ORIGINAL ARTICLE

Knowledge and perceived skills for health management after a flood among village health volunteers in southern Thailand

Siriporn RUMTIAMMAK, Wipa SAE-SIA and Praneed SONGWATHANA
Faculty of Nursing, Prince of Songkla University, Hatyai, Songkhla, Thailand

Abstract

Aim: This study aimed to identify the level of knowledge and perceived skills regarding health-related flood management among 380 village health volunteers (VHVs) living in flood-affected areas in southern Thailand.

Methods: The self-report of Knowledge and Perceived Skill Questionnaires, which was developed based on the risk-reduction planning process of the Community-Based Disaster Risk Management framework, were provided by the VHVs. These two questionnaires were validated and tested for reliability, yielding a correlation coefficient of 0.70 for the Knowledge Questionnaire and 0.96 for the Perceived Skills Questionnaire. Data were analyzed by using descriptive statistics.

Results: The VHVs had a high level of knowledge and a moderate level of perceived skills regarding health-related flood management. Moreover, the area that the VHVs had the highest of both knowledge and skills was related to performing first aid for Athlete’s foot care, whereas the area of the least knowledge was on assessing dwellers’ perception of disaster preparedness, and the lowest skills was in the area of administering first aid for a bone fracture.

Conclusion: These findings can be used as basic information for conducting appropriate disaster management programs to promote VHVs’ knowledge and enhance skills, especially health risk management and training in a disaster management plan.

Key words: floods management, knowledge and perceived skills, village health volunteers

INTRODUCTION

A disaster is an emergent and an unfortunate event that causes tremendous adverse effects, such as damage of property, physical disability, psychological problems, social and economic disruption, including environment destruction (International Federation of Red Cross and Red Crescent Societies (IFRC), 2013; The International Strategy for Disaster Reduction, 2009). According to a report by the Department of Disaster Prevention and Mitigation (DDPM), Ministry of Interior, Thailand (2013), the incidence of floods in Thailand was reported to be the highest among different types of natural disasters. Approximately 1,214,521 families from 47 provinces were affected by the floods, and 86 were killed during flood events from 2010 to 2011. In addition, 4,095,725 people were affected by the floods, which accounted for 35% of all Thai people. As flood events always occur in the southern part of Thailand, it is not easy for external supporters to arrive at the affected areas quickly; therefore, the role of village health volunteers (VHVs) as regional supporters is important.

Village health volunteers act as non-healthcare providers living in the community, and play a critical role in the crisis or emergency phase of a disaster to save many victims’ lives before the arrival of external teams to help (Kamal, Songwathana, & Sae Sia, 2012), especially for the elderly, disabled individuals, chronically ill individuals, or bedridden individuals. Health-related flood management for VHVs included knowledge and skills in terms of assessment and management of health problems of vulnerable individuals before, during, and after a flood disaster.
Knowledge and skills of flood management are important. A recently reviewed paper examined the ways the community volunteers participated in emergency and disaster management, in terms of their knowledge and skills, to help the victims; the research suggested to improve the knowledge and skills of those VHVs in order to reduce the risks or adverse effects on volunteers or victims (Whittaker, McLennan, & Handmer, 2015).

A previous study found that 79% of VHVs performed their helping activities without first aid training experience (Sauer, Catlett, Tosatto, & Kirsch, 2014). The study found that untrained VHVs were killed while helping victims during the disaster events (Orloff, 2011). According to the study by Kamal et al. (2012), the VHVs in Indonesia had a low level of knowledge in the areas related to team organization, disaster triage, and early disaster warning, and they had low levels of skills in cardiopulmonary resuscitation and identifying the victim’s health problems in the disaster scene. Although the study by Kamal et al. (2012) showed that some VHVs’ knowledge and perceived skills regarding health management during a Tsunami in Indonesia was low, Thai VHVs’ backgrounds and contexts might be different from those of VHVs in Indonesia due to difference in training background, knowledge and skills background, and difference in types or size of the community. Therefore, it is important to explore the knowledge and perceived skills of Thai VHVs regarding health management during floods. The results of this study would be helpful for developing a program to promote VHVs’ knowledge and perceived skills regarding health management during floods in future.

