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EVALUATING EXPERIMENTAL DRILL ON DEPLOYMENT OF MILITARY EMERGENCY MEDICAL TEAM FOR DISASTER RELIEF

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ABSTRACT

Objective: *To evaluate the results of implementing the Military Medical Team model for natural disasters.*

Subjects and methods: *Organizing an experimental drill of simulated earthquake situations with 25 trauma victims and 5 cases of chronic illness. The evaluated content included the implementation of military medical stations and Medical response at military medical stations in terms of admission, triage, emergency care, and transferring.*

Results: *The deployment of the military medical station for disaster relief met the requirements of over 80%. The management of the team leaders, the members' activities, proficiency in using equipment and forms, as well as coordination were sufficient > 95%. The triage results using START met the scenario requirements from 87.5% and over. All contents of operation achieved 90% or more.*

Conclusion: *The drill met the set requirements; some contents were added to complete the model.*

Keywords: *Military medical team disaster relief, drills*

1. INTRODUCTION

In 2003, the World Health Organization (WHO) issued minimum standards for emergency medical teams (EMT) which have been implemented and applied by many countries [1]. However, currently, Vietnam still does not have an EMT built according to the minimum standards of WHO in medical response to disasters.

In Vietnam, the military medical force plays a particularly important role in responding to medical emergencies, especially in overcoming the consequences

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of natural disasters in remote, border, and island areas. Building a military EMT for disaster relief is one of the main contents of the Government's project "Developing and improving the capacity to respond to natural disasters, search and rescue by 2030, with a vision to 2045" [2].

Based on the assessment of the status of the existing medical military units, we built a model of a military EMT for disaster relief that is close to the minimum standard of type 1 fixed EMT, suitable for Vietnam's conditions and general orientation of the health sector, ensuring consistency in domestic and international deployment. This study evaluated the results of the experimental exercise of deploying the military EMT for natural disasters to supplement and complete the built model.

2. OBJECTIVES AND RESEARCH METHODS

2.1. Scenario

A magnitude 7.0 earthquake occurred in H province. Many buildings, houses, and schools collapsed; some residential areas were isolated. According to initial assessments, some people died, injured, and many victims were still trapped in buildings. Commune and district health facilities in the disaster area were also destroyed and no longer able to operate. Rescue forces were deployed to the disaster area to search and rescue victims. EMTs were also dispatched to the affected area.

As assigned by the medical military department, a military EMT for disaster relief was dispatched to the disaster area setting up a medical station and coordinating with local medical forces to triage, provide emergency treatment, and transfer victims to the hospitals as well as care residence health at the affected area.

There was a total of 25 mass casualty victims including 6 requiring immediate emergency care (red), 12 delayed emergency care victims (yellow) and 07 mild victims (green). In addition, there were 5 assumed patients who were residents coming for examination and treatment of chronic diseases.

2.2. Drill setting

- Drill location and time: Le Huu Trac National Burn Hospital, on 27th July 2024.

- Participants: staff from the National Burn Hospital was assigned and trained as members of Military EMTs for disaster relief. Students from Hanoi Nursing College were trained as victims and patients.

An organizing committee was set up and a checklist was issued and performed before starting the drill.

2.3. Drill evaluation

- Evaluation team: 60 medical experts with experience in the fields of disaster medicine, emergency, intensive care, and medical organizations.

- Evaluation method: In order to obtain objective results when conducting the assessment, the evaluator developed a checklist for the assigned assessment contents. Based on the criteria built into the checklist, the performance content of the participants in the drill was evaluated as satisfactory or unsatisfactory. The criteria that need to be quantified were calculated and recorded independently among the assessment teams. The assessment information was aggregated and analyzed.

- Evaluated criteria:

+ Implementation of military medical station: Deployment location, arrangement

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of teams, medication and equipment arrangement, using EMT forms. Command system and standard operation system (SOP) as well as coordination between EMT components.

+ Medical response at military medical station: Patient admission, triage, providing medical care, transferring and outpatient care.

- Data analyzing collected data were analyzed by using Intercool Stata software.

3. RESULTS

The overall model of deploying the military medical station for disaster relief, arranging the deployment locations of the units, designing the classification form, transfer form, medical record form, and the station's signage system were assessed to reach 90% or more. The preparation of paperwork, medication and supplies, and equipment of the teams were also assessed to reach > 95% (Table 3.1).

