



Investigating the Factors Affecting Death Due to Flood in Iran

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Research Team

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Introduction: Flood definition

- Flood—the presence of water in areas that are usually dry.
- Flood outcome: environmental, economic, social, lose of life (death, injury...)



Ref:

- Jonkman SN, Kelman I. An analysis of the causes and circumstances of flood disaster deaths. *Disasters*. 2005 Mar;29(1):75-97.

Introduction: Flood definition

- Floods are the most common natural hazard in the world.
- More than one third of world's area in 90 countries are susceptible to catastrophic floods which account for about 82% of the world's population .
- Asia continent has been flooded more than other parts of the world .
- Iran is also one of the world's flood zones.

Ref:

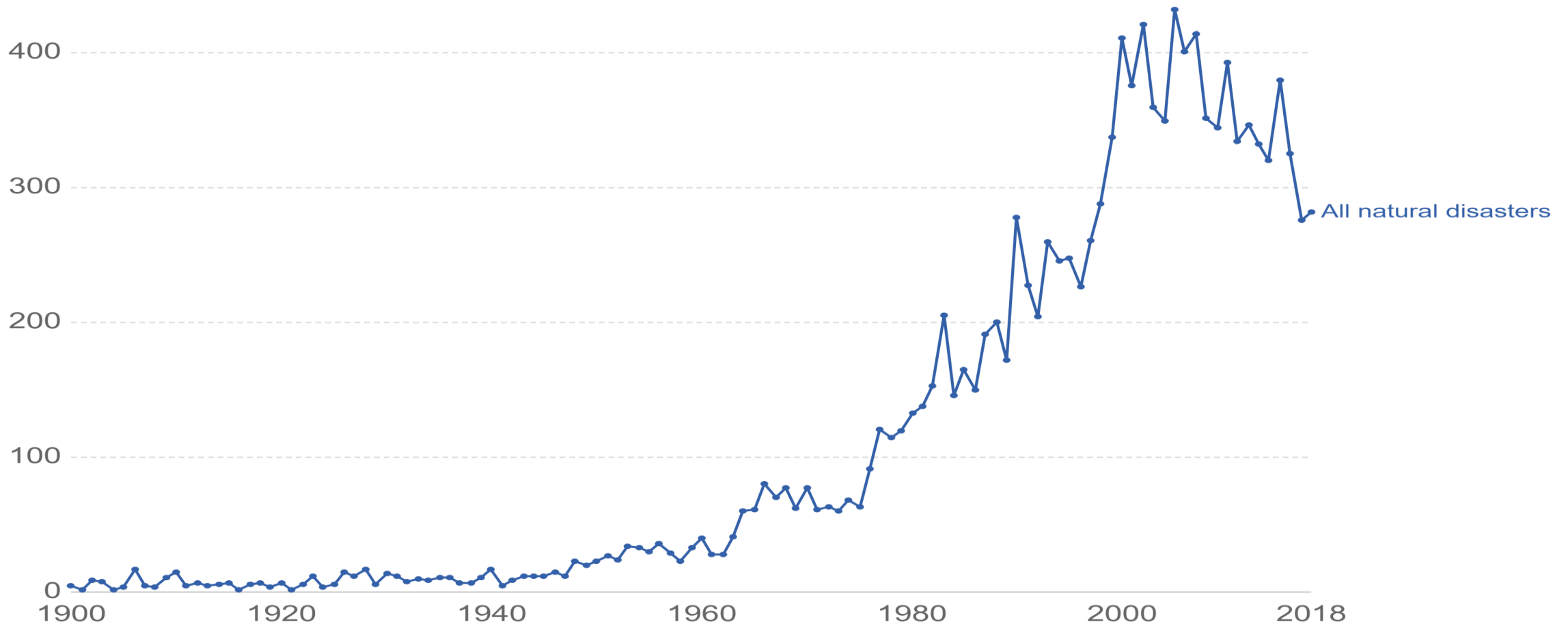
- Yari, A., Ardalan, A., Ostadtaghizadeh, A., Zarezadeh, Y., Boubakran, M.S., Bidarpoor, F. and Rahimiforushani, A., 2019. Underlying factors affecting death due to flood in Iran: A qualitative content analysis. *International Journal of Disaster Risk Reduction*, 40, p.101258.



Introduction: Natural Disaster Trend

Number of recorded natural disaster events, All natural disasters

The number of global reported natural disaster events in any given year. This includes those from drought, floods, extreme weather, extreme temperature, landslides, dry mass movements, wildfires, volcanic activity and earthquakes.

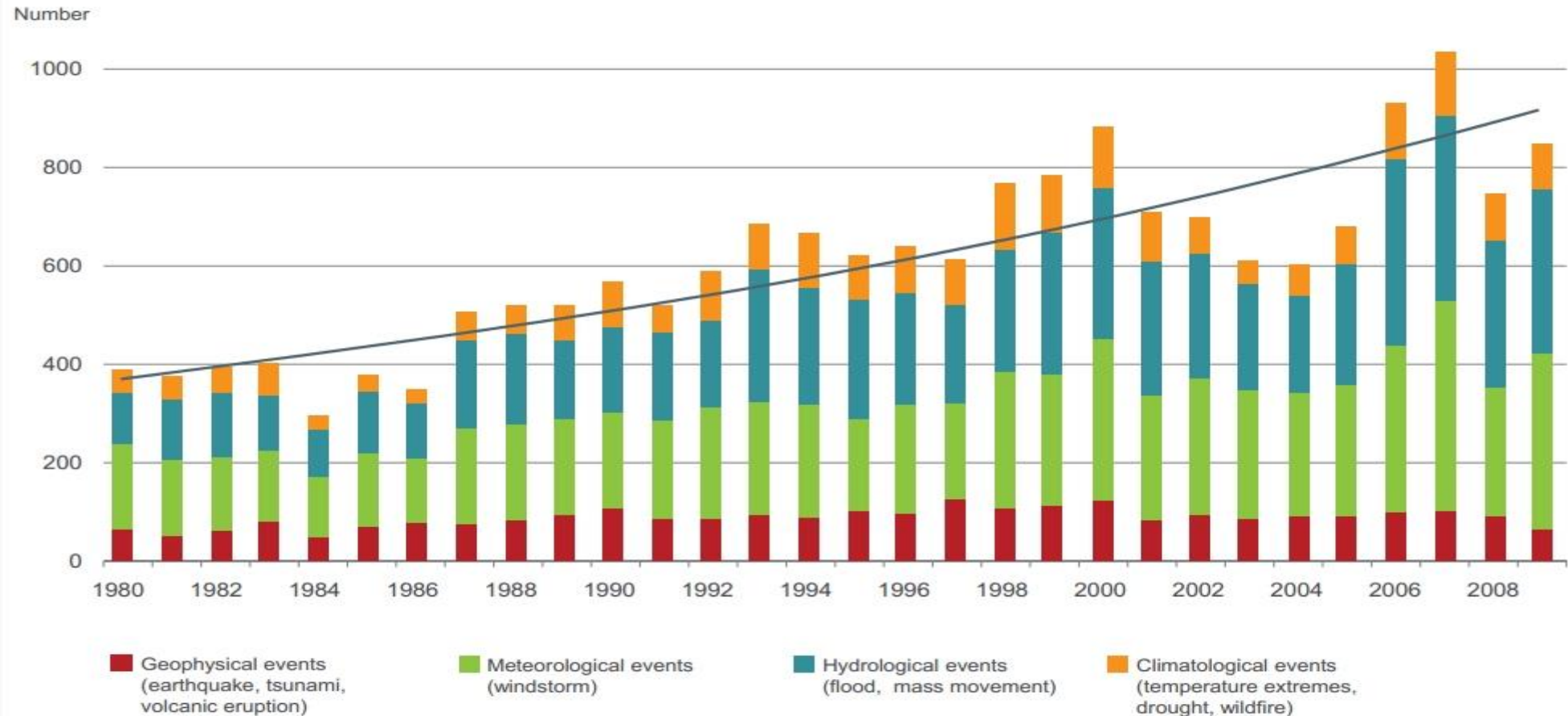


Source: EMDAT (2019): OFDA/CRED International Disaster Database, Université catholique de Louvain – Brussels – Belgium
OurWorldInData.org/natural-disasters/ • CC BY-SA

