		
<b>Sex</b>		
Male	2 (66.7)	8,11
Female	1 (33.3)	14
<b>Age</b>		
25-35	1 (33.3)	11
36-45	1 (33.3)	8
46-55	1 (33.3)	14
<b>Education</b>		
Medical doctor	3 (100)	8,11,14
<b>Work experience (years)</b>		
1-10	2 (66.6)	8,11
11-20	1 (33.3)	14
<b>Policy maker</b>		
<b>Sex</b>		
Male		
<b>Age</b>		
52	1 (100)	19
<b>Education</b>		
Medical doctor		
<b>Work experience (years)</b>		
28		

experience believe only in transporting patients to hospital. Some of EMTs who did not feel enough responsibility didn't pay attention to patient's rights. Most of the participants reported that some staff including the MDPs of Dispatch, dispatchers, hospital emergency physicians, and EMTs did not feel enough responsibility. They used the statement "Why me?" during their attendance to their duties. In other words, while the physicians

commanded EMTs to transport the patient to hospital, they said "why should I be held responsible for the probable negative consequences of non-transport". Moreover, although some EMTs knew that the patient needed a specific care, medication and nursing services, they refused to apply them. Based on the results of interviews and observations, many patients were transported by EMTs to hospital even though they did not need to

do that.

P11: "Most of the EMTs with more than 25 years of

work experience do not permit to operate the patients on the scene, they want only to transport

**Table 2:** The codes, sub-categories and categories of factors affecting the emergency medical technicians' on-scene decision-making in emergency situations in Iran

Category	Sub-Category	Example of code
Cultural context	Community's culture	Excess expectations
		Interference of people
		Only transportation
	Organizational culture	Lack of the understanding of the importance of on-scene cares Importance
		Importance of humans' dignity and values
		Only transportation culture
Interactions	Malingering	Why me culture
		Pretense to be ill
	Threat and Violence	Pretense to be in a lot of trouble, misfortune and innocent
		Verbal violence
	Considerations	Physical violence
		Coworkers' age consideration
Competency	Acquisitive	Patients' age consideration
		Bystanders' age consideration
		Clinical knowledge
		Clinical judgment
		Experiences
		Speed of reaction
		Educational degree
		Relaxation skills
		Stress management skill
		Making useful and appropriate communication skill
	Intrinsic	Comprehensive and accurate assessment skill
		Scene management creativity
		Emergency medical technicians spirit
		Charisma
		Certainty and faith in decision
Personal feeling	Positive feeling	Trust
		Security and safety
		Altruism
		Empathy
	Negative feeling	Fear and worry
		Comparing feeling
		Inequality feeling
		Useless feeling
Authority	Structural	Lack of organizational support
		Low Emergency medical technicians position
	In processing	Exorbitant support for the patients
		Lack of protocols and guidelines
Education	Public	Weakness of education
		Weakness of awareness and perception
	Professional education	Lack of enough practical education
Special conditions	Patient's clinical situation	Traumatic or non-traumatic patient
		Urgency
	Weather condition	Severe heat
		Severe cold
	Mission's time	Midnight missions
	Mission's location	Distance from the hospitals
		Mission in the village and city's margin
Mission in the political and religious institutions		
Organizational resources	Facility and equipment	Mission in the specialist physician offices
		Misdistribution
		Lack of medical portable ultrasound
		Lack of electrocardiogram
	Human resources	Lack of Tele-cardiology
		Shortage of human resources
		Elderly staff
		Weakness of staff motivation

them to hospitals... I believe that the patients' rights should be respected ... The EMTs say that they shall transport the patients and wouldn't like to be responsible for them. Some MDPs only order the transport for all cases...."

### **Interactions**

#### **• Malingering**

The participants emphasized that some patients with no mental or physical problems pretended to be ill in order to attract their families and the EMS personnel' attention. Some families pretended to be in a lot of trouble and misfortune in order to receive home cares such as serum therapy and other free services from EMTs. These malingerers were reported to have important disrupting effects on decision- making process.

