



Emergency Medical Services In Iran: An Overview

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REVIEW

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Abstract

Emergency Medical Services (EMS) in Iran, named "Emergency 115," was established in 1978 with cooperation from America. In Iran, EMS delivery is financed by the government and is free of charge. Established standards call for a response time of less than eight minutes in cities and less than 15 minutes in suburban areas for 80% of the cases, and this standard has been met everywhere in the country except for Tehran (the capital of Iran). Emergency services coverage for traffic accidents has exceeded 52.3%. In recent years, the Foundation of Medical Emergency Schools has established emergency medicine training programs for both EMS personnel and the general public. Also, personnel of the Iran Medical Emergency and Accidents Management Organization are establishing the standards for hospital emergency procedures and providing oversight of the emergency departments in hospitals. Over all, pre-hospital emergency services have made notable advances, and they are continuing to improve.

Key Words

Emergency Medicine, Iran, History, Education

Introduction

It has been established that many deaths and long term disabilities can be prevented through empowering the trauma centres and pre-hospital emergency services (1, 2 and 3). Iran is a western Asian country, located in the central Asian and Caucasus region, with an area of approximately 1,650,000 km² and a population of more than 75 million people. Iran, which extends from the Caspian Sea (the world's largest lake) to the Oman Sea and the Persian Gulf, is a path for cultural-political relationships of Eastern World (4, 5). Hospitals and healthcare centres are managed by the Universities of Medical Sciences, which are under the control of the Ministry of Health. According to articles 3, 29, and 43 in the principles of constitutional law, the government of Iran must meet the basic needs of the public, such as education, health care, housing, and clothing. Therefore, the government is required to meet public health requirements. However, at the present time, the people must pay for 60% of their healthcare costs, whereas the Ministry of Health, social insurance, and other public organizations pay the rest. So far, efforts to decentralize the health structure have not been successful. For example, the heads of Universities of Medical Sciences are chosen by the Minister of Health, and the manager of a public hospital cannot select a payment method or a management manpower method freely and autonomously. Ministry budgeting has progressed from traditional, incremental budgeting to operational budgeting, but it has yet to progress to performance-based budgeting (6, 7).

At present, the average life expectancy in Iran is 73 years (74 years for women and 72 years for men), and the rate of population growth is approximately 1.6% per year. The index of physician to population is 1.35 physicians per 1000 people. There are currently 771 hospitals in the country. The number of emergency ambulances has increased to 2300 in 2008 (a 77% increase since 2003). Also, emergency services attending traffic accidents have increased from 35% in 2006 to 52.3% in 2008. On the main roads of country, there is an emergency station every 30 kilometres (8, 9). According to the World Health Organization (WHO), cardiovascular diseases are the most prevalent causes of mortality in Iran. Unintentional accidents are the second cause of mortality. Iran with 28000 annual deaths has the highest mortality rate from road traffic accidents in the



world. The road accidents rate in Iran is 20 times higher than the world average. According to the Iranian data one person loses his/her life every 19 minutes due to car accidents. Poisoning, falling, drowning and burning are the next causes of accidental death (10, 11, 12, 13, 14 and 15).

Historical perspective of Emergency Medical Services (EMS) in Iran

The collapse of the ceiling in one of Mehrabad airport’s waiting rooms in 1975 claimed many lives because no planned system was in place to help injured people or transfer them to medical facilities. After this unfortunate accident, Emergency Medical Services (EMS) in Iran, named "Emergency 115," was established with America’s cooperation and Iran became the fourth country in the world to provide pre-hospital emergency services. However, during the Iranian revolution and the war that followed, these services were not adequately maintained or renewed, and many of the EMS facilities were damaged, their manpower was dispersed, and the service lost the trust of people due to the inappropriate services provided(16). Then, the universal and comprehensive emergency medical plan was approved in 1999 and formally commissioned in 2000, which brought about needed improvements in the services and resulted in a new speciality of Medical Emergency at some medical sciences universities. Based on this plan, new and up-to-date books were translated, new efficient and skilled managers were selected, ambulances were provided, the number of stations and bases was increased, and now, relatively speaking, Iran’s pre-hospital emergency services provide excellent services and have a good reputation. Even so, there was more that needed to be done to achieve the best acceptable standards, and, in recent years, these efforts have resulted in additional significant advances in the quality of the nation’s EMS services (16). Table 1 illustrates the performance of pre hospital Emergency in Iran (17). In contrast to advanced countries such as the Netherlands, U.K., Australia and U.S. where the EMS service is the advanced life support (ALS) type, the EMS is mostly the Basic Life Support (BLS) type (18).