Introduction: Natural Disaster Trend by Type

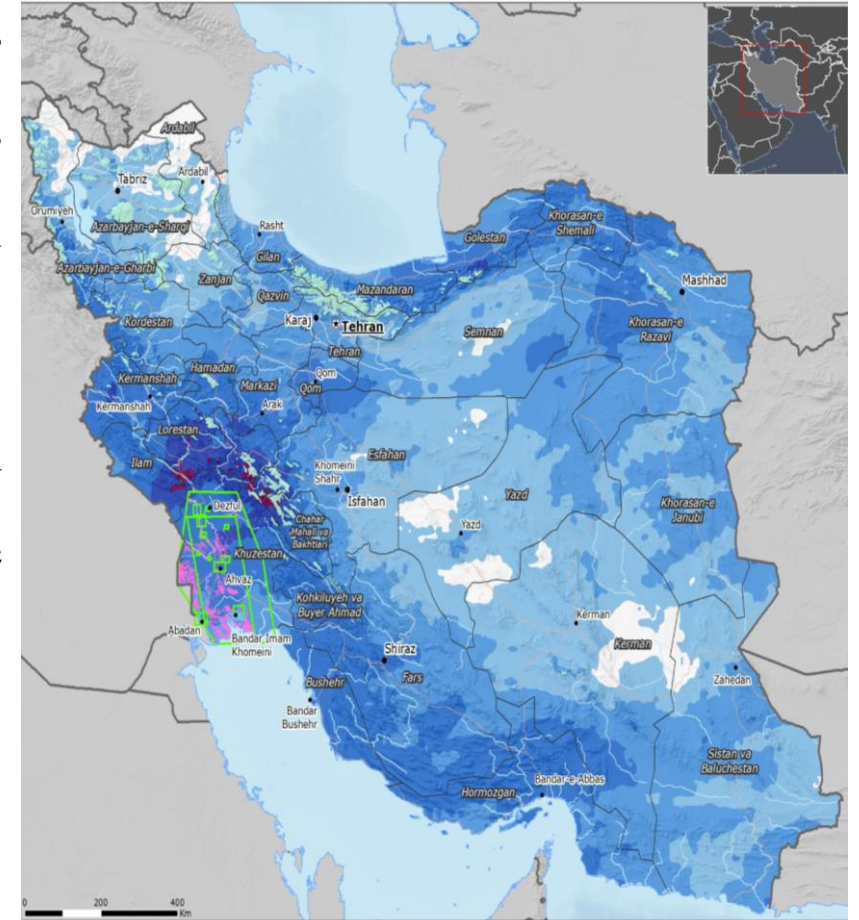
All worldwide natural catastrophes 1980–2009
Number of events with trend

Munich RE 



Introduction: Flood deaths in the world and Iran

- There has been a significant increase in the number of floods and the severity of their effects worldwide in recent decades with regard to future climate change, changes in rainfall patterns, and sea levels' rise .
- In addition, population growth, rapid urban and rural development and other human activities have increased the risk of flooding .
- Flood event in Iran is also increasing.



Ref:

- Yari, A., Ardalan, A., Ostadtaghizadeh, A., Zarezadeh, Y., Boubakran, M.S., Bidarpoor, F. and Rahimiforushani, A., 2019. Underlying factors affecting death due to flood in Iran: A qualitative content analysis. *International Journal of Disaster Risk Reduction*, 40, p.101258.

Introduction: Flood deaths in the world and Iran

- Floods are responsible for half of the deaths from natural hazards Specifically, in the period from 2005 to 2014, floods caused 50,092 deaths.
- Over a 30-year period (1980-2009) floods caused more than 539,811 lives worldwide.
- Along with the increasing frequency of floods, there has been a rise in the number of flood deaths in recent years.
- Iran is located in flood-prone areas, and in Recent decades, it has brought over four million homeless, eight thousand casualties and many injured .

Ref:

- Salvati, P., et al., Gender, age and circumstances analysis of flood and landslide fatalities in Italy. Science of the Total Environment, 2018. 610: p. 867-879.
- Haynes K, Coates L, van den Honert R et al (2017) Exploring the circumstances surrounding flood fatalities in Australia—1900–2015 and the implications for policy and practice. Environmental Science & Policy 76:165-76. <https://doi.org/10.1016/j.envsci.2017.07.003>
- EMDAT, profiles, E.-D.D. (2011) The OFDA/CRED International Disaster Database accessed September 20, 2011. Available at <http://www.emdat.be/database>

Introduction: Iran's floods in 2019

- According to a Red Cross report : Heavy rains and flash floods have affected more than 2000 cities and towns across almost all of Iran's.
- In total, about 10 million people were affected.
- more than half a million people became displaced permanently or temporarily out of their homes
- In the affected provinces across the country, 200 towns and 4,304 villages damaged.



Ref:

- Yadollahie M. The Flood in Iran: A Consequence of the Global Warming?. The international journal of occupational and environmental medicine. 2019 Apr;10(2):54.
- Yari A. et al. How behavior influence flood deaths? A case control study.2020.

Introduction: Iran's floods in 2019

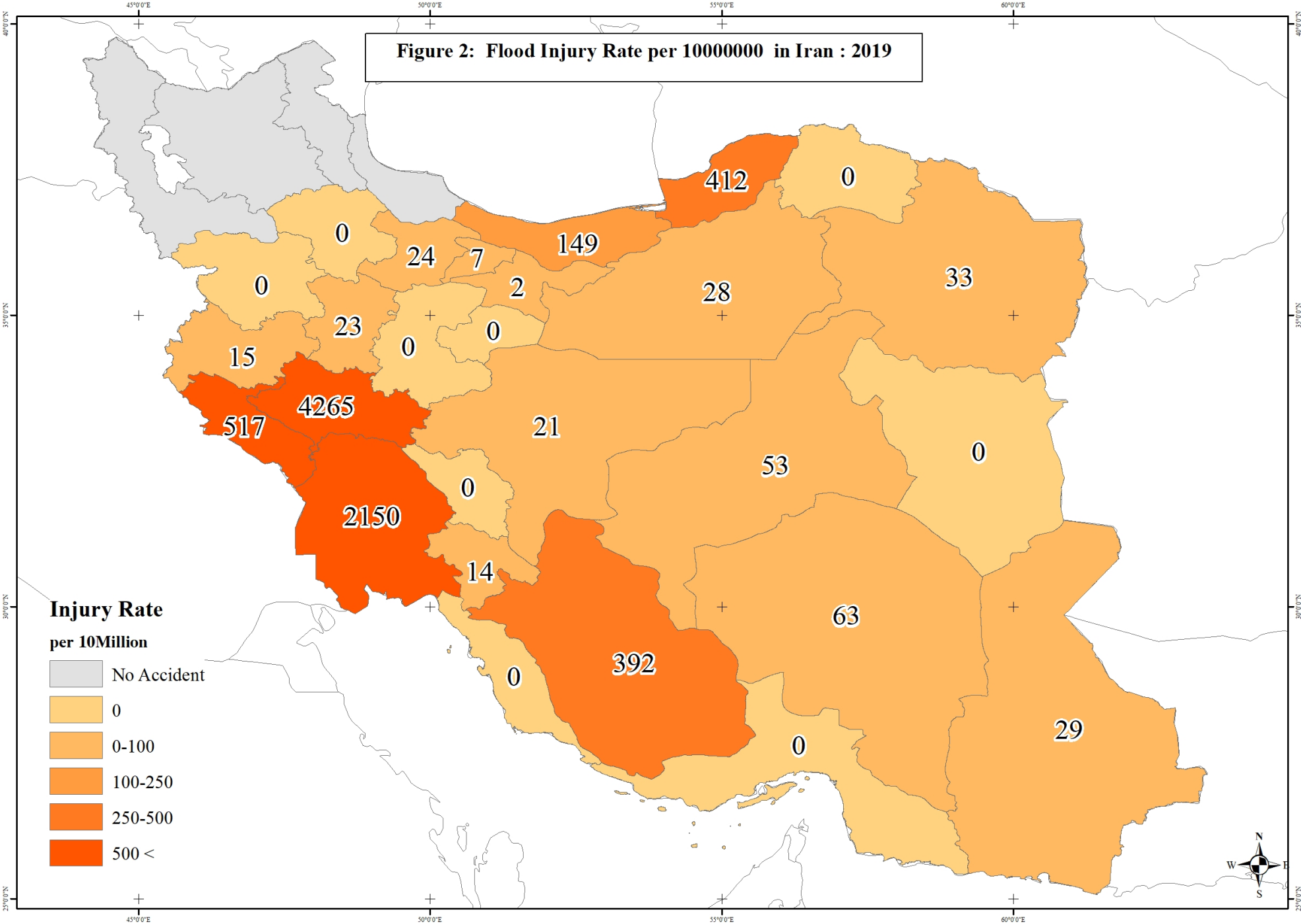
- The destruction of 6,000 urban and rural units and the damage of more than 75,000 urban and rural units have been part of the damage caused by the floods on people's property and assets
- In the floods that occurred during this period 2,193 people was injured and 82 died in the affected provinces .

