# Original Article

# Effect of Emergency Scenario-Based Training Program on Knowledge, Self-confidence, and Competency of Elderly Caregiver Volunteers in a Rural Thai Community: A Quasi-Experimental Study

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**Received:** 02 April 2024 **Revised:** 06 August 2024 **Accepted:** 08 August 2024

## Abstract

**Background:** Many older people with comorbidities encounter emergency or life-threatening situations, but the response is often neglected or delayed, resulting in increased morbidity and mortality rates. Community preparedness to reduce the impact of emergency crises on older people is essential. This study aimed to determine the effect of an emergency scenario-based training program (ESBTP) for elderly care on the knowledge, self-confidence, and competency of volunteer caregivers in a rural Thai community.

**Methods:** The one-group pre-post-test, quasi-experimental study, was conducted with a non-randomized research sampling of 40 community healthcare volunteers in Vibhavadi district, Surat Thani, Thailand. The research was conducted between October and December 2021. The ESBTP was based on Bloom's learning theory. The research instrument was a three-part questionnaire measuring knowledge, self-confidence, and competency in geriatric life-threatening surveillance and emergency assistance (GLTSEA) at one, four, and eight weeks of training. Data were analyzed using Bonferroni statistics and repeated measures ANOVA through the software IBM SPSS version 28 with hypothesis testing at $P<0.05$.

**Results:** The results revealed that at Week 1, Week 4, and Week 8, the volunteers attending the ESBTP demonstrated significantly higher GLTSEA competency ($P<0.001$). Otherwise, the participants were not significantly different in GLTSEA knowledge ($P=0.068$) and self-confidence ($P= 0.052$) after the training.

**Conclusions:** Volunteers' competency increased after ESBTP, but there must be continuity in community training to develop the relevant knowledge, self-confidence, and skills for emergencies.

**Keywords:** Elderly, Emergencies, Knowledge, Self-confidence, Skill

**Please cite this article as:** Pongtriang P, Soontorn T, Sumleepun J, Chuson N, Songwathana P. Effect of Emergency Scenario-Based Training Program on Knowledge, Self-confidence, and Competency of Elderly Caregiver Volunteers in a Rural Thai Community: A Quasi-Experimental Study. IJCBNM. 2024;12(4):267-277. doi: 10.30476/ijcbnm.2024.101514.2431.

## Introduction

Elderly people are known to be a particularly vulnerable group with physical, mental, and social limitations.[1] Chronic disease in older people often leads to emergencies involving ischemic stroke, myocardial infarction (MI), and other life-threatening conditions, resulting in increased morbidity and mortality rates.[2] Moreover, elderly people in rural areas encounter greater challenges in accessing healthcare services, causing their health status to be more complicated by long-term self-transfer to emergency care services.[3, 4] In this context, community members who provide elderly care play an important role in monitoring an individual's health and making decisions to involve emergency care services. However, there is evidence that the competence of such caregivers remains a challenge for further development.[5] For example, they are less confident in assessing and treating emergency problems, and this is perhaps a reason for the delayed treatment of elderly patients.[6]

Developing emergency competency through community training often comes as lectures and practical demonstrations. It can also be inconsistent, which affects the persistence of the knowledge and skills required to administer, for example, first aid and resuscitation. In addition, a recent study found that most participants were fearful of and distrusted cardiopulmonary resuscitation (CPR), and there remained a misperception of its side effects and the potential adverse effects on the patient.[7] These factors are barriers to developing resuscitation competency, and more appropriate strategies in community training are, therefore, required.[8, 9]

For increasing the survival rate for out-of-hospital cardiac arrests, automated external defibrillators (AEDs) need to be sufficiently provided throughout public areas. However, the accessibility and distribution of AEDs is a challenge, particularly in rural communities, and knowing how to use them is also an issue. People need to be trained to enhance their ability and self-confidence and improve their practical skills to help those suffering cardiac arrests in public spaces.[10-12] With all of the above obstacles which are relevant to points of care for older adults in medical emergencies, such as delayed access to the service system and increased risk of morbidity or mortality, the need for a training program becomes even more apparent. For instance, in remote areas, older people often face challenges such as a lack of immediate medical assistance, unfamiliarity with emergency procedures, and limited resources.[13] Therefore, it is crucial for community members or caregivers equipped with the knowledge, confidence, and skills to assist in emergencies to develop an initial care and assistance system for older adults before they receive care from healthcare providers.[14]

