WORLD JOURNAL OF PHARMACEUTICAL
AND MEDICAL RESEARCH
www.wjpmr.com

EVALUATION OF FACTORS AFFECTING DELAYED EMERGENCY SERVICES FROM VIEWS OF PREHOSPITAL EMERGENCY STAFFS IN NORTHEAST OF FARS IN 2016

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ABSTRACT

The present research aims to study factors affecting delayed emergency services from views of prehospital emergency staffs in northeast of Fars in 2016. The research was done qualitatively. A target sampling was done among key individuals, managers of emergency department, telephone answering operators, technicians and rescuer who had some experiences in emergency department. The size of participants will be based on theoretical saturation. Results identified following factors: long distance, heavy traffic, taking wrong address from dispatch, wrong travel of ambulance, wireless failure of ambulance or the station, lack of wireless antenna in some regions, wrong information given by patient's companions, prank call and busy lines, ambulance dispatch from regions other than the main regions of the station due to lack of ambulances, delayed dispatch of ambulance, no dispatch of ambulance in case of wrong calls, bad weather, corrupted access way, dangerous road, lack of up-to-date rescue & relief equipment, worn out ambulance, insufficient equipment in case of crises, lack of amenities in standard stations, lack of professional skill of some personnel, physical ability of personnel, the job morality and spirit, station's welfare services such as beds, cooling and heating facilities, lack of equipment for sport and physical activities, lack of thinking center for personnel, lack of educational materials and periods as well as lack of international competitions. Concerning research importance, some Delphi questionnaires were completed by semi-structured interviews. The interview is semi-structured and conceptual (such interview aims to explain and describe conceptually an event or a subject). The interviewer is going to illustrate the conceptual structure of concepts related to an event. The questions will explore the conceptual dimensions and meaning of central words, their place and relations with conceptual networks. In addition, factors related to the main components of the research were identified by interviewing with many emergency managers and rescuers who are still working in emergency department. Totally, ten main sources which play role in delayed emergency are as follows: 1- travel of ambulance in a wrong address, 2- long distance 3- dispatch of ambulance from regions other than the main regions of the station due to lack of ambulances 4- heavy traffic 5- bad weather 6- corrupted access way 7- dangerous road 8- taking a wrong address from dispatch 9- worn out ambulance 10- insufficient equipment in case of crisis.

KEYWORDS: prehospital emergency, treatment process, delay, qualitative.

INTRODUCTION

Prehospital emergency is a health management system with society-based approach and it has been coordinated with whole healthcare system. Medical emergency centers are considered as the most important organs of therapeutic services throughout the world. The most important target of the system is to offer satisfactory services in the shortest time based on up-to-date standards in the world (Joseph, 2007). The emergency patients face firstly with prehospital emergency in healthcare system. Prehospital emergency systems respond via two common ways in different countries. First, dispatch of ambulance with advanced equipment without considering the type of accident immediately after receiving the first call and information of the person who is on the phone. Second, collecting and classifying them as well as choosing the type of service dispatching to the region (Bidari, 2009). Since, prehospital emergency is an interface between healthcare system and the society, rapid, efficient and effective care will rescue lives of many people and reduce intensity and length of their illness as well as secondary side effects. The rapid

