

A Comparative Study of Knowledge Regarding Emergency Care During Disaster Between Community Health Volunteers Working In Tsunami-Affected And Non-Affected Areas in Aceh Province, Indonesia

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ABSTRACT

Purpose: This paper is a report of a survey to describe and compare the level of knowledge and compare these knowledge between community health volunteers (CHVs) working in the tsunami affected and non-affected areas in Aceh Province, Indonesia **Method:** 144 CHVs from six districts in Aceh were studied during November 2011 to January 2012 to evaluate their level knowledge regarding emergency care during disaster between CHVs working in Tsunami affected areas and non Tsunami affected areas. The knowledge was assessed by using the Community Health Volunteers' Knowledge Regarding Emergency Care Questionnaire (CHVK-ECQ) with 30-statement true/false. The composite scores of each area and the total score were calculated and transformed to percentage for ease of presentation. **Results:** Overall, the CHVs' knowledge in emergency care during disaster in Aceh was at a high level in both groups. However, subjects in non-affected areas had significantly higher mean rank of the overall knowledge than those in the affected areas ($p = .02$). In the tsunami area the highest mean score was for the disaster triage dimension ($M = 80.62\%$), and the lowest mean score was in the first Aid (60.48%). And on the contrary in the non tsunami areas the highest mean score was for First Aid (84.52%) and the lowers mean score was for disaster triage (64.38%). **Conclusion:** This finding indicated that although both groups had high levels of overall knowledge, education program for improved knowledge in the areas of first aid, team organization, and disaster triage should be established to refresh the CHVs' knowledge and skills for the disaster management.

Keywords: Knowledge, skills, community health volunteers, and natural disaster

BACKGROUND

Large-scale disasters around the world demonstrate that no one and no country is immune from the treat of natural disaster (Fung, Loke & Lai, 2008). Since the incidence occurrence of natural disasters is becoming more frequent, especially in the Asia-Pacific region where more than 80% of the reported victims live in this area (Rodríguez, & Aguirre, 2006). The World Health Organization (2008) reported that in the South-East Asian region in the last 10 years, approximately 61.6% of the total number of people killed were in disasters. Indonesia a country that is had high risk with disaster every year, because Indonesia is located in South East Asia between India and Pacific Ocean, and is also known as

active tectonic region (Indonesia Disaster, 2010). Especially in Aceh Province is at the high risk for natural disasters due to most districts or cities are located at the pounding of plate and earth fault (Her, 2010). In fact the devastating Asian tsunami on December 26, 2004 in Aceh caused more than 120,514 deaths, 403,420 homeless persons, and 37,000 people missing and presumed dead (Vogt & Kulbok, 2008).

To prevent lost of live and impact of disaster, there is need for emergency preparedness including community health volunteers (CHVs) because, the CHVs are people living in the community, who are trained to perform some task in helping people in the community in emergency

phase (Flint & Brennan, 2006). In the first few hours to the first days from the onset of a disaster event, is quite dynamic and forces the community to face the effect of the disaster. Disaster may destroy roads, bridges, ports and airports, and communication facilities (WHO & UNECE, 2010).

The evidence suggests that CHVs (both lay and professional) can play an important role in the development and achievement of emergency management, in all phases including mitigation, preparedness, emergency or response, and recovery (Fulmer, Portelli & Foltin, 2007). The CHVs play a critical role in crises or an emergency phase because many victims can be saved in the first hours after a crisis before external teams arrive to give help and CHVs are often the first persons on the scene, the closest to the catastrophe, and are typically trusted by the victims (Thomas, 2003). Well prepared and well-organized CHVs for the community can reduce risks and the impact of disaster (IFRC & RCS, 2009). In order to assist the victims in the emergency phase during disaster, basic knowledge are required to providing early warning, first aid, triage, logistics and communication, search and rescue, and team organization (Flint & Brennan, 2006).

However, one study addressed that the number of health volunteer assistants during disaster events was limited due to a lack of staff (Desimore, 2009). According to the statement from the head of the CHVs organization, the members of trained CHVs in Aceh province still have low competencies particularly in an emergency phase during disaster (Tarmizi, Head of CHVs, February, 24, 2011). It is not known whether CHVs who were trained have met the required knowledge working during disaster.

Therefore, it is important to compare the knowledge of emergency care

between CHVs who work in the Tsunami-affected areas and non-affected areas in Aceh Province. Because CHVs in both areas are needed to meet the minimum standard of knowledge in helping the victims in the community due to the high risk of disaster attack in the future. In addition, there has been no study conducted in Aceh to evaluate CHVs (lay volunteer), specifically what the level of current they have in the emergency care the CHVs' have during disaster management.

