

Health and Treatment Network Response to Flood, a Natural Disaster (Case Report)

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ARTICLE INFO	ABSTRACT
<p>ORIGINAL ARTICLE</p> <p>Article history: Received: 23 Des 2017 Revised: 7 Jan 2018 Accepted: 10 Feb 2018</p> <p>*Corresponding author: Seyed Akbar Hosseini</p> <p>Address: Dept. of health in Disasters and Emergency, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd</p> <p>Email: Hosseini.ph@gmail.com</p> <p>Tel: +98-9113217125</p>	<p>Introduction: Flood is a sudden disaster resulting from snow and rain overflow, breaking dam walls, broken floodgates in a few hours. Flood is more than a normal overflow of water. Such a situation is considered as a disaster if it puts human life in danger. Heavy and consistent rain can cause flood in a very short period of time. This study aimed to investigate the response of Nour city health and treatment network to the 2016 flood of Nour in Mazandaran.</p> <p>Methods: In this case-descriptive study, data was collected and analyzed using checklist and statistical forms of the Ministry of Health through observation, interviewing and reviewing of existing documentation and in-person visits of healthcare staff experts.</p> <p>Results: Due to the heavy rainfall and its coincidence with snow melting in Chamestan and Baladeh regions, a severe flood followed. Immediately a rapid health assessment was carried out. Home-to-home care increased. Eighteen kilograms of perchlorine were distributed and 212 cases were tested in terms of chlorine amount. Furthermore, mental health services, non-communicable diseases, and mothers and children health services were provided. None of medical facilities and health centers in the area was evacuated and no population evacuation had taken place.</p> <p>Conclusion: Considering the importance of intersectional cooperation in disaster management, it is important to consider sensitization of relevant authorities in order to draw their attention to common preventive measures. Beside the proper crisis Management in the health network of Nour, with respect to the high frequency occurrence of floods in the city, in order to keep the healthcare staff prepared, it is necessary to formulate and practice the response program while assessing risks.</p> <p>Keywords: Disasters, Flood, Nour Health Networks, Response Nour</p>

Introduction

Flood is a sudden disaster that is caused by excessive rain and snow, breaking dam walls, broken floodgates in a few hours (1). The flood is more than a normal overflow of water. Such a situation is considered as disaster if it puts

human life in danger Heavy and consistent rain in a very short period of time is the requirement (3) of a flood. Flood effects on population growth, economic development and climate changes. Hence, understanding the physical and temporal characteristics of the flood is essential for the

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development of effective flood mitigation measures(4).. In 2006-2015, flood has been the main cause of deaths from disasters. Flood alone accounted for 47.2 percent of all atmospheric disasters in the world and affected two billion and 300 million people' lives, with the highest number of casualties in Asia.(5) (Annual Disaster Statistical Review, 2016).

The reasons for the increase of flood damage in Asia are the vastness of the continent and the presence of many rivers drainage basins and the density of population along with them. In Asia, between 2000 and 2015, there were 2495 atmospheric disasters, affecting 37 million people and killing 332,000 people(5).

In Iran, over the past few years, in addition to the earthquake, the annual credits for the Natural Disasters Impacts Reduction Plan and Unanticipated Events Center have been used to compensate for the damage caused by floods. In Mazandaran, floods are generally of three types; floods resulting from all kinds of rains, the combination of melting snow and rain and melting snow. Floods have often threatened this province.

Noor city in Mazandaran province has a total area of 2,675 square kilometers and a population density of 41 people per square kilometer in the central part of Mazandaran province. From the north, Nour is bound to the Caspian Sea and from the south (through Kandovan and Damavand peak) to Tehran and Karaj provinces, from the East to Mahmood Abad and Amol and from the west to Noshahr city. This city is geographically in 52 degrees longitude to the east and 36 degrees and 35 minutes latitude to the North. Mahmoud Abad with a 25 km distance from Nour is the closest city. Nour is 114 km away from the capital, Sari, and to Tehran, it is 243 km. In terms of unevenness, it can be divided into mountainous and plain areas, the northern part of which have temperate climate of Caspian Sea, but the southern heights due to higher altitude and extension of mountains, has a temperate mountainous climate, which in high mountain tops changes into cold mountainous climate. In terms of vegetation, the major part of Nour is covered with forest and rangelands. There

are both winter and summer rangelands in the city. The city has three sections (central - Chamestan - Baldeh) and nine villages named Natal kenar olia, Natal, Mianrud, Lavij, Mianband, Sheikh Fazlollah, Tetarshak and Ozrood.(6) The population of Nour, according to the census of 2016, was 11, 1001. (Mazandaran provincial government, 2016).