In developing the curriculum and training program, an effective intervention is outlined and underpinned by the learning theory, which focuses on three essential domains: cognitive, affective, and psychomotor.[15] The main focus of learning theory in this project is to enhance knowledge, self-confidence, and skill relevance of emergency assistance to guide potential strategies for training caregivers in emergency scenarios relevant to assisting elderly individuals experiencing life-threatening medical crises and connecting them to emergency care services. This study aimed to determine the effect of an emergency scenario-based training program for elderly care on the knowledge, self-confidence, and competency of volunteer caregivers in a rural Thai community.

## Materials and Methods

This one-group pre-post-test, and quasi-experimental study is the third phase of a research and development project entitled "Development of geriatric life support system of caregivers in community", which was conducted at Vibhavadi district, Surat Thani, Thailand.

The research sample included 40 participants including family caregivers, community healthcare volunteers, and

those providing care to elderly individuals. This phase of research was conducted from October to December 2021.

The sample size was determined by power analysis of a similar study, which compares the knowledge variable in an emergency training program with a power (Zβ) of 80% (0.84), significance level (Zα) of 0.05 (1.96), mean difference of 3.03; $SD_1$ of 1.97; $SD_2$ of 1.04; k of 1 group and statistical significance of 0.05 to calculate the discriminant power in the test.[16, 17] Using the following formulas by Cohen (1988)[18] with a sample size of 28, and considering the participants' drop-out with multiple-time community training, we estimated the total sample for the study at 40 participants.

$$The\ Effect\ size = d_{pools} = \frac{m_1 - m_2}{SD_1 + SD_2} = f^2 = \frac{d^2}{2k} = \delta^2$$

$$n = \frac{\left(Z_{\frac{\alpha}{2}} + Z_{\beta}\right)^2 \times 2\sigma^2\,(1-\rho)}{\delta^2}$$

In the meticulously designed non-randomized research sampling method, the recruitment nurse actively promoted the research project at the community hall during monthly meetings. This approach ensured that only participants who showed genuine interest in the project were contacted, enhancing the credibility of the research. The recruitment nurse then briefly introduced the project and provided an information statement to see if the participant was interested. The inclusion criteria were informed consent to participate in the study, 18–50 years of age, voluntary participation in 24 hours of training over three days in two months, no limitations of physical movement, no underlying health conditions, such as heart disease or asthma according to self-statement, and the ability to read and write in Thai. The exclusion criteria included unwillingness to participate in the intervention, and physical issues during CPR training, such as dizziness or irregular heart rate.

The emergency scenario-based training program (ESBTP) intervention was developed by community stakeholders and the research team in 2021. The program is underpinned by Bloom's learning theory,[19] which divides a situation into three domains (cognitive, affective, and psychomotor) and is intended to promote caregiver competency in basic first aid for elderly people who suffer MI or stroke in community settings. The training program provides a comprehensive approach, beginning with theoretical lectures that offer essential knowledge. These lectures cover topics such as identification of life-threatening signs in older individuals, basic life support, and practical skills for emergencies in public areas. The program also includes disease knowledge and essential assistance for stroke and acute MI, which are crucial for caregivers and individuals interested in emergency response training.

Following the theoretical lectures, the training program progresses to practical sessions. These sessions help improve trainees' skills and confidence in real-life emergencies. Using scenario-based models, trainees develop resuscitation skills and practice calling for help, providing first aid and CPR, and activating teams for emergency assistance. These practical sessions provide realistic simulations and support multiple learning outcomes, as detailed in Table 1.