services in healthcare centers especially in prehospital emergency department are every important in order to reduce mortalities and disabilities. Response time and emergency services are the most important indicators in evaluation of emergency centers. Dispatch of ambulance from regions other than the main regions of the station due to lack of ambulance, travel of ambulance in a wrong address, delayed dispatch of ambulance, taking the wrong address, bad weather, long distance, heavy traffic, corrupted way and other reasons (Moradian, 2013) are factors affecting delayed services. Accidents are one of the biggest problems of general health in the world. 1.2 million people will die annually in accidents and above 50 million people suffer from injuries (Koyzo, 1990). About 16000 will die daily due to different types of injuries. The injuries and traumas include 12% of total load of illnesses and they are considered as the third cause of death as well as the main cause of death in people aged between 1 and 40 years old. Such traumas result from injuries (Sami Moafian, 2013) and they occur mostly in road accidents. According to data of WHO, road accident deaths include 25% of total deaths, 27567 people died and 276762 people were injured in Iran in 2006. Concerning population of 6 milliard and 342 million people throughout the world in 2004, one individual will die annually in accidents per 5285 people and one person will injure per 127 individuals. In Iran, these indicators are respectively 2539 and 253 individuals (Sami Moafian, 2013). Above 90% of road accidents are occurred in low and average income countries and they only own 48% of vehicles. WHO predicts that road traffic accidents will be changed into the fifth mortality road traffic factor in 2030 and mean growth of road traffic accidents will reach above 68% from 2000 to 2020 in the world. Such amount will be higher in developing countries (Bahadorianfar, 2013). Iran witnessed death of above 27000 people in 2006 and 270000 people were injured. About ten percent of victims will die. According to statistics, about 100 people are killed daily due to road traffic accidents in Iran. Such percent reaches to about 3000 people throughout the world (Mehmandar, 2016). Lack of receiving on time and rapid emergency services is one of the most important causes of death in road accidents. Different studies have shown that about ten percent of deaths can be prevented in case of receiving on time emergency services (Rajabi, 2015). Therefore, concerning the facts for 27000 deaths due to road accident in Iran, proper access to emergency services will reduce deaths of 2700 people. However, Iranian statistics suggest more requirements for emergency services in road traffic accidents but the effect of access to emergency services on mortality resulted from road traffic accidents varies in different countries. The regions will receive more emergency services when the rate of mortality in road traffic accidents is high due to lack of emergency department and lack of access to emergency services. One of indicators of access to emergency services is the length of receiving services and it is equal to the distance between accident scene and prehospital

emergency and reaching the injured (Zarezadeh, 2011). Moradian et al (2013) studied response time to emergency services in Fars province. The study was done descriptively and analytically. Data of 6068 missions were studied. Results indicated that about half of services were done in less than ten minutes. Lack of standard road, heavy traffic, bad weather, long distance, dispatch from other stations due to lack of emergency and ambulance, receiving a wrong address via operator, lack of dispatch of ambulance, delayed dispatch of ambulance are the main causes of delayed services. Rakei et al (2011) studied mean time spent on patients with head trauma from accident time to transportation of patient to Mobasher Kashani hospital. In this study, 450 patients with concussion were studied. Results indicated that different factors are effective on delayed services. All medical teams should be aware of accuracy and coordination in offering medical emergency services, the relationship between team elements, correct and scientific management of general measures. If the patient is offered medical services within 2-8 minutes, 40% of patients can be rescued from death. Jack (2017) studied delay of ambulances and patient's satisfaction from emergency services. He stated that bad weather and crowded streets are the problems which cause delay of ambulances. Wang (2016) studied delayed services of ambulance and he came up with the conclusion that delayed dispatch of ambulances is one of causes of delayed services to patients. In addition, another reason for delay was long distance and delayed services of ambulances to patients. Nosono et al (2010) studied death pattern and accidents of adults in emergency department of teaching hospital of Nigeria in 2010. This retrospective study was done for three years from January 2005 to December 2007. Concerning results, road traffic polices should control accidents and rapid access to proper facilities as well as checkpoints are required. Furthermore, effective transportation of injured people should be placed in governmental agenda to reduce time. Jarel (2007) studied delayed prehospital emergency and concluded that poor management of ambulance distributions in different regions is effective on long response time. The present research aims to study factors affecting delayed services from views of prehospital emergency staffs in northeast of Fars in 2016.

METHOD

Concerning main goal of the research and aforementioned issues, the research was done qualitatively, Grounded theory was used to make the conceptual model. For this purpose, qualitative data were collected. A number of aspects of the event are described in this stage. It is possible to formulate hypotheses for the event under study using primary identification. Statistical population includes managers of emergency centers, telephone answering operators, technicians and rescuers (N=25). Target sampling was done on key individuals, managers of emergency centers, telephone answering operators, technicians and rescuers who had experience of working in emergency department. The