*P8: "Patients often malingering to attract their families' attention. Although most of people know that medical and nursing home care are not in the scope of EMS, they pretend to be oppressed to make us provide them with their desires."*

*FO6: Based on the field observations, some of people were malingering. EMTs applied various methods such as talking to the patients, comforting the family members by presenting their stabilized clinical situation and normal vital signs in order to assure them that there was no medical problem and they were forced to transport them.*

#### **• Threat and violence**

According to some EMTs, a number of people threat the EMTs and sometimes, insult them by verbal or physical violence. Violence against EMTs was observed in some mission.

*FO3: in a motorcycle crash, the researcher observed verbal violence and disrespected behavior of the injured person's uncle, despite the respectful behavior of EMTs. P4: "Many of our personnel are violated. I think no one can make a correct decision in such a condition.*

#### **• Consideration**

Most participants stated that sometimes their decisions were affected by the age of their elder coworker. In fact, they observed the coworkers' mistakes but didn't warn them considering their age.

*P17: "I have numerously seen my coworker's wrong actions and I never oppose them because I was younger. Sometimes, for example, I had to act outside of my responsibilities scope because of the bystander who was old.*

### **Competency**

According to the participants, another critical factor influencing the process of decision-making

was competencies which, based on the analysis, were of two types: acquisitive competencies such as knowledge, judgment, experience, speed of reaction, educational degree and skills and intrinsic competence including creativity in managing the scene, EMT's spirit, the ability to penetrate the hearts/charisma, certainty of and faith in the decisions made. As observed in the field, the EMT played an important role in the bystanders and patient's relaxation due to their good communication.

*P3: "Experience, educational degree, clinical information, the ability to calm down you yourself and other people, and EMT's skills are the main competencies. ... Some EMTs have a special charisma and people listen to them so they can make their decisions more easily".*

### **Personal feeling**

#### **• Positive feeling**

Most EMTs indicated that feelings such as trust, the sense of being secure and safe, altruism and empathy play an important role in their decision - making. Providing care to the end-stage patients and those who were in poor financial circumstances had psycho-emotional effects on the EMTs. A number of participants believed that feeling safe and secure will make decision-making an easier and more efficient process. *P1: "When I see a patient suffering from severe pain and an end-stage patient especially those who are in poor financial circumstance, I know there is nothing to do for him/her, and I felt really sorry. ...The presence of the police makes us feel safe to better help the patients and injured people."*

#### **• Negative feeling**

All participants emphasized that fear and worry are the main feelings that disrupt their decisions. The EMTs fear from consequences of their decisions on non-transport of the patients to the hospital as well as their approaches and medical procedures they adopted and are constantly worried about the patients' reaction or sensitivity after intubation, needle decompression and prescribed medicines. Furthermore, some EMTs feel inequality which is effective both in their decision and the quality of services they render.

As most of the EMTs stated, it was happened that they felt useless because they couldn't do anything for the patients they are aware of their problem. They further noted that their organization awarded physicians greater rights, advantages and higher organizational positions, which caused them felt underrated compared with the physicians and therefore, be influenced in their decision-making.

P10: "I feel that there is no difference among us, we put our life in danger, some EMTs do nothing for patients and only transport them. The system containing the physicians and the EMTs is much similar to the Lord-and-vassal system". In the field observations, when an EMT was transporting elderly women with hip trauma, he took a deep breath and said: "we will take the patient down all the stairs, we hurt our knees and backs but we will not be appreciated at all."

### Authority

#### • Structural

The lack of organizational support for the EMTs versus the exorbitant support for the patients was reported as an effective factor in EMTs' decision-making. The result of interviews showed that inadequate organizational support for EMTs and EMT's lack of enough authority were two important barriers in decision-making. Some participants believed that although they had many responsibilities and duties, they didn't have a sufficient authority. P6: "We don't fully support our staff. Despite the EMTs' limited authorities, we have too responsibilities. I think decision-making in such circumstances is a dilemma."