Ref:

- Yadollahie M. The Flood in Iran: A Consequence of the Global Warming?. The international journal of occupational and environmental medicine. 2019 Apr;10(2):54.
- Yari A. et al. How behavior influence flood deaths? A case control study.2020.



Figure 2: Flood Injury Rate per 10000000 in Iran : 2019



Introduction: Flood death Definition

- Flood fatality or flood-related fatality: a fatality that would not have occurred without a specific flood event.
- Mortality is defined as the fraction of the inhabitants of the flooded area that lose their lives In the flood.

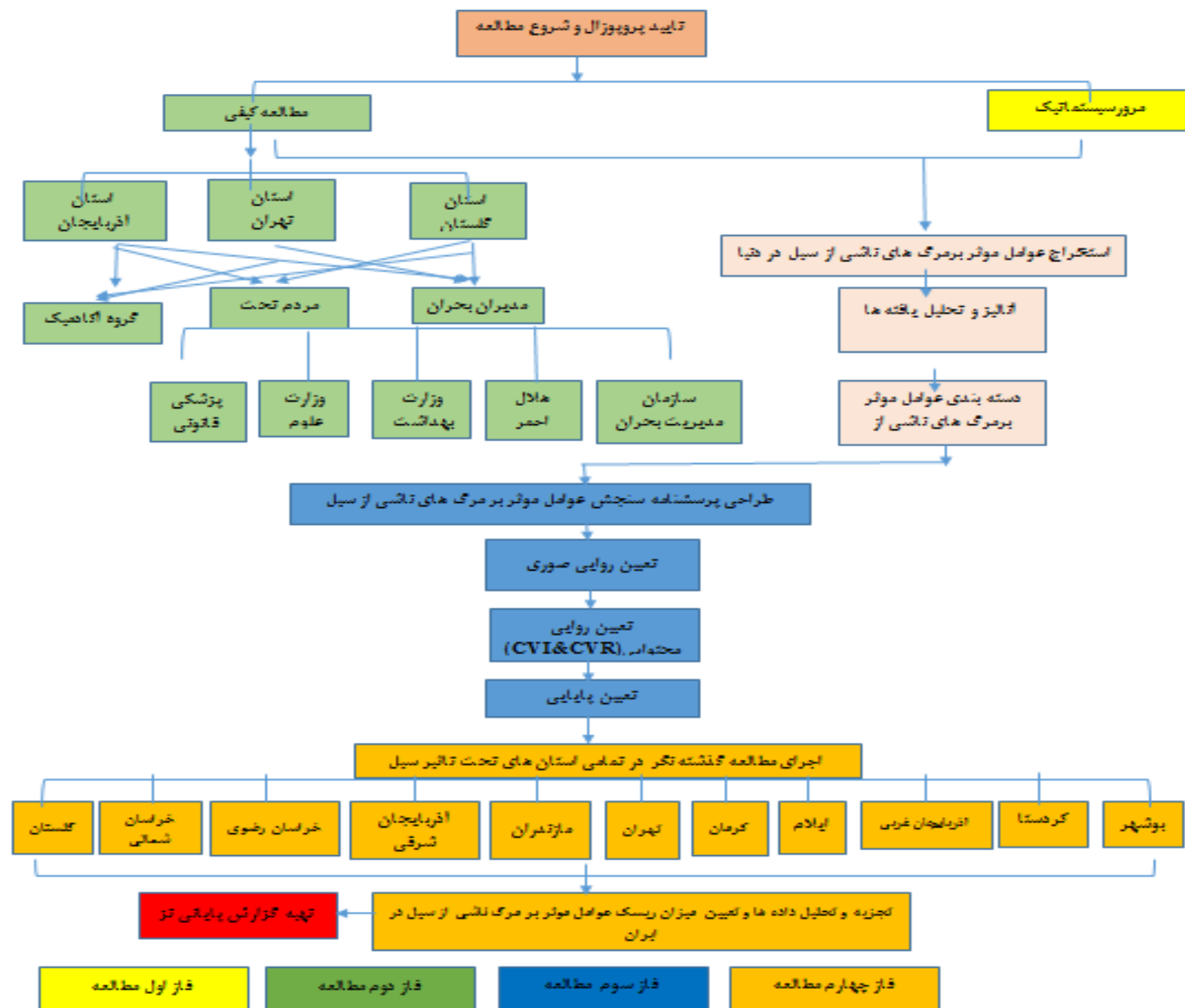


Ref:

- Jonkman, S.N. and I. Kelman, An analysis of the causes and circumstances of flood disaster deaths. *Disasters*, 2005. 29(1): p. 75-97.
- Brons, R.K. and J.J.L.M. Bierens, Water-Related Disasters, in *Handbook on Drowning: Prevention, Rescue, Treatment*, J.J.L.M. Bierens, Editor. 2006, Springer Berlin Heidelberg: Berlin, Heidelberg. p. 535-585.

Introduction: Underlying Factors of Flood Deaths

- Flood deaths do not occur directly due to floods or hazards, but the underlying causes cause death in the flood.
- Underline factors: Flood Characteristics, Features of the area affected by the flood, characteristics of the population (such as health, age) , The way people respond to the flood, Social vulnerabilities,...
- Our knowledge of the risk factors of deaths from floods is limited.
- Most studies on floods related to the rates and immediate causes of deaths and diseases caused by flood.



