A comparative study: Accreditation of universities' disaster risk management for health promotion

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Abstract:

BACKGROUND: Risk management processes accreditation in emergencies and disasters can determine the effectiveness and efficiency of these processes. Universities, as the highest level of education, should provide a safe environment for educational services and activities of these people.

AIMS: The present study aimed to review and compare different accreditation models for emergencies and disaster risk management in selected countries. Reaching other accreditation models together and identifying their similarities and differences, along with considering the implementation of each model, can significantly help the countries which aim to design and develop a risk management accreditation model or upgrade their models.

MATERIALS AND METHODS: In this qualitative comparative study, the US, UK, Canada, Australia, Japan, and South Africa were selected based on research criteria. A literature review compared university emergency and disaster risk management accreditation models. The obtained data were collected in a researcher-made matrix, and a content analysis method was used for data analysis. Differences and similarities of selected countries in the fields of accreditation program(s), accreditation institute, start year, obligation, accredited organizations, number of criteria, criteria titles, accreditation focus, accreditation stages, number of stages, scoring method, and ranking method were compared.

RESULT: Designing a local model for the accreditation of disaster risk management in universities based on the crisis management system in each country can lead to improving the level of responsiveness and quality of services in emergency situations and health promotion.

Keywords:

Accreditation, disasters, emergencies, risk management, university

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Background

Emergencies and disasters in developed and developing countries are inevitable and have different social, economic, health, and other consequences for people and governments. The Centre for Research on the Epidemiology of Disasters in the US reported 318 natural disasters in 122 countries in 2017. About 96 million people were affected. Several 9503 deaths were reported, and economic loss was $314 billion in the US. In addition, 43% of these emergencies and disasters have occurred in Asia.[1]

Universities, as the highest level of education, are a place for the presence and activity of elite and future-making people in each country. Providing a safe environment for educational services and activities is necessary for these people. In addition, universities can play their role in the four primary areas of education, research, crisis evaluation, and monitoring due to their scientific nature after disasters. Such actions are only possible in the shadow of safety in the university environment. Previous studies indicated that universities usually have a legal obligation to implement disaster risk management programs and accreditation. It is required to encourage universities

to implement such programs by creating financial incentives and government support.[2] Studies on risk management evaluation at Italian universities showed heterogeneous and fragmented models of emergency management model Salian university system and emphasis. They emphasized a more accurate framework of standard safety and emergency management guidelines.[3] Research on "Complying the US colleges and universities with nationally issued guidelines for emergencies and disasters preparedness" showed that 96% of universities had a disaster management program; compared, 10% lacked such a program. In addition, none failed to perform desk exercises, and 20% did not perform any report or corrective actions afterward.[4]

Accreditation is "the systematic evaluation and determination of credit by an external organization using the desired structural, process, and outcome standards". Accreditation is to evaluate structures, processes, and performance results and identify problems to apply corrective measures to improve service quality and performance.[5] Changing the attitude of the international community from disaster management to the risk management of emergencies and disasters requires the development of the accreditation process in all aspects of the risk management cycle of emergencies and disasters, including prevention and reduction of the effect, preparedness, response, and recovery. Accreditation of risk management processes in accidents and disasters can determine the effectiveness and efficiency of these processes. Accreditation of disaster management has been researched in various fields, such as hospitals, industrial factories, and universities.[2,6,7]

Different countries formulate and implement a model for emergency and disaster risk management according to their environmental and geographical risk factors and the experiences gained during past emergencies and disasters. Such models are common in many standards and sometimes different to develop a specific accreditation model for each risk management process. This study discussed accreditation models of emergency risk management at universities from selected countries on five continents and compared different models of emergencies and disaster risk management accreditation in selected countries comparatively. Comparing other accreditation models together and identifying their similarities and differences along with the context of each model implementation can significantly help the countries which aim to design and develop a risk management accreditation model or upgrade their models. The significance of this study in its subject, scope, and method is remarkable.

Materials and Method

Study design and setting
This study was a comparative study conducted from 2000 to 2021. A comparative study is the identification, interpretation, and adaptation of similarities and differences of the main variables, which are the subject of the study, as well as their relationship with underlying factors in different countries, cultures, organizations, groups, people, objects, and events.[8]

Study participants and sampling
A literature review was used to collect data. Accreditation of emergency and disaster risk management in universities and full access to emergency and disaster risk management accreditation models in English or Farsi were the criteria for entering the study. Studies and information that did not meet the above conditions were excluded.

