Emergency and Disaster Reports

ISSN 2340-9932 Vol 6, Num 3, 2019

Monographic issue

Iran earthquake risk profile

Moslem Sarani

University of Oviedo – Department of Medicine
Unit for Research in Emergency and Disaster

Letter from the editors

The Emergency and Disaster Reports is a journal edited by the Unit for Research in Emergency and Disaster of the Department of Medicine of the University of Oviedo aimed to introduce research papers, monographic reviews and technical reports related to the fields of Medicine and Public Health in the contexts of emergency and disaster. Both situations are events that can deeply affect the health, the economy, the environment and the development of the affected populations.

The topics covered by the journal include a wide range of issues related to the different dimensions of the phenomena of emergency and disaster, ranging from the study of the risk factors, patterns of frequency and distribution, characteristics, impacts, prevention, preparedness, mitigation, response, humanitarian aid, standards of intervention, operative research, recovery, rehabilitation, resilience and policies, strategies and actions to address these phenomena from a risk reduction approach. In the last thirty years has been substantial progress in the above-mentioned areas in part thanks to a better scientific knowledge of the subject. The aim of the journal is to contribute to this progress facilitating the dissemination of the results of research in this field.

This monographic issue is about disaster risk profile of Iran.
Iran, is located in the central Middle East and has an area of 1,648 million sq. km. The country faces many types of natural and man-made disasters, and it's ranked among top 10 countries regarding death related to disasters.

The present monographic issue gave an overview of the various hazards and corresponding vulnerabilities across Iran and the national disaster risk management.

Prof. Pedro Arcos, Prof. Rafael Castro, Dr. Alexandre Zerbo
Editors*, Emergency and Disaster Reports*
Unit for Research in Emergency and Disaster
Department of Medicine. University of Oviedo
Campus del Cristo 33006 Oviedo –Spain
www.uniovi.net/uied

Table of Content

Introduction

World and disasters

During 1970 to 2014, twelve thousand natural disaster events recorded in the world, including 5,139 (43 per cent) took place in Asia and the Pacific (Figure 1). Floods and storms were the most frequent in this territory, giving 64 per cent of the total number of such events reported between 1970 and 2014. After flood and storm, earthquakes and tsunamis (12 per cent) and landslides (7 per cent) are the most dominant phenomena. South and South-West Asia testified the huge numbers of natural disaster events with 1,652 cases records. South-East Asia and East and North-East Asia also reported over 1,000 cases. The Pacific and North and Central Asia had meaningfully lower cases of reports(1).

Figure 1: Overview of Natural Disasters and their Impacts in worldwide

source: Overview of Natural Disasters and their Impacts in Asia and the Pacific, 1970 – 2014

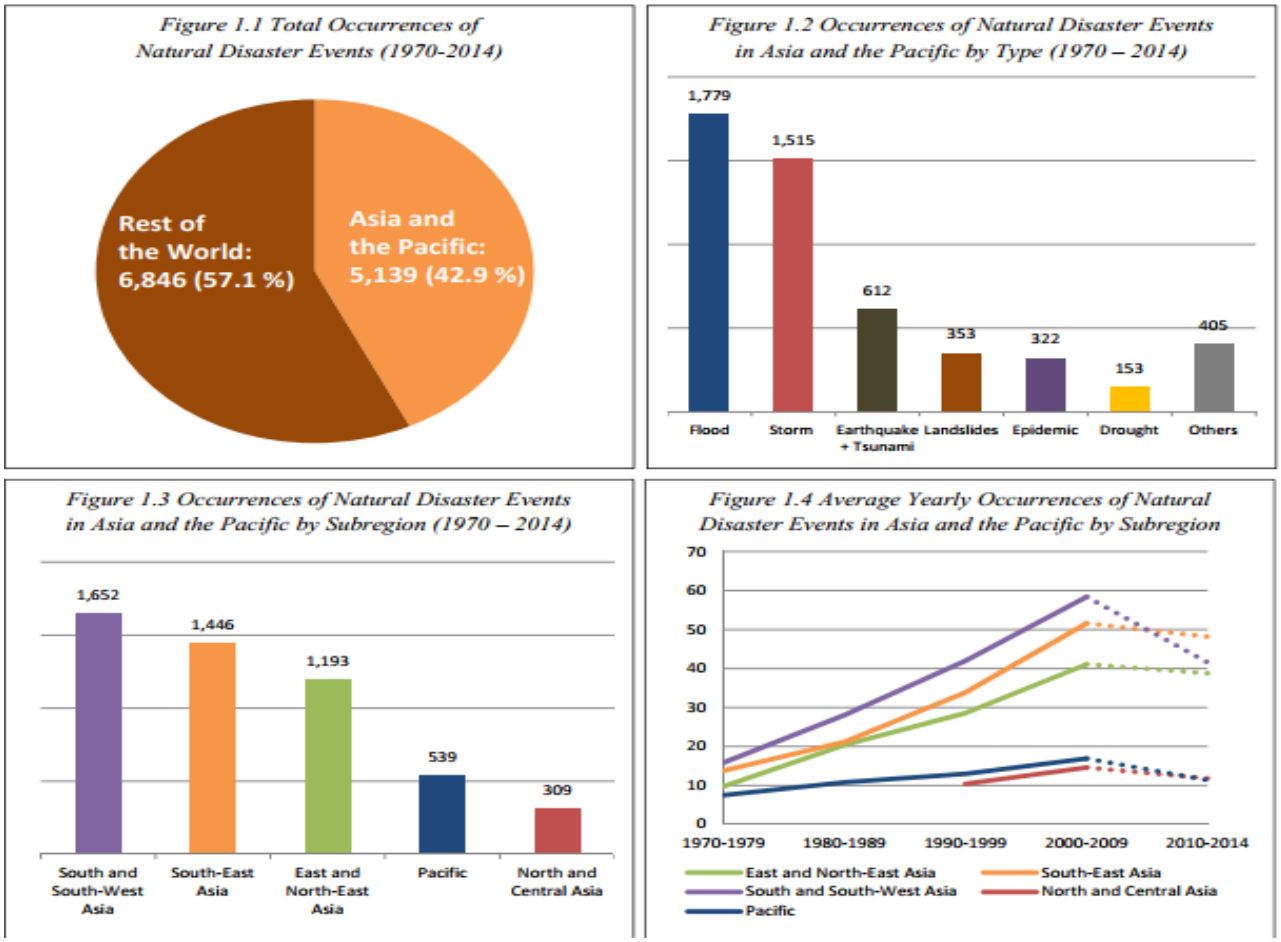
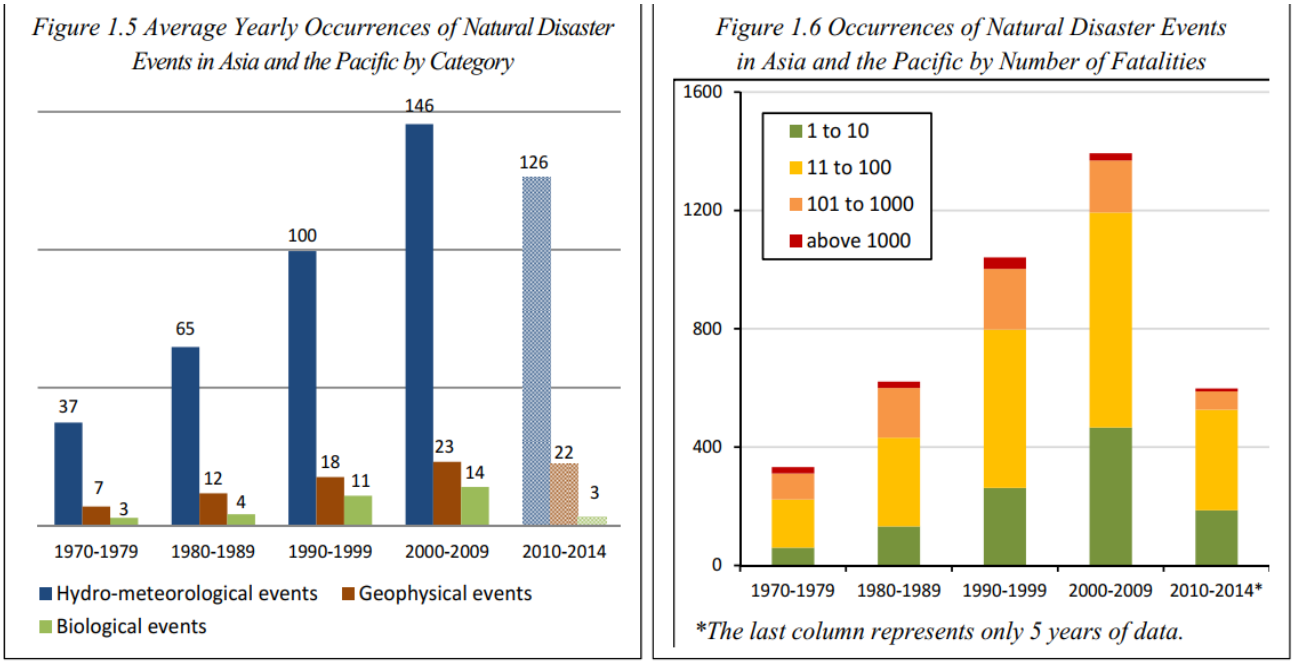