Results: Systematic Literature Review

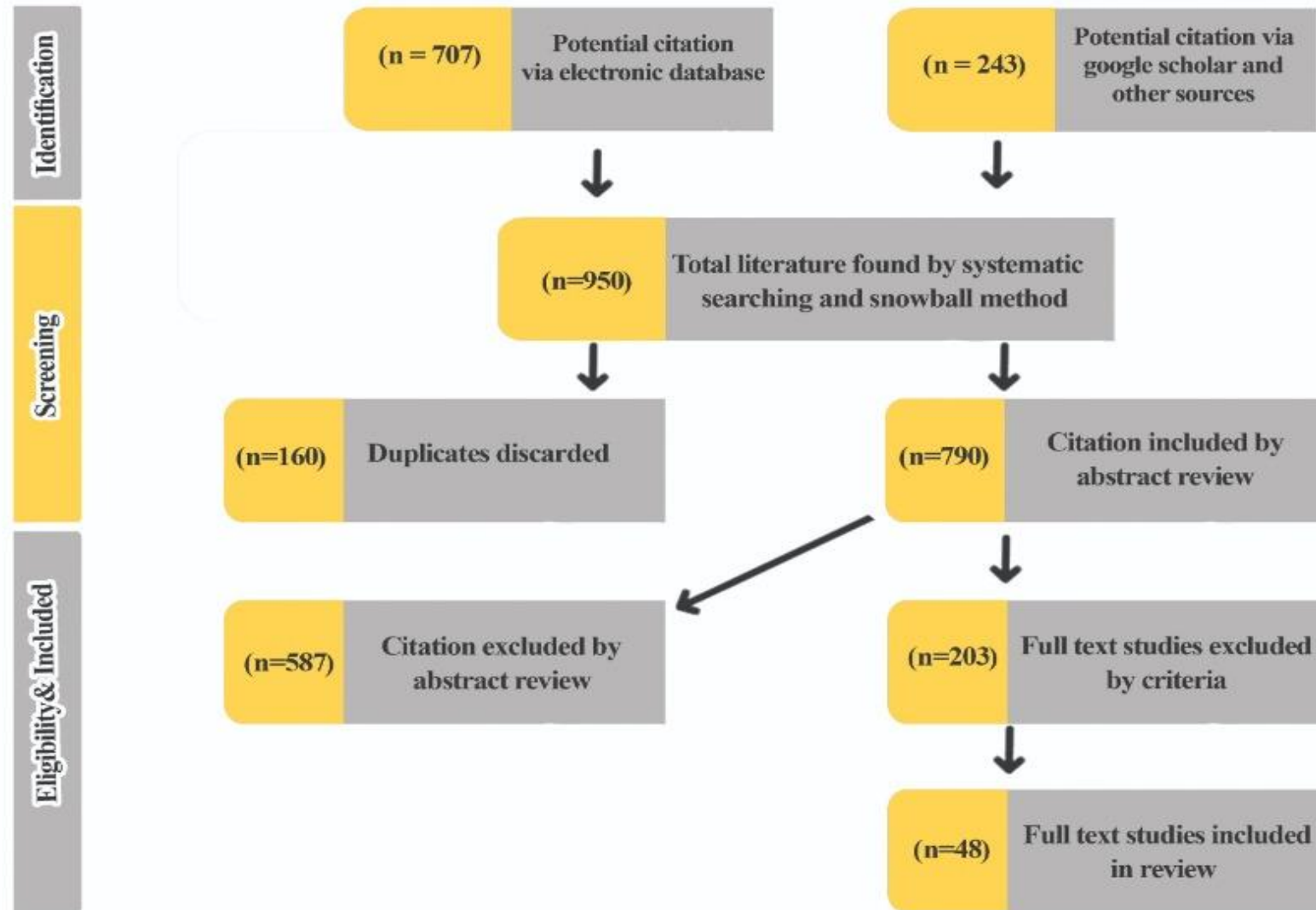


Figure 1. Flow diagram of the search and selection of papers

Results: Systematic Literature Review

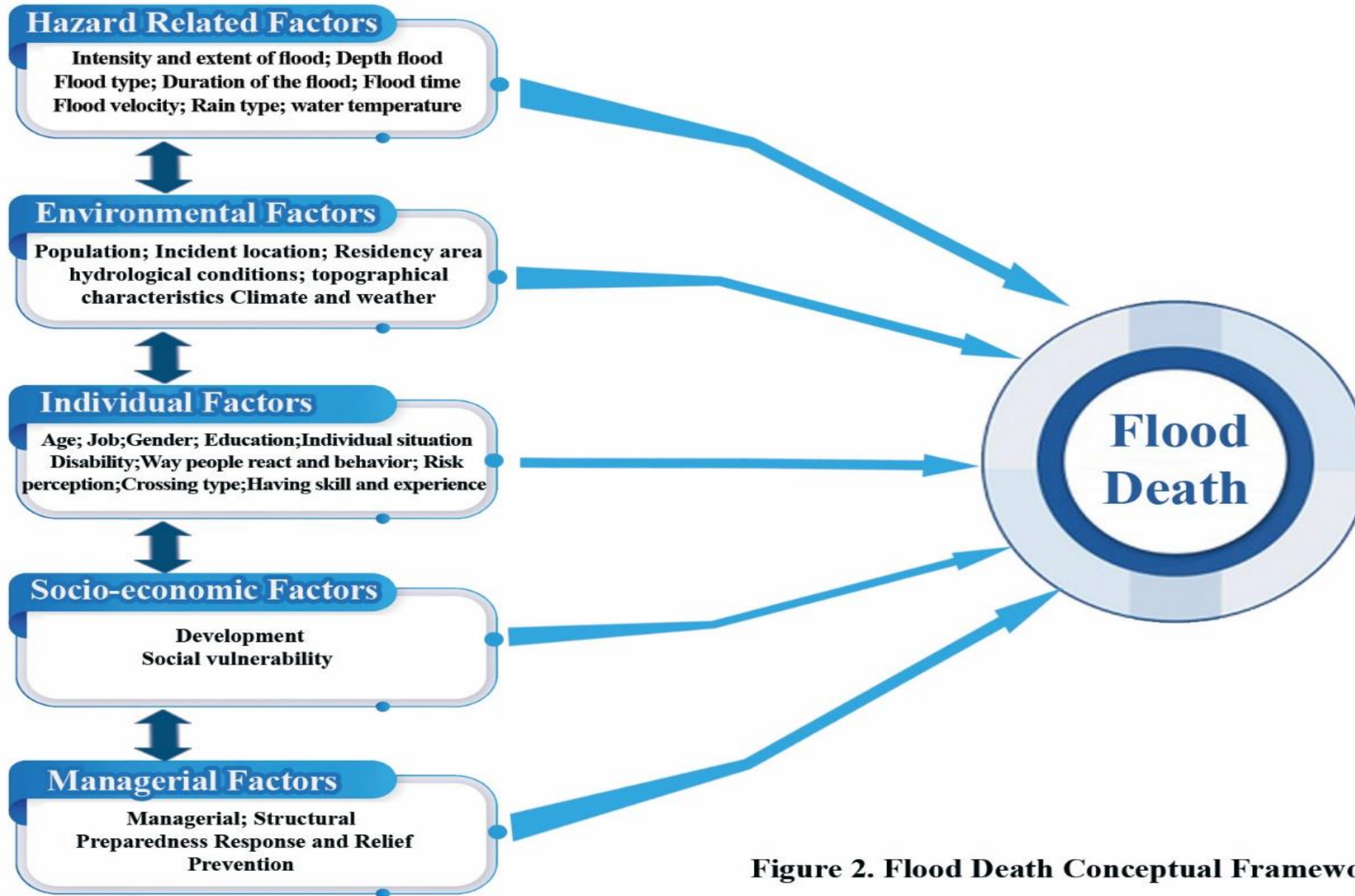
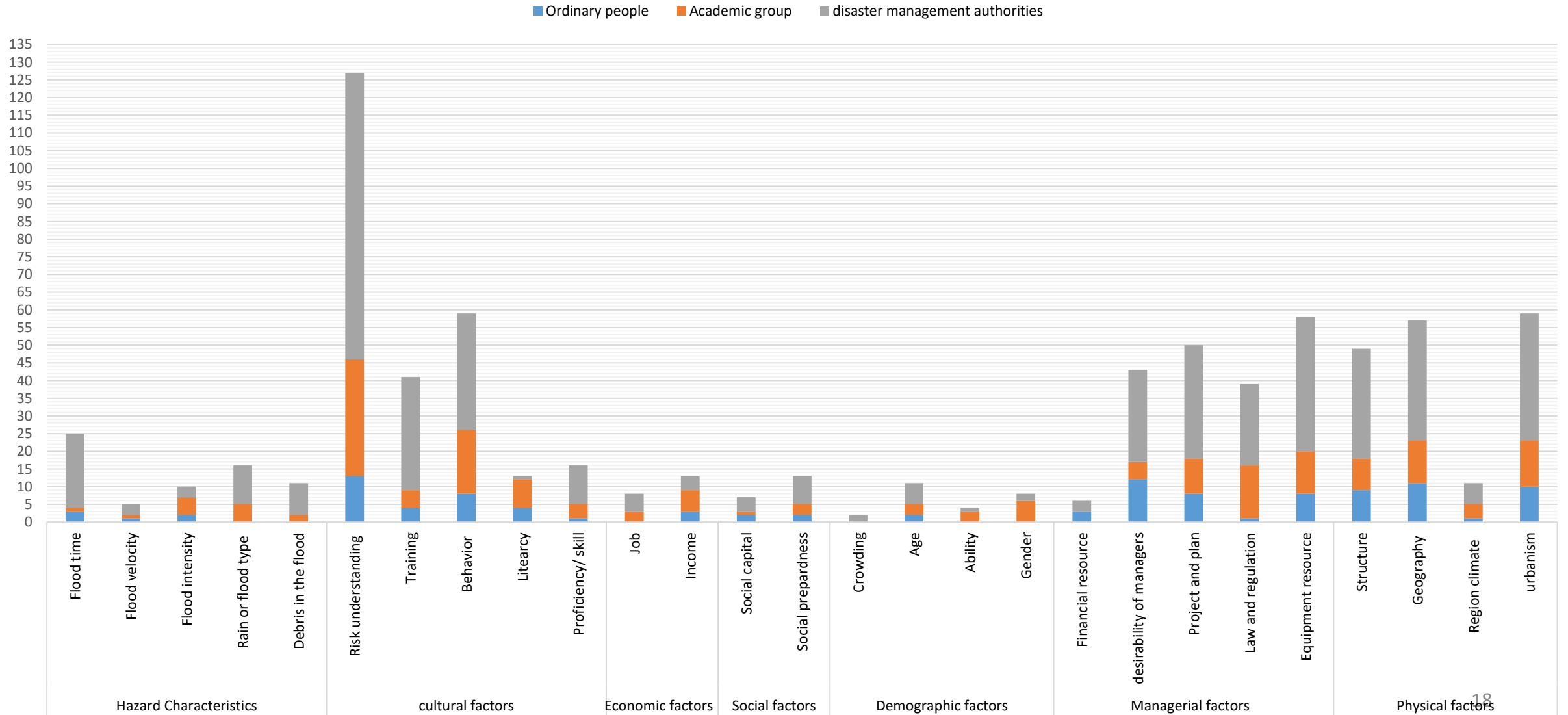