#### • In processing

According to the EMTs, guidelines and protocols are very helpful in decision-making because they are supportive for the users. All EMTs were concerned about the decisions they made without any medical decision-making protocol. They declared that since they often do not have access to the MDPs, offline protocols can help them manage their patient.

P12: "We don't have any protocols for many medical emergency conditions. Some of our protocols are extremely superficial. At the end, they start the IV line which is a routine sort of action by the EMTs."

### Education

#### • Public education

Promoting people's perception regarding the importance of on-scene pre-hospital emergency care and EMTs' services, duties and mutual rights would certainly increase their sense of cooperation and interaction. The weakness of public education affects EMTs' decision-making. The participants believed that their organization did not have a specific method for Public education and the media also lacked public educational programs to inform people about EMS. P9: "Many people don't know anything about EMS, its duties, and rights. They haven't even been taught how to call for aid. Despite all these TV programs, there is no educational

program, even a thirty-minute one- in this regard."

#### • Professional education

EMTs stated that professional training methods applied do not fulfill the job requirements because they are mainly theoretical, while they must be theoretical and practical at the same time. Most of the local EMS centers didn't have skill lab. EMTs believed that the professional educations must be practical and performed with maneuvers.

P14: "I think the EMS centers should run simulated education by simulating patients and scenes. Our centers didn't have clinical skill lab. ...professional and specialized practical trainings are required."

### Mission conditions

Most EMTs made their decisions under the influence of factors such as urgent conditions and laypeople pressure. The EMTs had to take faster measures in order to stabilize the conditions and be able to make correct decisions. P5: "Decision-making for traumatic patients and the injured ones is easier compared decision making for other patients.... When a patient has urgent condition, his/her family interferes in our decision so we must stabilize the patient faster. Therefore, we don't have enough time to think or to decide." In addition, situations including severe hot or cold weather, mission's time such as midnight missions, and mission's location, especially villages and margins of cities, mission in the political and religious institutions, and mission in the specialist physician offices affect the EMTs' decision-making.

P18: "Sometimes we have to take lunch or dinner inside the ambulance... Sometimes we are dispatched in severe cold or heat... Sometimes we wake up in the middle of the night twice or three times... Decision-making in the specialist physicians' offices, political and religious organs is also very hard."

### Organizational resources

#### • Human resources

All participants emphasized that the shortage of human resources had a critical role in the process of their clinical decision-making. Numerous work shifts and missions and the EMTs with no academic education are regarded as critical barriers to EMTs' decision. P15: "In most of the dispatch centers, one operator must operate four lines at the same time... EMTs with work experiences over 25 years have a lack of enough knowledge, motivation, energy."

#### • Facilities and Equipment

Since medical diagnosis is essential for making good decisions, the existence of Para-clinic equipment will make the EMTs diagnosis easier

and lack of the equipment such as medical portable ultrasound/sonograph, electrocardiogram and the Tele-cardiology create some serious problems for the EMTs' decision-making. P5: "How could one make a decision for a patient with chest pain while there is no ECG? ... Internal bleeding is determined faster and easier with portable medical ultrasound".

## DISCUSSION

The present study aims to identify the factors affecting EMTs' on-scene decision-making. Some of the factors are resulted from the cultural context which covers the interactions of patients and bystanders with technicians, patients and bystanders' interferences or participation in EMTs' decision making, threat or violence against the technicians.

Some are related to EMTs' competencies, responsibility, commitment, and fear and worries about the consequences of their decisions, their lack of enough authority and also lack of enough public and professional education.

Cultural context was an important factor affecting on-scene decision making process. In fact, people's interferences influence this process because most of the times, the emergency actions needed for the patient is different from what the patients themselves or their families ask. Culture of the community plays an important role in the relief & rescue operations, as some study show (30-32). Accordingly, people's interference may lead to the over-triage or under-triage of the patients and consequently, impair the technicians' focus and concentration which in turn disturb transportation decisions (15-17). They also affect the technician's decisions on whether or not to transfer the patient to the hospital. Perhaps, the reason for the technicians' decision-making disorder is their lack of focus, time and motivation.

