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Introduction: Chemical exposures can cause direct and indirect injuries to responding medical personnel. Therefore, hospital healthcare providers should be provided with disaster response training that includes identification of chemical hazards, establishment of the hazard zone, personal protective equipment use, decontamination, and chemical injury antidote use. This study evaluates the educational effectiveness of the chemical-mass casualty incident response education module (C-MCIREM) for hospital healthcare providers.

Method: This was a retrospective quasi-experimental study. Subjects were hospital providers who enrolled in the C-MCIREM program between May 1, 2021, and July 26, 2022. Subjects were hospital providers from Bucheon, Mokpo, Iksan, Jeonju, and Dae-gu cities in South Korea. Subjects completed pre, post, and three-month knowledge retention and self-assessments of readiness tests, as well as evaluations on tabletop exercises (TTX), and a satisfaction survey (11-point Likert) after the course. The instructors scored teamwork measures via standardized evaluations on TTX throughout the course. The K-paired Sample Friedman test was used to compare samples.

Results: 127 respondents were enrolled. The median knowledge score rose from 51/100 (39, 66) to 85.5/100 (73.75, 90) with a median retention score of 74/100 (64, 88) ($p<0.001$). Participants felt their readiness to respond increased in all facets (all $p<0.001$) on the post and retention test for the MCI situation. All three hospital teams showed significant increases in teamwork between the median of the 1st and 4th TTX as 27/100 (23.5, 29) and 69/100 (66.75, 69.5) ($p<0.05$). Participants were overall satisfied (9.1/10 SD 1.13) and would recommend the training to others (9.15/10 SD 1.2).

Conclusion: C-MCIREM participants had high satisfaction with a significant increase and persistence in knowledge, improved teamwork, and self-assessed readiness to respond to a chemical mass casualty incident.

Introduction: In response to the global upward trend of humanitarian emergencies, the humanitarian health workforce has grown substantially in the last decades. Still, humanitarian education and training programs are limited in availability, geographical locations, and teaching methods, and are too expensive for local respondents. To address these gaps, an e-learning tool for humanitarian public health has been developed and evaluated.

Method: Action research was used to develop the e-Learning tool. Rapid prototyping–a modified analysis, design, development, implementation, and evaluation (ADDIE) model, was used to identify the content and instructional design. This iterative process involved consultations and feedback from public health and disaster medicine instructors and students at different levels and training programs from within and outside CRIMEDIM. Qualitative data were analyzed using thematic analysis. Quantitative data were appropriately summarized. Pre/post-test change in knowledge score was tested with paired t-test.

Results: Although different levels of training are needed, targeting health professionals at the entry-level in the humanitarian field is identified as a priority. Scenario-based e-Simulation covers health needs assessment, essential health services, communicable diseases standards, and the health system was developed and evaluated. Trainees were highly satisfied by the clear objectives, the realism of the simulated scenarios, quizzes, and interactivity. In the 1-7 numerical scale, the median for overall experience satisfaction was 6.3 (IQR=5.3-7, N=35). The mean of the post-test score was 7.71, which was significantly higher than the mean of the pre-test score of 5.88. The large effect size of 1.179 indicates the training effectiveness. Poor internet was identified as a potential barrier to delivering the training.

Conclusion: This participatory study resulted in the development of effective Scenario-based e-Simulation. Offline mode of training will be adapted for trainees with poor internet connection settings. Successful factors in instructional design will be used to inform the development of advanced training in the field.

Development and Evaluation of Scenario-based E-Simulation for Humanitarian Health Training

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The Challenge of Mass Casualty Incident Response Simulation Exercise Design and Creation: A Modified Delphi Study

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Introduction: A Mass Casualty Incident response (MCI) full scale exercise (FSEx) assures MCI first responder competencies. Simulation and serious gaming platforms (Simulation) have been considered to achieve and maintain first responder competencies with the challenge of the FSEx. The translational science (TS) T0 question: How can students achieve similar MCI competencies through the use of simulation MCI exercises as with a FSEx?