The US, Britain, Canada, Australia, Japan, and South Africa were investigated based on accreditation models' inclusion and exclusion criteria. ProQuest Scupos Databases, Pubmed, Web of Science, and Google Scholar Search Engine, as well as guidelines, instructions, and other related information.[9] Gray literature using the following strategy was studied on the websites of the Ministry of Health, academic, public and private centers related to emergencies and disasters, and accreditation institutions in the countries [Table 1].

Data were collected using a researcher-made matrix. After collecting the data from the research team, they restudied the accuracy of the comparison [Table 2].

Table 1: Search strategies

Type of Data	Data Base	Search Strategy
Scientific Data Based	Scopus PubMed ProQuest Web of Science	(University OR Campus OR School OR Faculty) AND (Emergency OR Disaster OR Emergency risk OR "risk reduction") AND (UK OR USA OR Japan OR Australia OR Canada OR "South Africa") AND (Assessment OR Accreditation OR Indicator OR Standard OR Guideline)
Gray Literatures	Google-customized search engine Target web site Other gray literatures data based	Emergency And Disaster Accreditation Emergency And Disaster Assessment Emergency And Disaster Indicators Emergency And Disaster Standards AND Guideline OR Document OR Tool kit OR Paper

Table 2: Comparative study summaries

Subject	South Africa	Australia	UK	England		Japan		USA
Accreditation program	Emergency Management program	Australia's National Disaster Resilience Indicators	Public health	Emergency management performance evaluation indicators and risk assessment	Accreditation Program of Postgraduate Education Centers	International standard organization number 22320 (2018)	1600 Standard	Emergency Management program
Start	2018	2013	2003	1991	1984	2011	2011	2001
Requirement	Voluntary	Voluntary	Mandatory	Mandatory	Mandatory	Voluntary	Mandatory	Voluntary
Accredited organization	Universities	Provinces Universities Organization	Health service center	Public and private institutions	Universities' postgraduate center	Universities' public and private institutions	Universities' public and private institutions	Universities' public and private institutions
Criteria number	11	8	7	7	5	3	6	11
Criteria	- Risk assessment - Risk mitigation - Preparedness plan - Response plan - Emergency management - Resource management and support - Communications and alerts - human resource training - Practice, evaluation and corrective actions - Incident notification and public education	- Government and leadership - social advocacy - emergency services - Economic capital - social property Information access Environmental recovery plan	- Risk assessment - Mitigation - Communication - Corporation and coordination - Response plan - business continuity - training and exercise	- Emergency management policy - Emergency management structure - Emergency management - Emergency facility - Emergency management plan - Establish a prepared team - Exercise assessment	- Risk assessment - preparedness plan - Response plan - Information management - Training and Exercises	- Principle - Incident management - Corporation and coordination	- Plans management - planning - operational plan - Education - Exercises and evaluation - Quality improvement	- Risk assessment - Risk mitigation - Preparedness plan - Response plan - Emergency management - Resource management and support - Communications and alerts - human resource training - Practice, evaluation, and corrective actions - Incident notification and public education
Focus of accreditation	Mitigation/prevention Preparedness Response Recovery	Preparedness	Preparedness response	Mitigation/prevention Preparedness response	Mitigation/prevention Preparedness response	Response	Preparedness	Mitigation/prevention Preparedness Response Recovery
Scoring Methods	Qualitative Quantitative	Qualitative Quantitative	Qualitative	Quantitative	Qualitative	Qualitative	Qualitative	Qualitative Quantitative
Ranking Methods	Accredited Nonaccredited	Certificate of resilience level (weak, medium, excellent)	Accredited Nonaccredited	Accredited Nonaccredited	Accredited candidacy certificate - Temporary accreditation certificate - Complete validation	Certified noncertified	Certified noncertified	Accredited Nonaccredited
Certificate validity period	3 year	1 year	5 year	4 year	1 year	3 year	1 year	3 year

Data collection tool and technique

Data were collected using a researcher-made matrix. After collecting the data from the research team, they restudied the accuracy of the comparison. Directed content analysis (matrix content analysis) was used to analyze the obtained data on emergencies and disaster risk management accreditation models in the studied countries. In this method, content analysis is directed by indicators, and the models obtained from the studies are placed in the designed matrix.[10]

Ethical consideration

Ethical considerations, including the commitment to interpreting information, were observed in all stages of the study without bias.