The population of Nour, according to the census of 1395, was 110,013, of which 55,403 were male and 54,610 were female. This city has 76 healthcare centers, 8 health headquarters, 16 health and treatment centers and a 105-bed hospital (Mazandaran University of Medical Sciences, 2016). The present study describes how the health and treatment network system responds to flood as a natural disaster in Chamestan and Baladeh districts of Nour. Therefore, not many research studies have been conducted on the response of the health care network to disasters in Mazandaran province and the city of Nour. Accordingly, considering the importance and application of this issue in the healthcare network response to disasters and subsequent crises, the current study was conducted.

Materials and Methods

This case-descriptive study by making the necessary coordination with Nour city health and treatment network began by the researchers' reviewing of scientific texts and by going to Nour health network and asking about flood in Baladeh and Chamestan. The documentations in development and environment health network centers were investigated. Then all information was collected by visiting flood-affected areas of Baladeh and Chamestan, using checklists and statistical form of the Ministry of Health. It should be noted that all checklists were completed by interviewing in flood-affected areas and the response method of Nour health system was directly analyzed by researchers. In order to determine the scientific validity of the checklists to collect data, the health experts' views on events and disasters were applied. In order to determine the validity of the checklist, data collection was

used by health professionals in disasters and accidents

Results

Cyclonic Storm rains caused the heavy rainfall and flood to begin on Monday, 2016 May 16 in Chamestan. After a week of flooding in the mountainous area of Baladeh, which has always had heavy snow, the rapid increase in the temperature and its continuity for several days caused snow melting and floods. In total, 12 villages with 874 households and 4520 people were affected by the flood.

The flood effects are as follows:

Destruction of buildings, infrastructures and health facilities: Eighty rural residential units and 8 communicating bridges were damaged. As a result of flood, two drinking water springs in the area and drinking water pipelines of drinking water in two villages were destroyed. Fifteen toilets were ruined as a result of flood. None of the health and treatment facilities personnel and their equipment in the area was damaged.

Damage to agricultural products and animal casualties: A hundred livestock involving sheep were died. Nineteen livestock and poultry units were also damaged. An aviculture and a pathway for 2 aviculture's were also destroyed, 86 pieces in agricultural farms and gardens of Baladeh and Marzandeh were damaged by 20 to 100 percent. One hundred fifty hectares of agricultural and horticultural lands were damaged and the value of damages was estimated to be 165 billion rials.

Service continuity: Providing services in these two parts continued due to the lack of damage to the health and treatment centers and personnel and facilities in the region, and there was no restriction on public access to health services.

Mortality and injuries: As a result of this flood, 1 person died due to electric shock and 2 others were severely injured.

Health and treatment Network Response activities.

Early warning: The meteorological department of Mazandaran had predicted the flood and in broadcasting center of Mazandaran in different

news items had informed people of the weather condition; however, the warning did not go further. During the flood, health workers reported the flood to the healthcare network.

Evacuation and facilities: None of existing healthcare facilities and centers in the area was evacuated and no population evacuation had taken place.

Quick Assessment: The next morning, a team from the crisis committee of the Health Network was deployed to flood areas. A systematic evaluation was carried out using existing checklists. The members of the rapid assessment team observed the health status of the area closely and had given proper instructions.

Providing therapeutic and pre-hospital services: There were 13 healthcare centers with 7 doctors, 5 nurses and obstetricians, and 28 personnel in flood-hit areas. There were 8 healthcare homes in flood-affected areas whose healthcare providers continuously served people and collaborated with dispatch teams from the city health center and other departments. There was a record of five people at the centers who were referred to the hospital.

Providing public health services

Providing services for communicable diseases: Twenty-eight bottles of cary blair were prepared for the Eltor sample of diarrhea cases which were sent to the health centers. The health care providers had been given the necessary instructions regarding the possible outbreak of illness and that routine care was intensified.

During the month after the flood, there were no positive cases of Eltor, malaria, measles, meningitis and other treatable diseases. Furthermore, no contagious diseases was reported in the area during a month after the flood. During this time, only 3 cases of mild diarrhea and 1 animal bite were reported.

