

Original Article

Implementation of disaster preparedness education in Kenya

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Taiwan's disaster preparedness curriculum was introduced to Kenya in 2008. The authors report how a team of emergency department personnel from Taiwan assisted Kenyan medical authorities with institutional and community programs in disaster prevention, preparedness, and healthcare and shared their knowledge on how to establish information, surveillance, and networking systems to facilitate the success of these programs. This knowledge was shared in a two-week course on disaster management with various modules and training equipment for disaster preparedness in collaboration with the authors' Kenyan counterpart, Great Lakes University in Kisumu. The authors used project development planning tools which included needs assessment, stakeholder engagement, partnership formation, and proper budgeting. Fifty students representing various levels of private and public health care facilities from six districts in Kenya participated in the course. The results of this course evaluation revealed that most of the students were satisfied with the course content.

Key words: disaster preparedness education, hazards, tabletop exercise, field exercise

Introduction

The updated approach in contemporary disaster relief, according to the Code of Conduct for the International Red Cross, Red Crescent Movement, and nongovernmental organizations, is to create local capacity to respond to disasters^[1]. In the Humanitarian Forum 2008 at Geneva, the World Health Organization also stressed strengthening humanitarian relief work through disaster risk

reduction and institutional capacity building^[2]. Managing health crises in disasters should be transformed into building community capacity for preventing and preparing for disasters as well as for providing adequate healthcare in emergencies^[3]. Preparing for and responding to emergencies are tasks that require the availability of the right resources as well as the capacity to mobilize these resources effectively^[4,5]. In this context, capacity refers to the internal organizational capability with regard to planning, staffing, systems, communication, and information flow. Health hazards and disasters in Africa are on the rise both in frequency and intensity, and their heavy human, economic, and ecological tolls are increasing. About 93 percent of the natural disasters that occurred in Africa in 2006 were due to floods, epidemics, and droughts. These disasters caused

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the majority (99.5 percent) of the human losses^[6]. Recently, Kenya experienced several disasters that necessitated mobilizing resources beyond the capability of local communities. Some recent examples include the bombing of the American Embassy in Nairobi in 1998 and the country-wide post election violence in 2008^[7-9].

Emergencies and disasters tend to evolve according to certain recognizable patterns. Good emergency or disaster management relies on the knowledge of these patterns and of effective measures to deal with them. The chance of unnecessary tragedies occurring is greatly reduced if the emergency is well managed from the stage of preparedness onward^[10-12].

In Taiwan, National Disaster Medical Assistant Team (NDMAT) was created to augment and organize emergency medical relief after the Ji-Ji earthquake in 2000. Comprehensive disaster education was introduced among health care workers starting at that time. Since then a curriculum on Hazardous Materials and Radiation Incident Emergency Response, has also been included. Regional Emergency Operation Centers (REOC) were established in Taiwan to coordinate medical responses in mass casualty incidents after the severe acute respiratory syndrome outbreak in 2004. With these first hand experiences, we were able to transplant Taiwan's disaster preparedness curriculum to Kenya in 2008. The objectives of this report are to demonstrate how we facilitated Kenyan's capacity for disaster prevention, preparedness, and healthcare delivery in emergencies and to establish information systems, surveillance, and networking at the institutional and community levels.

Methods

We organized the Taiwanese disaster management materials into a two-week course with various modules and training equipment for disaster preparedness with our Kenyan counterpart at Great Lakes University in Kisumu. We used project development planning tools that included needs assessment, stakeholder engagement, partnership formation, and proper budgeting. The

course was divided into three stages:

1. Comprehensive discussion and field visits to local communities by project leaders to assess needs and then formulate the core content of these training agenda.
2. A pre-course baseline survey was administered in six districts to determine pre-course levels of disaster prevention, preparedness, and response, including available healthcare services. Participants gave supervisory support to the survey in their districts. Data were collected in each district for 5 days.
3. A consecutive 5-day course involving 50 commanders selected from different levels of private and public health facilities in six districts was planned. Kenyan physicians, senior nurses, and public health officers at disaster response centers were recruited (Table 1). A full-scale field exercise was scheduled to test what had been learned. A post-course evaluation was performed. A report was written and shared with stakeholders in a 1-day workshop. The report and workshop was intended to result in the local generation of district plans for disaster prevention, preparedness, and healthcare in emergencies. We compared the performance of students with tabletop (in-house simulation drill) and real field exercises by analyzing the χ^2 test. Statistical significance was set as $p < 0.05$.