Finding

The US

In the US, states are mainly responsible for public health and conduct a wide range of activities such as collecting and analyzing information, conducting inspections, planning, implementing policies and standards, controlling the implementation of health care requirements, etc.[11]

The American National Fire Protection Association (NFPA) and the American Institute for Emergency Management Program Accreditation evaluate safety and risk management in the US. The NFPA has set many fire protection and prevention standards, and its principal activities are in this area. This association has entered into accident management standards which can be used at the local, regional, national, and international levels for all organizations.[12] The American Institute for Emergency Management Program Accreditation voluntarily evaluates the emergency risk management organizations and risk management programs, as well as higher education at the national, state, and local levels using the Emergency Management Accreditation Model. This institute has an assessment team and a technical committee, including the public sector, a private sector representative, and public stakeholders.[13,14]

The NFPA standards are classified into six areas: program management, planning, implementation, training, practice, and assessment, as well as program improvement and upgrading.

Many universities in the US use the NFPA standard level about emergencies and disaster management for evaluating preparedness. Implementing these standards is optional and recommended by the US Department of Homeland Security.[15] The American Institute for Emergency Management Program Accreditation has 64 standards which are grouped into 11 areas such as risk identification, risk assessment, and effects analysis, risk

effect mitigation, prevention, operational planning and policies, accident management, management resources, received support, and assistance, communications and alert, facilities, skills training, practice, assessments, and corrective actions, emergency information, and public training. The American Institute for Emergency Accreditation process is conducted in five steps. First, the applicant organization pays a membership fee after registering in the system to use the assessment tools and standards for a year and benefits from free training and assistance in providing and entering emergencies and disaster risk management information. In addition, it can participate in the standard development technical group as a public benefit and use the available examples for self-assessments. Then, the accreditation manager is selected in the organization, and a self-assessment is conducted using the designed tools; the organization should eliminate possible deficiencies and noncompliance with the standards during the assessment. Then, the assessment team attends the site, reviews the standards through document control, interviews, and observations, and prepares a report for the jury on the compliance of the evaluated organization with the standards. After that, the team reviews the organization's status in each of the standards based on the assessment team's report at the commission site. The commission makes decisions on the status of accreditation, and the organization is given 9 months to eliminate any shortcomings which can be eliminated. In case of rejecting the accreditation of reasons for this decision, it will be explained in writing. When the accreditation is completed and the degree is granted (accredited – not accredited), annual visits are conducted to control the organization's status.[16] Such accreditation is valid for 3 years. The American NFPA accreditation process begins by forming a planning group. This group includes experts in occupational health, facilities, fire department, and other interested people with the highest position in the organization. After registering on the website and receiving the standards, the standards are implemented under the supervision of the group. Then, the evaluators monitor and evaluate the standards, and the organization is obliged to eliminate the shortcomings and implement the evaluators' opinions. After the final visit, an accreditation certificate will be given to the institution.

Japan

In Japan, municipalities are in charge of health in the province and own hospitals, clinics, long-term care centers, and government home care services. In addition, municipalities supervise the appropriate and effective implementation of risk management programs at universities, training centers, and all organizations and public and private departments.[17] In this country, the Ministry of Health, Labor, and Welfare supervises the

provision of services and the implementation of laws and standards.[18]

The International Organization for Standard, an international institution that evaluates different standards in different fields, is one of the standards assessed in disaster management in all organizations, whether governmental or nongovernmental. Many Japanese organizations and universities use such standards to evaluate emergencies and disaster risk management. International Accident Management Standard Code 22320 (2018) is a guide to assess the management of all emergencies. In addition, it coordinates multiple actions between organizations, departments, regions, states or provinces, and so on. The standards are divided into three criteria of assessment (basics, emergency management, and cooperation with each other). The assessment process for receiving an International Organization for Standard certification varies in different countries. This process has at least four steps: First, registering for the assessment in the system and receiving the standards, forms, and checklists, as well as preparing the initial documentation and uploading it. Then, the self-assessment is conducted based on the standards and the organization eliminates inconsistencies. After that, the assessment is performed by external evaluators, and finally, the decision-making committee makes decisions based on the evaluators' reports and the scores obtained for granting the certificate to the organization.

