Is Emergency Medical Services (EMS) in Islamic Republic of Iran Practical and Efficient in Facing Ebola?

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> ABSTRACT

Objective: To evaluate the efficacy and preparedness of Emergency Medical Services (EMS) in Islamic Republic of Iran to face Ebola.
Methods: The present study is cross-sectional and somehow descriptive. We used a standard questionnaire that was designed by "center for disease control and prevention". This questionnaire was captioned "Emergency Medical Services (EMS) checklist for Ebola preparedness". We collected a lot of data by studying that questionnaire and every manager in every province of Iran were informed about that info in 2016. This data was analyzed by using SSPP software version 16.
Results: Findings have showed the average score related to preparation level of EMS in facing Ebola in Iran was 63.73 ± 12.77 percent. There was no significant difference between the country regions regarding the preparedness of to detect ($p=0.975$), protect ($p=0.275$) and respond ($p=0.344$) to ebola outbreaks.The highest score had been achieved by region number 5 and the lowest score belonged to region number 7.
Conclusion: Although the acquired average score in this study is higher than standards, considering the increased threat of breaking out biologic threats especially Ebola infection, using and practicing some measures in order to enhance preparation level of Emergency Medical Services counter this infection and similar infectious diseases is inevitable.

Keywords: Preparation; Pre-hospital; Emergency medical services (EMS); Ebola; Bioterrorism; Biologic agents.

Introduction

Modern biotechnology, provided humans with the opportunity to use microorganisms in a better, faster and more meticulous way. But there is no doubt that this powerful tool can be harmful or beneficial for mankind, depending on who uses it. Good people or bad people [1]. Terrorism using radiological dirty bombs or improvised nuclear devices is recognized as a major threat to both public health and national security [2]. Biologic agents have some special features that make them interesting for different governments or terrorist groups. In the last 10 years, U.S government spent more than 60 billiard dollars in order to defend the country against biological threats (bioterrorism) [3]. By the way, using biologic agents as a weapon had been recorded in history and after September 11, 2001 terrorist attacks, using these agents as a weapon were considered by some organizations (e.g. terrorist groups) once again [4]. From 1980 to1990 we experienced almost 6000 terrorist attacks all over the world and because of these attacks 4000 people got killed and 11000 people got injured as well [5, 6].

One of the genetic modified Viruses that threaten world's security is Ebola hemorrhagic fever [7]. Ebola virus (that is known as hemorrhagic fever) is the cause for a sever infectious disease that kills more than 90 percent of patients. Touching and contacting contaminated mucous, body organs, blood, body fluids and animals with Ebola virus, is a popular way of transmission this virus [8]. The training of Emergency Medical Services personnel to provide care for disaster victims is a priority for the physician community, the federal government, and society as a whole [9]. According to the nature of biologic threats, the first group of people that will face a biologic attack includes managers and personnel who work in a public health center [10]. Emergency Medical Services is a significant part in presenting public health services. This system is a significant part in public health system [11] and plays a key role in presenting and transporting patient to the health centers [12].

Given the multiple terrorist attacks that have occurred in recent years in China, medical rescue teams and specialized incident assessment teams have been established by the government [13]. Emergency Medical Service is one of the first units that act in the field in case of having a disorder related to biological incidents, so all the personnel must go through some trainings based on considered instructions [13-16]. These trainings are designed and introduced based on principles of the American centers for disease control and prevention (CDC), World Health Organization guideline, the International Committee of the Red Cross and other international organization guideline. Based on the recommendations of these organizations the personnel who work in EMS must be trained based on global standard instructions, in order to learn how to deal with patients in the field [17-22]. One of the studies about this matter in Iran, known as "Assessment of Emergency Medical Services personnel preparedness against biological incidents' by Shoja Fard *et al*. was performed in 2014. These personnel were considered weak in a lot of aspects such as theoretical education, practical education, regulations and instructions and equipment and tools [23].

Base on all the mentioned facts, evaluating and assessing the preparation level of pre-hospital Emergency Medical Services' personnel counter biological incident and bioterrorism threats is absolutely crucial. There are a few conducted researches about the preparation level of these centers in counter biological threats especially an emerging infection like Ebola in Iran so we decided to design and conduct a study with aim of evaluating the preparation level of Emergency Medical Services(EMS) in Islamic Republic of Iran in counter Ebola hemorrhage fever.

Materials and Methods

Study Protocol

This study was a cross- sectional study that is considered descriptive. In this study the preparation level of Emergency Medical Services in Islamic Republic of Iran in counter Ebola was evaluated in 2016. It is important to know that all the centers in every province in Iran were the targets of this study. In every province, the preparation level of Emergency Medical Services (EMS) in counter Ebola was evaluated. In this process we considered some factors such as prepare to detect (triage and diagnosis), prepare to protect (considering some points about isolation and using Personal Protective Equipment (PPE) and prepare to respond (transport and caring needs in the course of a patient transition). This study has been carried out according to a questionnaire designed by center for disease control and prevention (CDC).

The questioner that is designed by center for disease control and prevention (CDC) includes 54 questions. Those questions are categorized into 3 parts including being prepared to detect (8 questions), being prepared to protect (25 questions) and being prepared to respond (21 questions).

Ten Regions of Iran

Region number 1 including Gilan university of medical sciences, Mazandaran university of medical sciences, Babol university of medical sciences, Golestan university of medical sciences, Semnan university of medical sciences, Shahrood university of medical sciences.

Region number 2 including Tabriz university of medical sciences, Urmia university of medical sciences, Ardabil university of medical sciences and other universities of medical sciences in this region.

Region number 3 including Kermanshah university of medical sciences, Hamadan university of medical sciences, Kurdistan university of medical sciences and Ilam university of medical sciences.