sample size will be based on theoretical saturation. Theoretical saturation means a stage in which new data are not created about the category and a relationship is made between categories. Interviewees were asked about their experiences and observations about factors affecting delayed services from views of prehospital emergency staffs as well as to offer suggestions for improvement of such process. Interviews were continued until saturation of information. In this stage, Delphi method was used and managers of emergency center, telephone answering operators, technicians and rescuers were invited either physically or by e-mail to Delphi group via. In this stage, census was used. Concerning the nature of research and qualification of people for presence in this stage, convenient sampling was used. It is noteworthy that in some cases, a questionnaire was used in addition to physical semi-structured interview.
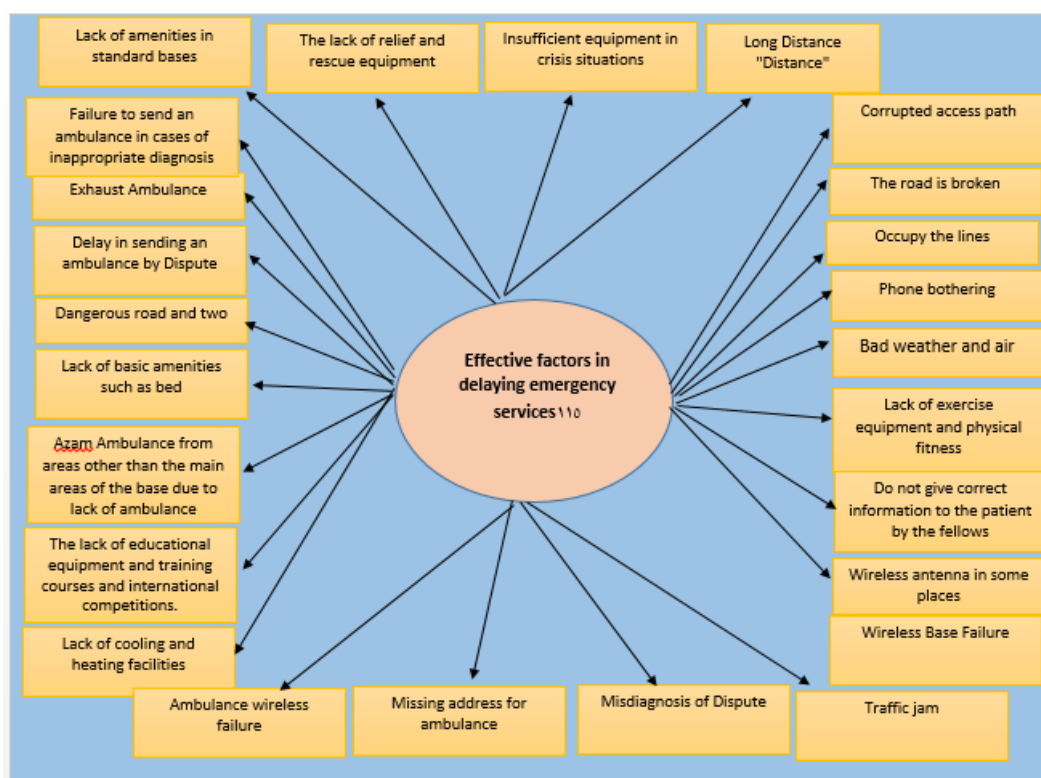
RESULTS

Section 1: results of Delphi group

Results of studies and investigation of analyzers and designers have led to identification of 25 sources of delayed emergency as shown in table 1.

In next stage, after selection of Delphi group, the group was asked to complete questionnaires as well as to help the researcher choose accurate delay of prehospital emergency. The questionnaire was sent to Delphi group. Then it was valued and summarized after collection of opinions. Table 1 shows components of the first stage of Delphi which were formulated by team designers. The components to which 60% of respondents answered positively were remained in the questionnaire and the components with low positive answers were deleted. Then, suggestions given by respondents were added to the questionnaire.

Table 1: questionnaire of the first stage of Delphi group.

Components	Yes	No
Long distance		
Heavy traffic		
Wrong address from dispatch		
Travel of ambulance in a wrong address		
Wireless failure of ambulance		
Lack of wireless antenna in some regions		
Incorrect information given by patient's companions		
Prank calls		
Busy lines		
Dispatch of ambulance from regions other than the main regions of station due to lack of ambulance		
Delayed dispatch of ambulance		
No dispatch of ambulance in case of wrong calls		
Corrupted access way		
Bad weather		
Corrupted road		
Two-way and dangerous road		
Lack of up-to-date rescue & relief equipment		
Worn out ambulance		
Insufficient equipment in case of crisis		
Lack of welfare services in standard stations		
Lack of amenities in stations such as bed		
Lack of cooling and heating facilities of the station		
Lack of sport equipment		
Lack of educational materials and periods as well as lack of international competitions		