According to the decision made by the decision-making commission, a certificate is granted in case of full compliance with the state granted. Otherwise, a period is given to the organization to eliminate the deficiencies. After revisiting, a decision is made to issue a certificate.[19] The certificate's validity is 4 years, and periodical assessment is performed during this period.[20]

The UK

The National Health Service is a healthcare provider in the UK. Based on UK law, the state health office is in charge of policy making, monitoring, and supporting health care services provided at the provincial level. The members of this service are the mayors of the cities in each state.[21]

Many organizations are working in the UK to give credit to organizations. Since each is in a specialized field, assessment models which address safety and risk management such as the British Accreditation Council and OCTO are examined by considering the standards. The OCTO evaluates the Emergency Management Performance Indicators and Risk Assessment. This model was designed in collaboration with the Cranfield University of Technology. This model addresses the assessment of the structure of disaster management

against potential risks, the creation of a preparedness model for assessed risks, and maximum identification and management of resources to promote the response to disasters.

The British Accreditation Council accredits the UK Health and Safety Executive's standards. Such standards are included risk assessment, health and safety policy (prevention programs), response to different emergency programs, information management, training, and practice.

The OCTO has a database that includes disaster preparedness for emergencies and good practices for emergency management. In this information dashboard, 82 preparedness indicators in six criteria are evaluated and the results are analyzed as a report. Furthermore, the two criteria are evaluated using practice. The assessment criteria are emergency management policies, emergency management structure, emergency management organization, emergency facilities, emergency management programs, preparedness team, and quantitative and qualitative assessment of performance in simulated practices. The assessment process starts with the British Accreditation Council by registering and applying for accreditation in the system. After holding a session to introduce the work process to the volunteer organization, the cost invoice after paying a part of the cost, the standards, and the schedule of visits are notified to the organization. The assessment report is submitted to the commission, and the final decision on granting the license is made after 6 months. The institutions which meet that meet the requirements of all standards receive a full accreditation license for r years.[21]

The OCTO assesses emergency risk management differently. After including the information about the applicant's organization in the system, the representatives of this institute attend the organization, interview the managers and key employees, and evaluate the organization's performance in simulated crises. Then, the evaluators enter the results of assessments into the system and receive the report as output; UK universities are required to enter the required information necessary for the system annually and, finally, their score is calculated in the information dashboard and declared to the relevant university. All UK universities (both medical and nonmedical) were evaluated from an accident management perspective using two standards from the National Fire Protection Association (NFPA 1600/2016) and Enterprise Risk Management Information System. The use of two models simultaneously is conducted due to the assessment's increase in validity and acceptability. In the first model, scoring is qualitative, and in the second model, it is quantitative.[22]

Canada

The Association of Accrediting Agencies of Canada oversees the overall supervision and accreditation of all the care providers and organizations. This governmental organization has several accreditation programs appropriate to the kind and services of each center or organization, e.g., accreditation standards for laboratories, clinics, etc., In addition, it supervises the implementation of ISO standards.[23]

This organization considers emergencies and disaster risk management as the basis for standards related to each area of health care delivery and integrated with other standards. In addition, the National Institutes of Health Accreditation affiliated with the Government of Canada was established in 2003 to conduct the national accreditation of public health.

Then, the Public Health Accreditation Board (PHAB) was established to conduct accreditation and improve the quality of health services at three levels: regional, state, and local. The institute evaluates all health service providers except hospitals.[23,24] This accreditation model is structurally consistent with the scope, standard, actions, documentation guide, implementation examples, and timeframe required. The seven general standards in this model are as follows: risk assessment and analysis of the process of emergencies and disasters have led to health problems for people.

Methods for mitigating the risk effect have been identified.

There is a policy and plan for communicating at times of emergency.

There is cooperation and coordination with each other at various levels and organizations.

Different programs have been formulated to respond to emergencies and disasters.

Capacity building has been conducted to continue service and recovery after emergencies and disasters.

Different training programs and exercises have been developed at all levels and are held and documented periodically. The accreditation process in Canada is similar to the evaluation process at the British Accreditation Council. The organization gets prepared for accreditation after receiving the standards and initial self-assessment.

The field evaluation is conducted by three or four trained evaluators and lasts for 2–3 days. In order to gain a degree of accreditation, the accredited organization must submit reports on the actions taken and quality improvement programs.