**Conceptual framework**

The conceptual framework of this study is based on the Community-Based Disaster Risk Management (CBDRM) framework (McLaughlin, 2011) and literature reviews (Department of Health Service Support, Ministry of Public Health, 2010; Sangsurin, Chatchawanyungkun, Pramonjareonkit, & Sreesong, 2012). The CBDRM framework has four processes including: community identification; disaster risk-reduction planning; implementation; and monitoring and evaluation. However, only the part of disaster risk-reduction planning was used as a framework of this study because this disaster risk-reduction planning process covers risk-reduction measures before, during, and after a flood. Although several components are listed in this phase, health-related flood management in this study only focused on the components that were related to the knowledge and perceived skills of: (1) assessment of health problems of the individuals with vulnerability; (2) first aid; (3) triage; (4) team organization; (5) search and rescue; (6) team communication; and (7) disease prevention during post disaster (Department of Health Service Support, Ministry of Public Health, 2010; Flint & Brennan, 2006; McLaughlin, 2011; Sangsurin Chatchawanyungkun, Pramonjareonkit, & Sreesong, 2012).

The objective of this study was to identify the level of knowledge and perceived skills regarding health-related floods management among VHVs in southern Thailand.

**METHODS**

**Population and setting**

The sample of this study was 380 VHVs living in the communities in southern Thailand. The following six provinces of southern Thailand, where floods commonly occurred, were included: Nakhon Si Thammarat, Surat Tani, Phattalung, Satun, Songkhla, and Narathiwat (DDPM, Ministry of Interior, Thailand, 2012). The inclusion criteria for sample selection were: (1) has worked in the position of VHVs for at least 6 months; (2) has worked as a VHV in flood-affected areas; (3) is aged between 18 and 60 years; and (4) be able to communicate in Thai language. The sample size calculation was based on the Taro Yamane formula (Polit & Beck, 2012) and a total 398 of VHVs were required. The samples were recruited using a multiple stage sampling technique.

**Instrumentation**

The self-report questionnaires used in this study were composed of three parts; those were: (1) the Demographic Data Questionnaire; (2) the Village Health Volunteer’s Knowledge Questionnaire; and (3) the Village Health Volunteer’s Perceived Skills. Both of the Village Health Volunteer’s Knowledge and Perceived Skill Questionnaires were developed by the first researcher, Siriporn Rumtiammak, based on the conceptual framework of this study. The items covered the three phases of disaster management; pre-disaster, disaster, and post disaster. The knowledge questionnaire involved true–false-type questions and the total number of items for this questionnaire was 49.

The Village Health Volunteer’s Perceived Skill Questionnaire consisted of 32 items and was rated by using a five-point Likert scale with 1 = unable to practice the statement at all; 2 = considered hardly able to practice this statement; 3 = uncertain; 4 = able to practice the statement following given instruction; and 5 = able to
practice the statement automatically. For the standardization of knowledge and perceived skills scores, the total score of knowledge and perceived skills was converted into a percentage. The total knowledge score was converted into a percentage by multiplying the total correct knowledge score by 100 and dividing by 49. Similarly, the total perceived skill score was also converted into a percentage by multiplying the total score of perceived skill by 100 and dividing by 32. Levels of knowledge and perceived skills were categorized into four levels (McDonald, 2002) as follows:

- Very low: <60.00%
- Low: 60.00–69.99%
- Moderate: 70.00–79.99%
- High: >80%

The knowledge and perceived skills assessed by health-related flood management questionnaires were analyzed by three experts using the scale content validity index (SCVI). The SCVI was found to be 1.0 for both questionnaires. The KR-20 coefficient of the Village Health Volunteer’s Knowledge Questionnaire yielded a value of 0.70. The Cronbach’s alpha coefficient of the Village Health Volunteer’s Perceived Skills Questionnaire was found to be 0.96.

**Ethical consideration**

Data were collected after the approval from the Ethics Committee of the Faculty of Nursing, Prince of Songkla University, Thailand. In addition, permission was obtained from the Head of the Social Department of each sub-district in southern Thailand where the participants were recruited. The approached participants who met the inclusion criteria and signed the informed consents were invited to participate through the assistance of the administrator of the Primary Care Unit.

**Data analysis**

Demographic data were analyzed by using descriptive statistics: frequencies, percentage, means, and standard deviation. Both the levels of the VHVs’ knowledge and perceived skills regarding health-related flood management during floods were analyzed by using descriptive statistics. The VHVs’ knowledge score was a normal distribution; therefore, frequency, percentage, mean, and standard deviation were used for analyzing the knowledge variable. However, the perceived skills variable showed skewed distribution. Therefore, median and interquartile ranges were used. Additional analyses of differences between groups were compared by using an independent Student’s t-test and Mann–Whitney U-test.