Researchers developed the four parts of the research instrument based on literature reviews.[20-23] The instrument was reviewed for content validity by Five experts (1 registered nurse, 3 university instructors, and 1 medical doctor with expertise in emergency healthcare) and revised according to their recommendations. The reliability of the instrument was examined after trying out in 33 cases as the following instrument details:

Part 1 was a personal characteristics questionnaire to collect data about gender, age, education, occupation, community role, experience of medical emergencies, and frequency of emergency assistance. The researcher then considered an item-objective congruence value between 0.6 and 1 and ensured that the content validity reached the standard value before implementation.

**Table 1:** The content of emergency scenarios in the study

| Scenario | Learning Outcomes | Training Strategy |
|---|---|---|
| First aid and calling for emergency help | 1. Deciding how to assist<br>2. How and what to communicate for help<br>3. Obtain the relevant basic first aid skills | - First aid tutorials and training<br>- Communication tutorials<br>- Emergency call tutorials and practice |
| Stroke signs and calling for help | 1. How to identify signs and symptoms of stroke<br>2. How and what to communicate for help in stroke situations<br>3. Obtain the relevant basic skills | - First aid tutorials and training<br>- Symptoms assessment<br>- Communication tutorials<br>- Emergency call tutorials and practice |
| MI[a], basic life support and calling for help | 1. How to identify signs and symptoms of MI<br>2. How and what to communicate for help in MI situations<br>3. Obtain the relevant basic skills | - First aid tutorials and training<br>- Symptoms assessment<br>- Communication tutorials<br>- Emergency call tutorials and practice |
| MI during a community meeting | 1. Assessing MI signs and symptoms<br>2. Deciding how to assist<br>3. How and what to communicate for help<br>4. Effective team coordination and communication | - Pre-briefing<br>- Scenario simulation<br>- Activate as a team in a real situation<br>- De-briefing<br>- Reflection |
| MI and fall in a temple | 1. Assessing MI signs and symptoms<br>2. Deciding how to assist<br>3. How and what to communicate for help<br>4. Effective first aid practice<br>5. Effective team coordination and communication | - Pre-briefing<br>- Scenario simulation<br>- Activate as a team in a real situation<br>- De-briefing<br>- Reflection |

[a]MI: Myocardial infarction

Part 2 involved 25 multiple-choice questions about geriatric life-threatening surveillance and emergency assistance (GLTSEA) knowledge with "Yes" or "No," each with a value of 0 or 1. All items were summed as the lowest score was 0 points and the highest score was 25 points. The five experts (1 registered nurse, 3 university instructors, and 1 medical doctor with expertise in emergency healthcare) examined the content validity, and the researcher then considered a scale content validity index (S-CVI) of 0.92 and a content validity ratio (CVR) of 0.99. The reliability of the instrument was examined, yielding a Kuder- Richardson 20 of 0.78.

Part 3 was a 15-item self-confidence questionnaire including both positive (1, 3, 6, 7, 9, 10, 12, 15) and negative statements (2, 4, 5, 8, 11, 13, 14) and using a five-point Likert scale from very low (1) to very high (5). All items were summed as the lowest score was 15 points and the highest score was 75 points. The five experts examined the content validity, and the researcher then considered a S-CVI of 0.93 and a CVR of 0.6-0.99. The reliability of the questionnaire was examined, yielding a Cronbach's alpha coefficient of 0.86.

Part 4 was a 10-item GLTSEA competency questionnaire with a three-point rating scale from missing (1) to completed (3). All items were summed as the lowest score was 10 points and the highest score was 30 points. The five experts examined the content validity, and the researcher then considered an S-CVI of 0.90 and a CVR of 0.6-0.99. The reliability of the instrument was examined, yielding a Cronbach's alpha coefficient of 0.84.

The participants received 24 hours of training on GLTSEA delivered across three sessions (three dates at week 1, week 4, and week 8). The training program was operated and taught by a medical doctor qualified as an emergency physician and a registered nurse qualified as an emergency nurse practitioner. The first session in week 1 was an eight-hour workshop divided into four hours of theory, focusing on life-threatening assessment issues, first aid, basic life support, and AED use, and four hours of practical work, looking at decision making, first aid, calling for help and basic life support, in simulated emergency scenarios involving

elderly people experiencing acute MI or stroke. In this phase, 40 subjects participated in a four-hour theoretical tutorial session on emergency assistance. Subsequently, they were divided into four groups to practice the skills. This training was done through individual activities like chest compression practice and group activities such as basic life support, ensuring a well-rounded learning experience.