Figure 2. Flood Death Conceptual Framework

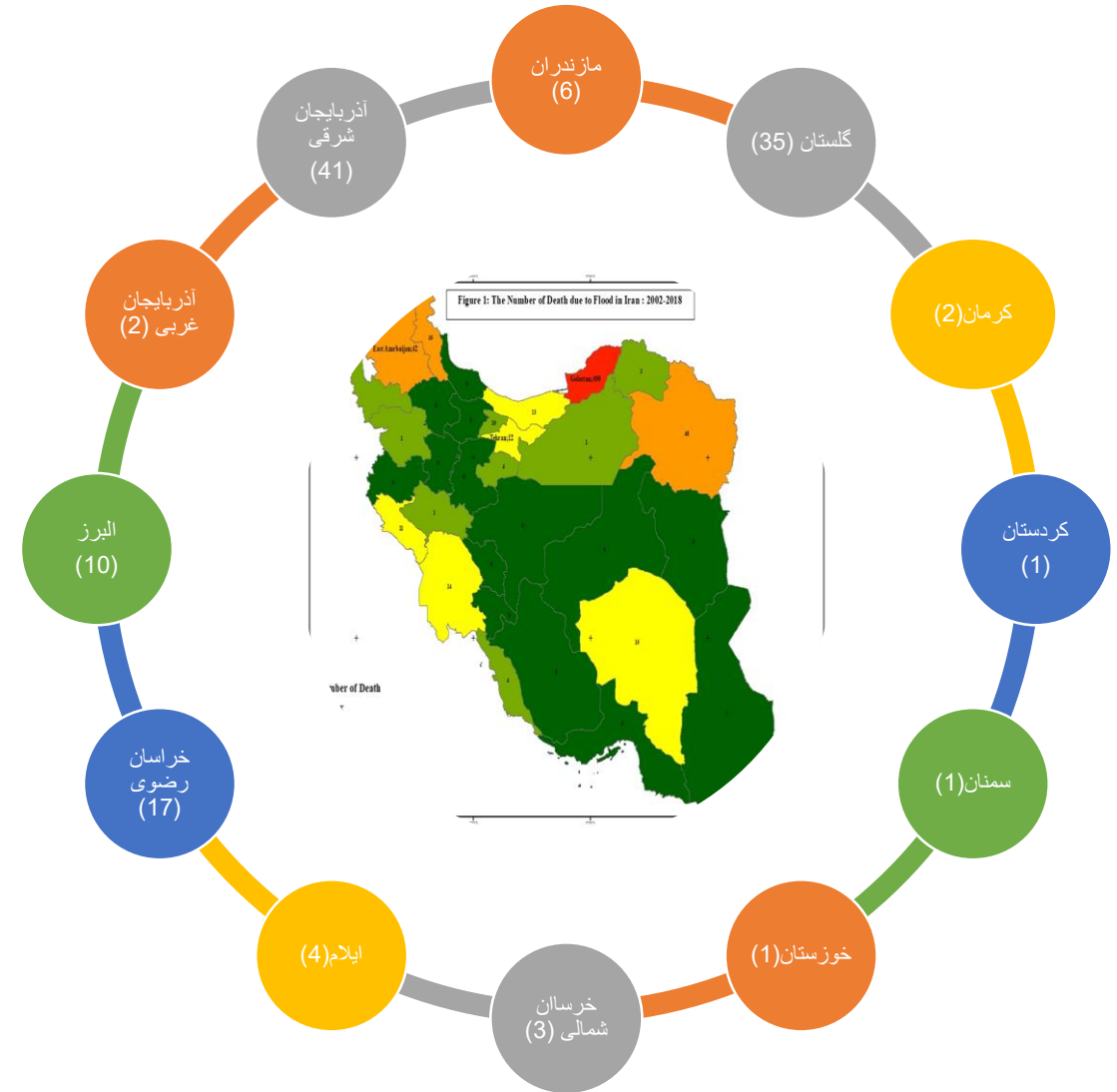
Quantitative Results: Qualitative Study

Chart1: Frequency of the Codes According to the Categories and Subcategories in Different Groups of Participants