Objectives

The objectives of the study was to describe and compare the levels of knowledge regarding emergency care during disaster between the CHVs who are working in the Tsunami-affected areas and non-affected areas in Aceh province, Indonesia.

METHOD

The target population in this study was CHVs who work in the community in Aceh province, Indonesia.

According to the Authority of Social Department of Aceh Province (2011), there are 23 districts, which include 1314 CHVs who are persistently and actively working in these communities and six districts were selected. Therefore, a total numbers of 144 CHVs were included in this study. The inclusion criteria included age 18 – 55 years old, able to communicate in Indonesian language, currently work as a CHVs located in the Tsunami affected areas and non-affected areas.

Questionnaire (DDQ) This questionnaire was developed by the researcher to collect the patient's demographic data. It consist the following items: age, gender, religion, and marital status, level of education, occupation, residential area, period of working, training in first aid and others related to emergency care, previous disaster experience and training needs for the future.

Community Health Volunteer Knowledge Regarding Emergency Care Questionnaire (CHVK-ECQ)

CHVK-ECQ was developed by the researcher based on the conceptual framework of this study. The questionnaire consists of 30 items using True/False type questions. One point was given for each correct answer and zero point for each incorrect answer, respectively. A possible total range score giving from 0 to 30. These scores were converted into percentage.

Ethical consideration

Data was collected after the approval of the research proposal by the Institutional Review Board of Faculty of Nursing, Prince of Songkla University, Thailand. The researcher also obtained permission from the head of the Social Department of Aceh Province. Then, the researcher approached the subjects who met the inclusion criteria, explained the purpose of the study and the expectation for the agreement to participate in this study using informed consent. The researcher also maintained the confidentiality of the subjects by using a code and the information was kept until all processes of the study were complete.

Demographic data were analyzed by using descriptive statistics: frequencies, percentage, means, standard deviation and Chi-square. Knowledge was analyzed by using descriptive statistics: median and inter quartile range and Mann-Whitney U test was used to test the mean rank differences of knowledge between the CHVs working in Tsunami-affected and non-affected areas. The significant level was set as $p < .05$.

There were 144 subjects included in this study, which composed of 72 subjects per group working in Tsunami affected and non-tsunami affected area (Table 1 and 2).

Comparing the difference of demographics data between two groups (affected and non-affected areas), there was

found no difference except that of the level of education, duration of working, attending training regarding emergency care, and future training need ($p < .05$) (Table 1 and 2).

Comparison of Knowledge Regarding Emergency Care during Disaster

Mann-Whitney U Test was used to compare the mean rank of CHVs knowledge regarding emergency care during disaster between CHVs working in Tsunami affected and non-affected area. Mostly, the subjects in the non-affected areas had a higher mean rank of overall knowledge than subjects in the affected areas (80.59 versus 64.41) and there was significant difference of overall knowledge of CHVs regarding emergency care during disaster ($Z = -2.354$, $p = .02$). However, when compared the mean rank in each dimension between two groups, four dimensions of knowledge were significant different, only two dimension were not significant different. Those were in dimension search and rescue and logistic and communication (Table 3).

DISCUSSION

There are several factors which contributed to the high level of knowledge regarding emergency care. Firstly, the major factor is related to the knowledge questionnaires used in this study. The use of the True/False format was easy to answer correctly by chance and items generated in the questionnaire were based on the theoretical knowledge rather than practical knowledge and some items were common sense questions.

Secondly, most CHVs had previous first aid training. A previous study conducted to evaluate the first aid capabilities of the lay public was found in similar findings in terms of those

Table 1. Frequency and Percentage of Demographic Data Classified by Subjects Location as Tsunami and Non-Tsunami Affected Areas (N= 144)

