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Preparation Rate of Environmental Health Operational Teams in Facing with Crisis of Drinking Water in Disasters

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Abstract

Aims: Iran is one of the countries that always faced with the unforeseen events and is in danger of all kinds of natural disasters. Since after natural disasters, affected region has the potential of various public health threats, establishing the environmental health department has been proposed. The aim of this study was to assess the preparation rate of environmental health operational teams from all around Iran, in facing with crisis of drinking water in disasters.

Instrument & Methods: This cross-sectional study was done in 2015 during the environmental health emergencies maneuver at Hormozgan Province, Iranand 15 operational teams and 15 assessor teams were selected randomly for the study. In order to assess the activities of environmental health teams, a checklist of environmental health was prepared and used. Spearman correlation coefficient and Chi square tests were used to analyze the data.

Findings: There were no significant differences between operational and assessor teams according to the studied parameters of water crisis ($p>0.05$). All operational and assessor teams believed that microbial, latour and chemical sampling were well done ($p=0.1$). There were significant correlations between operational and assessor teams in general assessment ($r=0.607$; $p=0.017$) and all other main parts except tubing design ($r=-0.279$; $p=0.313$)

Conclusion: The readiness of the operational teams of environmental health is not desirable in dealing with the crisis of drinking water.

Keywords

Environmental Health [https://www.ncbi.nlm.nih.gov/mesh/68004782];
Disasters [https://www.ncbi.nlm.nih.gov/mesh/68004190];
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Introduction

Iran is one of the countries that always faced with the unforeseen events and is in danger of all kinds of natural disasters [1]. Natural and fabricated disasters' losses and costs affect many people, equipment, assets and environment around the world, each year [2]. In the last 2 decades, about one billion people in the world, directly or indirectly have been involved in violent incidents [3]. Since after natural disasters, affected region has the potential of various public health threats, establishing the environmental health department, as one of the main units in the management of natural disasters and emergencies, has been proposed [4]. In this regard, it is one of the important components of communication between programming and operating in disasters. In many countries, e.g. Canada, Australia, the United States and Britain, holding practices and implementation of maneuvers, in the affairs related to being prepared for disasters have been accepted [5].

According to a study, the United States hospitals are the most and the Armenia hospitals are the least prepared against disasters and Kobe, Japan, hospitals are intermediate [6].

Some studies have focused on the management of water resources protection program in disasters and the ability of personnel in supplying and maintaining water resources and prevention of water borne diseases [7-9]. 62% of the hospitals of Tehran University of Medical Sciences in 2014 have not held any training courses for disaster response and 85% officials have not participated in any training program [10]. Staffs and rescue teams are the top scorer in dealing with the disasters [11]. Educational public hospitals of Ahwaz University of Medical Sciences, despite having equipment and facilities, are not ready to cope with the crisis [12]. Personnel awareness, medical equipment and readiness of the Iranian hospitals in front of undesirable events have been reported to be very limited [13, 14].

The aim of this study was to assess the preparation rate of environmental health operational teams from all around Iran, in facing with crisis of drinking water in disasters.

Instrument & Methods

This cross-sectional study was done in 2015 during the environmental health emergencies maneuver at Hormozgan Province, Iran. In this maneuver, the environmental health teams did health interventions and checked the accuracy of their work with regard to the scenario. According to similar studies and the number of the teams, 15 operational teams and 15 assessor teams were selected randomly for the study.

In order to assess the activities of environmental health teams, a checklist of environmental health was prepared and used. The checklist had 19 general questions about water supply characteristics and 40 questions for examining the readiness of operational teams in the water crisis in 5 areas; design review of pipelines, water supply, bottled water supply, quality of water facilities, and drinking water storage sites. These functional areas were designed according to the World Health Organization (WHO) guidelines, the guidelines of Health, Care and Medical Education Ministry of Iran in environmental health, and the guideline of operations of health that is a program of action in response to disasters and emergencies [15].

The checklists were filled during the maneuvers for each environmental health operational team by the head of each team.

Data was entered to SPSS 18 software and the results were reported by descriptive statistics. As the data found not to be normal, Spearman correlation coefficient and Chi square tests were used to analyze the data.

Findings

There were no significant differences between operational and assessor teams according to well potable water sources ($p>0.05$), respecting to the principles of water resources development ($p=0.7$), not using provided potable water from dedicated wells ($p=0.264$), well sanitation of potable water supply ($p>0.05$), proper functioning of chlorination facilities ($p=0.139$), not separation of potable water from washing water ($p=0.215$), being water in the tanks for maintenance ($p>0.05$), evaluation of the tanks for ground type ($p>0.05$), assessing the reinforced concrete reservoirs ($p>0.05$), not observing the

operational and sanitation conditions about reservoir security (p=0.245), not observing the privacy of reservoirs (p>0.05), and the pH range of evaluated water (p=0.682; Figure 1).