Because of the 5-year validity of the accreditation certificate, the organization should apply for reaccreditation after this period. Furthermore, suppose the organization fails to succeed in obtaining the accreditation certificate in the previous stages, in that case, it will have the opportunity to register the operational plan for resolving the deficiencies and then visit again.

Australia

The Fire and Natural Hazards Research Center, in cooperation with all Australian universities, government agencies, and NGOs, has developed Australian National Resilience Indicators. This institute started its activities in 2013 and has used these indicators to evaluate organizations in different states. The Australian Government has decided to use such indicators to evaluate universities and other government agencies in future projects. The Australian National Disaster Resilience Indicators evaluate resilience in eight areas.

The indicators are completed using subindicators, data from information sources such as the Australian National Statistics Center, the National Institutes of Health and Rehabilitation, organizational reports, medical universities, etc., Evaluation standards were developed in eight areas, including governance and leadership, social participation with six indicators, emergency services, economic capital with 15 indicators, social features, access to information, social capital, environmental planning, and construction. The evaluation is conducted annually, and the results are presented to the Australian Government in the form of a report including the resilience status of all states. In addition, it is visually mapped to specific websites and accessible. The final score is extracted due to the combination of indicators (quantitative and qualitative). In case of gaining a score of less than 25% of the low resilience score, a score of 25–75% of the average resilience rate and a score of more than 755 of the high resilience rate are considered.[22,25]

South Africa

The Disaster Management Institute of Southern Africa is a nonprofit organization active in the field of disaster management in this country. This institute trains professional disaster managers and technicians and has been operational since 1985. Since 2018, the risk management assessment of universities and organizations has been given to this institute through a joint memorandum with the National Disaster Management Center and the National Disaster Management Advisory Forum.[26] The Emergency

Management Programs Accreditation of America started accrediting institutions in South Africa in 2018 and has acted under the standards and models detailed in the US section.

Discussion

This study aimed to investigate the accreditation models of emergencies and disaster risk management at universities of selected countries and compare their similarities and differences. Each country has designed and implemented an accreditation process based on specific needs, priorities, and conditions. In all of the studied countries, there is a particular program for accreditation or risk management assessment. Only in Canada, standards in this area, along with other measures, are regarded in the Public Health Accreditation Program. Khankeh *et al*. also emphasized in their study on the design of accreditation standards for risk management in hospitals and the necessity of designing a unique accreditation program for risk management of emergencies and disasters.[2]

Japan (International Organization for Standard) and the United Kingdom (British Accreditation Council) are the accreditation and assessment institutes that work in all areas of quality management improvement. Still, in other countries, these institutes only focus on risk management and related areas.

Among the studied countries, the UK has the most extended history of disaster risk assessment (for 37 years), followed by the US and Canada. South Africa has just begun accreditation (for three years). Japan has started accrediting emergencies and disaster risk management independently of other programs since 2011.

In the US (one of the programs), Canada, and the UK, they are mandatory, and academic institutions and organizations should be certified to continue their activities, while other countries will be accredited or evaluated voluntarily by the time this text is written.

In their study, Sutton and Katlen also discussed the effect of voluntary and mandatory evaluation in the field of prevention of risk management. They found mandatory evaluation to be more effective than voluntary in improving the quality of actions.[1,27]

Universities and organizations are evaluated to similar standards in the US, Japan, Australia, and South Africa. However, all states, academic centers, and institutions are evaluated in Australia. In the UK, the British Accreditation Council evaluates disaster risk management at universities and higher education centers. Meanwhile, Canada evaluates all health care providers except hospitals with different accreditation processes. The number of criteria being assessed in the countries varied from 3 to 11 criteria, and the US had the highest number of accreditation criteria, while Japan had the lowest number of criteria. It seems that the development and conditions of risk management structures can be considered as one of the reasons for these differences.[28]

In all the studied countries, the risk analysis has been conducted, and the standards of the countries which have focused more on prevention and preparedness have been emphasized. In addition, there are all kinds of plans and programs, training, cooperation, and coordination in the model of all countries. In the US (Standard 1600), there is an axis on quality improvement and safety management which has not been addressed in other models.