**RESULTS**

In total, 380 (80.9%) VHVs returned the questionnaires. The majority of the VHVs were female (n = 338, 88.9%) with a mean age of 44.49 years (SD = 7.82). Nearly half of the participants (n = 186, 49.0%) had an education background of high school level. Nearly sixty percent of them were farmers (n = 237, 57.1%). The average work experience of these participants in a VHV position was 9.92 years (SD = 6.61), with 62.4% (n = 237) of the VHVs work experience ranging between 1 and 10 years. Of those VHVs, 62.1% (n = 236) had been affected by floods and 65.3% (n = 248) of participants had experience in attending disaster training courses. However, only 46.8% of VHVs (n = 178) had attended courses about health-related flood management. The demographic characteristics of the VHVs are shown in Table 1.

As shown in Table 2, based on an in-class only training method, the top five topics that most VHVs were trained in were: (1) assessment of vulnerable individuals’ health problems before, during, and after a flood disaster (n = 176, 46.3%); (2) first aid (n = 163, 42.9%); (3) signs and symptoms related to emergency care (n = 162, 42.6%); (4) assessment of community vulnerability and community capacity (n = 161, 42.4%); and (5) management of health problems after a flood disaster (n = 159, 41.8%).

Overall, the VHVs had a high level of knowledge (M = 80.7, SD = 8.7) with regards to health-related flood management. However, the overall perceived skills of participants regarding health-related flood management was at a moderate level (Mdn = 77.5, IQR = 17.5) (Table 3).

For all 49 items of knowledge regarding health-related floods management, the top three topics that the majority of VHVs had the highest knowledge scores in were: (1) to perform first aid for athlete’s foot care (M = 98.0, SD = 13.5); (2) perform first aid for fever (M = 98.0, SD = 14.4); and (3) knowledge for administering first aid for closed bone fracture care (M = 97.0, SD = 18.2). However, the top three areas in which the VHVs had the lowest knowledge scores were: 1) to assess dwellers’ perception of disaster preparedness (M = 24.0, SD = 42.6); (2) assign the right person to work in the right position (M = 52.0, SD = 50.0); and (3) develop a plan for management of health problems for vulnerable individuals during a flood disaster (M = 56.0, SD = 49.8) (Table 4).

As shown in Table 5, the top three items out of the 32 items that show the majority of VHVs had the highest level of perceived skills in: (1) administering first aid for Athlete’s foot care (Mdn = 100.0, IQR = 20.0); (2)
visiting victims at their homes post-flood (Mdn = 100.0, IQR = 20.0); and (3) administering first aid for fever (Mdn = 100.0, IQR = 40.0). The three areas in which VHV\'s demonstrated the lowest level of perceived skills were: (1) skill for performing first aid for closed bone fracture care (Mdn = 60.0, IQR = 20.0); (2) skill to transfer patients who have spinal injuries (Mdn = 60.0, IQR = 20.0); and (3) skill to perform basic cardiopulmonary resuscitation correctly and effectively (Mdn = 60, IQR = 35.0).

Additional analyses also found that VHV\'s who had previous experience of helping flood victims had higher (M = 81.54%, SD = 8.24) knowledge than those who had not (M = 79.35%, SD = 9.38) (p = 0.02). In addition, the VHV\'s who had experience being flood victims themselves were more likely to have higher perceived skills (Mdn = 77.50, IQR = 16.88) than those without experience being flood victims themselves (Mdn = 76.25, IQR = 21.56) (p = 0.27).

**DISCUSSION**

The results of the study showed that the VHV\'s had high-level knowledge about health-related flood management. This is consistent with a study conducted in Ethiopia, where more than half of the health professionals had good perceived knowledge (Bernhanu, Abrha, Ejigu & Woldemichael, 2016; Kamal et al., 2012). However, they had a moderate level of perceived skills regarding health-related flood management in this study. This result would be due to previous training experience, being victims in flood-affected areas, having previous experience in helping victims during a flood, and feeling empathy towards other victims’ experiences.

First, previous training experience is one factor that may increase the level of knowledge. As seen in the demographic data, 65.3% of the VHV\'s had experiences