Figure 2: Occurrences of Natural Disaster Events in Asia and the Pacific by Number of Fatalities



source: Overview of Natural Disasters and their Impacts in Asia and the Pacific, 1970 – 2014

IRAN

Iran, is located in the central Middle East and has an area of 1,648 million sq. km. This country inhibited for about 80 million people, facing many types of natural and man-made disasters, Iran ranked among top 10 countries regarding death relate to disasters(2). The neighbors are: Armenia, Turkmenistan, and Azerbaijan on the north, Afghanistan and Pakistan on the east, and Turkey and Iraq on the west. Tehran is the capital of the country and also largest one. Beside all most important political, cultural, commercial and industrial spot in the nation(3). Iran known as regional power, and plays an important role in international energy security and world economy because of its huge source of petroleum and natural gas. Based on World Bank report in 2015, Iranian GDP is 425 billion USD and ranked 26 in the world. Also based on population, ranked 17$^{th.}$ .According to Global Assessment Report (GAR) on Disaster Reduction (2009), Iran's natural disaster risk class is as 8 out of 10(4).

Table 1: some demographic information related to Iran

DEMOGRAPHIC STATUS OF IRAN			
Area: Total: 1,648,195 sq. km	Land: 1,531,595 sq. km	Water: 116,600 sq. km	
Population(million people)	77,447,168	Urban % Total Pop	72.32
Population growth rate (2013)	1.30%	Rural % Total Pop	27.68
Population under five (2013)	8.80%	Population density People / km2	47.6
Population aged 65 or older (2013)	4.90%	Capital	Tehran35°41′N 51°25′E
Life expectancy at birth (2013)	74 years	Under-5 mortality per 1000 live births (2013)	17
Official language(s)	Persian (Farsi)	Spoken languages	Persian Azeri, Kurdish, Lori, Balochi, Gilaki, Arabic, Turkmen, Armenian,
Religion	Islam	Government	Islamic republic
Administrative divisions	30 provinces		
ECONOMIC AND DEVELOPMENT INDICATORS			
GDP per capita (current US$, 2013)	6,631 USD	Currency	Rial (( )ریالIRR)
Total expenditure on health as % of GDP (2013)	6.70%	Natural resources	petroleum, natural gas, coal, chromium, copper, iron ore, lead, manganese, zinc, sulfur

Geography

Seated on the world dry belt, about 60 percent of Iran is covered with mountains and the rest part is desert and semi-arid areas. Eastern part of Iran is surrounded by a plateau, with large salty flats and big sandy deserts. The plateau is overlie by high mountains, including the Zagros in the west and the Alborz in the north. Khazar Lake as a biggest lake in the world located in the north and Persian Gulf with its strategic situation seated in the south. Iran is unique country regarding weather because. You can find all four different seasons at any time of the year, in each section of the country, one of the four seasons is visible. Iran's diversity regard to temperature, humidity and rainfall, vary from place to place and season to season. Season duration in Iran, differs region to region(5).

