

## Pre-hospital emergency performance in Iran; View of comprehensive coverage plan

Nasiripour A. A.<sup>1</sup> *PhD*, Bahadori M. K.<sup>\*</sup> *MSc*, Tofighi Sh.<sup>2</sup> *PhD*, Gohari M. R.<sup>3</sup> *PhD*

<sup>\*</sup>Faculty of Management & Economics, Sciences & Research Branch, Islamic Azad University, Tehran, Iran;

<sup>1</sup>Faculty of Management & Economics, Sciences & Research Branch, Islamic Azad University, Tehran, Iran;

<sup>2</sup>Health Management Research Center, Baqiyatallah Institute of Medical Sciences, Tehran, Iran;

<sup>3</sup>Department of Statistics, Faculty of Management & Informing, Iran University of Medical Sciences, Tehran, Iran

### Abstract

**Aims:** Primary prevention has remained one of the most important ways to reduce the burden of injuries. Many deaths and much long-term disabilities can also be prevented through strengthening trauma and emergency care. The purpose of this study was to survey the prehospital emergency performance in Iran.

**Methods:** In this cross-sectional descriptive study held during April to August 2009, 15 managers and experts of medical emergency and incident management working in health, treatment and medical education ministry were selected by achievable sampling method, were evaluated. Data gathering was performed by interview, information gathering special form and analysis of documents. Data analysis was conducted by SPSS 11 software.

**Results:** Response time in whole urban zones of country except Tehran was 7 minutes and was 14 minutes in suburban zones, generic coverage by incident management was 33%, number of ambulances were 3.19 per 100 thousand population, dispatch coverage was 80%, proportion of first aid learners were 58% and used care model was "mixed".

**Conclusion:** Prehospital emergency is approximately good in Iran but there is distance from desirable and standard condition.

**Keywords:** Performance, Pre Hospital Emergency, Iran

### Introduction

Primary prevention is known as one of the important ways of reducing injuries and damages, and several studies have shown that many deaths and long-term disabilities can be prevented through strengthening the trauma and emergency care [1, 2]. Each year, more than 5 million deaths and more than 100 million disabilities happen due to injuries that their main reason is violence, road traffic accidents, falling down, burns and drowning [3]. The aim of pre-hospital emergency system is to provide medical care for the people in need [4, 5].

Progress in medical care and technology in recent decades has changed the traditional parameters of emergency. Perhaps the common misconception is the inherent expensiveness of emergency medical care [6]. Medical care performed in critical situations by weak and ineffective programming of resources, may be inefficient. Some countries allocate limited resources to emergency; when conditions cause demand increase for emergency care, the allocation of resources hastily will accelerate, causing the costly spread of resources. The attempt for improving the emergency care does not necessarily increase the costs [7, 8, 9].

Emergency care should be recognized as a complete system with independent components. These

components include pre-hospital care, transportation, and hospital care. Every component is important, but they all must interact to have survival effect on public health. When hospital transportation is weak or does not exist at all, death will happen which can be prevented through low-cost methods. For example, a great part of the maternal mortality falls in this category [10, 11].

Most people of the world do not access formal pre-hospital emergency [12]. Pre-hospital system should be simple, ongoing and efficient [13]. Two kinds of respond is common from the pre-hospital emergency systems in different countries; dispatching ambulance with advanced equipments immediately after receiving the first call regardless of the type of event; and getting information from the caller, collecting and classifying them, and selecting the type and the level of dispatched service to the event site [14, 15, 16]. In some countries, paramedic staff and ambulance are only used to transfer patients to medical centers and no treatment action will be performed until their arriving to the care centers [17, 18]. The study of nonmilitary helicopter programs in U.S. reveals that the primary factor in reducing traumatic mortality has not been the transportation speed, but the care management by helicopter or hospital staff away from station [19]. Increasing the respond of health system to

\* Correspondence; Email: bahadori\_57@yahoo.com

people's expectations, leads to utilization of services and better outcomes [20]. Having access to medical services in emergencies and life threatening conditions is a key expectation in some societies [21]. The results of a study in Nepal show that people use basic care more than medical emergency for the preventive services and people have felt the need for available medical emergency and surgical services [22]. Lack of emergency medical service transportation is a major factor for care and may result from lack of proper facilities, inadequate roads and disability in paying the transportation costs. The consequences of the lack of transportation are very broad and heavy [23].

Special emergency forces are divided into two categories of Franco and Anglo. In Franco system, facilities and equipments are taken to the scene and patient's bedside and it is used a physician is present in the ambulance. In Anglo system, technicians who have passed the basic medical emergency courses attend the site, take the patients or injured people and carry out the initial actions and then transfer them to the equipped center or hospital [24]. Also, the ambulances used in the stations are divided into two types of B and C. Type B has been designed and equipped for transfer or initial treatment and monitoring of patients, and have quartet main equipments including oxygen, stretcher, resuscitation and suction bags. Type C, is designed and equipped for transfer or advanced treatment and in addition to the equipments of type B, has a defibrillator too [24]. In order to improve the level of emergency medical services, the statute of organizing the comprehensive coverage of pre-hospital emergency medical services of country was approved by the cabinet members in 2007, based on which the ministry of health and medical education was obligated to improve the functional index of pre-hospital emergency [25].

Due to lack of comprehensive data in the field of pre-hospital emergency in Iran and lack of specific information in field of activity and performance of incident management and emergency medical services in Iran, this study was conducted in order to investigate pre-hospital emergency in Iran.

## Methods

This is a descriptive-analytical study, which was conducted in the first half of year 2009. The participants were 15 managers and disaster management professionals and emergency medical services working in Ministry of Health and Medical Education. Due to the limitation of the statistical population, sample size was equal to population. Interview, specific form of data collection and

studying documents were used for data collection. Data analysis was carried out using descriptive statistics with SPSS 11 software.