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**Table 1** Demographic characteristics of village health volunteers

| Demographic characteristics | n  | %  |
|-----------------------------|----|----|
| Age (years) (M = 44.49, SD = 7.82, Min = 19, Max = 60) |  |  |
| 19–30 | 17 | 4.5 |
| 31–40 | 104 | 27.4 |
| 41–50 | 171 | 45.0 |
| 51–60 | 88 | 23.1 |
| Gender |  |  |
| Female | 338 | 88.9 |
| Male | 42 | 11.1 |
| Education level |  |  |
| No education | 3 | 0.8 |
| Primary school | 114 | 30.0 |
| High school | 186 | 49.0 |
| Vocational certificate | 40 | 10.5 |
| Bachelor degree | 37 | 9.7 |
| Occupation |  |  |
| Farmer | 217 | 57.1 |
| Employee | 62 | 16.3 |
| Business | 41 | 10.8 |
| Housewife | 10 | 2.6 |
| Retired | 50 | 13.2 |
| Work experience (years) (M = 9.92, SD = 6.61, Min = 1, Max = 35) |  |  |
| <10 | 237 | 62.1 |
| ≥10 | 144 | 37.9 |
| Direct experience in flood-affected area |  |  |
| Yes | 236 | 62.1 |
| No | 144 | 37.9 |
| Have attended disaster training courses |  |  |
| No | 132 | 34.7 |
| Yes | 248 | 65.3 |
| Have experience in flood management |  |  |
| No | 202 | 53.2 |
| Yes | 178 | 46.8 |

**Table 2** Top five disaster management training topics that most village health volunteers were trained (N = 248)

| Training topics | In-class only | Practice only | Both |
|-----------------|--------------|---------------|------|
| n | % | n | % | n | % |
| Assessment of vulnerable individuals’ health problems before, during, and after a flood disaster | 176 | 46.3 | 29 | 7.6 | 9 | 2.4 |
| First aid | 163 | 42.9 | 47 | 12.4 | 23 | 6.1 |
| Signs and symptoms related to emergency care | 162 | 42.6 | 31 | 8.2 | 7 | 1.8 |
| Assessment of community vulnerability and community capacity | 161 | 42.4 | 25 | 6.6 | 10 | 2.6 |
| Management of health problems after flood disaster | 159 | 41.8 | 44 | 11.6 | 9 | 2.4 |

Note. The order of the top five topics was based only on the in-class training method.
in attending disaster management training. This is consistent with previous studies that also found that having training experience could increase disaster-related knowledge (Buajaroen, 2013; Kamal et al., 2012; Kano, Siegel & Bourgue, 2005). As already mentioned, nearly two-thirds of the VHVs had attended disaster training courses, which were mainly related to first aid, assessment and management of health problems of flood victims. This are similar findings to another previous study in which it was shown that a lay person who attended a first aid training course had a level of first aid knowledge higher than that of those who had not attended a training course (Kano et al., 2005). Furthermore, the experiences and skills obtained from the disaster and health-related flood management training course are the top areas in which the VHVs had high scores for perceived skills. The training program included practical and theoretical class, which may have improved VHVs’ practice skills, because during the practice training class/program, participants could have a chance to participate in a drill for a scenario and/or case study. Therefore, we can suggest that knowledge and perceived skills can be enhanced by dialectic learning and hands on practice.

Second, being victims of a flood event is another factor that can increase level of knowledge and perceived skills because the VHVs may also learn through observing healthcare providers helping flood victims. A previous study reported that direct experience in a disaster event could increase VHVs’ knowledge regarding health-related floods management. VHVs can gain insights, acquire new learning experiences from observing formal healthcare providers’ actions during flood events (Maulidar, 2010 as cited in Kamal et al. 2012).

### Table 3 Knowledge and level of perceived skills categorized by overall scores and each disaster phase (N = 380)

| Knowledge | Perceived skills | Level | M (SD) | Mdn (IQR) | Level |
|-----------|------------------|-------|--------|-----------|-------|
| Total scores | 80.7 (8.7) | High | 77.5 (17.5) | Moderate |
| Pre-disaster phase | 78.2 (13.3) | Moderate | 77.5 (17.5) | Moderate |
| Disaster phase | 82.3 (9.85) | High | 76.0 (20.0) | Moderate |
| Post-disaster phase | 93.8 (19.5) | High | 80.0 (20.0) | High |

M, mean percentage; SD, standard deviation; Mdn, median; IQR, interquartile range.