Results

Group discussions helped students focus on practicing what the lecturer had discussed and encouraged interaction among students. Most of the 50 Kenyan participants in this course (Table 2) had never participated in disaster training but had worked in institutions associated with disaster preparedness and management (such as international airports, health departments, and district hospitals). The course evaluation showed that the students were greatly satisfied with the course (Table 3). The mean score on the post-course examination (25 multiple choice and two essay questions) was 64.5. There were no significant differences in the performance of students with tabletop and field exercises (Table 4)^[13].

Table 1. Course agenda for disaster preparedness training

Day	Classes
1	1. Introduction of disaster 2. Evacuation and shelter 3. Incident command system 4. Scenario of incident command system (practice)
2	1. Injuries in disaster 2. Principles of multicasualties incident (disaster) triage 3. Practice intercoms 4. Tent assemble (practice)
3	1. Chemical and biologic agents 2. Radiation hazards 3. Personal protective equipment 4. Personal protective equipment dressing and undressing (practice)
4	1. Public information and media 2. Management of mass corpses 3. Mental health in disaster 4. Principle of logistic resources management 5. Prepare for field exercise
5	1. Field exercise (practice)
6	1. Discussion and feedback of field exercise 2. Disaster planning and exercise 3. Cholera 4. How to build disaster response system (practice)
7	1. How to build disaster response system (practice) 2. Tabletop exercise (practice)
8	1. Floods and internally displaced persons (IDP) 2. Test of disaster training course
9	1. IDP trip (practice) 2. Discussion of IDP trip
10	1. IDP trip presentation (by students)

Discussion

We demonstrate the steps and procedures

Table 2. Characteristics of participants

Variable	Value
Gender	
Male:female	28:22
Age, y	
Mean (range)	39.9 (26-57)
Background	
Medical related	39
Medical doctors or clinics	17
Public health officials	11
Nurse	5
Lab/Phar/Biochem	5
Psychologic counselor	1
Nonmedical related	11
Administrator	5
Teacher	3
Statistician	1
Engineer	1
Finance	1

followed in an international partnership formation to facilitate and strengthen disaster preparedness. These included: (1). detailed needs assessment, the first crucial step; (2). mutual field visits by experienced project leaders for decision making, and (3). a precise estimation of logistics and financial costs to ensure that financial expenses can be properly allocated. Local needs would therefore be served.

Equipment donations (intercoms, field tents, and PPE) have made the training course more effective and helpful for local communities to establish their systems. Hand radios, for example, would be essential for ensuring that a disaster plan works in real emergencies. Moreover, how to overcome limited internet bandwidth to speed up communication with the outside world needs to be explored. Hands-on practice was carried out in the afternoon to prevent participants from drown-out

Table 3. Course evaluation (N = 36)

	Satisfied	Not Satisfied	Not available
Overall	75.0	5.6	19.4
Course objectives	90.8	0	9.2
Course materials	98.6	0.7	0.7
Grading	40.0	2.2	57.8
Faculty knowledge	100	0	0
Faculty communication	93.3	2.7	4.0
Faculty interactions with students	96.9	1.4	1.7

*The values are expressed in percentage.