Climate:

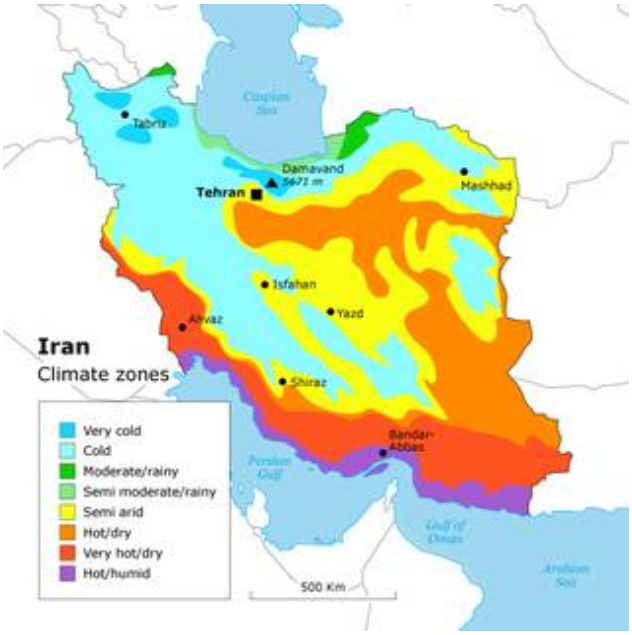
In summer, hot and dry weather and in winter very cold weather is dominated most of the country. The climate of the country divided in three categories including:

Warm and rainy summer in northern stripe which is the most green part of the country
Dry and hot weather in central parts(hottest spot of the world located in central of Iran)
Dry hot in step covered in the rest of the country

Apart from the coastal areas, the temperature in Iran is extremely continental. The annual range of temperature differs from 22°C to 28°C. Cold winters, mostly happen in the north in the Alborz

Mountains. The January mean temperature in Mashhad is 2°C and the minimum is -25°C. On the plateau it is warmer than in the Alborz Mountains. In summer hot weather covers most part of the country, in particular, in the low land area such as those of Khuzestan and Lorestan where the daily maximum often exceed 44°C. Even summer temperatures of more than 55°C have been seen in some parts of south and southwest. From November to May mostly is the rainy season. Average annual rainfall is about 240 mm. Maximum rain happens on the Alborz and Zagros mountainous area toward north and west areas respectively, where the mean annual rainfall for this region is more than 1200 mm. Western and northern mountains the annual mean precipitation is more than 480 mm and snow is the most forms of the precipitation. On the Caspian coasts, the rainfall is at its maximum in autumn. In the dry period between May and October, rain is rare in most of the country. It seems that the temporal and spatial distribution of precipitation in Iran is rapidly changing, as 90% of total precipitation falls in cold and humid days and in northern and western parts of the country and only 10 percent happen in warm and dry seasons and in central, southern, and eastern parts(6, 7).

Figure 3: Climatic Classification of Iran



Source: http://www.steptoiran.com/Files/0618144036760800.aspx

Health system:

The health care system in Iran begin to develop from the last century. Reports have shown that Iranian health condition is acceptable, and can be better by more efforts, but Iran's health care system now challenges with a number of serious problems like:

(1) Rapidly demographical transition and changes in population age structure
(2) Epidemiologic transition; distribution of non-communicable and chronic disease
(3) firmness of communicable disease in areas of the country, continuing of re-emerging disease occurrence, and starting of emergent disease occurrence,
(4) Lack of balance in spread and unequal distribution of above changes in the

Health system in Iran functioning acceptable. According to WHO statistics, Iran progressed a lot during past decades in terms of communicable and non-communicable diseases. Also life expectancy among men and women exceeded 70 years (where 40 years ago was around 55 years). Beside all immunization coverage for under 5 years children for 2016 progressed over 90 percent and now Iran stand in border of elimination of some vaccine preventable diseases like measles(8, 9). Iran still challenges with a number health development problems. The government is aware of many of these challenges, especially as most of them are relate to the financing of health care, for example depletion of high rate of out of-pocket expenditure, expanding access to primary health care and coverage of health insurance to 100% of the population, and lessen the burden of road traffic injuries, and has included them as priorities in the fifth 5-year national development plan(10).

Table 2: ***Organizational Structure of the Governmental Health System in I. R. Iran***

Level of Care	Service Delivery Unit	Administrative Unit
Tertiary Referral Level	Specialized (Teaching /University) Hospitals Capital level (Tehran)	MOHME headquarters in Tehran
Second Referral Level	Specialized (Teaching /University) Hospitals Provinces level	Universities of Medical Sciences in provinces
First Referral Level	District General Hospitals	District Health and Treatment Networks in districts
First Level Health Facility	Health & Treatment Center	
First Contact with health services/health providers	Health Houses (rural), Health Posts (urban)	

Hazards affecting the Islamic republic of Iran

Among the 40 different types of natural disasters existed in the world, 31 types have been observed in the Iran. The 31 types of natural disasters affecting the country are as follows:

Table 3: Hazards affecting Islamic republic of Iran

1. Earthquake	15. Desertification	29. Floods
2. Liquefaction	16. Cold and Frustration	30. Volcanoes
3. Tsunami	17. Avalanche	31. Fires on coal fields
4. Ground surface upwelling	18. Storms	
5. Mudflow	19. Environmental and Water pollution	
6. Landslides	20. Vegetation infestation	
7. Rock falls	21. Drought	
8. Slumps	22. Thunder	
9. Soil erosion	23. Geothermal hazards	
10. Forest Fires	24. Karstic subsidence	
11. See Water level Fluctuation	25. Ground subsidence due to mining and exploration	

12. Sedimentation	26. Underwater slumping	
13. Coastal degradation	27. Under water slides	
14. Marsh encroachment	28. Swamp encroachment	

Figure 4 shows disaster risk map for Islamic republic of Iran, you can't find a spot in this country without experience of a disaster. Iran located on earthquake belt and because of special seismic and tectonic shape, almost whole country is in danger of shaking. There is an interesting point regarding flood and rain: because Iran is semi desert country, every year a lot of people pray for rain, but when rain comes it leads to flood, kill people, damage infrastructures and destroy harvests.