Provision of non-communicable diseases services: To assess the extent of the incidence, Non-communicable Disease Unit made necessary arrangements with doctors, health experts and health care providers about the care for the injured patients with non-communicable diseases in

sampling centers. The Thyroid Screening was carried out by the Rapid Assessment Team. The non-communicable diseases condition form was completed by disease experts on a daily basis. Pharmaceutical and therapeutic (paraclinical) needs were determined for those at risk and were provided to the health care team doctor based in the health centers. Fortunately, no such case was reported. It was difficult to send samples of heels from 3-5 day old infants to sampling centers due to road collapse, which with the help of the governor, the post office of the city and the province, the problem of sending samples was fixed.

Providing the environment health services:

The Environmental Health Unit had 37 visits to flood hit villages. Forty four microbial samples were prepared from water sources, 7 samples of which had microbial contamination and no chemical samples were prepared. Six damaged drinking water source were reconstructed with the help of the Environmental Health Unit. Eighteen kilo perchlorin was distributed to health care centers for the preparation of the main chlorine, and besides teaching health providers how to make it; the necessary instructions were given to people as well.

The amount of chlorine of 212 cases was tested, 173 cases of which were okay. Fifteen household toilets were damaged, and with the guidance and collaboration of the Environmental Health Unit, eight of them were reconstructed during one year after the disaster. None of the centers for food preparation and distribution in the villages were destroyed.

Reproductive health services: This unit initially focused on stabilizing care for pregnant women near childbirth and made necessary arrangements with obstetrics and family health experts in crisis affected areas in the early hours. Three hundred twenty seven pregnant mothers were attended to daily by obstetrical personnel, in person or by telephone. Routine care for infants was carried out on a daily basis. No cases of mother or child's death were reported.

Discussion

In this study, only two cases of injuries were reported that they had also gone to the hospital. In previous floods, restrictions on access to health facilities have been reported due to their being stuck and damaged by flood(7) The incidence of diarrhea was only 3 mild cases in this study, while in a study on Bangladesh flood this number was high(8). According to the warning of the Meteorological Organization of Mazandaran and its notifying of all heads of departments, as well as the announcements via the capital broadcasting organization, as in previous studies, there was no evacuation of the injured which is questionable.(9, 10).

In this flood, there were many damages to agricultural land, agricultural products and livestock, which was reported in previous studies on the effects of floods on livestock and agricultural products(11).

In previous studies, following cascading events such as erosion, fire, and ... have been seen, but in this study on flood disaster, just electric shock followed that killed 1 person(12) .

In experts' post-accident review of the diseases, there has been no outbreak of contagious diseases or their increase ,while in previous studies, the prevalence of zoonotic diseases including leptospirosis was observed(13) . Previous studies also reported an increase in infectious diseases and diseases transmitted through vectors (14-16).

There was no delay or shortage of maternal and child health services, and because the health structures were not damaged, there was no problem regarding pregnant women and children.

Conclusions

Recent flood, due to the severity of rainfall, at the beginning of the flood in the adjacent flooded areas, carried a large amount of mud, stones and trunks of trees which led to their piling up in the margin of the rivers bridge and the blocking of the bridges. By increasing rainfall and flood, the rivers capacity decreased, resulting in rising of river water and overflowing with tree trunks into villages and causing damage to both parts. Most of flood damages have been to livestock and

agricultural products. Because the health infrastructures and of medical facilities were not damaged, there was no problem in providing health services to the injured, flood affected population. The quick warning about the flood, especially announcing the start of the flood and the blockage of the rivers' mouth through the mosque microphone to villagers, caused less damage to households and the target population of health. The city of Nour is one of the areas where the flood occurs with extensive frequency. It is recommended that Nour Health and treatment network:

1. Considering the importance of intersectional cooperation in disaster management, the sensitization of relevant authorities should be considered in order to attract their attention to joint preventive actions.

2. Beside good disaster management of Health and treatment network in Nour, regarding the high frequency of flood in the city, in order to keep health personnel prepared, personnel and people training during all stages of the management should be considered.

3- It is necessary to have an effective system for collecting data related to natural and man-made

disasters constructed in the health and treatment network in Nour in order to document and use the information in the form of lessons learned during disasters from the health effects that flood brought about.

4. Assessing the existing disasters in the area, making the disaster maps, and designing a systematic response plan in this city is essential.

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Conflicts of interest

The authors declare that they have no conflicts interests.

Authors' contribution

Drafting the manuscript and data collection: S.A.Hosseini, F.Taheri, F.Yazdi. Revising the manuscript critically for important intellectual content: B.Shiravand and N.Ghasemi.

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