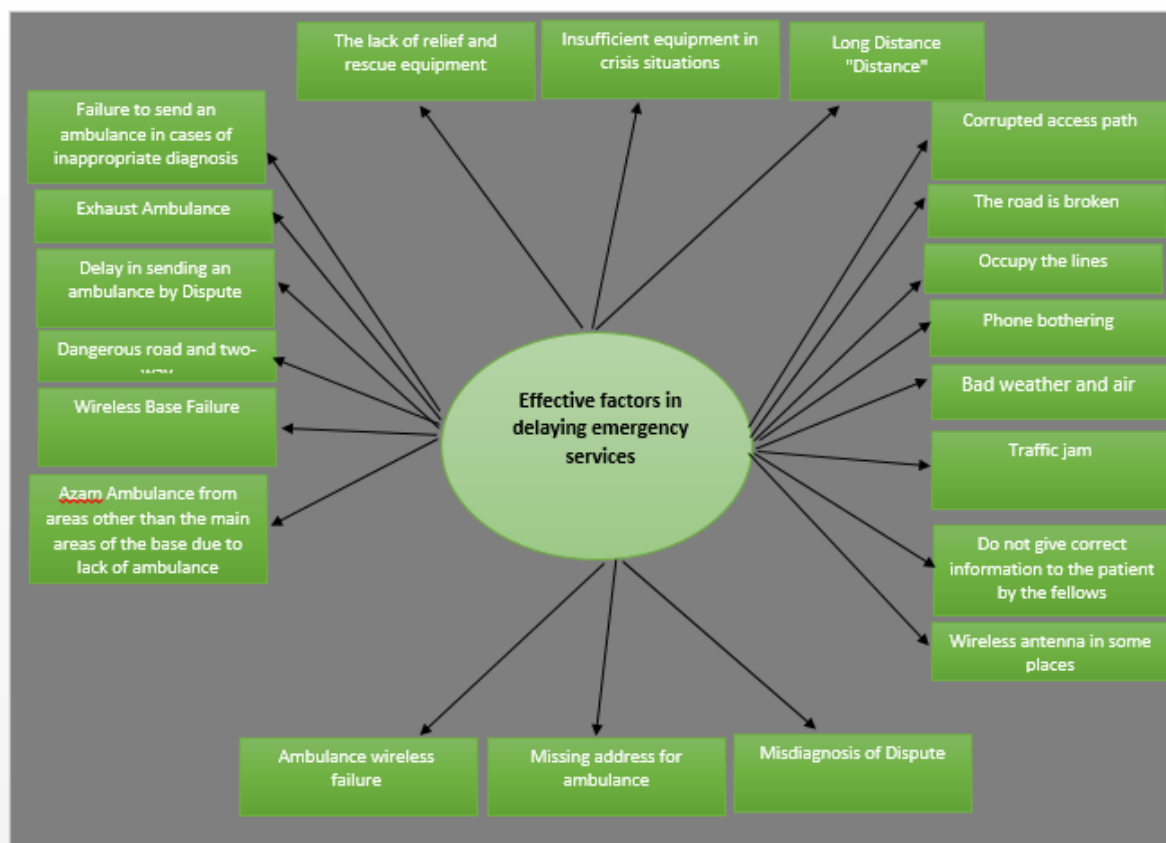**Conceptual model 1: the questionnaire of the first stage of Delphi group.**

Results of the first stage of Delphi
Table 2 shows the results of the first stage of Delphi. Components to which 60% of respondents answered positively were remained in the questionnaire and those with low positive answers were deleted. 5 components were deleted in this stage and four components were added by respondents.

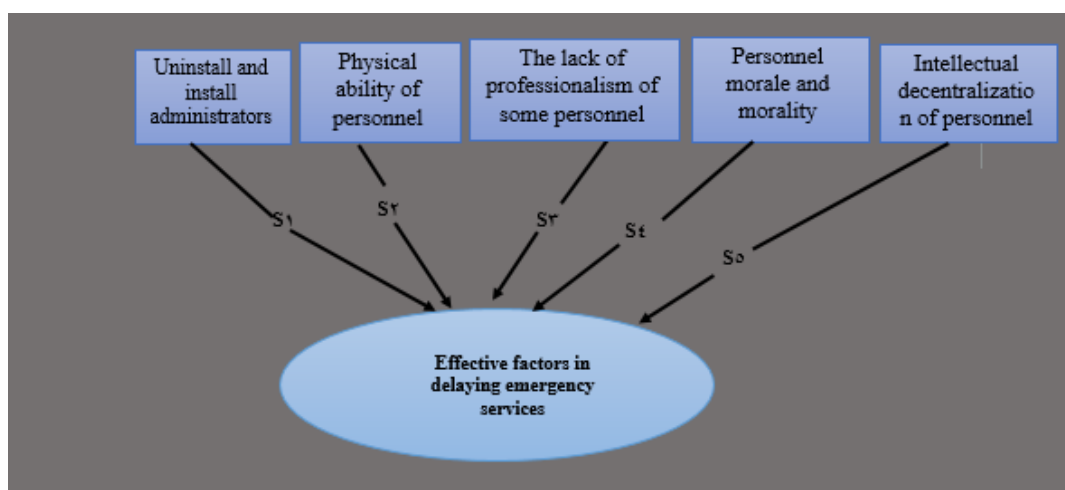**Table 2: results of the first stage of Delphi group.**