Table1. Performance of Pre hospital Emergency in Iran

Generic coverage by incident management	33%
Number of ambulance	3.19 for every 100 thousand of population
Dispatch coverage	80%
Percent of early aids pervasive	58%
Number of urban base	683
Number of road base	943
Traffic injuries coverage	50.3%

Medical Emergency and Accidents Management

To promote efforts to prepare for and to prevent accidents, Medical Emergency and Accidents Management services were established by the Health Minister in 2005. Since then, there have been significant improvements. Presently, this Management is responsible for the establishment and

implementation of policies by and overseeing the activities of following bureaus (19):

- 1- Logistic Bureau
- 2- Pre-hospital Services Bureau
- 3- Hospital Medical Emergency Services Bureau
- 4- Private Ambulance Services Bureau
- 5- Incident Preventing Programs Bureau
- 6- Research and Training Programs Bureau
- 7- Communications Bureau
- 8- Health Secretariat for Disasters
- 9- The Ministry of Health's secretariat of Passive Defence Committee
- 10- Emergency Operation Centre (EOC)

At the present time, Medical Emergency and Accidents Management are offered in only 13 medical sciences universities due to budget limitations. For managing the ambulance fleet and delivering medical emergency services, there are 42 Communication Bureaus and 203 dispatch centres country wide to increase access to Emergency 115. In the Pre-hospital Services Bureau, civil cooperation has been enlisted and planning has undertaken to for special occasions such as the New Year festival and important spiritual-political occasions (20). In this Bureau, based on health system priorities, statistics related to incidents are monitored, and there is continuous cooperation with other related institutions and organizations (20). Also, hospital emergency departments are now under the jurisdiction of the Medical Emergency and Accidents Management. Personnel. Medical Emergency and Accidents Management are setting standards for hospital emergency departments with respect to equipment, physical facilities, manpower, and administrative processes. Based on principle 44 of the constitutional law (relegating the delivery of services to the private sector), the Private Ambulances Services Bureau intends to formally facilitate the use of private sector facilities and capabilities in the health sector. The Incident Preventing Programs Bureau was established in the Medical Emergency and Accidents Management in 2008 to make a comprehensive review about incidents (before occurrence, during the occurrence, and after occurrence). In this Bureau, some issues, such as safe society and incidents occurrence prevention approaches, are reviewed based on a society-based perspective (21).

One of the important activities of Medical Emergency and Accidents Management is policy making and planning for comprehensive coverage of wireless communication. At the present time, updating the communication equipment is an essential priority in health and safety systems, especially in Tehran and other metropolitan areas. Therefore, utilizing the new advanced technologies for communicating data as a multi-layer system and communicating between pre-hospital and hospital services are among the important objectives of Medical Emergency and Accidents Management centre (20). The EOC, which is a centre of managing and directing of medical emergency services in the entire health system, is under the control of the Health Minister and cooperates with all other administrative



centres to help him or her foster cooperative efforts inside and outside of the health system and make on-time and scientific decisions in a short time after the occurrence of the incidents. The Health Ministry's EOC has been equipped with modern technology by the Health Minister's efforts and the allocation of a generous budget (19). The Secretariat of the Passive Defence Committee is another active unit that coordinates activities inside and outside of the Medical Emergency and Accidents Management centre. The health deputy and development deputy are the heads of the Passive Defence Committee, and the Director of the Medical Emergency and Accidents Management is its Secretary. At present, this Secretary is developing the guidelines needed to prepare service packages due to be completed in the near future (21).

