

# Resiliency Improvements in Medical Emergency Staff in Burn Missions: A Qualitative Study in an Iranian Context

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**Background:** Medical emergency staff complete understanding of the nature of resiliency in burn events is a prerequisite for improving the quality of clinical service delivery in pre-hospital burn events.

**Objectives:** The present study aimed to describe resiliency in view of medical emergency staff in burn events.

**Materials and Methods:** The present qualitative study was performed using a content analysis method. In total, 18 Iranian emergency care personnel participated in the study. A purposeful sampling method was applied until reaching data saturation. Data was collected using semi-structured interviews and field observations. Afterwards, data was analyzed by face content analysis.

**Results:** By analyzing 456 primary codes, four main concepts including: 1) scene safety/security, 2) effective clinical decision making, 3) self-efficacy and 4) religious support were extracted through content analysis from experiences of pre-hospital emergency personnel during burn care.

**Conclusions:** Different factors affect resiliency improvements in medical emergency staff and consequently the quality of pre-hospital burn care. This study showed that various factors such as scene security/safety, effective decision making, self-efficacy and religious support are effective in the improvement of resiliency and the quality of pre-hospital emergency care.

**Keywords:** Burn Care; Pre-Hospital Emergency Personnel; Resiliency

## 1. Background

Emergency Medical Services (EMS) providers constantly deal with situations associated with high stress and anxiety (1). Given the serious nature of burn injuries, dealing with burn emergencies is a challenging task for EMS providers (2). Pre-hospital emergency teams and hospital staff face various problems, particularly in times of major burn emergencies, when victims are severely and extensively injured (3).

Many pre-hospital emergency personnel describe missions of caring for burned patients a time of great anxiety (4). Job stress can lead to significant physical and emotional issues for medical care providers (1); consequently, they may be easily affected by post-traumatic stress disorder (1, 5, 6).

As previous studies suggested, nearly 22% of medical emergency staff show symptoms of post-traumatic stress disorder (7). Negative stressors affect the health of EMS providers and compromise their ability to provide care for victims (8). Exceedingly high levels of anxiety may gradually result in job burnout (9). Studies show that approximately 6.8% of emergency technicians are at risk of job burnout (10).

One of the suitable strategies for improving mental

health of EMS staff is resilience (11). Inzlicht et al. argue that resilience may reduce anxiety and depression and help individuals overcome the adverse effects of physical and emotional exhaustion; moreover, it can help staff maintain their mental health (12). Therefore, resilience, as a coping strategy, can help EMS personnel to deal with occupational challenges (13).

## 2. Objectives

Considering lack of sufficient information about resilience of EMS staff in face of burn injuries, the present study aimed to qualitatively assess resilience and its contributing factors among pre-hospital care providers, based on their perceptions and experiences of burn emergencies.

## 3. Materials and Methods

### 3.1. Study Design

In the present study, a qualitative approach using latent content analysis was used to provide a condensed but comprehensive description of EMS staff experiences; the

outcome was an overview of concepts and categories, describing the staff experiences. Data was collected with no a priori hypothesis and focused on obtaining interviewee's point of view. Different codes and categories were derived using an inductive approach. Afterwards, they were conceptually ordered considering their properties and dimensions (14, 15).

### 3.2. Study Setting and Participants

Pre-hospital care professionals in Tehran were interviewed. Tehran, the capital and largest city of Iran, has a population of 13 million (16) and is equipped with a large number of EMS vehicles dispatched from a call center. In this study, 18 interviews were conducted with experts and authorities in pre-hospital emergency system, (including 12 emergency technicians, 1 emergency care support worker and 1 anesthesiology assistant and 4 nurses). They were recruited by purposeful sampling method and included if had previous experience with burn injury patients. Diversity was observed by selecting subjects of various age groups with different education levels, working experiences and organizational roles. Insufficient experience in any participant was considered as exclusion criterion.

### 3.3. Data Collection and Analysis

Data was collected through a semi-structured interview. The interview guide included general as well as more specific questions to direct the interview. Some examples of the questions are "Please talk about your experience of burn care", "What problems do you face during burn injury care?" and "What do you do in face of burn accidents?". Subjects were asked to elaborate on their answers where necessary. On average, each interview lasted 40 - 60 minutes and conducted by the same interviewer (in Persian); the interviews were transcribed verbatim and then translated into English. All interviews were performed by the first author and audiotaped with the medical emergency staff consent. The interviewer was an expert in qualitative research, trained in qualitative courses and workshops and had the experience of working in emergency burn units (18 years). Data collection, data analysis and participants' selection continued until data saturation occurred and a rich description of medical emergency staff experiences was obtained. To analyze data, 'Framework' was used as a method of qualitative data analysis. 'Framework' is an analytical process, which involves a number of distinct though highly interconnected stages (17).