Conducting all kinds of exercises is also included in the standard of all countries, which shows this topic's importance. Sheikh Bardsiri and his colleagues also listed exercise as the most important element of preparation in their study.[29]

In the UK (Emergency Management Performance Indicators and Risk Evaluation), some criteria have been developed to evaluate policies and the structure of disaster management, which are not found in other models. In some models, such as the US, resource management and support is regarded as separate axis. In other countries, it is addressed in the planning criteria and types of programs. Australia is the focus of social, economic, and environmental resilience assessments, which is not valid in any other country.

Models used in the US (Institute for Emergency Management Programs Accreditation) and South Africa cover all stages of the disaster risk management cycle, including prevention and effect mitigation, preparedness, response, and recovery. In the US (National Fire Protection Association), Canada, and Australia, standards are primarily focused on the preparedness stage. In the UK, the British Accreditation Council has not regarded a recovery stage, and OCTO considers two stages of preparedness and response. Japan is the only country where the focus of university evaluation is on the response stage because most of the standards have been reviewed at the time of obtaining the institution's activity license, and there is no need for recontrol.

In the US and South Africa, self-evaluation is one of the stages of accreditation, but it is not seen in other countries. In all countries, face-to-face evaluations are performed by on-site inspectors. In the model of the US (Institute for Emergency Management Programs

Accreditation), South Africa, and Canada, the accredited university or organization is allowed to correct if there is noncompliance with the standards. There is a charge for accreditation in the US and UK, but there is no charge in other countries. Other evaluation stages are similar in all countries. The number of evaluation stages is a minimum of three and a maximum of seven stages. This difference is relatively related to the structure and date of model implementation, so the number of steps will be higher in countries with a long accreditation history.

Scoring in different models is quantitative, qualitative, or a combination of both methods. It means that according to the conditions of the evaluators, they assign a numerical or percentage score to the standards or conduct scoring using qualitative criteria such as compliance or noncompliance. The hybrid method is used in the US and South Africa. Qualitative criteria have been used in the UK, Japan, and Canada.[30]

The US (Emergency Management Accreditation Program), UK, Canada, and South Africa use the term "accredited" or "non-accredited." However, in the accreditation program of British Postgraduate Centers, the ranking title is conducted in three forms: accreditation candidacy certificate, temporary accreditation certificate, and full accreditation. In the US (Standard 1600) and Japan, receiving or not receiving a certificate is equivalent to being accredited or nonaccredited in other countries. In Australia, the level of literacy is certified by states and organizations. In terms of the certificate, the resilience rate is included in three levels weak, average, and perfect.

The validity period of the certificate or accreditation degree is 1–5 years. Accreditation or evaluation is valid for 1 year in the US (Standard 1600), the UK (British Accreditation Council), and Australia.

The US (Emergency Management Accreditation Program), Japan, and South Africa are accredited for 3 years, during which periodical visits are performed. In the UK (Emergency Management Performance Indicators and Risk Evaluation) and Canada, this period is 4 and 5 years, respectively.

In general, leading countries such as Canada, Australia, and the US appear to have more complete standards for disaster risk management.

Countries seeking to review and develop standards should focus more on process and outcome standards but less on structural standards. The dominance of structural standards in some countries indicates that they pay less attention to the criteria of prevention and recovery and shows the power of disaster management thinking over disaster risk management in those countries.[6]

Conclusion

This study aims to design accreditation patterns for emergencies and disaster risk management for universities to improve people's health. Studying on dimensions and components of the models can open the way to health promotion in universities.

It is also suggested to guide the level of macropolicy, necessary infrastructure, training, and culture around the correct and complete implementation of the accreditation process of the risk management of emergencies and disasters. Then, quality improvement and continuous review of the accreditation process of risk management should be made according to the challenges faced by each university. One of the study's limitations is the lack of resources and related articles in this field, so further research is needed to extract the challenges of implementing risk management accreditation models in universities and change and develop processes based on the results of these research studies.

Conflicts of interest
There are no conflicts of interest.

References

1. Cred C. Natural disasters in 2017: Lower mortality, higher cost. Tech Rep 2018.
2. Khankeh H, Mosadeghrad AM, Abbasabadi Arab M. Developing accreditation standards for disaster risk management: An approach for hospital preparedness improvement–editorial. J Mil Med 2019;20:574-6.
3. Marincioni F, Fraboni R. A baseline assessment of emergency planning and preparedness in Italian universities. Disasters 2012;36:291-315.
4. Cheung JM, Basiaga M, Olympia RP. Compliance of colleges and universities in the United States with nationally published guidelines for emergency and disaster preparedness. Pediatr Emerg Care 2014;30:319-26.
5. Mosadeghrad AM. Comments on "Iran hospital accreditation system." Iran J Public Health 2016;45:837-9.
6. Bruzzone AG, Frascio M, Longo F, Chiurco A, Zanoni S, Zavanella L, *et al.*, editors. Disaster and Emergency Management Simulation in Industrial Plants. Proc 26ᵗʰ Eur Model Simul Symp; 2014.
7. Human RJ, Palit M, Simpson DM. Improving Risk Assessment Methodology: The University of Louisville and the Disaster Resistant University (DRU) Program.