Table 3.1. Results of model implementation evaluation (n = 60)

Criteria	Satisfactory		Unsatisfactory	
	n	%	n	%
Overall model of military medical station	60	100	0	0
Location of team deployment	60	100	0	0
Medication and consumable material setting	55	91.67	5	8.33
Equipment setting	54	90	6	10
Design of triage tag	60	100	0	0
Referral form	60	100	0	0
Disaster medical record	60	100	0	0
Outpatient prescription	60	100	0	0
Paper works, EMT forms	58	96.67	2	3.33
Direction system	60	100	0	0

Table 3.2 indicates that the team leader's management, the members' performance of their duties, the assessment of the proficiency in using equipment and forms, and the coordination of activities with other departments all meet requirements from 95% and more.

Table 3.2. Evaluation result of operations and activities (satisfactory)

Criteria	Triage		Emergency care		Treatment		Logistic	
	n	%	n	%	n	%	n	%
Team leader's management	60	100	59	98.33	56	93.33	60	100
EMT member works	57	95.00	60	100	100	100	60	100
EMT forms using	58	96.67	58	96.67	58	96.67	-	-
Equipment using	60	100	100	100	100	100	57	95.00
Coordinating	60	100	100	95.00	58	96.67	-	-

As can be seen from Table 3.3, the results of on-scene triage according to the START procedure met the requirements of the scenario in 100% of red victims, 91.6% of yellow victims, and 87.5% of green. The average triage time for 1 victim was 1.6 minutes.

Table 3.3. Victim triage results (n = 25)

Triage tags	Script	Reality	Matching (%)
Red	06	06	100
Yellow	12	11	91.6
Green	07	08	87.5
Average triage time	1.6 ± 0.8 minutes		

All medical interventions including first aid, caring before transferring, ambulance team and medical command operating were assessed as satisfactory (100%). Completing the transfer form and activities of the evacuated team reached 90% (Table 3.4).

Table 3.4. Results of medical treatment assessment at the station (n = 60)

Criteria	Satisfactory		Unsatisfactory	
	n	%	n	%
Performing first aid techniques	10	100	0	0
Caring before transferring	10	100	0	0
Completing the transfer form	9	90	1	10
Activities of the evacuated team	9	90	1	10
Activities of an ambulance team	10	100	0	0
Medical command operating	10	100	0	0

4. DISCUSSION

Drills are considered as the highest and most effective form of training. They are real-time, on-site activities designed to evaluate plans and arrangements for medical response in emergency and disaster situations. Participants in the drills are assigned to positions that they will perform in the medical response plan in emergency and disaster situations. Command and management work as well as plans for handling hypothetical situations, practical skills, use of equipment and techniques applied in specific situations are evaluated and lessons learned to update and supplement the response plan to be more appropriate and closer to reality.

In the world, there are many models of military medical forces operating when participating in disaster response, depending on the conditions of each country. According to the recommendations of the World Health Organization,

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developing countries (including Vietnam) should build EMT type 1 and recommend unifying the medical force model when participating in international relief [1].

According to WHO statistics currently, the military medical forces of some Countries that have built disaster relief medical teams (Vietnamese conventional name) based on the minimum standards of the World Health Organization include: Israel (Type 3), Barbados (fixed type 1), some have registered for WHO assessment including Indonesia, Sri Lanka (type 1 fixed) [3].

Madge SN et al. (2004) investigated the ability of doctors in 11 hospitals in the Wessex region of England to respond to mass casualty situations. The results showed that less than 1/3 of doctors had ever participated in mass casualty management, 11% had participated in disaster medical response drills, and only 45% of doctors felt confident in participating in disaster medical response [4].

In Switzerland, in 2011, the first drill was conducted on the response procedures for fire and explosion disasters that had been developed since 2010 with a hypothetical situation of a dance floor fire with a large number of victims of burns, combined injuries, and respiratory burns. The experience was done and in 2012, the second drill was conducted with the same scenario, showing a clear improvement in the command and control of first aid, emergency care, triage and referral from the scene to the specialized line, reducing errors and overcoming the limitations of the first drill [5]; this result also showed similarities with our study when the command and control results of department heads and team leaders all clearly improved through training activities, drill rounds, and reached over 80% at the end of the drill.

With many patients at the same time after a disaster, triage, first aid and transportation require flexibility, as well as command and control experience are very important. In developing countries, there is no professional rescue team, most of them rescue themselves and rely mainly on the fire department, while the rescue skills of this force are also limited, and insufficient specialized ambulances. This is one of the major limitations for mass victim rescue. Many patients do not receive pain relief, the means of transport are not guaranteed, the transport time is long, resulting in a high rate of patients with serious complications and a high risk of death.