Figure 1) Comparing the frequency between operational and assessor teams according to questionnaire parameters (answer of each parameter is out of 15 and numbers in parentheses are percentages)

Parameters	Operational	Assessor	p Value
Presence of nitrate in water	6 (40)	9 (60)	0.466
Presence of chlorination facility in place	10 (66.7)	10 (66.7)	>0.05
Allow residual chlorine in water	8 (53.3)	7 (46.7)	>0.05
Study of radioactive substances in water	0	4 (26.7)	0.1
Pseudomonas biopsy	0	9 (60)	>0.05
well potable water sources	11 (73.3)	10 (66.7)	>0.05
respecting to the principles of water resources development	11 (73.3)	9 (60)	0.7
not using provided potable water from dedicated wells	11 (73.3)	7 (46.7)	0.264
well sanitation of potable water supply	10 (66.7)	9 (60)	>0.05
proper functioning of chlorination facilities	11 (73.3)	6 (40)	0.139
not separation of potable water from washing water	13 (86.7)	9 (60)	0.215
being water in the tanks for maintenance	13 (86.7)	13 (86.7)	>0.05
evaluation of the tanks for ground type	13 (86.7)	14 (93.3)	>0.05
assessing the reinforced concrete reservoirs	12 (80)	13 (86.7)	>0.05
not observing reservoir security	12 (80)	8 (53.3)	0.245
not observing the privacy of reservoirs	11 (73.3)	10 (66.7)	>0.05
and the pH range of evaluated water	12 (80)	10 (66.7)	0.682

All operational and assessor teams believed that microbial, latour and chemical sampling were well done (p=0.1).

There were significant correlations between operational and assessor teams in general assessment (r=0.607; p=0.017) and all other main parts except tubing design (r=-0.279; p=0.313; Figure 2).

Figure 2) Comparing the mean of the teams in 5 main parameters and the total and the correlation of them

Group	Mean	p Value	r	p Value
Tubing design				
Operational	0.39±0.37	0.933	-0.279	0.313
Assessor	0.40±0.35			
Existing water supplies				
Operational	0.39±0.25	0.673	0.718	0.003
Assessor	0.43±0.17			
Possibility of evaluating water quality				
Operational	0.46±0.31	0.433	0.556	0.031
Assessor	0.55±0.30			
Location of water maintenance				
Operational	0.32±0.33	0.446	0.785	0.001
Assessor	0.24±0.27			
Provided bottled water				
Operational	0.34±0.37	0.711	0.677	0.006
Assessor	0.29±0.36			
General assessment				
Operational	0.39±0.25	0.95	0.607	0.017
Assessor	0.39±0.17			

Discussion

To enhance the preparedness of the country in disasters, having a proactive approach in the formulation of comprehensive disaster management seems inevitable [2]. Disaster management plan should include at least the phases of prevention/mitigation, preparedness, response and recovery [4]. With regard to our study, which appears to assess the readiness of the operational health system in dealing with the drinking water crisis the results showed a semi-favorable condition.

Lack of any differences between the operational and assessor teams demonstrated the comprehension of the study however, more coordination between operational teams is needed to create a suitable model in dealing with crisis [13-20]. Holding global maneuvers during year can identify the strengths and weaknesses, and take measures to eliminate weaknesses. Global environmental health emergencies' maneuvers have achieved positive results in the direction of operational coordination of environmental health teams. Having preparedness maneuvers before the outbreak of the disaster can help the development and understanding the organization command orders. Because at that time and disaster reigns disorder, and people willingness to act as members of the group to achieve a certain goal [21, 22].

Using qualitative approaches to design the health management model for unforeseen events have shown the lack of preparedness in hospitals and health centers in Iran and the necessity of attention to this. Khankeh *et al.* have reported the lack of preparedness of Rehabilitation University hospitals in front of disasters [9]. In examining the impact of maneuvers in promoting awareness of the environmental health personnel, Ingrassia *et al.* have stated that performing the exercises close to disasters have influential role in improvement of awareness of the forces involved in the crisis [18]. Mahbubi has reported that the majority of the medical study centers are far from the standards relating to the labor and equipment for a possible confrontation with the crisis [21].

The readiness of the educational hospitals of Isfahan City, Iran has been reported in a not satisfactory state in operational maneuver of crisis management that complies with the results of our study [22].

Regarding natural disasters cannot be prevented; we need to raise the preparedness of health care system to decrease mortality and damage. Generally, readiness is including having plan, facilities and staffs in place, to provide effective response at the right time. Readiness needs financial and administrative support and other organizations counterpart, in order to plan for effective answer [23-25]. Since the policy of the Ministry of Health, Care & Medical Education generally has been to improve the readiness of the health sector in front of the disaster, providing the environmental health department is needed.

In line with our research that showed the lack of preparation and the need to make coordination and strategic management other studies have also shown the need of maneuvers and planning in order to maintain the water resources [26-30]. To achieve this goal we suggest performing continuously maneuvers, surveying the operational teams ability in other health areas, evaluating each university separately and running educational programs and principles programming techniques scenario in all provinces of the country.

Conclusion

The readiness of the operational teams of environmental health is not desirable in dealing with the crisis of drinking water.

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