## Results

Based on the comprehensive coverage plan, the time of reaching to the patient's bedside in cities (except Tehran) in 80% of cases was less than 8 minutes and in 80% of cases was less than 15 minutes on the roads. In table 1, the status of functional indices of pre-hospital emergency has been specified.

**Table 1-**Functional indices of disaster management and emergency medical services in Iran

Index	Rate
Intra-city responding time	7 Min
Suburban responding time	14 Min
Responding time in Tehran	12 Min
Traffic injuries coverage	%50.3
The overall coverage by the management of emergencies	%33
Communication coverage	%80
Number of calls per day	120 thousand
The number of man force	9400people
The number of ambulances per hundred thousand population	3.19
The number of urban emergency stations	683 Station
The number of road emergency stations	943 Station
The ratio of first aid course learners of the total target population	%58
The ratio of emergency relief course learners of total relief forces	%43

The number of ambulance stations per one hundred kilometer of main road was 2.92, and the percentage of the roads covered by emergency centers in highways, freeways, main roads and subordinate roads were 80, 90, 78 and 52%, respectively. The used care model was a combination of Franco and Anglo models which was used according to the accident type and appropriate conditions. Also, educations were classified into different levels of general, specialized and continuous. All ambulances of emergency 115 in Iran are of type B. B advanced type ambulances existed in all universities. Ambulances of the B advanced type were equipped with a physician. In total, 42 emergency115 centers existed in Iran, which have been named as the "center of disaster management and medical emergencies in universities" by regarding crisis management and unexpected events during the past two years, and the emergency 115 is a part of it. There are 10 relief aircrafts In Iran. In Tehran that has the most active air aid, there is a helicopter that covers whole Tehran province by cooperation of force airline. The helicopters which are in Iran are mainly military which are used in a multi-

purpose way, i.e. both for the organizational measures and for transfer of emergency patients.

The communication center lacked automated phone identification system and location detection system and operators were forced to register caller's address and telephone number.

## Discussion

There are no empirical data about people who have stayed alive due to emergency medical care or the people whose life years have been reduced by their disability. However, providing timely and quick treatments leads to reduction of the disease load [25]. The standard time of reaching to the event site is eight minutes in urban areas and 15 minutes in areas outside the town that in this study, the time of reaching to the site has been less than these numbers. In the Roessler study in Germany, the response time has been more than 10 minutes in urban areas [26]. Also, results of the study by Charles showed that the state and central standards for reaction time does not exist in U.S. For example, in New York, the reaction time of 10 minutes has been an obligation. While in California, this time is 12-15 minutes. In general, the standard time is considered 8 minutes, but this goal is rarely accessible and has a considerable deviation [16]. John study in England suggests that the government goal is to reach the 8 minutes in 75% of cases which has not been achieved so far. Thus, comparison between the results of this study and other studies shows that the responding time is in a proper status in Iran [27].

The effort of best teams equipped with the latest technology and logistics, will be wasted if being unable to reach the scene in time or communicate with health centers. Most of world population lives in areas with very poor communication. In 2000, in Brazil there were 15 telephone lines for every 100 households [28]. While the coverage of communication centers is 80% in Iran. In Mexico, increase in ambulance dispatch centers from 2 to 4 centers and preparation of basic skills training in traumatic care, have led to decrease in patient deaths during their transfer to hospital [29]. In advanced countries, the most commonly used system is equipped with automatic telephone identification system and automatic location detection system. These systems determine the phone number and the accurate address from where the call has been made [30, 31]. While the results of present study showed that the pre-hospital emergency of Iran does not utilize these systems. In the U.S. the Anglo model of care and in European countries except the Netherlands, Franco

model are used [32, 33, 34]; while in pre-hospital emergency of Iran a combination model of Anglo and Franco is used.

According to the results of this study, there are 3.19 ambulances per one hundred people in Iran. The results of the study in Kuala Lumpur with 1.1 million population showed that this figure is equal to 48, but the ambulances are only able to answer 20% of calls; its main cause is only the problems related to maps and signs [35]. In Iran ambulances of type B are used which are also used in the United States, Germany and France [36, 37].

Pre-hospital Emergency study in some systems showed that the levels of education have been separated and categorized (basic, medium and paramedic emergency medical services technician) [15, 32]; while this type of classification does not exist in Iran and only education for medical emergency technicians are provided. Also, disaster management and emergency medical services has trained approximately 58% of the target group considering the highly important role of people in improving the pre-hospital emergency performance. Results of a study in Ghana showed that the first aid training to taxi and bus drivers provides more effective pre-hospital care [38]. Moreover, the study in Northern Iraq and Cambodia investigated the designed programs for the training of paramedics and people who have trained by these paramedics, and a significant decrease was observed in the mortality of injured people with severe traumas after training [39].

Based on the results of this study, there are 10 helicopters for the air relief which are military, in Iran. Dutch government has contracted with four helicopters for the provision of air ambulance. Each of the four helicopters has been put to minimize the responding time in Netherlands strategic points [34]. Also, in Norway the ground ambulances are supported by fixed-wing helicopters and airplanes [40]. Although in the United States helicopters are preferred for emergency services, but a fixed wing aircraft including small jets are often used to transfer patients from the rural hospitals to the secondary care places [34].

## Conclusion

Pre-hospital emergency is in a relatively good status in Iran and functional indices confirm this fact. Definitely, a long way should be passed to reach the standard level. Organizational maneuvers for training people, preparing the background for raising the participation of people and also the help of private

sector and developing of required protocols are essential in this regard.

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