The second community session in Week 4 aimed at enhancing the caregivers' GLTSEA knowledge, self-confidence, and competency, conducted through scenario-based training consisting of assessing incidents in the community (Table 1). In this follow-up phase, 35 volunteers participated in the community training. This training was designed to be hands-on and realistic, with participants divided into four groups for skill training on various emergency scenarios. This approach ensured the program was effective and instilled confidence in the volunteers. In Week 8, the final session was a follow-up review of the training thus far. It focused on CPR skills, AED use, and calling for emergency help. 31 participants were involved in this session; they were divided into four groups for skill and practice evaluation through emergency scenarios.

To compare the mean scores of knowledge, we evaluated self-confidence and competency, pre- and post-test questionnaires as relevant variables before and after attending the community training at Weeks 1, 4, and 8. A total of 40 participants entered the training program in Week 1. Despite the challenges, the commitment of our participants to the training program was truly remarkable. Even when personal reasons and community occasions led to the simultaneous loss of five participants in week 4 and nine in week 8, the remaining 26 participants completed the community training program thrice, demonstrating their dedication and value of the program.

The research data were analysed using IBM SPSS version 28. Personal characteristics were analyzed using frequency and percentage. The continuous variables were tested according to normality distribution and assumption testing with parametric statistics before the analysis. The differences in knowledge, self-confidence, and competency before and after the program were analyzed using Bonferroni statistics and repeated ANOVA measures.

The human rights and confidentiality of all participants were protected throughout the entire research process. They were asked to participate in the training voluntarily and given sufficient information and time to decide whether or not to become involved. Each individual was provided with all relevant information to decide whether or not to participate in the research before signing a written informed consent form. Forms were signed by each participant before the training program commenced, and their right to withdraw at any time without penalty or effect on their everyday lives was highlighted. During the training programme, the participants were monitored for any physical problems by the research team. The personal information of the participants was anonymized and remained confidential to protect their privacy. The research data and all documents will be destroyed after five years.

The ethical considerations of this research were reviewed and approved by the Human Research Ethics Committee at Suratthani Rajabhat University (No. SRU-EC 2021/055).

## Results

The demographic data collected encompassed an extensive range of factors, including gender, age, education, occupation, community role, experience of medical emergencies, and frequency of emergency assistance. The analysis of these personal characteristics yielded intriguing insights. For instance, most voluntary participants were female (90%), and a significant number of them (35%) were aged between 46 and 50 years. Approximately 40% had completed their education at the senior high level, and around 72.5% were engaged in

agriculture. Moreover, a substantial percentage of the participants (60%) held a community role as health volunteers. However, the research also revealed that a significant portion (62.5%) had no prior experience with medical emergencies (Table 2).

The questionnaire data of the 26 participants who completed the entire course of the community training were analyzed to compare the mean scores of GLTSEA knowledge, self-confidence, and competency.

The mean score of knowledge in GLTSEA among the participants attending the ESBTP was not significantly different after training (P=0.068) in the pre-test (17.69±2.07), Week 1 (18.27±2.77), Week 4 (18.69±2.05), and Week 8 (18.81±2.35). In addition, when comparing pairs by Bonferroni statistics, the differences in knowledge mean scores between the pre-test and week 1 (P>0.99), pre-test and week 4 (P=0.21), pre-test and week 8 (P=0.17), week 1 and week 4 (P>0.99), week 1 and week 8 (P=0.65), and week 4 and week 8 (P>0.99) were not statistically significant (Table 3).