It seems that the adoption of management measures by standards, such as the control of the police, especially at the scene, can greatly reduce people's interference. According to our findings, one of the most important reasons for people's involvement in the actions of technicians is their lack of awareness of the importance of clinical measures and emergency care at the scene of the accident. Therefore, it is necessary to increase people's awareness and understanding of the pre-hospital emergency services through education. Additional reason might be the lack of mutual trust between people and EMTs, as shown by previous studies (33). Based on the findings, mutual trust between EMS crew is vital, too. Other studies were focused on the trust as a crucial social concept for

the success of health services because it can improve collaboration (34, 35).

The main factor related to organizational culture was inadequate responsibility of some EMTs. The authors referred to the lack of responsibility by means of "why me culture", i.e. "why should I undertake the responsibility and negative consequences of decision-making process?", which is resulted from a precise evaluation and monitoring system. Previous studies pointed to health providers' responsibility as an essential factor (15, 36). Furthermore, responsibility were introduced as the fundamental element of decision-making process in EMS and the cornerstone of providing the patients with their rights (22).

Only transportation culture was identified as another major barrier related to organizational culture. Some EMTs do not believe in on-scene interventions and cares and think that the best strategy was immediate transport. In a study it was found that on-scene time is affected by some factors such as the ability and attitude of EMS staff (37).

According to the studies, transporting all patients resulted in inappropriate use of health system resources (6, 34). It is important to note that Iran's EMS system follows the Anglo-American system, which has shifted from immediate transport to on-scene medical assessment and intervention (38). As a result, the only transportation approach in the national EMS should be changed through designing and implementing some protocols and guidelines. According to the EMTs, malingering as a kind of interaction influences the bystanders' behavior and EMTs' reaction. EMTs stated that malingerers had normal and stable symptoms and vital signs including blood pressure, respiratory rate, heart rate, body temperature, blood sugar levels and O<sub>2</sub> saturation.

A study showed that attracting the attention of family members is the main aim of the factitious disorders often seen in malingerers in the form of faint or syncope (39). Due to the lack of awareness, the patient's family believe their patients and hence, it is difficult for the technicians to convince them that their patients are in a good condition (40-42). Through good interaction and empathy, EMTs can encourage such patients to control themselves (41, 43, 44). Other studies also suggested that in order to manage such patients and their family members, ambulance crew should be able to establish respectful interaction with them (45, 46).

Among the other factors that disturb EMTs decision-making is threat and violence against

EMTs. The main reasons of this behavior are the patients' critical conditions, emotional reactions of the patients' family members and lack of a monitoring system and legal support for EMTs. The studies revealed that violence leads to EMTs' fear and worry, as well as low-quality care (47, 48). The studies highlighted that lack of follow-up strategies and supportive rules are the main reason of violence against the medical staff (47, 49-51). Relaxing the patients are the best measure for managing them and their families' anger (52). Competencies including skills, experience and knowledge to manage the patients are another factor influencing the on-scene decisions (38, 45). The EMTs' empathy and altruism were also identified in this study as a factor that plays an important role in EMTs' decisions. Previous studies mentioned empathy and altruism as the fundamental responsibilities of health providers (53-55).

A study showed that EMTs could not leave suicide survivors because of their sympathy and empathy (6). Thus, it is necessary for the technicians to manage their emotions so that their decision-making is not affected by excessive empathy. The negative feelings including fear from the legal consequences of interventions such as prescription or non-transport of the patient is another factor that influences EMTs' decisions. According to them, the lack of organizational support, authority, guarantee and decisions-making protocols are the main sources of their fear and worry. These results are in line with a similar study in which the lack of authority, legal support and codified guidelines were found as the main cause of EMTs' stress and worry (26). One of the important findings of the study was the importance of public education and awareness. The patients and bystanders' knowledge boosts the mutual trust between them and the EMS crew (56). Some studies indicated that public training is the best way to overcome the EMS' barriers (57, 58). Therefore, the increase in the people's understanding of the pre-hospital cares can not only decrease people interferences but also increase their participation.