According to a study by Nguyen Nhu Lam and colleagues (2016), in 83 mass burn cases, only 16.5% of patients were cooled with clean water, 1.48% dressing, while 14.8% used inappropriate materials applied to the burned area. Among 241 patients with burns ≥ 10% of body surface area, 15 patients were given Oresol, accounting for 6.22% [6].

Performing well the work of classifying, giving first aid, and transporting victims to treatment facilities is an important condition to minimize the risk of death, reduce complications, and create favorable conditions for treatment. However, due to the accident occurring suddenly, the victim panicked and ran away from the scene and was rescued by people around, then went to the nearest emergency medical facility without being triaged and emergency management.

Schenker JD et al. in 2006, evaluated the triage results according to the START

procedure at the scene in a fire disaster drill with 130 victims, the participating forces had been trained in advance but at the time of the drill were not retrained, the results showed that the rate of meeting the requirements was 78% (correct classification), and 62% if the situation changed on the same victim [7].

In our study, the correct triage rate according to the scenario reached 87.5% or more, but the results when changing the situation were not evaluated.

Through organizing drills and evaluating results from independent experts, positive results have been achieved. Some limitations have also been pointed out by experts, including coordination between forces, especially medical transfer and emergency teams, resource allocation, packaging of medicine and equipment, scientific and easy-to-manage manner, supplementing instruction documents and forms when participating in international activities, etc. These contents have been absorbed and supplemented to perfect the model of the disaster relief medical team.

5. CONCLUSION

The results of the exercise on the deployment of the military EMT model for earthquake disaster relief showed that the deployment of the military medical station and the appropriate arrangement of human resources met the requirements. Some additional contents were noted to complete the model.

Acknowledgments: The research team would like to thank the experts who are military medical officers in units throughout the army who participated, visited, and gave their opinions on the exercise to perfect the model of the Military EMT disaster relief in this study.

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Appendix

VOUCHER EVALUATION OF EXPERIMENTAL REVIEW RESULTS DEPLOYMENT OF DISASTER RELIEF MILITARY MEDICAL TEAM MODEL

I. GENERAL INFORMATION

1. Reviewer's name:
2. Place of work:
3. Evaluation content: Results of the experimental exercise to deploy a model of a military EMT for natural disaster relief.
4. Rehearsal location: Le Huu Trac National Burn Hospital
5. Time: / / 2024

II. EVALUATION CONTENT (MARK X IN THE CORRESPONDING BOX)

STT	Review content	Satisfactory	Unsatisfactory
1.	**Field deployment of the model**		
1.1	Overall model of military medical station		
1.2	Location of deployment of military medical station teams		
1.3	Medicine and consumable material		
1.4	Equipment setting		
1.5	Design of triage tag		
1.6	Referral form		
1.7	Disaster medical record		
1.8	Outpatient prescription		
1.9	Paperwork’s, EMT forms and reports		
1.10	Direction system…		
2.	**Triage team activities**		
2.1	Reasonable deployment layout		
2.2	Level of task mastery		
2.3	Team leader's management		
2.4	Proficient use of triage tag		
2.5	Practical classification skills		
2.6	Coordination of triage and transferring		
3.	**Emergency Team Activities**		
3.1	Reasonable deployment layout		
3.2	Level of task mastery		

3.3	Team leader's operation		
3.4	Use of equipment		
3.5	Emergency management skills		
3.6	Emergency medical record complete skills		
3.7	Completing referral form		
3.8	Coordinate within the organization		
3.9	Coordinate with other groups		
4.	**Activities of care-treatment**		
4.1	Reasonable deployment layout		
4.2	Level of task mastery		
4.3	Team leader's operation		
4.4	Use of equipment		
4.5	Skills of treatment techniques		
4.6	Medical record complete skills		
4.7	Outpatient examination and prescription skills		
4.8	Record the transfer note		
4.9	Coordinate within the organization		
4.10	Coordinate with other departments		
5.	**Activities of the logistic group**		
5.1	Reasonable deployment layout		
5.2	Level of task mastery		
5.3	Team leader's operation		
5.4	Use of material and equipment		
6.	**Activities of the transfer team**		
7.	**Ambulance Team Activities**		
8.	**Team command operations**		

Other comments:

Reviewer