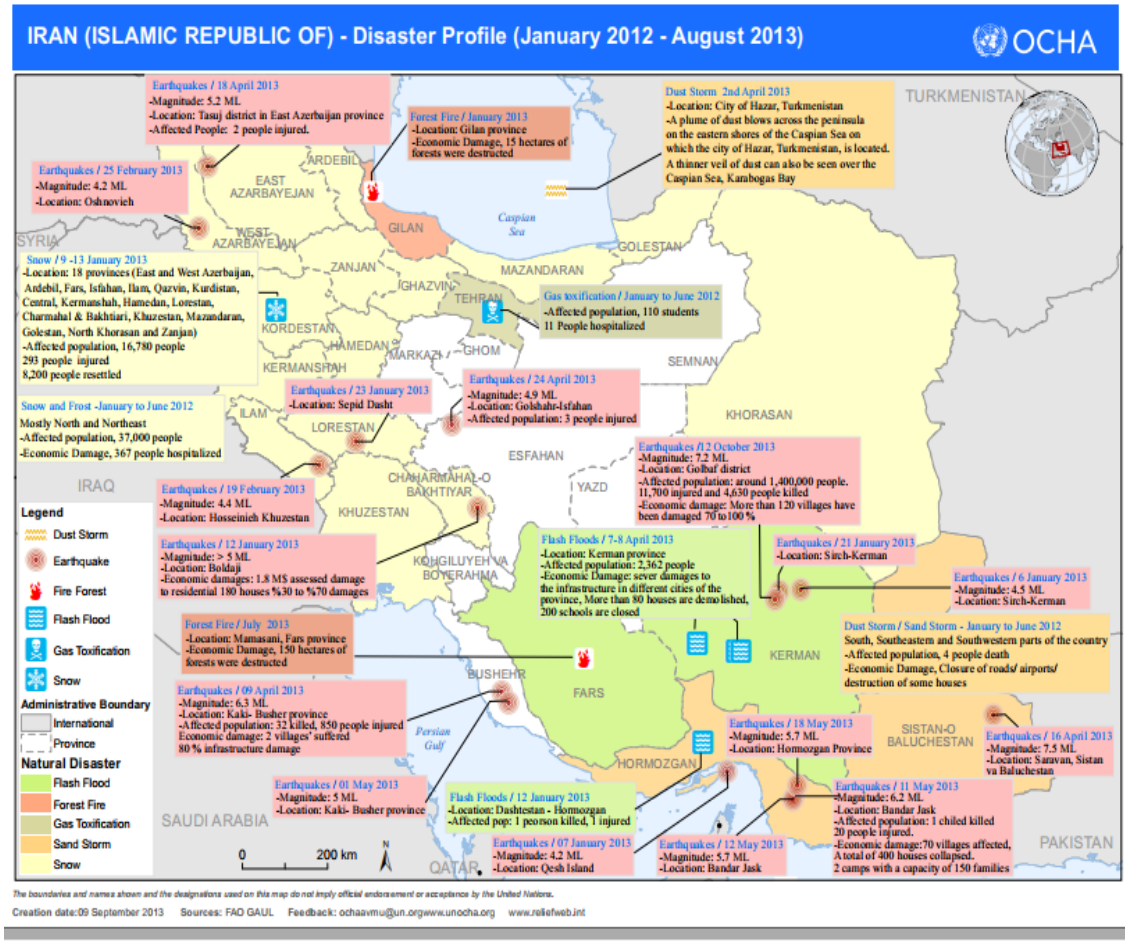


Figure 4: Islamic Republic of Iran`s Disaster Profile(January 2012- August 2013)

https://reliefweb.int/map/iran-islamic-republic/iran-islamic-republic-disaster-profile-january-2012-august-2013

Frequency and types of natural disasters in Iran

Below you can see the hazards hit the Islamic republic of Iran in different provinces from 1990 to 2002. Flood mostly happen in north strip of the country, which surrounded by Alborz mountains. Storm newly started in the west part due to dam construction and land dehydration in Iraq and Syria. The most frightening phenomena is drought, which affect more than 40 million people and now there is a fear of immigration and marginal habitation problems. Iran is located in earthquake belt and shaking, known as a disaster from several hundred years ago.

Table 4: Frequency of Natural Disasters in Different Provinces of I. R. of Iran, 1990-2002

Disaster Type	The First Three Provinces	Frequency	Relative Frequency
Flood	Golestan	380	19%
	East	294	14%
	Azarbayjan	200	10%
	Khorasan		
Storm	Gilan	77	17%
	West	70	15%
	Azarbayjan	62	13%
	Kordestan		
Drought	Kerman	765	8%
	Khorasan		7%
	Yazd		6%
Avalanche	Kordestan	46	42%
	Mazandaran	26	24%
	Ghazvin	11	10%
Earthquake	Gilan	107	26%
	Kerman	53	13%
	East	28	7%
	Azarbayjan		
Blowing Storm	West	210	43%
	Azarbayjan	105	21%
	East	51	10%
	Azarbayjan		
	Gilan		
Hail storm	West	420	48%
	East	200	23%
Frost	Ghazvin	280	40%
	Gilan	133	19%
	East	101	14%
	Azarbayjan		
Landslides	Ghazvin	51	18%
	Semnan	41	14%
	Khorasan	36	12%

Heat wave	East	49	42%
	Azarbayjan	34	29%
	Khorasan	7	6%
	Semnan		
Lightning Strike	Ghazvin	95	26%
	Semnan	40	11%
	Khorasan	33	9%
Whirl Wind	Yazd	50	36%
	Gilan	45	32%
	West	16	11%
	Azarbayjan		
Heavy Rainfall	Chahar Mahall	192	25%
	East	133	17%
	Azarbayjan	80	1%
	Golestan		

Vulnerability

Regarding vulnerability, since building codes in the country are not well implemented, people are confined between concrete and stone parts of during an earthquake. Statistics shows that more than 2000 people were died annually in Iran regarding earthquake (table 5). In many rural areas people still live in clay houses and in north of Iran many of them built their houses in the agriculture fields themselves without any building code consideration. In the other side, the phenomena which affects Iranian citizen and physically exposure them to disasters. Were flood, where more than 10 million people annually expose to this hazard.

Table 5: Vulnerability to Natural Disasters in Iran 1980-2000, by UNDP

Indicator	Unit	Earthquakes	Floods	Drought	Σ All three
Average number of events per year	Event per year	1.43	1.90	0.10	-
Number of people killed per year	Killed per Year	2250.81	131.19	0	2382
Average number of people killed per million inhabitants	Killed per million	38.68	2.20	0	40.88
Average physical exposure per year	People per year	2'094'097	10'903'040	6'285'132	19'282'269
Physical exposure in percentage of population	%	3.60	18.26	Not in 19 countries mentioned	-
Relative vulnerability	Killed per million exposed	1074.84	12.03	0	1086.87
Relative vulnerability rank	Rank in total countries	1 in 49	52 in 119	Not in 19	-
Density of population (living in the water shed exposed to flood)	Inhabitants per km2	-	45.40	-	-

Statistics: Iran`s situation regarding disaster management

Based on Prevention web information, from 2005-2011 more than 7 million house destroyed due to natural disasters (1.6% from extensive and 98.4% from intensive disasters), more than12 million houses were damaged(77.11% from extensive and 22.89% from intensive).more than 2 million people injured and more than 6 million other displaced(11, 12)(table 6).