#### **Study strengths and limitations**

The qualitative approach was used to explore the EMTs' on-scene decision-making experiences in a middle-income setting. This study is the first study on EMTs' on-scene decision making in Iran which was conducted by interview and observation. To have Maximum variation, the participants were selected from among EMTs, dispatchers, MDPs and policymakers. Different methods including constant comparison, member checking, and peer

checking were used to achieve consistent and credible data. One of the limitations of the current study is the generalizability of the results to other countries because its context is limited to Iran. However, it seems that, the results can be applicable in low- and middle-income countries, considering their common problems (59).

#### **CONCLUSIONS**

Emergency Medical Technicians' on-scene decision-making should be facilitated to save more lives and lessen the mortality. Therefore, it is recommended to focus on public training, community culture improvement, modification of people's expectations, police monitoring and control and value the star of life logo on the EMTs' uniform. Furthermore, clarifying the EMTs' responsibilities and authorities and codify the medical decision-making protocols and guidelines with insurance support can help EMTs make better decisions. In addition, skills and competencies of EMS staff should be improved with knowledge transfer, sharing of international experiences and establishment of exercise-based and practical training. Furthermore, increasing and distributing medical diagnosis devices such as portable sonograph and tele-electrocardiogram can be helpful in EMTs' on-scene decision-making process.

#### **ACKNOWLEDGEMENTS**

This study is a part of the Ph.D. thesis. The authors thank Shahid Beheshti University of Medical Sciences as well as all the participants in this study, especially the EMTs.

#### **AUTHORS' CONTRIBUTION**

MSK and DKZ have made substantial contributions to and undertake the responsibility of the study design and analysis of the data and coordinated the acquisition of data. MSK and DKZ were involved in the data collection process and took part in the data analysis. DKZ and KB took part in the writing-up and finalization of the manuscript. DKZ and MSK contributed to the study design, data acquisition, results interpretation and writing-up of the manuscript. All authors read and approved the final manuscript.

#### **CONFLICT OF INTEREST**

The authors declare no competing interests.

#### **FUNDING**

This study was funded by Shahid Beheshti University of Medical Sciences.