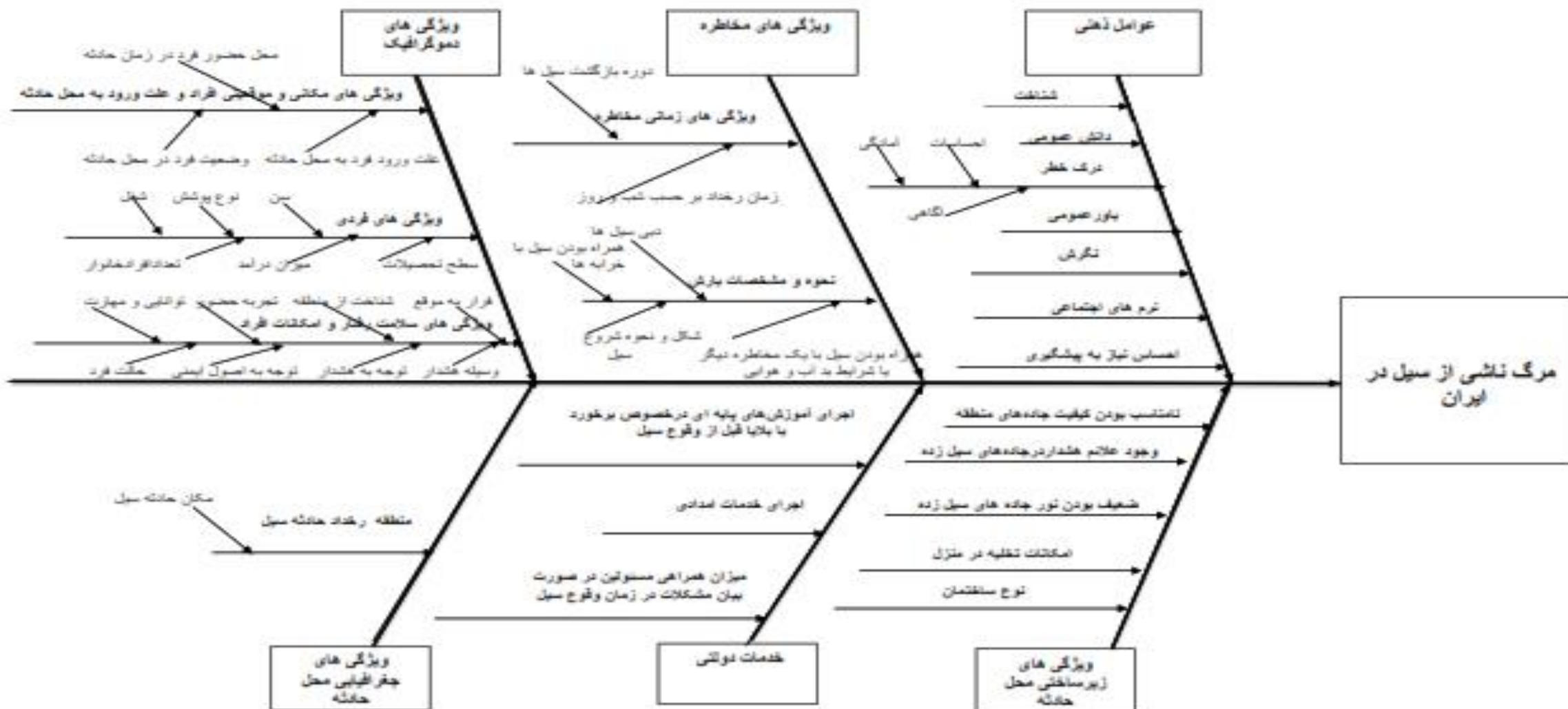


Method: Retrospective study

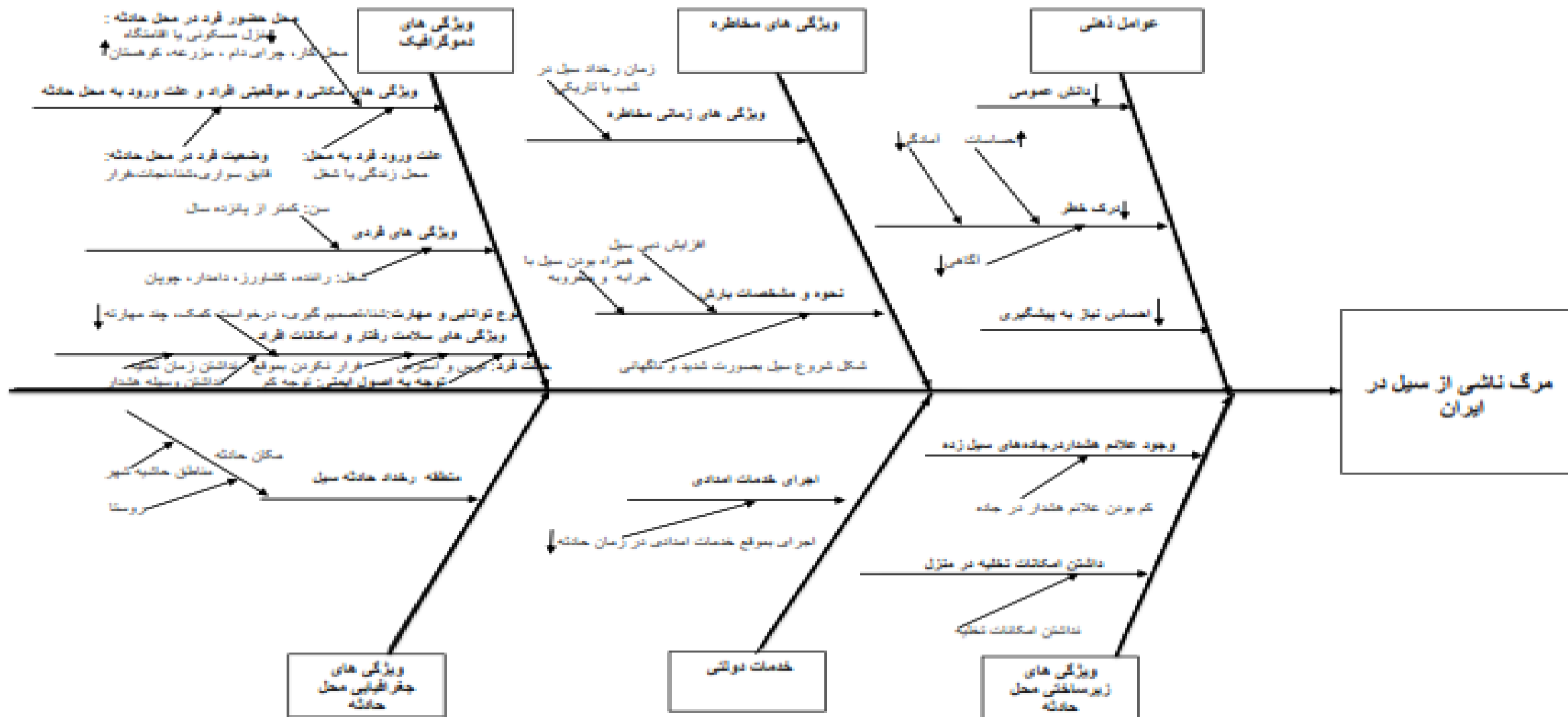
- The case- control study was conducted in 12 provinces and 30 cities in Iran.
- Data were collected using a questionnaire.
- A questionnaire was completed for 369 persons: 123 case and 246 control.
- The data were entered into SPSS software(version 22)
- Descriptive analysis of data was performed
- Analytical data analysis was performed(Data analysis was performed (Chi-square, Fisher exact and binary logistic regression analysis).



Discussion - Relationship Network of Factors Associated with Flood Deaths Based on Analytical Findings of Chi-square Test and Fisher's Exact Test in a Case-Control Study



Causality Network of Factors Affecting Flood Deaths Based on Analytical Findings of Regression Analysis in Case-Control Study



Retrospective study Result: Analytical Analysis

Chi-square, Fisher exact

نام دسته ابزار	زیر دسته ها و عوامل مرتبط با مرگ ناشی از سیل به شکل معنی دار
سازه های عوامل ذهنی پرسشنامه	شناخت
	دانش
	باورهای عمومی
	احساسات
	آگاهی
	آمادگی
	نگرش
	نرم های اجتماعی
	احساس نیاز به پیشگیری

Binary logistic regression

نام دسته ابزار	زیر دسته ها و عوامل مرتبط با مرگ ناشی از سیل به شکل معنی دار
سازه های عوامل ذهنی پرسشنامه	دانش عمومی
	دانش عمومی متوسط (0.104)
	دانش عمومی کم (0.263)
	احساسات
	احساسات زیاد (0.300)
	احساسات متوسط (0.352)
	آگاهی
	آگاهی متوسط (0.161)
	آگاهی کم (0.259)
	آمادگی
	آمادگی متوسط (0.246)
	آمادگی کم (0.251)
	احساس نیاز به پیشگیری
	احساس نیاز به پیشگیری متوسط (0.179)
	احساس نیاز به پیشگیری کم (0.196)

Discussion: Retrospective study

- In this study low risk perception increase the risk of flood death by 0.509 in flood-affected individuals.
- Jackson in his study in 2009 explicitly stated that low risk perception in people at risk of hazard flood increases their risk of death.
- Indeed, one of the aspects of modern flood risk management and one of the effective strategies to reduce the flood is awareness of the quality and risk perception of the public. Because knowing the public's perception of natural hazards is indicative of people's willingness to take precautionary measures and
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Ref:

- Jackson, T.L., The impacts of increasing rainfall: Flood fatalities in Texas. 2009: The University of Texas at San Antonio.
- Yari, A., Ardalan, A., Ostadtaghizadeh, A., Zarezadeh, Y., Boubakran, M.S., Bidarpoor, F. and Rahimiforushani, A., 2019. Underlying factors affecting death due to flood in Iran: A qualitative content analysis. International Journal of Disaster Risk Reduction, 40, p.101258.

Discussion: Retrospective study

- In this study low level of awareness increase the risk of flood death by 0.251 in flood-affected individuals.
- Education and training can enhance the culture of preparedness for disasters Disaster risk reduction policies emphasize the use of education and training to promote the sustainability of societies .
- increasing the level of education will reduce vulnerability due to dangers by promoting the level of awareness and type of occupation. Ultimately, flood deaths will be less in people with higher awareness.

Ref:

- Yari, A., Ardalan, A., Ostadtaghizadeh, A., Zarezadeh, Y., Boubakran, M.S., Bidarpoor, F. and Rahimiforoushani, A., 2019. Underlying factors affecting death due to flood in Iran: A qualitative content analysis. International Journal of Disaster Risk Reduction, 40, p.101258.