The mean score of Self-confidence in GLTSEA of the participants was not significantly different after training (P=0.052) in the pretest (52.69±6.24), Week 1 (52.04±6.33), Week 4 (54.62±5.64), and Week 8 (54.92±6.63) of the training course. In addition, when comparing pairs using Bonferroni statistics, the difference in mean self-confidence scores between pre-test and week 1 (P>0.99), pre-test and week 4

**Table 2:** Participants' characteristics in the study (N=40)

| Characteristics | N (%) |
|---|---|
| Sex | |
| Male | 4 (10) |
| Female | 36 (90) |
| Age (years) | |
| 20–25 | 1 (2.5) |
| 26–30 | 5 (12.5) |
| 31–35 | 6 (15) |
| 36–40 | 6 (15) |
| 41–45 | 8 (20) |
| 46–50 | 14 (35) |
| Education | |
| Primary | 7 (17.5) |
| Junior high | 8 (20) |
| Senior high | 16 (40) |
| University | 9 (22.5) |
| Occupation | |
| Freelance worker | 3 (7.5) |
| Agriculturist | 29 (72.5) |
| Government officer | 6 (15) |
| Public enterprise | 1 (2.5) |
| Own business | 1 (2.5) |
| Community role | |
| Healthcare volunteer | 24 (60) |
| Elderly caregiver | 5 (12.5) |
| Rescue (emergency services) | 1 (2.5) |
| General volunteer | 6 (15) |
| None | 4 (10) |
| Experience of medical emergencies | |
| Yes | 15 (37.5) |
| No | 25 (62.5) |
| Frequency of emergency assistance (N=15) | |
| 1–2 times | 12 (80) |
| 3–5 times | 3 (20) |

**Table 3:** Comparison of mean scores of geriatric life-threatening surveillance and emergency assistance knowledge before and during training at Week 1, Week 4, and Week 8 (N=26)

| Time | Scores (Mean±SD) | P value* | | | | P value** |
|---|---|---|---|---|---|---|
| | | Pre-test | Week 1 | Week 4 | Week 8 | |
| Pre-test | 17.69±2.07 | - | >0.99 | 0.21 | 0.17 | 0.068 |
| Week 1 | 18.27±2.77 | - | - | >0.99 | 0.65 | |
| Week 4 | 18.69±2.05 | - | - | - | >0.99 | |
| Week 8 | 18.81±2.35 | - | - | - | - | |

*Bonferroni for pairwise comparisons; **Repeated measure ANOVA for test of within-subjects effects

**Table 4:** Comparison of mean scores of geriatric life-threatening surveillance and emergency assistance self-confidence before and during training at Week 1, Week 4, and Week 8 (N=26)

| Time | Scores (Mean±SD) | P value* | | | | P value** |
|---|---|---|---|---|---|---|
| | | Pre-test | Week 1 | Week 4 | Week 8 | |
| Pre-test | 52.69±6.24 | - | >0.99 | 0.40 | 0.87 | 0.052 |
| Week 1 | 52.04±6.33 | - | - | 0.19 | 0.15 | |
| Week 4 | 54.62±5.64 | - | - | - | >0.99 | |
| Week 8 | 54.92±6.63 | - | - | - | - | |

*Bonferroni for pairwise comparisons; **Repeated measure ANOVA for test of within-subjects effects

**Table 5:** Comparison of mean scores of geriatric life-threatening surveillance and emergency assistance competency during the training at Week 1, Week 4, and Week 8 (N=26)

| Time | Scores (Mean±SD) | P value* | | | P value** |
|---|---|---|---|---|---|
| | | Week 1 | Week 4 | Week 8 | |
| Week 1 | 25.46±2.00 | - | 0.11 | 0.002 | <0.001 |
| Week 4 | 26.38±0.85 | - | - | 0.003 | |
| Week 8 | 27.88±1.79 | - | - | - | |

*Bonferroni for pairwise comparisons; **Repeated measure ANOVA for test of within-subjects effects

(P=0.40), pre-test and week 8 (P=0.87), week 1 and week 4 (P=0.19), week 1 and week 8 (P=0.15), and week 4 and week 8 (P>0.99) were not statistically significant (Table 4).

The mean score of competency in GLTSEA of the participants after attending the ESBTP was significantly higher (P<0.001) at Week 1 (25.46±2.00), Week 4 (26.38±0.85), and Week 8 (27.88±1.79). In addition, when comparing pairs using Bonferroni statistics, the difference in mean competency scores between Week 1 and Week 8 (P=0.002), and Week 4 and Week 8 (P=0.003) were statistically significant (Table 5).