In the first stage or familiarization stage, we transcribed data verbatim and read each interview several times to gain a sense of content. The second stage or identifying a thematic framework, involved dividing the text into meaning units. The condensed meaning units were abstracted and labeled with a code, which constitute the manifest content. In the third stage or indexing, we compared various codes based on differences and similarities and sorted them into subcategories and categories and collated all

the relevant codes into data extracts within the identified categories. In the fourth stage or charting, we read all the collated extracts for each category and considered whether they appeared to form a coherent pattern. Then, we considered the validity of individual categories in relation to the dataset and whether our candidate categories "accurately" reflected the meaning evident in the dataset as a whole. Two researchers independently examined data for categories. In the fifth stage or mapping and interpretation, we defined and further refined the categories.

### 3.4. Rigor

The simultaneous analysis of the interviews was performed using the Lundmen and Grancheim content analysis method in five stages (18). We acquired four criteria of credibility, transferability, dependability and conformability to provide the validity and reliability of the results (19). Prolonged engagement in the field from September 2012 to March 2013 helped us to establish some trust and support the participants, providing an opportunity to collect data. To ensure that the analysis reveals the EMS experiences, member checking was performed during the data collection, and where needed, some changes were made. For the credibility of the findings, we tried to present the quotes of participants with fidelity, so that the readers had a better judgment over the study results. To confirm dependability and conformability of data, the interviews, and the results of the analyses, like the initial codes and subcategories were audited by some experts. We implemented the external check method using two authors (the first and second authors) expert in pre-hospital care and then peer-checked by two PhD students who had previous experience in pre-hospital care (20). Furthermore, maximum variation of sampling confirmed the transferability of data.

### 3.5. Ethical Considerations

This project was approved in the Ethics Committee of University of Social Welfare and Rehabilitation Sciences under the code 3113/2/A/ 801/91 July, 2012 with consideration of the above-mentioned guidelines.

## 4. Results

The subjects were within the age range of 26 - 43 years, with a mean age of  $34.28 \pm 4.8$  years and a mean working experience of  $11.28 \pm 3.4$  years (Table 1). All participants had more than five years of experience in dealing with burn injuries and performing pre-hospital emergency care.

From the deep and rich explanations of the participants, 456 initial codes were derived. After several reviewing and summarizing and based on similarities and differences, 21 codes were derived. Regarding the development of resilience, four main contributing concepts were formed through the content analysis method including: 1) scene safety/security, 2) effective clinical decision making, 3) self-efficacy and 4) religious support (Table 2).

**Table 1.** Participant Characteristics

Participant	Age, y	Position	Working Experience, y
1	28	Emergency Technician	7
2	29	Anesthesia Technician	9
3	32	Emergency Technician	10
4	42	Emergency Technician	16
5	33	Rescue	9
6	33	Nurse	9
7	35	Emergency Technician	12
8	26	Emergency Technician	6
9	37	Emergency Technician	13
10	35	Emergency Technician	11
11	38	Emergency Technician	15
12	26	Nurse	5
13	43	Emergency Technician	16
14	36	Emergency Technician	14
15	38	Emergency Technician	15
16	38	Emergency Technician	14
17	33	Nurse	10
18	35	Nurse	12

**Table 2.** Concepts and Their Sub-Categories of Resilience Theme

Category	Subcategory	Code
<b>Scene security/safety</b>	Management of the burn scene	Event scene security before arrival
		Event scene evaluation
	Sensible approach	Encouraging the aggressor to keep calm
		Being sympathetic towards the victims and significant others
		Not giving up
		Self defense
<b>Effective clinical decision making</b>	Patient monitoring/ experience exchange	Continuous victim care
		Consultation with and using the experience of coworkers
	Selection of a medical center	The need for physicians with various specialties
		The necessity of para-clinical tests
		Victims condition/the need for emergency services
<b>Self-efficacy</b>	Acquisition of clinical skills	Improving skills in the operational fields
	Knowledge/competence improvement	Unofficial educations
		Communication and interaction with physician and nurse
		Following the results of the emergency measurements taken for victims condition
	Self-control	Psychological (or mental) preparation
	Social support/ encouragement	Task-centered approach
		Support of experienced coworkers (or colleagues)
<b>Religious support</b>	Spiritual wealth	Support of family and community
		Trusting
		Appealing

#### 4.1. Scene Safety/Security

The first derived concept, scene safety/security included two subcategories: (a) management of the burn scene and (b) sensible approach. In this regard, P9 said:

"...We make sacrifices during our missions, especially during burn emergencies...We have no protection...In an electric shock accident, the anxious and angry father of the victim got in a fight with me...He did not understand that I had to wait for the rescue team to come and secure the location...I was forced to act at the scene..."