Retrospective study Result: Analytical Analysis

Chi-square, Fisher exact		
نام دسته ابزار	زیر دسته ها و عوامل مرتبط با مرگ ناشی از سیل به شکل معنی دار	
ویژگی های مخاطره	اطلاعات زمانی رخداد مخاطره	زمان رخداد(شب و روز)
		دوره بازگشت سیل ها
	نحوه و مشخصات بارش	شکل و نحوه شروع سیل
		همراه بودن سیل با مخاطره یا شرایط بد آبوهوایی
		همراه بودن سیل با خرابه و مخروبه
		دبی سیل

Binary logistic regression		
ویژگی های مخاطره	نحوه و مشخصات بارش	همراه بودن سیل با خرابه و مخروبه
		(1.062) همراه بودن سیل با خرابه و مخروبه ها(بلی)
		دبی سیل
		(0.456) دبی سیل ها (۲۰۰-۳۰۰)
		(1.336) دبی سیل ها (۳۰۰-۵۰۰)

Retrospective study Result: Analytical Analysis

Chi-square, Fisher exact

نام دسته ابزار	زیر دسته ها و عوامل مرتبط با مرگ ناشی از سیل به شکل معنی دار	
ویژگی های جغرافیایی	ویژگی های منطقه رخداد حادثه	مکان حادثه سیل
	ویژگی های زیر ساختی	میزان نامناسب بودن کیفیت جاده های منطقه
		میزان تأثیر ضعیف بودن نور جاده های منطقه بر مرگ های ناشی از سیل
		وجود علائم هشدار در جاده های سیل زده
		نوع ساختمان فرد متوفی یا کنترل
		داشتن امکانات تخلیه در صورتی که محل حادثه منزل بوده است

Binary logistic regression

ویژگی های جغرافیایی	ویژگی های منطقه رخداد حادثه	مکان حادثه سیل
		مکان حادثه سیل (حومه شهر) (25.365)
		مکان حادثه سیل (روستا) (32.236)
	ویژگی های زیر ساختی	وجود علائم هشدار در جاده های سیل زده
		زیاد بودن علائم هشدار در جاده های سیل زده (2.191)
		داشتن امکانات تخلیه در صورتی که محل حادثه منزل بوده است
		نبود امکانات تخلیه در صورتی که محل حادثه (5.085) منزل بوده است (هیچ امکاناتی)

Discussion: Retrospective study

- In our study the chance of death from flood in rural areas is 32.236 times and in the marginal areas of the city is 25.365 more than urban areas.
- A study by Spitalar et al. In 2014 also showed that flood deaths were more frequent in rural areas. Given the low population density of rural areas, there is a lower chance of community assistance in rural areas .
- While Sharif and colleagues point to the higher number of deaths in urban areas, this difference may be due to Sharif taking into account the raw number of deaths, but Spitalar et al and calculates the likelihood of death from a flood.

Ref:

- Špitalar, M., et al., Analysis of flash flood parameters and human impacts in the US from 2006 to 2012. Journal of hydrology, 2014. 519: p. 863-870.
- Sharif HO, Jackson TL, Hossain MM et al (2014) Analysis of flood fatalities in Texas. Natural Hazards Review 16(1):04014016. 10.1061/(ASCE)NH.1527-6996.0000145

Discussion: Retrospective study

- It is self-evident that physical factors such as building, settlement zones, public places, dams, and the like affect death due to flood.
- Engineering, planning and managing such premises based on flood risk reduction measures reduces death.

- Ref:
- Jonkman S. Loss of life caused by floods: an overview of mortality statistics for worldwide floods. DC1-233-6. 2003.
- Priest S. Building a model to estimate Risk to Life for European flood events. T10-0710. 2009.

Discussion: Retrospective study

- In 2002, the World Health Organization estimated that about 40% of the health effects of floods in Europe were associated to risky behaviors . Many of these high-risk behaviors during floods are unnecessary , such as the use of vehicles in the United States during floods that have resulted in flood deaths .
- In 2002, Eagle stated that in Switzerland, 40 percent of the 67 flood deaths that occurred between 1972 and 2001 were due to inappropriate behavior (10).
- Ref:
- World Health Organization (WHO) (2002) 'Floods: climate change and adaptation strategies for human health. WHO, Regional Office for Europe, Geneva, Switzerland.
- Egli T. Nonstructural flood plain management: measures and their effectiveness. International Commission for the Protection of the Rhine (ICPR); 2002.

Retrospective study Result: Analytical Analysis

Chi-square, Fisher exact

نام دسته ابزار	زیر دسته ها و عوامل مرتبط با مرگ ناشی از سیل به شکل معنی دار	
ویژگی های دموگرافیک	اطلاعات مکانی و موقعیتی شرکت کنندگان	محل حضور فرد متوفی یا شاهد در زمان رخداد حادثه
		علت ورود فرد به محل حادثه
		وضعیت فرد در محل حادثه

Binary logistic regression

نام دسته ابزار	زیر دسته ها و عوامل مرتبط با مرگ ناشی از سیل به شکل معنی دار	
ویژگی های دموگرافیک	اطلاعات مکانی و موقعیتی شرکت کنندگان	محل حضور فرد متوفی یا شاهد در زمان رخداد حادثه
		محل حضور فرد متوفی یا شاهد در زمان حادثه (منزل مسکونی یا اقامتگاه) (0.017)
		محل حضور فرد متوفی یا شاهد در زمان حادثه (محل کار - چرای دام - مزرعه - درکوهستان) (0.158)
		علت ورود فرد به محل حادثه
		(0.130) علت ورود فرد به محل حادثه (محل زندگی یا شغل فرد)
		(0.224) علت ورود فرد به محل حادثه (تفریح و گردش و کنجکاوی)
		(0.206) علت ورود فرد به محل حادثه (نجات جان افراد و کمک)
		وضعیت فرد در محل حادثه
		وضعیت فرد در محل حادثه (قایق سواری - شنا - نجات یا فرار) (11.235)

Retrospective study Result: Analytical Analysis

Chi-square, Fisher exact		
نام دسته ابزار	زیر دسته ها و عوامل مرتبط با مرگ ناشی از سیل به شکل معنی دار	
ویژگی های دموگرافیک	اطلاعات سلامت، رفتار و امکانات شرکت کنندگان	فرار بموقع در زمان سیل
		تجربه حضور در سیل
		شناخت از منطقه تحت تأثیر
		توجه به اصول ایمنی و خطر حریم
		داشتن وسیله مناسب برای دریافت هشدار سیل
		توجه به هشدارهای هواشناسی
		داشتن زمان کافی برای تخلیه

Binary logistic regression		
ویژگی های دموگرافیک	اطلاعات سلامت، رفتار و امکانات شرکت کنندگان	فرار بموقع در زمان سیل
		(0.241) فرار بموقع در زمان سیل (بله)
		توجه به اصول ایمنی و خطر حریم
		توجه به اصول ایمنی و خطر حریم (خیلی زیاد)(0.425)
		(0.264)توجه به اصول ایمنی و خطر حریم (زیاد)
		توجه به اصول ایمنی و خطر حریم (متوسط) (0.230)
		داشتن وسیله مناسب برای دریافت هشدار سیل
		داشتن وسیله مناسب برای دریافت هشدار سیل (2.358) (داشته)
		داشتن زمان کافی برای تخلیه
		داشتن زمان کافی برای تخلیه (بله) (0.215)

Discussion: Retrospective study

- Attention to the Safety and danger Limits decreases the risk of flood death, in confirmation of this finding, some studies that have shown that neglecting and minimizing the risk increases the risk of flood death .
- consequently, the researcher suggests applying the principles of safety and danger Limits in residential, educational, recreational, governmental, non-governmental, road, and other areas of presence, especially in densely populated areas.

Ref:

- Priest S. Building a model to estimate Risk to Life for European flood events. T10-0710. 2009.
- Kundzewicz Z, Kundzewicz W. Mortality in flood disasters. Extreme weather events and public health responses: Springer; 2005. p. 197-206.
- Jackson TL. The impacts of increasing rainfall: Flood fatalities in Texas: The University of Texas at San Antonio; 2009.

Discussion: Retrospective study

- In addition, informing the public and attracting their attention should be done by installing signs, banners, and posters or through the media and any other appropriate method regarding attention to safety principles and danger limits. Because early warning and sending alerts in flood risk areas can play a very important role in reducing flood deaths.

Ref:

- Duclos P, Vidonne O, Beuf P, Perray P, Stoebner A. Flash flood disaster-nîmes, France, 1988. European Journal of Epidemiology. 1991;7(4):365-71.