## REFERENCES

1. Sun KM, Song KJ, Shin SD, Tanaka H, Shaun GE, Chiang W-C, et al. Comparison of emergency medical services and trauma care systems among pan-Asian countries: an international, multicenter, population-based survey. *Prehosp Emerg Care*. 2017;21(2):242-51.
2. Al-Shaqsi S. Models of international emergency medical service (EMS) systems. *Oman Med J*. 2010;25(4):320.
3. Millin MG, Johnson DE, Schimelpfenig T, Conover K, Sholl M, Busko J, et al. Medical oversight, educational core content, and proposed scopes of practice of wilderness EMS providers: A joint project developed by wilderness EMS educators, medical directors, and regulators using a Delphi approach. *Prehosp Emerg Care*. 2017;21(6):673-81.
4. Regehr C, LeBlanc V, Jelley RB, Barath I. Acute stress and performance in police recruits. *Stress Health*. 2008;24(4):295-303.
5. Janka A, Duschek S. Self-reported stress and psychophysiological reactivity in paramedics. *Anxiety Stress Coping*. 2018;31(4):402-17.
6. Nilsson C, Bremer A, Blomberg K, Svantesson M. Responsibility and compassion in prehospital support to survivors of suicide victim—Professionals' experiences. *Int Emerg Nurs*. 2017;35:37-42.
7. Halter M, Vernon S, Snooks H, Porter A, Close J, Moore F, et al. Complexity of the decision-making process of ambulance staff for assessment and referral of older people who have fallen: a qualitative study. *Emerg Med J*. 2011;28(1):44-50.
8. Johnson M, O'Hara R, Hirst E, Weyman A, Turner J, Mason S, et al. Multiple triangulation and collaborative research using qualitative methods to explore decision making in pre-hospital emergency care. *BMC Med Res Methodol*. 2017;17(1):11.
9. Ekins K, Morphet J. The accuracy and consistency of rural, remote and outpost triage nurse decision making in one Western Australia Country Health Service Region. *Australas Emerg Nurs J*. 2015;18(4):227-33.
10. Harjola P, Boyd J, Tarvasmäki T, Mattila J, Koski R, Kuisma M, et al. The impact of emergency medical services in acute heart failure. *Int J Cardiol*. 2017;232:222-6.
11. Chew KS. What's new in Emergencies, Trauma and Shock? Tackling prehospital delay to reperfusion therapy in ST-elevation myocardial infarction: A global problem, a glocal approach. *J Emerg Trauma Shock*. 2017;10(2):53-4.
12. Voskens FJ, van Rein EA, van der Sluijs R, Houwert RM, Lichtveld RA, Verleisdonk EJ, et al. Accuracy of prehospital triage in selecting severely injured trauma patients. *JAMA Surg*. 2018;153(4):322-7.
13. Snooks HA, Kingston MR, Anthony RE, Russell IT. New models of emergency prehospital care that avoid unnecessary conveyance to emergency department: translation of research evidence into practice? *ScientificWorldJournal*. 2013;2013:182102.
14. Nutt PC. Some Considerations in Selecting Interactive and Analytical Decision Approaches for EMS Councils. *Med Care*. 1979;17(2):152-67.
15. Wros PL, Doutrich D, Izumi S. Ethical concerns: Comparison of values from two cultures. *Nurs Health Sci*. 2004;6(2):131-40.
16. Andersen MS, Johnsen SP, Hansen AE, Skjaereth E, Hansen CM, Sørensen JN, et al. Preventable deaths following emergency medical dispatch—an audit study. *Scand J Trauma Resusc Emerg Med*. 2014;22(1):74.
17. Lavery T, Greenslade JH, Parsonage WA, Hawkins T, Dalton E, Hammett C, et al. Factors influencing choice of pre-hospital transportation of patients with potential acute coronary syndrome: An observational study. *Emerg Med Australas*. 2017;29(2):210-6.
18. Delshad V, Sabzalizadeh S, Moradian MJ, Safarpour H, Malekyan L, Shemshadi H, et al. Epidemiology of accidents in Tehran emergency medical service during 2012 to 2013. *Trauma Mon*. 2018;23(1):e61871.
19. Jensen A, Lidell E. The influence of conscience in nursing. *Nurs Ethics*. 2009;16(1):31-42.