8. Mosadeghrad AM, Rahimi-Tabar P. Health system governance in Iran: A comparative study. Razi J Med Sci 2019;26:10-28.

9. Adams J, Hillier-Brown FC, Moore HJ, Lake AA, Araujo-Soares V, White M, *et al*. Searching and synthesising 'grey literature'and 'grey information'in public health: Critical reflections on three case studies. Syst Rev 2016;5:164.

10. Islamic Parliament Research Center (IPRC). The Law of Organization and Duties of the Ministry of Health, Treatment and Medical Education Tehran: IPRC; 1988. Available from: https://rc.majlis.ir/fa/law/show/91555.%20Accessed%20%20March%2021,2016%20%20%20.

11. Datta SK, Dennis PA, Davis JM. Health benefits and economic advantages associated with increased utilization of a smoking cessation program. J Comp Eff Res 2020;9:817-28.

12. Casey Cavanaugh Grant PE. History of NFPA: National Fire Protection Association (NFPA); 2020.

13. Mack D. University of South Florida's emergency management program earns accreditation. Security Magazine. 2021.

14. UCOP. Emergency Management and Business Continuity Annual Report. Oakland; 2020.

15. National Fire Protection Association. Standard on Continuity, Emergency, and Crisis Management. Quincy: National Fire Protection Association; 2019.

16. Landa N, Zhou S, Marongwe N. Education in emergencies: Lessons from COVID-19 in South Africa. Int Rev Educ 2021;67:167-83.

17. Guo AH. The Construction And Empirical Analysis of Campus Emergency Management Capability Index: Dhurakij Pundit University; 2018.

18. Sakamoto H, Rahman M, Nomura S, Okamoto E, Koike S, Yasunaga H, *et al*. Japan Health system review. Health Syst Trans 2018;8:228.

19. International Organization for Standardization. International Standard: Quality management systems -Requirements. ISO 9001: ISO; 2000. p. 32.

20. Payne GC. ISO 9001 Quality Manual: Example Quality Manual: American Society for Quality (ASQ); 2020. Available from: https://asq.org/quality-resources/iso-9001-quality-manual.

21. British Accreditation Council. Accreditation Handbook. UK: BAC; 2022.

22. Australian Disaster Resilience Handbook Collection. Emergency Planning: Australian Institute for Disaster Resilience; 2020.

23. Accreditation Canada. Qmentum Accreditation Program Ottawa, Canada: Accreditation Agrement Canada; 2021.

24. Public Health Accreditation Board. What is Public Health Department Accreditation? PHAB; 2021.

25. Parsons M, Reeve I, McGregor J, Marshall G, Stayner R, McNeill J, *et al*. The Australian Disaster Resilience Index: State of Disaster Resilience Report. Melbourne: Bushfire and Natural Hazards CRC; 2020.

26. Disaster Management Institute of Southern Africa. Comments on the Disaster Management Amendment Bill [B10-2015]. DMISA; 2015.

27. Sutton J, Tierney K. Disaster Preparedness: Concepts, Guidance, and Research. Vol 3. Colorado: University of Colorado; 2006. p. 1-41.

28. Casile M, Davis-Blake A. When accreditation standards change: Factors affecting differential responsiveness of public and private organizations. Acad Manag J 2002;45:180-95.

29. Sheikhbardsiri H, Yarmohammadian MH, Khankeh H, Khademipour G, Moradian MJ, Rastegarfar B, *et al*. An operational exercise for disaster assessment and emergency preparedness in south of Iran. J Public Health Manag Pract 2020;26:451-6.

30. Izumi T, Sukhwani V, Surjan A, Shaw R. Managing and responding to pandemics in higher educational institutions: Initial learning from COVID-19. Int J Disaster Resil Built Environ 2020;12:51-6.