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A course on "health management in crises" for medical students: a Delphi study

Yadolah Zarezaedh[1], Haidar Nadrian[2,3], Golakeh Karimi[4], Tayeb Ghadimi[5], Fayegh Yousefi[1], Arash Pooladi[4], Arezoo Yari[6,1*]

[1]Social Determinants of Health Research Center, Kurdistan University of Medical Sciences, Sanandaj, Iran
[2]Department of Health Education and Promotion, Faculty of Health, Tabriz University of Medical Sciences, Tabriz, Iran
[3]Social Determinants of Health Research Center,Tabriz University of Medical Sciences, Tabriz, Iran
[4]Kurdistan University of Medical Sciences, Sanandaj, Iran
[5]Department of Reconstructive Surgery, Shahid Motahari Burns Hospital, Iran University of Medical Sciences, Tehran, Iran
[6]Department of Health in Emergencies and Disasters, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

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Abstract

Background: General physicians play a significant role in the health management of crises. In order to enhance the knowledge and skills of medical students on how to address health-related issues in crises and to promote their ability to manage and deal with such crises after graduation, appropriate training is necessary.

Methods: Applying the Delphi method, 103 experts with field experience in health management and crises were invited to participate in the study. The Delphi study provided aggregation of the opinions and extracted the topics. Conventional content analysis was used to make sense of qualitative data gathered during the study.

Results: Among the feedback (n=66) obtained in the first round, a primary list was extracted including 27 topics and 97 single items. Nineteen major topics, encompassing 97 items, were finally determined in the subsequent rounds. The participants agreed to teach this course at the beginning the internship period via different methods of instruction.

Conclusion: This study indicated that health management in crises is important and must be taught in medicine. This study provided a blueprint and an educational rationale as well as contents and structure of a course on health management in crisis to be delivered in undergraduate medical education.

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Introduction

Over the past two decades, there has been a considerable increase in the frequency and intensity of disasters, resulting in high mortality, economic losses and environmental and health impacts on communities.[1,2] In this period of time, about 200 million people have been affected annually by disasters[3] In other words, these crises have increasingly affected the global economy and sustainable development of the developing countries.[4] This situation is worse in those countries where the consequences of crises are among the main factors associated with growth retardation.[5]

As the first and the most important demand of people is health and safety, the role of the health sector is remarkable among all sectors engaged in disaster management.[6] Therefore, training health and medical care teams on health management in crises is a necessary and undeniable part of crisis management.[7]

Some initiatives on disaster management have begun in Iranian higher education, for example establishing M.Sc and PhD courses in some Iranian universities, but in spite of the important role of general physicians in health management of crises, there is no mention of disaster management training for medical students in the reports.[7,8] General physicians should be trained on health care emergency procedures and mechanisms required

***Corresponding author:** Arezoo Yari, Email: yariarezoorose@gmail.c

during and after crises.[7] Previous studies have focused on specialized training of health and medical care in crises for medical specialists in emergency medicine, anesthesiology, family medicine, and pediatrics surgery, in the hope that these specialists could cope with crises appropriately.[9]

Because of the lack of appropriate training in undergraduate medical courses, it is unlikely that general physicians can address disastrous health events as expected.[10]

Pfenninger et al, after a review of existing studies, indicated there were very few reported curricula and courses on health management in crises for medical students.[11]

In order to enhance the knowledge and skills of medical students on how to understand the health-related issues in crises and to promote their ability to manage and deal with crises, such courses and curriculums for medical education are necessary.[10]

This study was conducted at the Kurdistan University of Medical Sciences in Iran. The aim of the study was to design and develop a course on "health management in crisis" for medical students in order to enable them to cope with and the address health-related issues in crises at graduation and beyond.

Materials and Methods

The Delphi method was used to conduct the study. As Linestone and Turoff defined, "Delphi may be characterized as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem."[12]

The Delphi study allows an aggregation of experts' opinions and extracts underlying topics in a structured manner.[13] This was the method employed in this study.

The key characteristic for experts to be included in the study was the kind of knowledge they had on the subject under study.[14] In this study, a total number of 150 experts, including all faculty members, lecturers, executive managers and nurses who had high levels of knowledge and information on the management of health crisis, were recruited based on the complete enumeration survey method. After entering the field, the researcher found out that only 103 informants were available for the study.