Table 6: Comparison between Intensive and Extensive hazards and fatalities left behind

6-year moving average 2005-2011		Extensive [%]	Intensive [%]
Deaths	187.00	63.00	37.00
House destroyed	7,394.50	1.60	98.40
House damaged	12,758.50	77.11	22.89
Injured people	2,752.00	12.53	87.47
Displaced people	6,958.50	50.00	50.00
Combined economic loss (US$)	1,542,347,873.00	88.57	11.43

http://www.preventionweb.net/countries/irn/data/

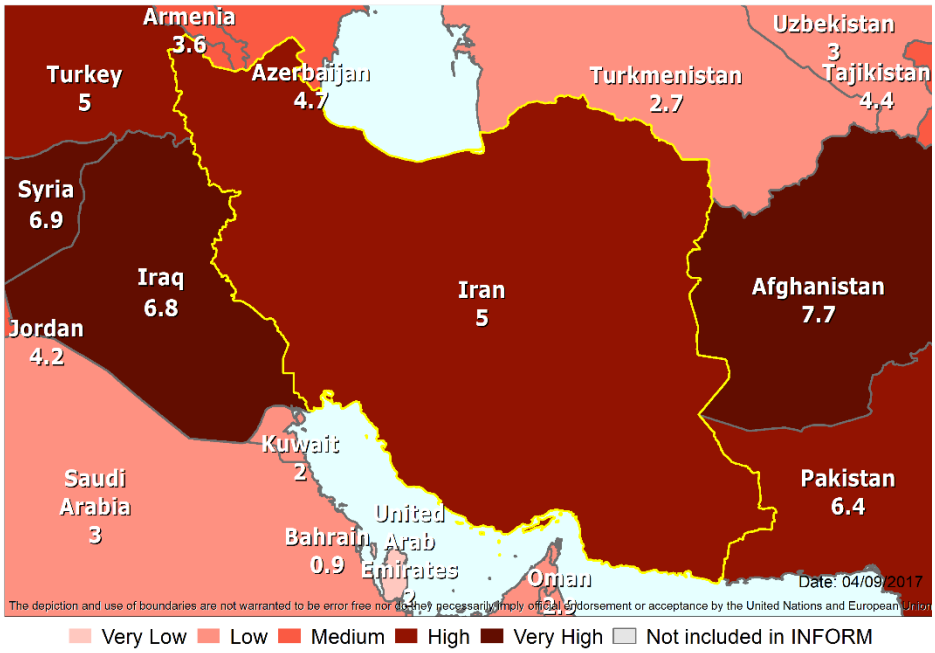
According to INFORM (which is a collaborative inter-agency standing committee reference group, on risk, early warning and preparedness) Iran`s risk regard to 5 out of 10 and detail is following: **value of exposure** to hazards is 6.3 and ranked27, **value of vulnerability** is4.2 and ranked 72, **value of lack of coping capacity** is 4.6 and ranked88 and the sum of these numbers puts Iran at high risk countries position (table 7).

Table 7*: *INFORM country risk profiles for Islamic republic of Iran

	Value	**Rank**	**Trend**
INFORM Risk	5	45	Not changed
Hazard & Exposure	6.3	27	Not changed
Vulnerability	4.2	72	Not changed
Lack of Coping Capacity	4.6	88	decreased

Source: http://www.inform-index.org/Countries/Country-profiles/iso3/IRN

Figure 5 depict a critic view of Iran, the map comparing Iran`s situation relate to risk elements to neighboring countries. The situation is not good! Iran ranked as high, in term of risk of disaster elements, it means exposure to hazards is high, conversely capacity to cope is weak, and vulnerability in term of face to hazard is high and resilience to tolerate and back to normal situation is down.



Considering figure5, the big country of Iran, rich in natural resources, and large population (about 80 million), in terms of total risks score, is not well positioned. Comparing to peer countries, Iran stand beside Madagascar, Guinea, Rwanda, Turkey and Lebanon. total score for this element is 5 out of ten (13).

Figure 5: INFORM 2018 Risk Index

http://www.inform-index.org/Countries/Country-Profile-Map

Disaster management structure in Iran

Accompanying to "Hyogo Framework for Action" (global initiatives of strategic planning for Disaster Management and Risk Reduction) accepted in January 2005 by the United Nations International Strategy for Disaster Reduction (UNISDR), Iran has stablish national frameworks and programs. The country is divided into nine Disaster Management Poles, each contains two to four provinces. Two major organizations are responsible for DMRR:

1) The National Disaster Management Organization (NDMO), under the Ministry of Interior (MOI)

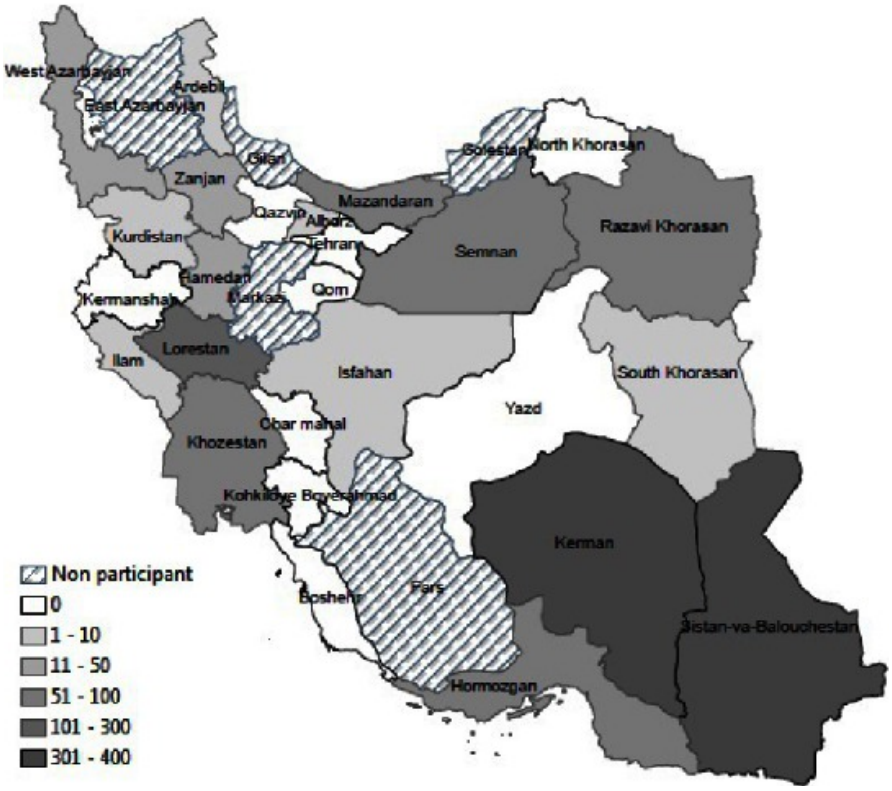
2) The National Passive Defense Organization (NDPO), under the Supreme Leader.