Region number 4 including Ahvaz university of medical sciences, Lorestan university of medical sciences, Dezful university of medical sciences and other universities of medical sciences in this region.

Region number 5 including Shiraz university of medical sciences, Jahrom university of medical sciences, Fasa university of medical sciences, Bandar Abbas university of medical sciences, Busher university of medical sciences, Yasoj university of medical sciences and other universities of medical sciences in the region

Region number 6 including Zanjan university of medical sciences, Arak university of medical sciences, Qazvin university of medical sciences, Qom university of medical sciences, Alborz university of medical sciences and other universities of medical sciences in the region.

Region number 7 including Esfahan university of medical sciences, Yazd university of medical sciences, Kashan university of medical sciences and Sharkord university of medical sciences

Region number 8 including Kerman university of medical sciences, Zahedan university of medical sciences, Rafsanjan university of medical sciences, Jiroft university of medical sciences, Zabol university of medical sciences, Bam university of medical sciences and other universities of medical sciences in the region.

Region number 9 including Mashhad university of medical sciences, Birjand university of medical sciences, Bojnord university of medical sciences, Sabzvar university of medical sciences, Gonabad university of medical sciences, Torbat-e Heydariyeh

university of medical sciences and other universities of medical sciences in the region

Region number 10 including Tehran university of medical sciences, Shahid Beheshti university of medical sciences, Iran university of medical sciences, Baqiyatallh university of medical sciences, Shahed university of medical sciences, Medical University for the Islamic Republic of Iran's Army and University of Social Welfare and Rehabilitation Sciences.

Statitical Analysis

After translating this questionnaire from English to Farsi, it was given to 7 professors who have been Professor in Arak University of Medical Sciences then it was modified according to their comments. These professors were expert in Emergency Medicine and Infectious disease. After modifying, the questionnaire was used in this study. Questionnaires were sent to all the managers of Emergency Medical Services (EMS) in every province then the gathered data were analyzed by using SPSS version 16, central statistical methods and ANOVA test.

Results

Data related to this study were gathered from all Emergency Medical Services (EMS) in every province of the Iran (31 provinces). The overall scores to detect, to protect and to respond the ebola are summarized in Table 1. The scores of the preparedness to detect and respond to the ebola outbreak in each 10 regions are summarized in Table 2. As demonstrated in Table 3, there was no significant difference between the country regions regarding the preparedness of to detect ($p=0.975$), protect ($p=0.275$) and respond ($p=0.344$) to ebola outbreaks.

Table 1. Average and standard deviation of total score and sub scale related to preparation level of Emergency Medical Services in Islamic Republic of Iran in facing Ebola

	Mean	Min.	Max
Being prepared to detect	57.93±15.34	33.33	95.83
Being prepared to protect	60.38±11.47	38.46	79.49
Being prepared to respond	70.09±18.28	34.92	96.83
Total score	63.73±12.77	36.36	84.85

*Note: All the scores are percentages

Table 2. Average and standard deviation of total score related to preparation level of Emergency Medical Services in counter Ebola according to regional classification

Region	Mean	Min.	Max
1	66.96±15.97	47.88	84.85
2	61.21±8.92	55.76	71.52
3	65.75±16.71	53.94	77.58
4	57.37±7.88	49.70	65.45
5	75.15±13.71	65.45	84.85
6	66.96±8.91	59.39	79.39
7	40.60±5.99	36.36	44.85
8	60.30±13.57	44.24	72.73
9	70.90±5.78	64.24	74.55
10	66.81±15.10	51.52	81.82

Table 3. Scores related to ANOVA test including total score and subscales of preparation level in every region of the country

	Mean Squares	Sum of Squares	*p* value
Being prepared to detect	82.548	742.934	0.975
Being prepared to protect	163.339	1470.047	0.257
Being prepared to respond	379.383	3414.446	0.344
Total score	200.277	1802.489	0.267

Discussion

According to result of the study, the preparation level of Emergency Medical Services in Islamic Republic of Iran in facing Ebola by considering three aspects including preparation to detect, preparation to protect and preparation to respond is more than 50%. The lowest score belonged to region 7 and the highest belonged to region 5. After searching and investigation some data sources, there was no evidence related to a similar study, but in a study that was done by Javad Shoja Fard and et al in 2014, with the title of "Assessment of Emergency Medical Services personnel preparedness against biological incidents' personnel who work in Tehran in facing Ebola" all the personnel were considered weak in the contexts of theoretical education, practical education, regulations and instructions and equipment and tools [23].

In another study in Belgium, known as "Preparedness of Belgian civil hospitals for chemical, biological, radiation, and nuclear incidents: are we there yet?" by Mortelmans, Luc JM *et al*. was performed in 2014. The study showed that there are serious gaps in hospital preparedness for CBRN incidents in Belgium. Lack of financial resources is a major obstacle in achieving sufficient preparedness [24]. In another study in US emergency departments known as "An assessment of Chemical, Biological, Radiologic, Nuclear, and Explosive preparedness among emergency department healthcare providers in an inner city emergency department " By Kotora JG, was performed in 2014. The study showed that The overall frequency of correct answers was 66.26 percent, indicating a relatively poor level of CBRNE preparedness in EMS personnel [25]. The preparation level of emergency medical services depends on a lot of factors. Some of these important factors are parameters that influence the preparation level of emergency medical services including human resources, equipments and logistic, educational courses, IT, management, organizations and chief among all motivation [26].

In conclusion, although the acquired average score in this study is higher than standards, considering the increased threat of breaking out biologic threats especially Ebola infection, using and practicing some measures in order to enhance preparation level of Emergency Medical Services counter this infection and similar infectious diseases is inevitable.

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Conflicts of Interest: None declared.

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