Components	Yes	No
Long distance		
Heavy traffic		
Taking wrong address from dispatch		
Travel of ambulance in a wrong address		
Failure of ambulance wireless		
Station's wireless failure		
Lack of wireless antenna in some regions		
Incorrect information given by patients' companions		
Prank calls		
Busy lines		
Dispatch of ambulance from regions other than main regions of station due to lack of ambulance		
Delayed dispatch of ambulance		
No dispatch of ambulance in case of incorrect calls		
Corrupted access way		
Bad weather		
Corrupted road		
Two way and dangerous road		
Lack of up-to-date rescue & relief equipment		
Worn out ambulance		
Insufficient equipment in case of crises		

Diagram 2: Results of the first stage of Delphi group.

Table 3: Components added to the first stage of Delphi.

Components added to the first stage of Delphi	Yes	No
Lack of concentration of personnel		
Lack of professional skills of some personnel		
Personnel's work ethics and spirit		
Physical ability of personnel		
Submission and appointment of managers		

Diagram 3: components added to the first stage of Delphi

Results from the second stage of Delphi
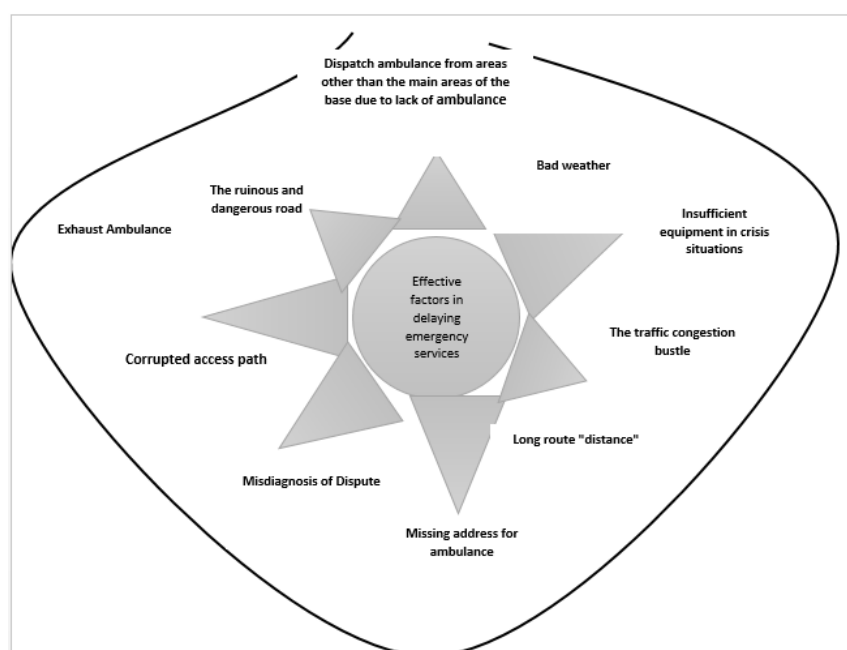Finally, results of the second stage of Delphi led to identification of ten main sources of delayed services of prehospital emergency in northeast of Fars province. Such results were listed in table 4.

Table 4: results of the first stage of Delphi.

Travel of ambulance in a wrong address
Inconsistent goals
Long distance
Dispatch of ambulance from regions other than main regions of the station due to lack of ambulance
Crowded road
Bad weather
Corrupted access way
Corrupted and dangerous road
Taking wrong address from dispatch
Worn out ambulance
Insufficient equipment in case of crises

The main components of the research are as follows: 1- travel of ambulance in a wrong address 2- long distance 3- dispatch of ambulance from regions other than the main regions of station due to lack of ambulance 4- heavy traffic 5- bad weather 6- corrupted access way 7- corrupted and dangerous road 8- taking wrong address from dispatch 9- worn out ambulance 10- insufficient equipment in case of crises.