Table 4. Comparison of field and tabletop exercise*

	Field exercise, N = 35	Tabletop exercise, N = 25	p value
1. Do disaster exercises address valid disaster problems?			
Yes	33 (94.3)	24 (96.0)	0.764
No	2 (5.7)	1 (4.0)	
Unknown	0 (0)	0 (0)	
2. Does the facility participate in disaster exercises with other organizations likely to be involved in an actual disaster?			
Yes	30 (85.7)	17 (68.0)	0.191
No	2 (5.7)	5 (20.0)	
Unknown	3 (8.6)	3 (12.0)	
3. Do adequate training classes precede disaster exercise?			
Yes	26 (74.3)	15 (60.0)	0.225
No	7 (20.0)	5 (20.0)	
Unknown	2 (5.7)	5 (20.0)	
4. Do adequate evaluation and critique follow the disaster exercises so staff members can learn from them?			
Yes	24 (68.6)	20 (80.0)	0.609
No	4 (11.4)	2 (4.0)	
Unknown	7 (20.0)	3 (12.0)	
5. Do results of disaster exercises lead to appropriate changes in training, equipment, supplies, and plans?			
Yes	30 (85.7)	17 (68.0)	0.259
No	3 (8.6)	5 (20.0)	
Unknown	2 (5.7)	3 (12.0)	
6. Does the exercise response include not relying on the use of telephones, which may be damaged or jammed in a real disaster?			
Yes	22 (62.9)	14 (56.0)	0.473
No	8 (22.9)	9 (36.0)	
Unknown	5 (14.1)	2 (8.0)	
7. Do the highest levels of executive staff act out their disaster roles in the disaster exercises?			
Yes	19 (54.3)	12 (48.0)	0.789
No	11 (31.4)	10 (40.0)	
Unknown	5 (14.3)	3 (12.0)	
8. Can others show their ability to fill in during the absence of key executives?			
Yes	31 (88.57)	23 (92)	0.766
No	3 (8.58)	1 (4)	
Unknown	1 (2.85)	1 (4)	
9. Do disaster exercises expose personnel to the unexpected arrival of emergency/disaster response personnel, apparatus, or vehicles and are they unable to contact local officials to find out what needs are affected?			
Yes	23 (65.7)	21 (84.0)	0.277
No	8 (22.9)	3 (12.0)	
Unknown	4 (11.4)	1 (4.0)	

*The values in parenthesis are expressed in percentage.

learning. Practice also familiarized students with the equipment they had accepted.10 Students were least satisfied with their course grades (score, 64.5). It undoubtedly needs revising and validity testing to ensure that the test is a reasonable assessment tool. Validation of the education model is absolutely critical in conducting a training course. The lack of a pre/post survey is also a limitation of this article.

This paper can be regarded as a report to

be shared with whoever has the opportunity to launch a similar program in other countries. Field and tabletop simulations were useful to assess consequence management, the appropriateness of decision-making, operational processes, and overall team performance. They made possible the comprehensive assessment of the course. We found no statistically significant differences between performances based on field and tabletop exercises;

therefore, we recommend using tabletop exercises when cost and field equipment are problems for the host country. A strong commitment by local agencies is required for the success of this training course. Further follow-up of the real impact is mandatory.

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災難應變準備教育於非洲肯亞之施行

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2008年台灣一群急診及災難醫學專家於非洲肯亞率先導入災難應變準備教育課程，以當地社區的醫療人員、公衛官員為訓練對象，結合該區在地各級醫院與當地社區大學師生的力量，展開包含了災難預防、災難準備、醫療照護等面向的教育紮根工作。並且協助當地建構資訊通報系統，疫病偵測機制，網路建設等基礎工程，務實地促成該計劃的成功。本文介紹教育訓練的內容、實施方式、各類訓練模組及訓練裝備，與肯亞當地的合作夥伴——大湖大學師生們——如何藉由開發計劃的步驟，自需求評估著手，夥伴關係之建立和互動互信的增強完成建構工程，共計五十名來自六個不同地區公、私立機構的學員參與本計劃，實施後的評估亦獲得相當正面的迴響。

關鍵詞：災難應變準備教育、風險、桌上模擬演練、實兵演練

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