In the present study, the three rounds of Delphi were conducted to collect data from the experts. In the first round, a questionnaire, including three open-ended questions, was sent, in a print version, to all 103 accessible members of the target groups, from whom 66 experts responded to the first poll (response rate = 64.07%). In this round, respondents were asked about the most important topics, issues and problems in health management in crises. The interpretation of the answers was conducted using conventional content analysis.[15] The answers were condensed into 27 major themes with a total of 97 items to be evaluated.

In the second round, the findings of the first round were given to 66 respondents. In this round, 40 experts responded to the second poll (response rate = 60.6%), evaluated the themes and their related items, and gave a series of suggestions on prioritization and modification of the items.

The third round was conducted to finalize the topics to be included in the course. In this round, six experienced faculty members were invited to evaluate the provided topics considering the needs of general physicians at graduation and beyond. The ultimate topics were extracted and finalized in this round.

Data analysis

In the first round, the feedback obtained from the 66 respondents was assessed to find similarities. After performing the content analysis, a primary list of 27 themes and 97 single items was prepared. A discussion session was conducted by the team, within which the 97 items were discussed one by one and categorized into 19 major topics. The panel also used a five point Likert type scaling (not at all important = 1 to extremely important = 5) in categorizing and condensing items using the mean as the major indicator to compare the items.

In the second round, the participants assessed the categorization and prioritization of the items in the topics. In this round, the respondents were asked to select at least 5 topics as the highest priority topics for the course.

In the third round, the emphasis was on assessing the final topics and clarifying the issues related to each topic.

The experts in a Delphi study provide feedback on the findings of the preceding rounds for further assessment, thus the construct validity of such studies is inherently secured.[14] Conventional content analysis and the survey techniques used for data analysis ensured internal validity. Moreover, the discussion sessions among the research team members may have contributed to internal validity.

All steps of the study process were documented and the way that the rounds of the Delphi study were built on each other was described, which ensured the reliability of the work.

Results

The first round was based on the following open question: "What are the most important topics, issues and problems in a given course on "health management in crises"?" All of the answers were analyzed and condensed to search for more frequently noted issues, which resulted in 27 themes (topics) with 97 items (Table 1).

In the second round, the 27 topics obtained in the first round were revised by the respondents. After further summarization and prioritization, the final topics, covering 19 issues, were obtained (Table 2). The subtopics provided in the parentheses are the contents proposed by the participants to be included in each topic. The frequencies are provided regarding how often a topic was mentioned.

Table 1. Aggregated topics and items for health management in crisis course identified in the round 1