The second subcategory, sensible approach to challenges at the burn scene deals with the strategies used by personnel when they do not feel secure at the scene. Examples of this approach include encouraging the aggressor to calm down, showing empathy with victims and their companions, involuntary submission and self-defense.

As a reaction to verbal violence, some EMS staff tried to calm down the aggressor. As P8 said:

"...The accident scene was overcrowded ...I acted calmly...I mean I acted in a way that the unrest calmed down... In other words, I offered them reassurance...The victim and his companions trusted us because of our approach."

Regarding empathy with victims and their families, P6 said:

"When I got into the house, I tried to put myself in the victim's shoes; in fact, I consider the victim as part of my family. After all, we put ourselves out there during missions."

Due to the particular nature of emergency care, most personnel involved in the process experience physical and psychological problems. Provision of emergency care, especially in burn emergencies, is associated with many difficulties and abnormal behaviors, including violent and aggressive manners. Submission, albeit involuntarily, to the requests of the aggressor is another approach used by EMS workers when dealing with a violent situation. In this regard, P1 said:

"People were agitated at the burn scene...the victim's companion kept shouting 'What are you doing?...Come on...Take him to a hospital...Damn it, he is dying'...One of his companions attacked me...Because of the anxiety at the accident site, we transferred the victim to the ambulance...We could have got ourselves beaten up."

Threat and violence at the scene have negative impacts on the mental health of EMS staff. In relation to self-defense in face of violence, P11 said:

"We are humans just like you, we unconsciously act in self-defense...You see, on one hand, the high number of missions is devastating, and on the other hand, victims should be immobilized...But they (the companions) do not let us do our work...They attack us...Well, these can affect the quality of our work."

#### 4.2. Effective Clinical Decision Making

The second emerged concept was effective clinical decision making, which included two subcategories: (a) patient monitoring/exchange of experience and (b) selec-

tion of a medical center.

Participants believed that clinical decision making as well as clinical skills is of critical importance. According to participants' experiences, due to factors such as special conditions of burn scenes, limited burn care experiences, and lack of coherent protocols, pre-hospital care providers make clinical decisions based on careful monitoring of victims and exchange of experiences. In this regard, P5 added:

"The kid was trapped in a car full of smoke...I checked his airway...He could talk ... He was crying ...But it was all temporary...I controlled his breathing regularly...The kid had problems breathing on our way to Motahari Burn Hospital...I talked to my experienced partner and we decided to intubate the kid...We stopped the ambulance and managed to intubate the kid."

The current study includes only one specialized hospital with limited equipment for specific emergency situations such as burn traumas. Therefore, EMS personnel choose a medical center, based on the needs of victim. As P2 said:

"The burn victim was unconscious due to the explosion...he needed a CT scan and a neurologist consultation. Choosing the right hospital for transferring the victim is a serious issue since equipment and facilities of Motahari Hospital are limited...We may have trouble hospitalizing the victim."

#### 4.3. Self-Efficacy

The third concept, self-efficacy, is categorized as (a) knowledge/competence improvement, (b) increased self-control, (c) acquisition of clinical skills and (d) social support/encouragement.

Through formal training, interaction with hospital staff and tracking the effects of emergency care on burn victims, the competence and self-efficacy of the personnel improve. P17 made the following remark about informal training of staff:

"During a mission, a novice partner accompanied me... On our way to the accident scene, we discussed scene management, venipuncture and control of breathing in airway burns."

EMS providers are in contact with hospital staff at emergency departments to verify clinical appropriateness of emergency interventions for burn victims. As P18 remarked:

"We even sometimes bet on the type and degree of burn injuries... We were happy to see that we made the right diagnosis; actually, we want to prove our skills and expertise."

EMS personnel seek to enhance their clinical practice through tracking the outcomes of emergency medical interventions for burn victims. As P10 said:

"I asked Motahari burn emergency team about the condition of a burn victim. Unfortunately, due to inhalation burn and restlessness, the victim was intubated and transferred to ICU... I had some time to myself and reviewed the victim's symptoms and clinical measures..."