Diagram 4: results of the second stage of Delphi

DISCUSSION AND CONCLUSION

The present research aims to answer following hypotheses: what are the most important factors affecting delayed emergency services from views of prehospital emergency staffs in northeast of Fars in 2016? Some components related to research subject were identified by studying papers and documents and they were the main components of research. Such components are long distance, heavy traffic, taking wrong address from dispatch, wrong travel of ambulance, wireless failure of ambulance or the station, lack of wireless antenna, incorrect information given by companions of patient, prank calls, busy lines, dispatch of ambulance from regions other than the main regions of the station due to lack of ambulances, delayed dispatch of ambulance, no dispatch of ambulance in case of wrong recognition, bad weather, corrupted access way, dangerous road, lack of up-to-date rescue and relief equipment, worn out ambulance, insufficient equipment in case of crises, lack of welfare services in standard stations, lack of professional skill of some personnel, physical ability of personnel, the job morality and spirit, station's welfare services such as beds, cooling and heating facilities, lack of equipment for sport and physical activities, lack of thinking center for personnel, lack of educational materials and periods as well as lack of international competitions.

Concerning research importance, some Delphi questionnaires were completed by semi-structured interviews. The interview is semi-structured and conceptual (such interview aims to explain and describe conceptually an event or a subject). The interviewer is going to illustrate the conceptual structure of concepts related to an event. The questions will explore the conceptual dimensions and meaning of central words,

their place and relations with conceptual networks. In addition, some emergency managers and rescuers who were still working in emergency department were interviewed to identify factors related to the main components of the research. Totally, ten main sources which play role in delayed emergency are as follows: 1- travel of ambulance in a wrong address, 2- long distance 3- dispatch of ambulance from regions other than the main regions of the station due to lack of ambulances 4- heavy traffic 5- bad weather 6- corrupted access way 7- dangerous road 8- taking a wrong address from dispatch 9- worn out ambulance 10- insufficient equipment in case of crisis. Since, prehospital emergency is the interface between healthcare system and the society, rapid, efficient and effective care will rescue lives of many people and reduce intensity and length of their illness as well as secondary side effects. Therefore, paying attention to time is very important as a criterion in this research.

Medical emergency system is considered as the front line of healthcare centers as well as the most important cause of reduction of mortality (Rostaminejad, 2000) because some measures should be taken when facing such patients based on global standard protocols. Such measures include fixation of backbone, blooding control in the scene, taking vein, control of vital signs, level of consciousness, venous injection of benzothiazines, convulsion, fixation of fractures, keeping the airway open, increase of oxygen and intravenous injection of liquids. The measures are divided into general cares, central neural system cares, respiration system cares and hemodynamic cares (Maas, 2008).

In addition, studies indicate that rapid and high-quality rescue can reduce 30% mortality resulted from accidents and adverse effects which cause improper measures and displacement of injured people are prevented (Bidari, 2007) specially in patients with brain and spinal cord traumas. Harrop et al stated that 6% of patients with intense cervical vertebra injury reported worse of neurological position whereas cervical fixation requires two paramedics thus it is time consuming (Ramasamy, 2009).