Description of the topics	No. (%)[a]
CPR training (children – adults - infants)	9 (50)
Stratifying patients based on their emergency condition needs (triage the victims)	6 (33.3)
Rehydration of the patient and understanding the use and the effects of blood products, learning to recognize and treat shocks, especially the hemorrhagic shock	6 (33.3)
Dealing with multi-trauma patients	4 (22.2)
Skillful in nursing techniques such as venipuncture, cut-down procedure, intubation, the arterial blood, stomach fluid or pleural fluid drag, catheterization, suprapubic catheter and so on	4 (22.2)
Understanding the psychological issues after the crisis (PTSD, psychosocial interventions in disasters, stress management, anger management, identifying reactions and psychological symptoms among victims, familiar with the treatment protocol for patients with substance abuse, suicide, acute stress disorder and other anxiety disorders, preventive interventions in children in mourning disasters and accidents, the need to provide mental health services to those affected by disaster)	3 (16.6)
Dealing with trauma (burns, bio-terrorism, trauma due to accidents), dealing with amputated parts (limbs, ears, nose, etc)	3 (16.6)
Early diagnosis and management of head and neck injuries, loss of consciousness approach, early diagnosis and management of facial fractures cedar, identify signs of cranial injury (rhinorrhea, ottorea, etc.) and laryngeal trauma	3 (16.6)
Recognition and control of epidemic or pandemic diseases, epidemiology and treatment of communicable diseases, a variety of infectious diseases and how to treat and control them after the crisis	2 (11.1)
Interpretation and specific application of common graph fractures in trauma such as bleeding or hematoma treatment and diagnosis of brain CT scan, chest X-ray simple / a variety of radiology modalities such as ultrasound, X-ray plain color, CT scan and MRI	1 (5.5)
Early diagnosis and management of spinal cord injury patient, transportation and fixing the neck, spine and organs of the injured	1 (5.5)
Diagnosis and treatment of acute coronary syndrome, hypertension, acute dysrhythmia, acute heart failure (pulmonary edema, cardiogenic shock)	1 (5.5)
Management of women with pregnancy, and help to manage deliveries, controlling maternal bleeding, septicemia, eclampsia and pre-eclampsia	1 (5.5)
Dealing with and managing the limb fractures (especially open fractures) and dislocations, managing orthopedic emergencies and their complications (compartment syndrome, fat emboli, crush injury) dealing with unstable pelvic fractures	1 (5.5)
Dealing with and managing eye injuries resulting from trauma, chemical damage, heat damage and immediate referral of the cases	1 (5.5)
Dealing with patients with acute pulmonary diseases (asthma - pulmonary edema), acute GI bleeding, Rhabdomyolysis and hyper-verbal in crush injury	1 (5.5)
Dealing with infectious diseases such as urinary tract infections, sexually transmitted disease, typhoid, meningococcal meningitis, hepatitis A & E, anthrax, influenza and diseases endemic in the area, wound infections, parasitic infections after the crisis (lice, etc) and encephalitis	1 (5.5)
Rescue operation desert	1 (5.5)
The definition of crisis	1 (5.5)
The classification of crisis	1 (5.5)
Interventions in crisis: act based on the previously established guidelines , adaptation with existing facilities	1 (5.5)
Crisis management training: organization, planning/training to lessen the consequences of crises/plan to diminish the negative outcomes of crisis through education/training to set priorities for action in crisis management/proper management of human resources/management of available equipment	1 (5.5)
Epidemiology of national and local crises	1 (5.5)
Disease surveillance and reporting	1 (5.5)
Community education	1 (5.5)
Understanding the social determinants of health	1 (5.5)
Health services in crisis (environmental health- disaster nutrition - disaster triage principles - principles of working with hospital disaster mental health - principles of working with field hospital - bioterrorism -incident command system in hospital- HEICO-HICO)	1 (5.5)

[a] The number (%) of the groups that offered the topic.

In the second round, participants were asked two more questions: first, "What is the best method to teach these topics to the medical students?" The respondents were asked to provide their answers for this question based on a 5-point scaling (Theory-Practical = 1, Skill Lab. = 2, Running Maneuver = 3, Workshops = 4, A combination of different methods as needed = 5); and second, "When is the best semester/year of education to deliver this course to the medical students?" The respondents were asked to provide their answers for this question based on a

Table 2. Aggregated topics and items for health management in crisis course identified in the round 2