20. Camargo CA. A Model Protocol for Emergency Medical Services Management of Asthma Exacerbations: Workgroup on EMS Management of Asthma Exacerbations. *Prehosp Emerg Care*. 2006;10(4):418-29.
21. Ebrahimian A, Seyedin H, Jamshidi-Orak R, Masoumi G. Exploring factors affecting emergency medical services staffs' decision about transporting medical patients to medical facilities. *Emerg Med Int*. 2014;2014:215329.
22. Hosseini SMR, Maleki M, Gorji HA, Khorasani-Zavareh D, Roudbari M. Factors affecting emergency medical dispatchers' decision-making: a qualitative study. *J Multidiscip Healthc*. 2018;11:391-8.
23. Bossaert LL, Perkins GD, Askitopoulou H, Raffay VI, Greif R, Haywood KL, et al. European Resuscitation Council Guidelines for Resuscitation 2015 Section 11. The ethics of resuscitation and end-of-life decisions. *Resuscitation*. 2015;95:302-11.
24. Keykaleh MS, Safarpour H, Yousefian S, Faghisolouk F, Mohammadi E, Ghomian Z. The Relationship between Nurse's Job Stress and Patient Safety. *Open Access Maced J Med Sci*. 2018;6(11):2228-32.
25. Esmaili-Vardanjani S, Cheraghi M, Masuodi R, Rabihi L, kayvani A. Decision Making in Prehospital Emergency Nurses:A Qualitative Research. *J Rescue Relief*. 2011;3(1 and 2):19-32.
26. Arnold DH, Gebretsadik T, Abramo TJ, Sheller JR, Resha DJ, Hartert TV. The Acute Asthma Severity Assessment Protocol (AASAP) study: objectives and methods of a study to develop an acute asthma clinical prediction rule. *Emerg Med J*. 2012;29(6):444-50.
27. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today*. 2004;24(2):105-12.
28. Neergaard MA, Olesen F, Andersen RS, Sondergaard J. Qualitative description—the poor cousin of health research? *BMC Med Res Methodol*. 2009;9(1):52.
29. Korstjens I, Moser A. Series: Practical guidance to qualitative research. Part 4: trustworthiness and publishing. *Eur J Gen Pract*. 2018;24(1):120-4.
30. Khorasani-Zavareh D, Khankeh HR, Mohammadi R, Laflamme L, Bikmoradi A, Haglund BJ. Post-crash management of road traffic injury victims in Iran. Stakeholders' views on current barriers and potential facilitators. *BMC Emerg Med*. 2009;9(1):8.
31. Jat TR, Deo PR, Goicolea I, Hurtig AK, Sebastian MS. Socio-cultural and service delivery dimensions of maternal mortality in rural central India: a qualitative exploration using a human rights lens. *Glob Health Action*. 2015;8(1):24976.
32. Bergeron WP. Considering culture in evacuation planning and consequence management. *J Emerg Manag*. 2015;13(2):87-92.
33. Bigdeli M, Khorasani-Zavareh D, Mohammadi R. Pre-hospital care time intervals among victims of road traffic injuries in Iran. A cross-sectional study. *BMC Public Health*. 2010;10:406.
34. Norberg Boysen G, Nyström M, Christensson L, Herlitz J, Wireklint Sundström B. Trust in the early chain of healthcare: lifeworld hermeneutics from the patient's perspective. *Int J Qual Stud Health Well-being*. 2017;12(1):1356674.
35. Ruotsalainen P, Blobel B. Trust-Essential Requirement and Basis for pHealth Services. *Stud Health Technol Inform*. 2017;237:25-33..
36. Verpeet E, De Casterle BD, Arend AVd, Gastmans CA. Nurses' views on ethical codes: a focus group study. *J Adv Nurs*. 2005;51(2):188-95.
37. Bossaert LL, Perkins GD, Askitopoulou H, Raffay VI, Greif R, Haywood KL, et al. European Resuscitation Council Guidelines for Resuscitation 2015: Section 11. The ethics of resuscitation and end-of-life decisions. *Resuscitation*. 2015;95:302-11.
38. von Vopelius-Feldt J, Benger J. Who does what in prehospital critical care? An analysis of competencies of paramedics, critical care paramedics and prehospital physicians. *Emerg Med J*. 2014;31(12):1009-13.
39. Flaherty EG, MacMillan HL, Abuse CoC, Neglect. Caregiver-fabricated illness in a child: a manifestation of child maltreatment. *Pediatrics*. 2013;132(3):590-7.