The National Platform for Disaster Risk Reduction was also established under NDMO to run the Hyogo Framework for Action (HFA) priorities for action. Both NDMO and NPDO have a Health & Medical Services Taskforce (HMST) and Disaster & Emergency Management Center (DEMC) at the Ministry of Health & Medical Education (MOH&ME), which is the main agency for both taskforces. MOH&ME consists of 60 Universities of Medical Sciences & Health Services (UMSHS) that are responsible for both higher education and health care delivery in determine local areas. Each UMSHS has its own Emergency Operations Center (EOC) cooperating with other organizations to response to disasters, also, military forces and other ministries. The Iranian Red Crescent Society (IRCS) is one of major organizations responding disasters and according to law, responsible for international humanitarian assistance. The medical branch of Basij organization, under the Revolutionary Guard, is another organization with a big role in both national and international responses(14, 15).

Disaster management in MoH and health sector

We expect the health system to be always efficient and active and perform its duty in all circumstances. In times of crisis and disaster, in which a large number of people are physically injured, people go to health centers to regain their own health or their loved ones. But are the health centers and their employees well served by the normal conditions during the crisis? Crisis and disasters affect the health of populations directly through injury and loss of life; expanding physical and mental problems; dislocation and interrupt of social networks; as well as damage of environment and personal assets. destruction of the structure and function of health facilities can have added impacts by weaken the ability of communities to respond to these catastrophic events(16). Ardalan et al did a research regarding effects of natural disasters on public health facilities (Impacts determined across four domains – personnel, structural damage, non-structural damage and functional failure), result are shocking. During a decade from 2001 to 2011, about 120 natural hazards documented which result in physical destruction and/or dysfunctionality in 1,401 health centers, 127 deaths and injury or illness in 644 health staff. Earthquakes responsible for the most physical damage and all health-worker deaths. However, there was a raising trend of effects due to hydro-meteorological hazards.

Figure 6: Provincial distribution of affected primary health care centers by natural hazards, I.R.Iran, 2001-2011



Source: Impacts of Natural Hazards on Primary Health Care Facilities of Iran: A 10-Year Retrospective Survey

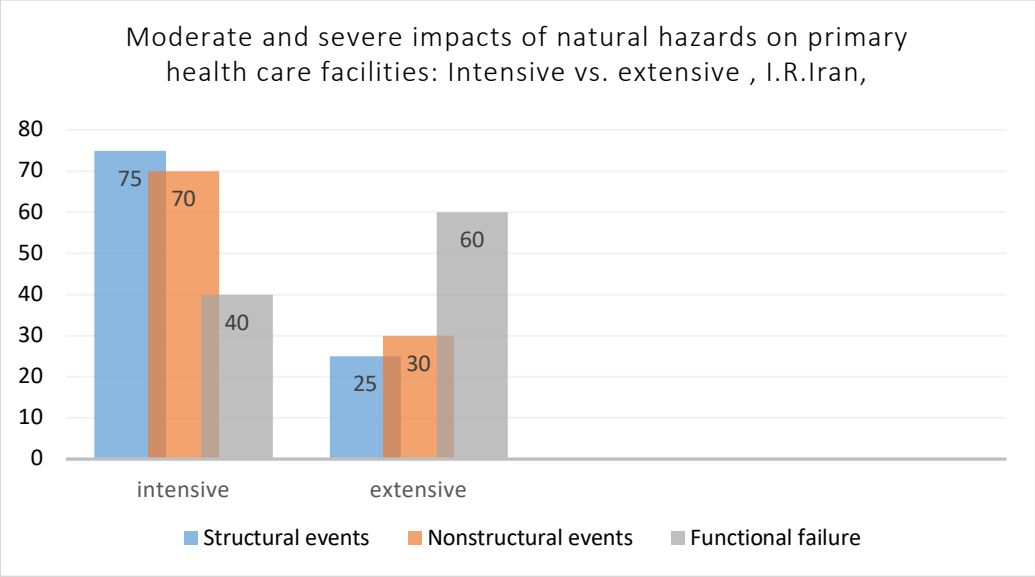
Table 8: Frequency and impacts of natural hazards on primary health care system by type of hazards, I.R.Iran, 2001-2011

Hazard type	Hazard frequency N (%)	Affected health staff		Affected health facilities		
		Death N (%)	Injury/ illness N (%)	Structural damage N (%)	Non-structural damage N (%)	Functional failure N (%)
Earthquake	32 (26.9)	127 (100)	500 (77.6)	375 (53.8)	534 (63.4)	892 (64.7)
Landslide	28 (23.5)	0	0	24 (3.4)	25 (3.0)	13 (0.9)
Subsidence	15 (12.6)	0	4 (0.6)	18 (2.6)	4 (0.5)	2 (0.1)
Storm	13 (10.9)	0	105 (16.3)	109 (15.6)	100 (11.9)	252 (18.3)
Torrential rain	10 (8.4)	0	0	60 (8.6)	17 (2.0)	48 (3.5)
Flood	10 (8.4)	0	0	48 (6.9)	46 (5.5)	9 (0.7)
Extreme Weather	8 (6.7)	0	25 (3.9)	57 (8.2)	110 (13.1)	78 (5.7)
Dust/Sand Storm	3 (2.5)	0	10 (1.6)	6 (0.9)	6 (0.7)	84 (6.1)
Total	119 (100)	127 (100)	644 (100)	697 (100)	842 (100)	1,378 (100)

Source: Impacts of Natural Hazards on Primary Health Care Facilities of Iran: A 10-Year Retrospective Survey

Table 8 shows that, total deaths lead from natural disasters. As shown in table, more than *53percent of* structural damage, *77 percent* of injuries and illness, *63 percent* of nonstructural damages and *64 percent* of dysfunctionalities in primary health system in Iran caused by earthquake and following the earthquakes landslides and subsidence responsible for 2nd and 3rd fatalities(16).

Graph 1: Moderate and severe impacts of natural hazards on primary health care facilities: Intensive vs. extensive, I.R.Iran, 2001-2011



Graph 1, demonstrates the moderate and severe impacts of natural hazards on primary health care facilities in Islamic republic of Iran, where in one hand, more than 70 percent of structural

damages happen due to intensive hazards, in the other hand, about 60 percent of malfunctioning in primary health care facilities belong to extensive hazards(16). **Extensive risk** is used to describe the risk of low-severity, high-frequency disasters, mainly but not exclusively associated with highly localized hazards. **Intensive risk** is used to describe the risk of high-severity, mid to low-frequency disasters, mainly associated with major hazards (11, 17).