Description of the topics
The definition and classification of crises
Crises management education
How to intervene in crises (measure based on predetermined guidelines/accommodate the existing resources and facilities to the extent of crises/organization - planning/strategies to reduce the consequences of the crises/planning to resolve the issues in crises/prioritization for action in crises/managing a medical team in crises/managing human resources in crises /managing available resources)
Healthcare services in crises (environmental health/nutrition/reproductive health/mental health/ basics of working with a field hospital/ Bioterrorism/Disaster Command System Hospital HEICO-HICO)
Disease surveillance and reporting system
Epidemiology of national and regional crises
Rescue operation in a field (properly bringing out the victims from the collapses/proper transportation and dispatching the victims/proper fixation of neck, spine and other organs in victims)
Cardiopulmonary resuscitation (children, adults, infants) Acute air way management/Advanced Primary Life Support & Support
Triage the victims (categorizing the victims based on their condition and need to urgent treatment)
How to deal with the victims with multiple trauma (head injury diagnosis and initial actions/approach to consciousness loss/diagnosis and initial measures in the case of face and head fractures/diagnosing the symptoms of skull injury (rhinorrhea, Ettorrhea, etc/laryngeal injuries/dealing with trauma (burns, bioterrorism, trauma due to accidents)/dealing with amputated parts (limbs, ears, nose, etc)/ Diagnosis and initial management of spinal cord injury/dealing with and initial actions in extremity fractures (especially open fractures) and dislocations/dealing with orthopedic emergencies and its complications (compartment syndrome Crush and fat emboli injure)/ dealing with unstable pelvic fractures, eye injuries resulting from trauma, chemical injuries, heat damages and immediate referal of these cases
Fluid therapy (understanding the use and the side effects of blood products/learning to diagnose and treat shocks (especially hemorrhagic shock)/treatment of rhabdomyolysis and hyperkalemia in crush injury)
Learning practical skills (such as venipuncture, cut down, intubation, arterial blood sampling, stomach or pleural fluid drag, catheterization, suprapubic catheter, etc)
How to deal with the pregnant victims (delivery management/resuscitation of mother and infant/maternal hemorrhage/septicemia/ eclampsia and pre-eclampsia)
The types of treatment and control of infectious diseases after crisis (urinary tract infections /, sexually transmitted infections/Typhoid/ meningococcal meningitis/hepatitis A & E/anthrax/ influenza/the endemic diseases of the region with crisis/wound infections/parasitic infections after crisis (lice, etc./recognition and control of epidemic or pandemic disease/epidemiology and treatment of communicable diseases)
The common graphs of trauma (e.g. graphs of fractured or bleeding organs and detect brain hematoma at CT scan, chest radiography/the specific applications of the modalities of radiology like ultrasound simple primary or colored, CT scans and MRI)
Diagnosis and treatment of acute coronary syndrome/blood pressure/acute dysrhythmia/acute heart failure/pulmonary edema/ cardiogenic shock
The psychological issues after the crisis (PTSD, psychosocial interventions in disasters, stress management, anger management, psychological reactions and symptoms of the victims, knowing the treatment protocol of patients with substance abuse, suicide, acute stress disorders and other anxiety disorders, mourning preventive interventions for children in disasters and accidents, the need to provide mental health services to those affected by disaster)
Communication in crises
Social determinants of health

4-point scaling (Basic sciences = 1, Physiopathology = 2, Externship = 3, Internship = 4). The participants in the second round mostly agreed on teaching this course in the internship period. The results are presented in Table 3.

As the best period of education suggested for providing the course was internship, another question was asked from the participants in round three: "When is the best time of education in internship period to teach this course to the medical students?" The answer options provided for the participants as well as the frequency and percent of their answers to each option are shown in Table 4.

Discussion

This study resulted in designing a course on health management in crises to be delivered in undergraduate medical education. Different sequential rounds of Delphi, content analysis and panel discussions resulted in a 19-theme list of contents and topics to be covered in the course. The study also determined when and how these contents could be delivered during the course of medicine in order to prepare medical graduates to address health issues in crises.

Preparedness of health systems to address affected communities' health issues is one of the main elements of disaster management.[4,16,17] The developed course and findings of this study supports the policy of the World Health Organization (WHO) that every effort must be made to reduce the health risks of disasters through

Table 3. The best period of education to teach this course to medical students

Periods of education	No. (%)
Basic Sciences	0 (0)
Physiopathology	0 (0)
Externship	1 (16.6)
Internship	5 (83.4)
Total	6 (100)

Table 4. The frequency of answers to the best time of education in internship period to teach this course to medical students

The best time of education in internship period	No. (%)
The distance between the pre-internship exam and the beginning the internship	3 (50)
As the first part of the internship period	1 (16.6)
Along with a major course like surgery	1 (16.6)
The required time for this course should be added to the internship time	1 (16.6)
Total	6 (100)

education, training and technical guidance, to strengthen the knowledge, skills and attitudes of professionals in health and other sectors[17] and is in line with announced policies of the Iranian national high order.[18]

The results of this study address the global concern that physicians are not prepared well to respond in times of disaster.[19] In a study among 236 medical students in China, only a few (1.3%) had received medical training for disasters.[20] The findings of this study are in line with other studies, which concluded that training in disaster medical training is necessary for medical students.[1]