Characteristics	Total		Affected area (n=72)		Non-affected area (n=72)		χ^2	p
	N	%	n	%	n	%		
Gender							.05 ^b	.82
Male	121	84.0	61	84.7	60	83.3		
Female	23	16.0	11	15.3	12	16.7		
Marital status							.03 ^b	.87
Married	70	52.8	37	51.4	39	54.2		
Single	68	47.2	35	48.6	33	45.8		
Age (years)							.30 ^a	.09
18-26	53	36.8	26	36.1	27	37.5		
27-36	73	50.7	37	51.4	36	50		
>37	18	12.5	9	12.5	9	12.5		
Education							4.01 ^a	.04
High school or less	101	70.16	45	62.6	56	77.8		
Beyond high school	43	29.9	27	37.4	16	22.2		
Duration of working (years)							25.15 ^a	<.01
2-3	58	40.3	40	55.5	18	25		
4-5	74	51.4	23	32.0	51	70.8		
>6	12	8.3	9	12.5	3	4.2		
Occupation							1.78 ^a	.61
Employer	74	51.4	34	47.2	40	55.6		
Labor	21	14.6	10	13.8	11	15.3		
Farmer	6	4.2	4	5.7	2	2.8		
Students	43	29.8	24	33.3	19	26.3		
Previous experiences in emergency care during disaster							2.63 ^b	.11
No								
Yes	31	21.5	20	27.8	11	15.3		
Attending training first aid							3.254 ^b	.07
No	113	78.5	52	72.2	61	84.7		
Yes								
No	32	22.2	21	29.2	11	15.3		
Yes	112	77.8	51	70.8	61	84.7		
a. Disaster triage							32.62 ^b	<.01
No	63	43.8	14	19.4	49	68.13		
Yes	81	56.2	58	80.6	23	1.9		
b. Logistic communication							11.28 ^b	<.01
No	79	54.9	29	40.3	50	49.4		
Yes	65	45.1	43	59.7	22	30.6		
c. Search and rescue							10.00 ^b	<.01
No	40	27.8	11	15.3	29	40.3		
Yes	104	72.2	61	84.7	43	59.7		
							17.36 ^b	<.01

Characteristics	Total		Affected area (n=72)		Non-affected area (n=72)		χ^2	p
	N	%	n	%	n	%		
Attending previous training regarding emergency care								
a. Early warning							32.62 ^b	<.01
No	63	43.8	14	19.4	49	68.131		
Yes	81	56.2	58	80.6	23	.9		
b. Disaster triage							11.28 ^b	<.01
No	79	54.9	29	40.3	50	49.4		
Yes	65	45.1	43	59.7	22	30.6		
c. Logistic communication							10.00 ^b	<.01
No	40	27.8	11	15.3	29	40.3		
Yes	104	72.2	61	84.7	43	59.7		
d. Search and rescue							17.36 ^b	<.01
No	72	50%	23	31.9	49	68.1		
Yes	72	50%	49	68.1	23	31.9		
e. Team organization							4.32 ^b	.04
No	29	20.1	9	12.5	20	27.8		
Yes	115	79.9	63	87.5	52	72.2		
Training need for future							43.95 ^a	<.01
No	22	15.3	22	30.6	0	0		
Yes								
- First aid and logistic	32	22.2	21	29.2	11	15.3		
- Disaster triage	15	16.4	2	2.7	13	18.2		
- Search and rescue	42	29.2	12	16.6	30	41.6		
- Evacuation and shelter	19	12.2	11	15.3	8	11.1		
- Team organization	14	9.7	4	5.6	10	13.8		

who were trained would be more willing to use acquired knowledge and skills, particularly to assist family members, rather than those who never attended training (Kano, Siegel & Bourque, 2005).

Thirdly, having previous experience in a disaster might have contributed to the high level of knowledge on emergency care during a disaster. Consistently, Flint and Brennan (2006) found that CHVs who have more experience in disaster response can play an important role at site of disaster, they also can perform actions such as performing triage, starting basic life support, and communication with another teams. Moreover, CHVs who had more experience in emergency care during a disaster could play a critical role in disaster response and they were often the first people to arrive at

the scene, and typically trusted by the victims (WHO, 2011).

Another factor that might have contributed to higher level of knowledge of CHVs in non-affected areas than those in the affected area is the duration of working. Duration of working can be an absolute factor of achieving experience in helping the victim during emergency care of disaster, CHVs who have long time working years may gain more experience and mastery on knowledge and skills related to emergency care (Williams, Nocera, & Casteel, 2008). Similarly, Maulidar (2010) also found that duration of working in a disaster was correlated with improvement in knowledge and skills of health care providers, CHVs will act more adequately than those who had less duration of working. CHVs that have

direct experience in disaster and working in non-affected areas may be more alert.

This study found that subjects in the non-affected area had a significantly higher mean of knowledge score than those in the experience in emergency care during disaster and training experience.