Discussion: Retrospective study

- the results of regression analysis showed that some risky behavior such as watching or taking a picture and curiosity, relief efforts and rescue, retrieve stock or property, incaution, crossing flooded water, river, roads and bridges greatly increases the risk of flood deaths. Some studies have also suggested that, relief efforts and rescue entering or floodwater or unnecessary risky behaviors as one of the factors influencing flood deaths
- In fact, it can infer that risky behavior increase the risk of flooding and should be avoided
- Ref:
- 37- Brazdova M, Riha J. A simple model for the estimation of the number of fatalities due to floods in central Europe. *Natural Hazards and Earth System Sciences*. 2014;14(7):1663-76.

Retrospective study Result: Analytical Analysis

Chi-square, Fisher exact		
نام دس ته ابزار	زیر دسته ها و عوامل مرتبط با مرگ ناشی از سیل به شکل معنی دار	
ویژگی های دموگرافیک	اطلاعات سلامت، رفتار و امکانات شرکت کنندگان	نوع توانایی و مهارتی که در زمان سیل می تواند به نجات فرد کمک کند
		حالت فرد در زمان حادثه (که درخصوص افراد متوفی می توانسته علت مرگ باشد)

Binary logistic regression		
ویژگی های دموگرافیک	اطلاعات سلامت، رفتار و امکانات شرکت کنندگان	نوع توانایی و مهارتی که در زمان سیل می توانسته به نجات (23.982) فرد کمک کند (چند مهارته)
		نوع توانایی و مهارتی که در زمان سیل (8.479) (شنا کردن)
		نوع توانایی و مهارتی که در زمان سیل می توانسته به نجات (4.031) فرد کمک کند (تصمیم گیری درست و درخواست کمک)
		حالت فرد در زمان حادثه (که درخصوص افراد متوفی می توانسته علت مرگ باشد)
		حالت فرد در زمان حادثه (ترس و استرس) (0.175)

Discussion: Retrospective study

- The results of regression analysis showed that possession of the abilities and skills such as evacuating, prompt decision-making, requesting help, escaping and scrambling greatly reduced the risk of flood deaths. This finding suggests that individual's chances of survival depend on a person's endurance and ability to find the appropriate shelter .
- it is recommended to train, exercise and improve the ability and skills to reduce death and damage during floods in flood-prone areas.

- Ref:
- Jonkman SN, Vrijling JK. Loss of life due to floods. *Journal of Flood Risk Management*.2008;1(1):43-56.
- Rae E, Campbell, P, Haynes, K, Gissing, A, Coates, L. Preventing flood related fatalities: a focus on people driving through floodwater. Non-peer reviewed research proceedings from the Bushfire and Natural Hazards CRC & AFAC conference. 30 August – 1 September 2016.

Discussion: Retrospective study

- People's skills and abilities affect their mortality in flood time. paradoxically perceived or real swimming skill increases the risk of flood death
- paradoxically perceived or real swimming skill (OR=8.479) Increases the risk of flood death compare to individual without any skills and abilities.
- behavior and decision making during natural disasters is a very complex process and is the result of a combination of environmental factors, social processes, and individual factors and skills . attitude toward swimming skills can affect people's risk acceptance and risky behaviors during floods.
- Some studies have confirmed that people who try to walk or swim in floods are more likely to die. Perceived or real skill of swimming may increase self-esteem and courage in confronting water. This increases the probability of death due to flood because swimming skill is not sufficient to survive flood in which the nature and behavior of water is dramatically different from pools or lakes.
- Accordingly, training and informing people and communities in flood prone areas about the dangers of swimming and walking in floods is essential.

Retrospective study Result: Analytical Analysis

Chi-square, Fisher exact

نام دسته ابزار	زیر دسته ها و عوامل مرتبط با مرگ ناشی از سیل به شکل معنی دار	
ویژگی های دموگرافیک	ویژگی های فردی	سن شرکت کنندگان
		سطح تحصیلات
		شغل
		تعداد افراد خانوار
		نوع پوشش
		میزان درآمد

Binary logistic regression

نام دسته ابزار	زیر دسته ها و عوامل مرتبط با مرگ ناشی از سیل به شکل معنی دار	
ویژگی های دموگرافیک	ویژگی های فردی	سن شرکت کنندگان
		سن کمتر از ۱۵ سال (31.974)
		شغل
		شغل راننده (13.874)

Discussion: Retrospective study

- In our study the age of less than 15 years 31.974 times increased the chance of death from flood.
- This result is consistent with the findings of many studies that have suggested that low age (or youth) is a risk factor for flood-related deaths . While other studies have identified aging as one of the risk factors for flood-related deaths.
- Therefore, it is necessary to support and implement appropriate measures to protect vulnerable age groups.
- Ref:
- Salvati, P., et al., Gender, age and circumstances analysis of flood and landslide fatalities in Italy. *Science of the Total Environment*, 2018. 610: p. 867-879.
- Haynes, K., et al., Exploring the circumstances surrounding flood fatalities in Australia—1900–2015 and the implications for policy and practice. *Environmental science & policy*, 2017. 76: p. 165-176.
- Kellar, D. and T. Schmidlin, Vehicle-related flood deaths in the U nited S tates, 1995–2005. *Journal of flood risk management*, 2012. 5(2): p. 153-163.
- FitzGerald, G., et al., Flood fatalities in contemporary Australia (1997–2008). *Emergency Medicine Australasia*, 2010. 22(2): p. 180-186.
- Lee, S. and K. Vink, Assessing the vulnerability of different age groups regarding flood fatalities: case study in the Philippines. *Water Policy*, 2015. 17(6): p. 1045-1061.

Discussion: Retrospective study

- In this study having the driving jobs 13.874 times increased the chance of death from flood.
- Jackson has described occupation as a risk factor for flood-related deaths , and many studies have pointed to the driving profession as one of the high-risk occupations in flood-related deaths.

Ref:

- Jackson, T.L., The impacts of increasing rainfall: Flood fatalities in Texas. 2009: The University of Texas at San Antonio.
- Salvati, P., et al., Gender, age and circumstances analysis of flood and landslide fatalities in Italy. Science of the Total Environment, 2018. 610: p. 867-879.
- Diakakis, M. and G. Deligiannakis, Vehicle-related flood fatalities in Greece. Environmental Hazards, 2013. 12(3-4): p. 278-290.
- Jonkman, S. and J. Vrijling, Loss of life due to floods. Journal of flood risk management, 2008. 1(1): p. 43-56.

Discussion: Retrospective study

- Regarding the risk of being less than 15 years old and drivers and residents of rural and marginal areas of the city, special programs to support and protect these groups during the flood must be developed and implemented.
- Therefore, we recommend that prevention, training and upgrading measures be taken in the prevention and preparedness phase to reduce flood-related deaths in high-risk groups and residents in high-risk areas

Retrospective study Result: Analytical Analysis

Chi-square, Fisher exact	
نام دسته ابزار	زیر دسته ها و عوامل مرتبط با مرگ ناشی از سیل به شکل معنی دار
خدمات دولتی	میزان به موقع بودن خدمات امدادی
	آموزش‌های پایه ای درخصوص برخورد با بلایا قبل از وقوع سیل
	میزان همراهی مسئولین در صورت بیان مشکلات در زمان وقوع سیل

Binary logistic regression	
نام دسته ابزار	زیر دسته ها و عوامل مرتبط با مرگ ناشی از سیل به شکل معنی دار
خدمات دولتی	میزان به موقع بودن خدمات امدادی
	خدمات امدادی تا چه اندازه بموقع انجام شد (خیلی 0.568) (زیاد)
	خدمات امدادی تا چه اندازه بموقع انجام شد (زیاد) 0.352

Conclusion

- flood risk management and reduction require a variety of strategies and tactics:
- Planning and Training,
- Promotion of culture of Prevention, Awareness, Recognition and Readiness, Coordination, Cooperation,
- Involve all Community Members, Policymakers, Managers, Decision Makers and Responsible Organizations in different stages of disaster management based on the challenges and problems of the community.
- The results of this study can be used by policy makers and disaster management planners at national and international levels.

Thank you for
your attention