### Table 4 Mean (M), standard deviation (SD), and level of the top three highest and top three lowest knowledge scores categorized by items of health-related flood management (N =380)

| Items of knowledge | M (SD) | Level | Disaster phase |
|--------------------|--------|-------|----------------|
| The top three highest scores |         |       |                |
| Performing first aid for Athlete’s foot care | 98.0 (13.5) | High | Disaster |
| Performing first aid for fever | 98.0 (14.4) | High | Disaster |
| Performing first aid for closed bone fracture care | 97.0 (18.2) | High | Disaster |
| The top three lowest scores |         |       |                |
| Assessing dwellers’ perception of disaster preparedness | 24.0 (42.6) | Very low | Pre-disaster |
| Assigning of the right person to work in the right position | 52.0 (50.0) | Low | Disaster |
| Developing a plan for management of health problems for vulnerable individuals during a flood disaster | 56.0 (49.8) | Low | Pre-disaster |

### Table 5 Median (Mdn), interquartile range (IQR) and level of the three highest and three lowest items of perceived skills scores categorized by items of health-related floods management (N = 380)

| Areas of perceived skills | Mdn (IQR) | Level | Disaster phase |
|--------------------------|-----------|-------|----------------|
| The three highest scores |           |       |                |
| Performing first aid for Athlete’s foot care | 100.0 (20.0) | High | Disaster |
| Performing home visits to people during post-flood | 100.0 (20.0) | High | Post-disaster |
| Performing first aid for fever | 100.0 (40.0) | High | Disaster |
| The three lowest scores |           |       |                |
| Performing first aid for closed bone fracture care | 60.0 (20.0) | Moderate | Disaster |
| Transferring patients with spinal injuries | 60.0 (20.0) | Moderate | Disaster |
| Performing basic cardiopulmonary resuscitation correctly and effectively | 60.0 (35.0) | Moderate | Disaster |
Third, having experience in health-related flood management is also a factor in increasing the VHVs’ knowledge. Nearly half of the VHVs in this study had health-related flood management experience. In addition, in the emergency situation, they played a role in evacuating the victims from the dangerous flood areas to safer areas. They also worked as assistants to the healthcare providers in performing first aid, such as wound dressings, transferring victims or providing fever care. Therefore, experience obtained from direct observation and working as an assistant to healthcare providers helped the VHVs gain more knowledge related to health-related floods management.

Finally, empathizing with victims’ experiences of flood disasters could possibly be a reason for having a high level of knowledge and moderate level of skills in relation to health-related flood management because the VHVs were willing to help save vulnerable individuals as they remembered being assisted by other VHVs when they were victims of a flood event. However, there were some areas where the VHVs’ knowledge of health-related floods management was at either a low or very low level. The lowest score was found for the assessment of knowledge in the area of dwellers’ perception of disaster preparedness. The majority of the VHVs consider their role as a helper during the flood disaster, and they tend to work mostly under the supervision of the professional healthcare providers. Hence, they may lack awareness of their role of being an instructor to teach community dwellers and assess the community dwellers’ perception. Also, the Thai VHVs’ job description identifies the VHVs’ role in general, but does not clarify the role of the VHVs for the assessment of community dweller’s perception. Therefore, this role may not be a priority job for the VHVs, which resulted in the lowest knowledge score.

A previous study has suggested that higher knowledge levels may lead to higher skill levels when performing some actions (Kamal et al., 2012). However, the present study revealed that the overall knowledge level regarding health-related flood management of the VHVs was high, but the VHVs’ perceived skills regarding health-related flood management was at a moderate level. This suggests that there may be other factors than knowledge that may influence the level of perceived skills of the VHVs. Those factors may be related to practical training experience. It was found that less than 15% of VHVs had experience in cardiopulmonary resuscitation training even though 65.3% of VHVs had experience in disaster training management. In addition, most of them had training experience once a year only, so that lack of periodical practice training could result in lack of confidence to perform a specific task, such as cardiopulmonary resuscitation, or disaster triage. Furthermore, it may relate to the paradox of local people’s perception and knowledge towards the causes of flood in high-risk areas or global environment changes (Emmanuel, Darnswasdi, & Ratanachai, 2016). These factors might lead to a moderate level of perceived skills of the VHVs.

According to the above discussion, we can recommend municipality or related administrators to develop and implement strategies to enhance the VHVs knowledge and perceived skills of health-related floods management. In addition, the strategies are suggested to be endorsed in the fiscal year plan and also need to be monitored routinely for the efficacy. The first priority should be to promote VHVs’ knowledge related to increasing the ability of community dwellers to assess and perceive the level of health risks during floods, disaster planning, disaster training and awareness, and cardiopulmonary resuscitation; areas that showed the lowest scores of knowledge and perceived skills in this study.

The limitation of this study was related to the length of the questions related to items of knowledge and perceived skill of health-related flood management; the long length of the questions could reduce the attention span of the VHVs, which may prevent the true level of knowledge and perceived skills. In addition, the self-report questionnaire about perceived skills might not represent the true capacities of the VHVs in relation to health-related flood management. Future studies with shorter questions for the knowledge questionnaire and observational data collection of actual skills of the VHVs are needed.

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