Firstly, the difference of knowledge in both groups in this study was related to duration of working. In non-affected areas, the subjects (70.8%) who active working CHVs for 4-5 years more than twice of those in affected areas (32.0%). This was similar to a previous study conducted by Maulidar (2010) among public health nurses where

The second factor that might contribute to higher knowledge in non affected areas is attending training related emergency care, particularly in first aid. More subjects in non-affected area (84.7%) were trained compared to those in affected areas (70.8%). According to Pan American Health Organization (PAHO) (2011), after attending training CHVs personnel can provide early intervention with first aid, which is critical in emergency care when the victims cannot be transported to a health facility. A similar finding was found in the study conducted by Kano, Siegel and Bourque, (2005) where first-aid training could increase both expected and actual utilization of first-aid skills as well as perceived competence in implementing those skills.

The third factor that may have contributed to a higher knowledge of CHVs working in the non-affected area was having previous experience in emergency care during a disaster. Most subjects in non-affected areas (84.7%) had previous experience in emergency care during a disaster. This is similar to previous studies that found an individual who had a greater experience may lead to an increase in confidence and mastery (O'Sullivan et al., 2008), Furthermore, from the experience in

affected area. It was significant difference of overall knowledge between the groups. There are some factors that might contribute to different result the two groups. Those factors are duration of working, previous half of the nurses who had less than five years of working experience were considered as having limited knowledge regarding disaster nursing management. Similarly, the finding of this study found that duration of working influenced the CHVs competencies, including level of knowledge, and it can be assumed that less experience in working in affected areas may contribute to their limited knowledge regarding emergency care during a disaster. disaster, CHVs can gain insights, acquire new views on the benefit of former learning, absorb from others examples, and learn from mistakes and repeat action in similar situations by being attuned (Jensen et al., 2008). Furthermore, in the non-affected areas, although they have limitation of available resources and equipment to provide early warning during a disaster compared to those in tsunami affected areas, more than half (68.1%) the subjects in non-affected areas had attending training on early warning compared to those in Tsunami-affected areas (49%). It can be assumed that all of the subjects in non-affected areas were alert and aware when disaster occurred to be the first responders to emergency, particularly in the community and really want to prepare and improve their knowledge to work during disaster. The CHVs also need to be concerned about warning and evacuating the victims because that is the first action needed during a disaster (Vogt & Kulbok, 2008). In addition, CHVs need to be identify the available resources and equipment that can be used for early detection and notify the community (Gebbie & Qureshi, 2007).

Table 2 Mean, Minimum- Maximum, Standard Deviation of Demographic Data Classified by Subjects Location as Tsunami and Non-Tsunami Affected Areas (N= 144)

Characteristic	Affected area (n=72)			Non-affected area (n=72)		
	Mean	Min-Max	SD	Mean	Min-Max	SD
Age	29.15	18-55	6.64	28.89	18-53	6.13
Duration of working	3.69	2-6	1.66	3.96	2-6	.971

Table 3 Comparison of Knowledge Regarding Emergency Care During Disaster Between CHVs Working in Tsunami Affected and Non-affected Areas Using Mann-Whitney U Test (N=144)

Knowledge	Affected area (n=72)			Non-affected area (n=72)			Z	p
	Mean Rank	Min	Max	Mean Rank	Min	Max		
Early warning	66.14	40	100	78.86	40	80	-2.08	.04
Disaster triage	80.62	20	100	64.38	20	100	-2.45	.01
First aid	60.48	60	100	84.52	20	100	-3.75	<.01
Search and rescue	74.22	60	100	70.78	20	100	-.656	.51
Logistic/communication	71.72	60	100	73.28	40	100	-.435	.66
Team organization	61.59	40	100	83.41	20	100	-3.45	<.01
Total score	64.41	46.66	100	80.59	26.66	100	-2.35	.02

Conclusions

In summary, the finding of this study showed that the subjects in the non-affected areas had a higher mean rank of overall knowledge than subjects in the affected areas. Conducting regular training, especially in first aid and rescue, is important during a disaster. Factors that may have contribute to the results of this study include using True/False format questions for assessing knowledge, duration of working, experience in emergency care, and attending training regarding emergency care during a disaster.

From the results of this study, we recommend that the CHVs should prepare and always ready to face with future disaster

by enhancing their knowledge in disaster via attending regular training, particularly on first aid and disaster triage and the questionnaire developed must be refined to be more measurable in the real situation. Further study should include CHVs' knowledge and skills for all phases of disaster, not only in emergency phase and for all types of disasters.

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