Hospitals and disasters

Hospitals and primary health facilities are important assets for communities for proper response in daily and in disaster situation. hospitals successful response to the emergency needs a good coordination among all hospital units, planning and coordination to police, fire-fighting and pre-hospital emergency systems(EMS) in order to be sure communication lines are established and there is needed flexibility for responding to extent and severity of incident.(18, 19)

Most important disasters

Floods

Most destructive floods happened in Iran following by this (ranked based on number of death):

1-Golestan province (located in north of country bordered to Khazar lake) flash flood which is happened in 2001 and killed more than 500 people,

2-Darband and Tajrish(located in Tehran province) in 1987 and killed and missed over 300 people,

3- Neka(a small city located in Mazandaran province in north of Iran) which killed more than 60 people and happened in 1999,

4- Masooleh (small and very beautiful city which is most tourist attracted spot in Iran and located in Guilan province in north strip) happened in 1998, 5- Tehran andMazandaran flash flood happened in 2015 and killed and missed more than 28 people(20).

4- North provinces, 10 August, 2017. Flooding hit the provinces of Golestan, Gilan, Khorasan Razavi, North Khorasan and Semnan since heavy rain began. More than 20

cities or villages have been affected, and more than 2,000 people needed aid and relief act.

Earthquake

Earthquakes make a heavy fatalities. Iran is located on the Alp-Himalaya orogenic belt and is known as part of the youngest and last orogenic regions of the world. Therefore, Iran sustains big economic and social damages caused by seismic activities within its territory. Earthquakes have killed around 200 thousand people during the last decade. Many cities including Tehran, Tabriz, Rudbar, Manjil, Tabas, Lar, Qazvin, Zanjan. Hamedan. Kermanshah, and Fars have sustained substantial damages resulting from severe earthquake activities. Historical seismic review of data depicts that almost all country affected by the earthquakes consequences. The most recent major earthquake with 7.3 on the Richter scale hit the historic and touristic city of Kermanshah in the west part of Iran and killed more than 5 hundred people, left more than 2 thousand people injured and destroy a lot of infrastructures and agriculture fields and thousand livestock fatalities in the region which the common income is farming and animal husbandry. In some rural areas about 100 percent of the houses were destroyed, lead to over 800 million US dollars' worth of damages. There is always feared of a big shaking in Tehran, as a mega metropolis which home for more tahn10 million inhabitants, and located just on a number of major faults, could cause substantial loss of life and notable financial damages because we know appropriate mitigation measures were not applied.

1990 Manjil,

A terrible earthquake occurred on Thursday at 30 minutes and 13 seconds in the Guilan province, according to the country's national earth sciences database. Its focal length is estimated at latitude 36 ° 49 and 49 ° 24 'and 51' longitude respectively. According to the initial figures, the magnitude ranged from 7.3 to 7.7 on the Richter scale. The event took place, on June 20, 1990, in the Roodbar, Manjil and Loshan areas of the Alborz West Bank, killing nearly 35,000 people, injuring 60,000 people and homeless people of more than 500,000 people. In this incident, about 200,000 residential units were destroyed, of which 60,000 units were totally destroyed, and the initial damage caused by the earthquake was estimated at more than 800 billion rials. In this incident, four villages in the Oshkur area of Rudsar were buried in the depths of the soil due to the fall of the Kalishsh Amarlou Mountains and the deep slot. Also in the middle part of the city of Roodbar, in the east of the Sefid Rood River, there were deep inlets, with the waters of the "Colon" and "Lazbad" mountains, with its high eyes. In the aftermath of the earthquake, the mountains surrounding the valley that covered the olive trees were loaded up to a kilometer long by drifting towards the road and the Sepidrood River. Along with this displacement, approximately 25,000 trees were turned into a mountain of soil and wood. The earthquake caused economic losses of 2.5% of GDP. The study of the consequences of the earthquake has shown that the focal depth of

this earthquake is located at a depth of 19 kilometers from the earth's surface. Its fault on the surface of the earth was also revealed in a three-piece, discontinuous, ladder image, in a distance of nearly 80 kilometers.

2003 Bam,

Bam earthquake was a magnitude 6.6 magnitude earthquake that occurred at 5:26 am on January 5, 2003 in Bam and its surrounding areas in the east of Kerman province. According to official statistics, the earthquake killed 26, 271 people, 30,000 injured, and left over hundreds of thousands of homeless people. This is despite the fact that the actual number of victims has been well above the level (Previously it was said that more than 41,000 had died, but apparently some victims were counted more than once in the chaotic aftermath of the disaster.). On the 11th of January of that year, authorities said that the number of casualties was more than 50,000, given that in some areas of Bam 100 percent of the houses were destroyed by the earthquake. According to them, in the first days, everyone was thinking about the burial of his loved ones, and the pit was loaded with a loader, and the bodies were buried collectively and no one involved in the census. As a result of this incident, 90% of the structures in the city of Bam were completely destroyed. The Bam Citadel, which was the world's largest floral structure, with 2500 years history, was completely destroyed. Because of bad management, inconsistency among institutions, the inadequate use of foreign expert forces, the lack of proper training of aid workers and misuse, along with a variety of other factors, have led to slow rebuilding of the city and not to end yet(21).

1978 Tabas earthquakes

Tabas earthquake occurred on September 25, 1979, the most severe earthquake in Iran in the last few centuries. The magnitude of the earthquake was 7.8 (or 7.7) in Richter scale. The previous city of Tabas, dating to over 2,500 years, and was unique in architecture. Alongside the city of Tabas, thirty other historic villages, has become a waste of soil and has left tens of thousands dead, so that some bodies have never been found. This shock was felt in Tehran, about 610 kilometers (380 mi) away. About 55–85 km (34–53 mi) of ground deformation was observed, with about 1.7 meters (5 ft 7 in) of maximum slip. Only one significant M5 aftershock occurred(22).

2017 Kemanshah earthquake

The "Uzugle" earthquake struck 7.3 on Richter scale, on Sunday evening of November 21, 2013 in Kermanshah Province, near the border between Iran and Iraq. The source of the earthquake was 5 km from the city of Kermanshah. According to the head of the Iranian Seismic Center, several pre-earthquakes occurred before the 7th magnitude earthquake that caused the people to be alert. The largest pre-earthquake was recorded at a magnitude 4. 5 magnitude. The number of deaths in Iran has reached 574, and 9, 388 have been injured, and about 70,000 have become homeless.

Methodology

The disaster risk profile of Iran was made by secondary data reviewing, resources focusing mainly on earthquake. The statistics and information were gathered from international disaster sources (EM-DAT and DesInventar, INFORM, Reliefweb, Preventionweb) and literature reviews of International reports and journals. National data and information were obtained from Iran national databases, including e Ministry of Home Affairs and Ministry of health. national sectors.