40. Yates GP, Feldman MD. Factitious disorder: a systematic review of 455 cases in the professional literature. *Gen Hosp Psychiatry*. 2016;41:20-8.
41. Tozzo P, Picozzi M, Caenazzo L. Munchausen Syndrome by Proxy: balancing ethical and clinical challenges for healthcare professionals Ethical consideration in factitious disorders. *Clin Ter*. 2018;169(3);169(3):e129-34.
42. Bass C, Halligan P. Factitious disorders and malingering: challenges for clinical assessment and management. *Lancet*. 2014;383(9926):1422-32.
43. Stone J, Warlow C, Sharpe M. Functional weakness: clues to mechanism from the nature of onset. *J Neurol Neurosurg Psychiatry*. 2012;83(1):67-9.
44. Salmon P. Conflict, collusion or collaboration in consultations about medically unexplained symptoms: the need for a curriculum of medical explanation. *Patient Educ Couns*. 2007;67(3):246-54.
45. Chang YT, Tsai KC, Williams B. Development of new core competencies for Taiwanese Emergency Medical Technicians. *Adv Med Educ Pract*. 2018;9:147-58.
46. Mishra A. 'Trust and teamwork matter': Community health workers' experiences in integrated service delivery in India. *Glob Public Health*. 2014;9(8):960-74.
47. Hosseinikia SH, Zarei S, Najafi Kalyani M, Tahamtan S. A cross-sectional multicenter study of workplace violence against prehospital emergency medical technicians. *Emerg Med Int*. 2018;2018:7835676.
48. Maguire BJ, O'Meara P, O'Neill BJ, Brightwell R. Violence against emergency medical services personnel: A systematic review of the literature. *Am J Ind Med*. 2018;61(2):167-80.
49. Pourshaikhian M, Gorji HA, Aryankhesal A, Khorasani-Zavareh D, Barati A. A systematic literature review: workplace violence against emergency medical services personnel. *Arch Trauma Res*. 2016 Mar;5(1):e28734.
50. Bigham BL, Jensen JL, Tavares W, Drennan IR, Saleem H, Dainty KN, et al. Paramedic self-reported exposure to violence in the emergency medical services (EMS) workplace: a mixed-methods cross-sectional survey. *Prehosp Emerg Care*. 2014;18(4):489-94.
51. Rahmani A, Dadashzadeh A, Namdar H, Akbari M, Allahbakhshian A. Violence in workplace against emergency care personnel in east azarbaijan province. *Ir J Forensic Med*. 2009;15(2):100-7.
52. Koohestani H, Baghcheghi N, Rezaii K, Ebrahimi Fakhari H. Risk factors for workplace violence in emergency medical technician students. *Iran Occup Health*. 2012;9(1):68-75.
53. Milaniak I, Wilczek-Rużyczka E, Przybyłowski P, editors. Role of Empathy and Altruism in Organ Donation Decisionmaking Among Nursing and Paramedic Students. *Transplantation proceedings*; 2018: Elsevier.
54. Jose MM. Cultural, ethical, and spiritual competencies of health care providers responding to a catastrophic event. *Crit Care Nurs Clin North Am*. 2010;22(4):455-64.
55. Brennan N, Barnes R, Calnan M, Corrigan O, Dieppe P, Entwistle V. Trust in the health-care provider-patient relationship: a systematic mapping review of the evidence base. *Int J Qual Health Care*. 2013;25(6):682-8.
56. McCullough MB, Petrakis BA, Gillespie C, Solomon JL, Park AM, Ourth H, et al. Knowing the patient: A qualitative study on care-taking and the clinical pharmacist-patient relationship. *Res Social Adm Pharm*. 2016;12(1):78-90
57. Glow SD, Colucci VJ, Allington DR, Noonan CW, Hall EC. Managing multiple-casualty incidents: a rural medical preparedness training assessment. *Prehosp Disaster Med*. 2013;28(4):334-41.
58. Khankeh H, Alinia S, Masoumi G, Ranjbar M, Daddoost L, Hosseini S, et al. Prehospital services by focus on road traffic accidents: Assessment developed and developing countries. *J Health Promot Manag*. 2013;2(2):71-9.
59. Khankeh H, Ranjbar M, Khorasani-Zavareh D, Zargham-Boroujeni A, Johansson E. Challenges in conducting qualitative research in health: A conceptual paper. *Iran J Nurs Midwifery Res*. 2015;20(6):635-41.