Method: Initial TS phase T1: Scoping Review

A Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Review was conducted to develop statements for the TS second phase T2 modified Delphi study. 1320 reference titles and abstracts were reviewed with 215 full articles progressing for full review leading to 97 undergoing data extraction.

Second TS stage T2: modified Delphi study

The database was analyzed and initial draft statements were created. Selected modified Delphi experts were presented with 27 statements with instructions to rank each statement on a seven-point linear numeric scale, where 1 = disagree and 7 = agree. Consensus amongst experts was defined as a standard deviation ≤1.0.

Results: After three modified Delphi rounds 19 statements attained consensus and eight did not attain a consensus.

Conclusion: The modified Delphi experts agreed that the simultaneous integration of individual duty and incident management skills should be incorporated into simulation MCI exercise design to achieve competencies depending on high physical fidelity to develop the individual's manual abilities, as well as high conceptual fidelity, to develop the individual's clinical reasoning and problem-solving skills. MCI simulation exercises can be developed to achieve similar competencies as FSExs incorporating the 19 statements that attained consensus through the TS phases of a scoping review (T1) and modified Delphi study (T2). The TS process should continue with development of these exercises in the T3 implementation stage and then evaluated in the T4 stage.

Evaluation of the Degree of Crisis Awareness and Behavioral Change Through Disaster Exercise: A Case Study of a Disaster Response Exercise in a Pharmacy Department

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Introduction: The authors developed an evaluation tool to measure changes in exercise participants' awareness of disaster risk and their disaster preparedness behaviors. To create the tool, a mechanism was modeled to visualize the process of changing people's crisis awareness and behavior and questions were developed for each of the twelve factors and two outcomes within the mechanism. In this study, we conducted a disaster exercise in the pharmacy department of Hospital A, one of the disaster base hospitals, and measured the effectiveness of the exercise using the tool.

Method: In the disaster exercise, participants were asked to perform dispensing tasks on five dummy prescriptions using actual medicines, based on the assumption that the dispensing support system was out of order due to a major earthquake. Participants were paired up and dispensed as much as possible within a time limit of 30 minutes. Pre- and post-education sessions were conducted before and after the exercise. Respondents were asked to score each question on a 5-point scale at three time points: before the pre-education, immediately after the disaster exercise, and after post-education.

Results: 59 people, including 16 participants, responded to the questionnaire using the evaluation tool. The analysis of the evaluation results revealed that the disaster exercise increased the participants' crisis awareness. Furthermore, participants improved their scores on the questions on feelings of anxiety about the current situation, assumptions about the impact, sense of ownership, and fear of not acting, but no change was observed among non-participants. However, there was no significant difference in scores between the two groups regarding whether they had taken action for disaster preparedness in the period following the exercise.

Conclusion: The exercise raised the participants' crisis awareness, but did not encourage them to change their behavior. Future research should consider ways to encourage staff members to take action to prepare for disasters.

Teaching Senior Medical Students Mass Casualty Incident Management by 3D Tabletop Exercise without Lecture: Increase Students' Knowledge and Motivation

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Introduction: Mass casualty incident (MCI) management was usually taught by lectures and then tested by exercises. However, the lecture may not be interesting and tabletop exercise (TTx) may not adequately engage participants, especially senior medical students. To solve these two problems, we think that a TTx using 3D models can be a good teaching method of MCI management for medical students.

Method: A TTx of MCI in the emergency room (ER) was designed for senior medical students based on five core capabilities of MCI management: incident management system, event recognition and initiation of response, patient triage, surge capacity and capability, and recovery and demobilization. 3D models containing miniatures of the ER, hospital staff, patients, and other personnel were used in the TTx. No lecture was conducted before or during the exercise. Students needed to discuss how to respond to events in the incident and show their responses using the 3D models, and the instructor facilitated