One of the findings of this study is the course topics and contents as research indicates that the extent of the trainings of health management in crises, if any, is very suboptimal.[1] In a recent electronic survey conducted in American medical schools, disaster medicine education (optional or mandatory) was provided for undergraduate students in some of the schools but the extent and contents of this course was not clear.[21]

Moreover, similar to the course provided in the present study, training in health management in crises for medical students has been defined in the curriculum of medicine in German medical universities; nevertheless, the content of the course seems to be specific to the country it has been prepared.[22]

In the present study, 19 topics were suggested for the health management in crises course to be delivered for medical students. Pfenninger et al, at Johns Hopkins University, developed a similar course with 14 headlines using a six-step method.[11] The main similarity between the two studies lay in the headlines, which was due to the similarity in the nature of health management in crises. There were also some differences which may result from the differences that exist between crises and available resources in different communities. Moreover, observed differences may be due to the differences that exist between the educational and practical context of different countries and the experiences of the participants.[11]

In the present study, according to the findings of content analysis in the first round, almost all of the participants from different departments were agreement with the need for such a training course for medical students. This is in line with studies conducted in the United States.[19]

Although some of the proposed headlines are being taught to medical students in different courses and different periods of medical education, teaching these topics with a specific design and organization in the format of a new course titled "health management in crises" may help medical students to be purposely educated on how to react throughout a possible crisis.

Interestingly, contrary to the present study, in topics mentioned for a similar course at the School of Public Health at Boston University, there was a focus on ethnic and racial minority and rural populations.[23] These differences may be due to the cultural differences that exist in the context of the societies where the studies took place. For instance, the ethnic and racial minorities in Iran may not be as diverse and significant as in the United States, and thus, the health system provides health care services to all the populations in the society without any attention to their ethnicity. However, the provision of health services in crises for rural populations should be considered as a specific topic, considering that their needs and prerequisites may be different from those in the urban areas.

The country-specific characteristics of the proposed contents indicate that participants of the studies have considered real-world issues that the graduates may encounter at graduation.

As another result, in each of the three rounds, the internship period was proposed as the best time to teach this course. The respondents argued that the majority of students attending during this period have completed the theory courses and have entered the phase of putting their knowledge into practice. They also noted that it was better to provide the course as the first part of the internship period. Similar with the present finding, Scott et al found that the best time to provide a crisis management course to medical students was during the first days of the internship period.[9] The exact time of the beginning of internship to deliver the course was not determined and was left for the course organizers to decide when to merge the courses in the educational timetable based in available resources.

On the contrary to our findings, Smith et al reported that only about 20% of the participants considered the disaster management courses as practical and effective.[19]

Our results also showed that the best method to teach

this course is a combination of different methods, which should be selected based on the specific topic. For instance, issues such as the definitions and classifications of crisis and health services and crisis management for medical students should be provided in theory or workshop classes. However, the issue of how to bring out the victims from, e.g., structural collapses and how to dispatch aid to the victims should be taught applying the maneuver method.

Limitations and Suggestions

Authors identified two main limitations of study: first, the lack of guidelines for determining consensus inherent in the Delphi method, and, secondly, the response rate of 64.07% of all potential informant participants in a study conducted in one university. Further studies on the development of such courses using other curricula and course development methods are suggested to consolidate the course as an inseparable part of education for medical students.

Conclusion

Findings of this meticulously conducted Delphi study provided content and structure for a course on health management in crises to be delivered in undergraduate medical education. The study indicated that graduates of medicine are not well-prepared to address health issues in time of crises and emphasized on the importance of such preparedness. It can be concluded that basic dimensions of "health management in crises" found in the present study may serve as a blueprint and an educational rationale for medical schools and course organizers considering a course on this topic.

Ethical approval

This study was approved by Ethics Committee of Kurdistan University of Medical Sciences under the ethical code of IR.MUK.REC.1390.101.

Competing interests

Authors declare that they have no competing interests that might have influenced the conducting and publishing of this research.

Authors' contribution

YZ and AP conceived the idea of the research. YZ planned the methodology and supervised the data collection and interpretation. GK collected the data and provided interpretation and report. TG and FY gave critical feedback and helped with interpretation. AY and HN wrote the manuscript with the input from YZ. All authors provided critical feedback in all stages of the research.

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