Participants acknowledged that preparation strategies such as mental preparation (related to mental picture formed by previous experiences of burn scenes) and

task-driven approaches would lead to resilience improvement. In relation to mental preparedness, P3 said:

“While we were on our way to the scene, I described a mental image of the scene for my novice colleague so that he could get a grip on the situation... Since I had previous experience of burn accidents... We reviewed all the measures and described our duties.”

Participants, to control their emotions, manage the burn scene and provide proper clinical care for burn victims, try to focus on the sites of burn injuries and use a task-driven approach. As P4 said:

“I tried to just look at the burn injuries... In fact, I only thought about what I had to do at that moment ...Unfortunately, I did not have any eye contact with the victim.”

Due to limited skills of EMS staff in clinical care provision for burn victims, they try to acquire essential skills. In this regard, P13 said:

“The best learning opportunity for me was when I was at the burn scene...I tried to review the situation and performed triage with the help of my supervisor...I rapidly intubated the patient, because the situation was getting worse every second.”

Social support/encouragement, one of the strongest predictors of mental health, comprises the support provided by experienced colleagues, families and society. As the participants stated, higher social support is associated with higher levels of mental health. In this regard, P14 said:

“As the emergency dispatcher declared a burn accident, I thanked God that a skilled technician, who was actually my teammate, accompanied me during the mission...Well, he is experienced...I trust him ...He sends good vibes...”

Given the stressful nature of working in EMS and caring for burned individuals, EMS personnel try to avoid discussing their experiences with their family members to prevent tension; this ultimately deprives staff of emotional support of their own families. In this respect, P7 said:

“I try my best to leave everything behind as I enter home, but I cannot, it is out of my hands...I keep telling my wife that if I had done this or that, the victim might have survived...She gets nervous when I go to work...”

#### 4.4. Religious Support

Religious support significantly affected participants' lives and modified the situation in a way that they could enjoy a stress-free lifestyle. Religious support takes many forms among EMS personnel such as trust in God and intercession (seek nearness to God and Imams). As P16 remarked:

“As I saw the victim, who was burned from tip to toe, I put my trust in God; he helped me control myself...I provided emergency care as fast as I could...”

### 5. Discussion

The four key concepts derived in this study were scene security/safety, effective clinical decision making, self-efficacy and religious support (Figure 1).

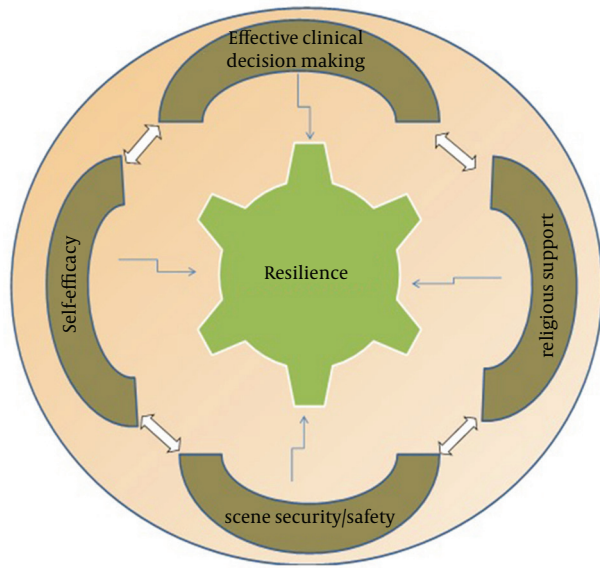


Figure 1. Four Key Concepts

**Scene security/safety:** The security/safety of the EMS staff, before entering the burn scene, is the most important matter in pre-hospital emergency care. As the participants stated, lack of required safety equipment and insufficient training were among their negative experiences. In fact, they were compelled to risk their own lives to ensure the safety and security of area. A recent national study showed that 89% of EMS personnel reported behaviors which endangered their own safety (21). Regarding the sensible approach subcategory of scene security/safety, due to the nature of burn injuries, EMS personnel are more prone to workplace violence, which in turn interrupts the flow of patient care. Suserud stated that many ambulance personnel are at risk of being attacked and being beaten up and are threatened by victims' companions (20). In another study, he suggests to use appropriate strategies to mitigate threats and violence at the scene (22). Given the complexity of situation, EMS personnel approach to control violence varies and might involve asking the aggressor to calm down, empathize with victim and cooperate with personnel. Moreover, EMS personnel frequently use strategies of submission and self-defense in face of threats.