Discussion:

Iran is the 6th most disaster-prone country in the world. Considering previous decade, an average of 4,000 people were killed and 55,000 affected annually by natural disasters. Iran is located in one the most seismically active area of the world. Regarding to hydro-meteorological hazards losses such as drought, floods, and landslides the country is on the fire. Respect to number of people killed and affected, Iran is the 10^{th} country affected by earthquakes in the 1901- 2004 period. In the 1980-2000 period, with 47,267 people were killed in earthquakes. More than 12 percent of deadliest catastrophes of the world (in terms of casualties) between 1970-2004 have occurred in Iran, and destructive earthquakes rank 6, 7, 8 have occurred in the 1990 Manjil, 2003 Bam, 1978 Tabas and Kermanshah 2017. Based on the National Committee for the Natural Disasters Risk Reduction(NDRR), the earthquakes and floods are the first priorities in Iran, droughts followed closely after them but regarding to the number of affected people drought affects about 30 million people .Average number of disasters per year in Iran 1980-2000 had been 1.43 earthquakes, 1.90 floods, and 0.10 droughts(23, 24).

Conclusion

Iran has been faced with repeated occurrence of dust/sand storms in south and west provinces that originated from Iraq .While these storms did not lead to physical damage the result in air pollution caused frequent illnesses of health staff and closing the health centers when pollution levels exceeded a defined threshold. Keeping the importance of intensive risks events in mind, the impact of extensive risks hazards, on health system must be underlined in disaster mitigation and preparedness planning. Beside intensive risks as a destructive phenomenon, we should have an eye on extensive risks. The land use planning and design methods should be adapted to the

vulnerability of each area. While hospitals and primary health care centers are components of the same system and have interrelated functions, there are functions that are specific to primary health centers that cannot be replaced by hospitals. These functions are community disaster preparedness before a disaster and providing public health services afterwards. Designs of PHCs are less complex and are less costly to retrofit to improve resilience to natural hazards.

Reference

1. ESCAP. Overview of Natural Disasters and their Impacts in Asia and the Pacific, 1970 - 2014. In: Division DRRSIaDRR, editor. March 2015.
2. Ardalan A, Rajaei MH, Masoumi G, Azin A, Zonoobi V, Sarvar M. 2012-2025 Roadmap of IR Iran's Disaster Health Management. PLoS currents. 2012;4.
3. Badiee R. Detailed Geography of Iran. Tehran: Gitashenasi Institute. 1983.
4. isk Assessment R. Tehran, Iran Disaster Risk Management Profile.
5. Hafeznia MR. Political geography of Iran. Tehran: Samt Publications. 2002.
6. Alijani B, Harman JR. Synoptic climatology of precipitation in Iran. Annals of the Association of American Geographers. 1985;75(3):404-16.
7. Masoodian A, Kaviani M. Iran Climatology. Esfahan university publication. 2008.
8. Mehrdad R. Health system in Iran. JMAJ. 2009;52(1):69-73.
9. Tajvar M, Arab M, Montazeri A. Determinants of health-related quality of life in elderly in Tehran, Iran. BMC public health. 2008;8(1):323.
10. Organization WH. Country Cooperation Strategy for WHO and the Islamic Republic of Iran. World Health Organization, Regional Office for Eastern Mediterranean, Cairo, EM/ARD/012/E/R. 2006.
11. Peduzzi P, Dao H, Herold C, Mouton F. Assessing global exposure and vulnerability towards natural hazards: the Disaster Risk Index. Natural Hazards and Earth System Sciences. 2009;9(4):1149-59.
12. Kent R. ALNAP REVIEW OF HUMANITARIAN ACTIO.
13. http://www.inform-index.org/Countries/Country-Profile-Map. INFORM country profiles 2016 [
14. A Ardalan GM, MM Goya , M Ghaffari, J Miadfar , MR Sarvar , M Soroush ,, A Maghsoodi HNK, MJ Kabir, HR Khankeh , B Abolshams , M Aghazadeh. Disaster Health Management: Iran's Progress and Challenges. Iranian J Publ Health. 2009;38(1):93-7.
15. Ali Ardalan P, Mohammad Hossein Rajaei,Gholamreza Masoumi, Ali Azin, Vahid Zonoobi, MD, Mohammad Sarvar, khorshid Vaskoei Eshkevari,Elham Ahmadnezhad, and Gelareh Jafari. 2012-2025 Roadmap of I.R.Iran's Disaster Health Management. PLoS Curr. 2012;4(1).
16. Ardalan A, Mowafi H, Homa Yousefi K. Impacts of natural hazards on primary health care facilities of Iran: a 10-year retrospective survey. PLoS currents. 2013;5.
17. Disaster Trends, World 1900-2010. EM-DAT, International Disaster Database. [http://www.emdat.be]. Accessed June 2011.
18. Ojaghi S, Nourizad S, Mahboobi M, Khazaei M, Najafi G. Disaster crisis handling preparedness level of hospitals in Kermanshah. Journal of Kermanshah University of Medical Sciences (J Kermanshah Univ Med Sci). 2009;13(3).
19. Yarmohammadian MH, Atighechian G, Shams L, Haghshenas A. Are hospitals ready to response to disasters? Challenges, opportunities and strategies of Hospital Emergency Incident Command System

(HEICS). Journal of research in medical sciences: the official journal of Isfahan University of Medical Sciences. 2011;16(8):1070.
20. Sharifi F, Mahdavi M. Technical report on investigating causes of summer flooding on North-east of Golestan-Iran deputy of watershed management-Iran. Iranian Journal of watershed management. 2001;60:85-110.
21. Talebian M, Fielding EJ, Funning GJ, Ghorashi M, Jackson J, Nazari H, et al. The 2003 Bam (Iran) earthquake: Rupture of a blind strike-slip fault. Geophysical Research Letters. 2004;31(11).
22. Mohajer-Ashjai A, Nowroozi A. The Tabas Earthquake of September 161978 in east-central IranA preliminary field report. Geophysical Research Letters. 1979;6(9):689-92.
23. Ardalan A, Pourmalek F, Mohammadi H, Russel M. Concise emergency country profile: Islamic Republic of Iran. Tehran: Ministry of Health and Medical Education. 2005.
24. Disaster statistics 1991-2005. International Strategy for Disaster Reduction. [http://www.unisdr.org/disaster-statistics/occurrence-trends-century.htm]. Accessed December 2010.