Education

- 1. General Education:** Cardio Pulmonary Resuscitation (CPR) training is one of the public preparation plans in which the primary principles of CPR are taught to educate the people in a target population, such as teachers, airplane and train crews, and professional drivers. Also, these same targeted populations are being given First Responder training by the Iran Medical Emergency and Accidents Management in cooperation with the medical sciences universities, based on the Minister's council's enactments (19, 20, and 21).
- 2. Special Education:** Including training to promote scientific services (19, 20, and 21).
- 3. Continuous training:** Now, medical emergency technicians have access to foreign scientific books and materials that have been translated and distributed. The technicians are required to study and sit a comprehensive examination monthly. Also, each month, they must take and pass a six-hour educational course at the medical sciences universities. During the last few years, medical emergency schools have been established based on the Health Minister's direction, and they are in the process of training the needed manpower. Another of the Iran Medical Emergency and Accidents Management's plans that has had successful results is the development and promotion of an emergency medicine specialty. This field of study was approved by the Specialty and Medical Educational Committee in 1996, and Iran's University of Medical Sciences began the curriculum in 2000 and graduated the first class of students in 2004. At the present time, new workers in this field (as an independent field of study with specific goals) are being trained in the Iran, Tehran, Tabriz, and Shahid Beheshti Universities of Medical Sciences. Such widespread training in this new field will extend the capabilities of hospital emergency physical facilities, ensure the use of scientific behaviours and treatments for patients before they arrive at the hospital and enhance patient

satisfaction with the medical emergency hospitals. It will also guarantee the triage of patients in need of more urgent attention, and decrease the patient waiting times. Most importantly, the existence of associated emergency authorities and the new view of emergency departments as independent departments have resulted in changes in the departments, such as the development of research and educational plans, the development of plans for long-term improvements, and financial management (19, 20, and 21).

Providing pre-hospital emergency services (manpower, transfer, care model)

In Iran, EMS delivery is free of charge. The systems of pre-hospital medical emergency or emergency 115 are divided into two groups: Franco-German and Americo-England. In the Franco-German system, equipment and facilities are taken to the scene of the accident, and a physician attends to the patient in the ambulance. In the Americo-England system (Iran system during the early days), trained technicians provide care for the patient at the scene of the accident and then transfer the patient to a well-equipped medical centre. At the present time, the medical emergency system used in Iran is a blend of the two above-mentioned systems. In some cases, a physician may be present at the scene of the accident and provide care for the patient in cooperation with the medical emergency technicians, but, in other cases, the physician may remain at the communication centre while technicians at the scene of the accident provide care for the patient based on their consultations with the physician. Established standards call for a response time of less than eight minutes in cities and less than 15 minutes in suburban areas for 80% of the cases, and this standard has been met everywhere in the country except for Tehran city (22).

During the last few years, many activities have been implemented that have resulted in improving medical emergency transfers in Iran. Some of them are using Sprinter 314 ambulances, encouraging medical emergency technicians to obtain a degree from the junior college of anaesthesia or a bachelor's degree in nursing. We can also add the using helicopters to transport seriously injured patients, providing continuous medical education programs for ambulance technicians and physicians, creating additional emergency bases and stations, and utilizing modern equipment in the ambulances to the above list. For transferring injured persons and patients to emergency medical centres in disasters 5% all ambulances, including active ambulances and ambulances that support medical universities' emergency 115 operations have been equipped with mobile intensive care units (MICUs) (23). The ambulances in Iran are either A-type ambulances, type B (mostly) or C. All medical universities have the advanced B-type ambulances which are the ambulances equipped with Basic Life Support. In all, there are 42 emergency 115 centres in the country, and each one is equipped either with B-type ambulances or C-type ambulances (Equipped with Advanced life Support). The so called A-type ambulances



are only used to transfer patients who are not having a medical emergency (24).