Unfortunately, Iran's healthcare system has not paid enough attention to physical violence and very few studies investigated physical violence against medical staff (23, 24). Studies in other countries indicate a high level of workplace violence against pre-hospital emergency personnel (22, 25), which confirms the hypothesis that violence against healthcare workers is a global issue, affecting all countries.

**Effective clinical decision making:** due to the changing conditions of victims and uncertain clinical environments, EMS personnel must constantly make decisions

of uncertain consequences. Participants consider clinical decision making, particularly during burn emergencies, as the most critical part of their profession. Participants considered protocol-based treatments to be useful and necessary; however, considering pre-hospital clinical environment, existing trainings and protocols for emergency care of burn victims are not sufficient.

Due to the limited facilities and equipment of hospitals, experienced personnel can be of high value, because other team members can benefit from their experiences. Therefore, through gaining a comprehensive understanding of victims' clinical status, EMS providers can make a proper clinical decision. White (26) argue that clinical decision making is the main responsibility of nurses. Nurses have to deal with various legal, professional and educational issues. Therefore, they should acquire essential skills for clinical decision making, given its high impact on the quality of care.

**Self-efficacy:** The third derived concept, self-efficacy, included four subcategories: knowledge/competence improvement, self-control, acquisition of clinical skills and social support/encouragement. Gillespie et al. included self-efficacy as one of the components of resilience, which includes the ability to perform a specific task in a specific situation (27). Acquisition of new skills and improvement of the learned ones can significantly contribute to the quality of care provided. Following up patient's status to evaluate shortcomings of performed approaches, is of critical value in this regard. Harrahill and Gunnels suggested that ambulance nurses are often not adequately trained and tracking patient's health status can help increase their knowledge (28).

Another factor leading to self-efficacy is self-control. EMS personnel are exposed to significant occupational stressors. These factors may have physical, emotional, cognitive and behavioral consequences, which may eventually affect the personnel's performance. Through the use of mental images and task-driven approaches, EMS personnel try to picture the situation beforehand. Through this method, they are also able to deal with the situation objectively and not let their emotions stand in the way. Chang et al. stated that through self-control, individuals learn how to face traumas and keep their feelings to themselves (29).

Based on the study findings, acquisition of clinical skills is one of the subcategories of self-efficacy. Participants believed that due to their inadequate education and training, burn scenes serve as the only opportunity where they can enhance their skills. Spencer argues that clinical environments provide the opportunity for focused learning in a professional context. In these environments, students become motivated through active participation; they also acquire various skills such as history taking, physical examination, clinical reasoning, decision-making, empathy and commitment, in an integrated manner (30).

Social support, the fourth subcategory of self-efficacy, can substantially decrease the stress of personnel and act

as a buffer against stressful conditions. Tusaie and Dyer found that social support is an essential element of resilience (31). Moreover, another studies found that social support has a positive impact on personal and organizational objectives. It is believed that when EMS personnel are supported by their colleagues, their mental health is positively affected (32, 33). Based on our findings, many young and inexperienced personnel are not adequately supported by their partners; however, experienced colleagues, working in a team, have positive feelings, interact with each other and benefit from each other's company.

**Religious support:** many participants considered spirituality, faith, belief and trust in God as highly effective strategies for coping with stress and dealing with burn emergencies. Therefore, it can be inferred that religious beliefs contribute to the development of resilience and intrapersonal aspects of mental health and positively influence mental health. Shaker et al. stated that religious beliefs are associated with reduced psychological stress (34).

The present study showed that major themes contributing to resilience of the EMS workforce in caring for burned patients are scene security/safety, effective decision making, self-efficacy and religious support. These contributing factors, if used in the right direction, help EMS personnel cope with environmental stressors, have positive effects on their mental health and protect them from burnout. By recognizing the importance of resilience in EMS care and enforcing its contributing factors, healthcare system, EMS personnel and patient would all benefit. Future studies are needed to address the question whether the findings of the present study can be generalized to EMS workers with different cultural backgrounds, work experience and education/training levels.

This was the first qualitative study on the experiences of pre-hospital emergency personnel dealing with resilience in the event of burn in Tehran, Iran. This study was able to provide valuable information about experiences of pre-hospital emergency personnel in the event of burn injuries. However, since data was collected through semi-structured interviews, the results were more comprehensive and subjective. Considering the fact that the process of providing pre-hospital emergency care for the burn victims is not yet well-established, a Grand Theory approach is recommended for further investigations.

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