Concerning the importance of proper equipment inside ambulance, ambulance equipment was divided into four groups in moroccan area: A) devices that support ventilation and airway B) devices that support systemic circulation C) devices for fixation and transportation and D) communicating devices. Ambulance equipment were not based on standard principles except for communicating and fixation devices (Bhatti, 2011). Bidari et al studied a research in the last three months in 2004 which compared prehospital emergency performance with global standard in Tehran. They came up with the conclusion that primary services offered to patients who were transported by Tehran emergency were considerably lower than global standards (Bidari, 2007). In most developed countries, prehospital care is done by a skillful team of emergency services outside the hospital (Von, 2009). Soysal et al (2005) conducted a study in Turkey on 81 patients who were transported to Bozyaka and Azmir hospitals by emergencies. They concluded that prehospital emergency cares were not sufficient and suggested more in-service education as well as increase of personnel's knowledge and awareness (Soysal, 2005). Time is another important factor that determines outcome of injured patients. Standard time for arriving to the scene in urban and sub-urban regions is respectively 8 minutes and 15 minutes (Nasripour, 2009). It seems that the outcome of patients was better when they were transported to hospital within early hours after trauma. Of course, there is no direct relationship between more rapid transportation time, mortality reduction and secondary traumas. In a study conducted in America, there was no relationship between transportation time in prehospital stage and mortality of traumatic patients (Michael, 2012). Coska et al studied interventions conducted when healthcare team arrived the scene of accident and when the patient was transported to hospital. They concluded that patients had higher mortality when they received no intervention in the place of accident and were transported to hospital in shorter time (Esmaili, 2014). Concerning the importance of time management in prehospital emergency, Jack Cample (2007) stated mean response time above the standard time. Clindorfer (2003) stated in his study that 93-97% of emergency missions were lasted in ten minutes in 2003 which was longer than standard time. Jack Cample and Timoney Gordily (2008) concluded in their study that among 1945 missions, response time of 1059 emergency missions was longer than the standard time. According to Skinner (2008), the emergency services have to rescue patients in less than standard time (below 8 minutes). It is while that standard response time of emergency mission is 8 minutes. Concerning that reduction of response time will increase the chance of patients' survival and reduce mortality of patients, Moradian et al (2013) studied the response time of emergency services in Fars province. The study was done descriptively and analytically. Data of 6068 missions were studied. Results indicated that about half of services were conducted in less than ten minutes. Lack of standard road, heavy traffic, bad weather, long distance, dispatching from other stations due to lack of sufficient emergency and ambulance, receiving wrong address via operator, lack of dispatch of ambulance, delayed dispatch of ambulance are the main causes of delayed services. Bidari et al (2007) evaluated qualitative performance of prehospital emergency and compared it with global standards. The study was done descriptively on 500 patients. Results showed that the mean time is 12 minutes and 54 seconds and there is statistically significant difference. IV was taken from most patients in the scene and according to standard protocol, it should be done during transportation. Totally, 465 people (93%) had IV and 35 people (7%) did not have IV. The number of active IVs was 395 (84.95%) and the number of inactive IVs was 70 (15.05%). Hypertension was

measured in 92.3% of people, the pulse rates were measured in 88% of people. The number of breathes was measured in 83.07% of people, temperature was measured in 71.15% of people and GCS was measured in 73.07% of people. Among 163 traumatic patients, cervical vertebra fixation was done on 3.5% of people whereas it should be done on all patients in the scene. Blooding control was done on 7.05% whereas based on global standard, it should be done on 50%. It was concluded that traumatic patients are not behaved based on global standard.

Mehrabian et al (2006) studied the response time of prehospital emergency in Gilan. It was found that the highest number of missions were cancelled in the center of province. Therefore, the mean response time of prehospital emergency in urban regions was longer than sub-urban regions due to traffic. It was suggested that related organs such as IRIB, road traffic polices and road & transportation were coordinated to train and inform emergency rescuers as well as to control time interval between the request for prehospital emergency and dispatch of rescuers to the scene. Jack (2017) studied delay of ambulances and patient's satisfaction from emergency services. He stated that bad weather and crowded streets are the problems which cause delay of ambulances. Wang (2016) studied delayed services of ambulance and he came up with the conclusion that delayed dispatch of ambulances is one of causes of delayed services to patients. In addition, another reason for delay was long distance and delayed services of ambulances to patients. Nosono et al (2010) studied death pattern and accidents of adults in emergency department of teaching hospital of Nigeria in 2010. This retrospective study was done for three years from January 2005 to December 2007. Concerning results, road traffic polices should control accidents and rapid access to proper facilities as well as checkpoints are required. Furthermore, effective transportation of injured people should be placed in governmental agenda to reduce time. Jarel (2007) studied delayed prehospital emergency and concluded that poor management of ambulance distributions in different regions is effective on long response time. Rakei et al (2011) studied mean time spent on patients with head trauma from accident time to transportation of patient to Mobasher Kashani hospital. In this study, 450 patients with concussion were studied. Results indicated that different factors are effective on delayed services. All medical teams should be aware of accuracy and coordination in offering medical emergency services, the relationship between team elements, correct and scientific management of general measures. If the patient is offered medical services within 2-8 minutes, 40% of patients can be rescued from death. The research results are consistent with those of Jarel (2007), Rakei et al (2011), Nosono et al (2010), Wang (2016), Jack (2017), Mehrabian et al (2006), Bidari et al (2007), Moradian et al (2013), Skinner (2008), Jack Kample and Timoney Gordili (2008) and Klindorfer (2003).

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