Private ambulance services centres can transfer ordinary patients based on medical universities' health deputy's agreements and rules. These centres are not allowed to provide drugs, medical equipment, or nurses. Also, there are 10 helicopters available for transporting emergency patients. Tehran, which has the most active helicopter services, has a helicopter which operates and provides services for patients in the Tehran suburban roads and highways where the helicopter can land and take off during daylight hours. The equipment of these helicopters is the same as the equipment in the ambulances. The majority of Iran's helicopters are military helicopters utilized for both organizational measures and transferring medical emergency patients. These are not medical helicopters, but they have medical emergency equipment. Therefore, although they are efficient and effective, they cannot be classified as ambulances. However, some efforts are being made to provide medicopters to fulfil needs (24).

Communication

The Communication and Operations Directing Centre is responsible for operating the emergency 115 service, and the coordinator of emergency bases and stations, who coordinates all the related units of emergency 115, must take appropriate measures after a call for assistance is received. The communication centres are independently located in appropriate places in provincial centres, i.e., cities that have a population of more than 250,000 people and that have medical universities and colleges. In cities that do not meet these qualifications, a dispatch centre exists that serves as an information centre, coordinating the provision of assistance, summoning emergency ambulances, and cooperating with the Communication Centre in critical situations. The number 115 has been designed for contacting medical emergency services in that it only communicates with the medical emergency centre. The Communication Centre lacks Automatic Number Identification (ANI) and Automatic Location Identification (ALI), and, when a call is received, its operators must accept the call and record the caller's address and telephone number, a process that wastes valuable time and contributes to responding to spurious assignments and missions. In Iran, those who have been hired to serve as emergency 115 operators have included nursing students with a Bachelor's degree who lacked any actual experience in medical emergency services. They have no experience in managing stressful situations, obtaining and properly categorizing patients' histories from information provided by telephone, or making proper decisions to dispatch suitable services to the scene of the incident. They are being replaced with new graduates who have completed their Human Resources Services Plan but still lack the required experience in dealing with emergency care decisions (25, 26).

Problems and challenges

In recent years, the Iran Ministry of Health has made efforts to increase the number of ambulances, but it still has a long way to go to reach international standards. Based on the latest available statistics from recent years, someone in Iran is killed in an automobile accident every three hours. Even so, the most common cause of mortality in Iran is cardiovascular disease, which usually strikes people in their productive years between the ages of 45 and 50. At these ages, the loss of these people who are likely to have dependents under their guardianship causes irretrievable losses to both their families and Iranian society. This situation further emphasizes the importance of a functional system of emergency services in place throughout the nation, because such a system benefits not only individual people but also serves the best interests of the nation. Furthermore, because of heavy traffic and road problems in Tehran, it is sometimes difficult to get to injured persons. For these reasons, it is essential to design the emergency services system so that the potential distances between injured people and the emergency bases are decreased, especially in Tehran.

Services that are provided by emergency centres are defined as pre-hospital services. Transferring people from incident sites to the hospitals is one duty of the emergency centres. It is especially important that properly trained professionals implement these transfers, because, in some cases, people who have been injured in a minor accident suffer from irreversible damages, such as spinal cord injuries, because of improper transferring. Pre-hospital services are essential services for the health of the population, and the absence of such services, as well as their poor implementation may result in irrevocable losses to society. In Iran, the emergency 115 number is not familiar to people yet. Probably, one of reasons for this is that the emergency centres and services have yet to meet people's needs and expectations. Because of inappropriate situations and imbalances between supply and demand, people have come to believe that emergency ambulances cannot be counted on to arrive at the accident scenes expeditiously, so they feel that they should transport injured persons to a hospital or a healthcare centre. In recent years, due to increases in the number of ambulances and improvements in the in-ambulance medical equipment, the general population has developed increased confidence in and reliance on emergency centres and services.

Unfortunately, some people who have little or no knowledge of emergency centres, emergency services, or emergency equipment have begun to market and sell such equipment. In other words, purchasing medical emergency equipment and other medical equipment should be regulated and based on the exact needs of the medical emergency centres. Since the country population in general and the urban population in particular are increasing in Iran, the rate of accidents and other emergent situations are on the rise. These trends suggest an increasing need to improve EMS service as a priority in Iran and other similar countries. Pre hospital services require an integrated



management system. Public education and facilitating the involvement of private sector in EMS service are necessary.

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CONFLICTS OF INTEREST

The authors declare no competing interests.