## Discussion

In the current study, volunteers who attended the ESBTP demonstrated significantly higher GLTSEA competency, indicating the effectiveness of the program. Notably, they exhibited significant improvements in GLTSEA skills. This is particularly reassuring for community healthcare volunteers who may have been unsure about their ability to deal with specific health issues.[24] In addition, most of the participants had not assisted in emergency medical situations affecting the elderly, and this could be influential in their decision-making when faced with an emergency involving older patients and in the speed of delivering treatment and accessing emergency services.[6] A recent study indicated that continuous training delivered at least every 3–6 months was more effective for improving skills and self-confidence to enhance emergency competencies.[25] It has also been found that resuscitation skills decline 2–3 months after attending the training programs.[26, 27] It appears that continuity of community healthcare training is necessary, and finding a similarly appropriate strategy for promoting emergency competency remains a

challenge.[28]

The core concept of this study is an ESBTP with a training schedule which focused on developing emergency healthcare knowledge, self-confidence, and competency in the community context. This study demonstrates the impact that scenario simulation can have on learning outcomes, and this is similar to a recent study of the effects of simulation training in increasing CPR skills.[26, 29] However, there is a need to pay attention to strategy to enhance knowledge and self-confidence. Further, simulation training is an effective strategy for enhancing CPR skills, but competency needs to be further monitored in the longer term.[30] Incorporating simulation-based education in community initiatives can also enhance self-efficacy in managing out-of-hospital emergencies.[31]

The results of the study showed that competency in GLTSEA increased sequentially over time from before and during the ESBTP. In contrast, self-confidence was lower after the first session than before the training commenced. This decline in self-confidence may have occurred because the participants' first experience of the program included AED training, and this could affect their confidence to practice. The result also found that, after the second and third sessions, no statistically significant increase in participants' self-confidence was observed, and this is in line with a recent study that found that confidence in AED use did not change immediately after training but increased with continued practice.[32, 33] A different study showed that six months after CPR and AED skills training, at least two hours of retraining and reskilling was necessary to maintain competency.[34] Similarly, results have indicated that a high frequency of practice is required to improve CPR skills.[35, 36] Training for basic life support in the community must include the ability to use AEDs, and an emergency medical service for guiding AED use in real-time should be established.[37]

This study involved multiple group sessions conducted during the global COVID outbreak. The COVID-19 pandemic significantly affected daily lives and remained a barrier to organizing healthcare activities,[38] including resuscitation skills development in the community. With this limitation, virtual training has been found to enhance the participants' knowledge more than conventional approaches and can result in an increase in the number of participants involved.[39, 40] However, virtual delivery also limits the opportunity to conduct effective training in rural areas where technological access, connectivity, and skills remain a problem.[41] For this reason, in-person training was conducted through multiple sessions of scenario simulations with strict prevention control of the COVID-19 outbreaks.

This study conducted time-limited skills training in groups of approximately 10 members, and this may have affected the inclusiveness of each session. Therefore, future activities should involve smaller groups of four or five people to better stimulate learning and enable comprehensive practice for all involved. In addition, 14 participants did not complete an entire training course due to personal reasons and overlapping the community occasion. Therefore, further programs can be provided at suitable times considering each community context, such as occupational responsibilities and involvement in community events. However, realistic scenarios developed by integrating the cultural context of everyday life had the advantage of fostering volunteers' goal competencies in assisting older people in confronting emergencies in the community.

## Conclusion

The findings of this study showed that volunteers' competency increased after ESBTP, but there must be continuity in community training to develop the relevant knowledge, self-confidence, and skills for emergencies. Those who provide care to the elderly in rural communities play an important role in detecting early warning signs of ill health. This article also adds that making

emergency calls is the most challenging task among rural community residents. Therefore, further studies are suggested to pay attention to development of a communications skill and self-confidence for making emergency calls for improving emergency care access.

**Acknowledgment**

We sincerely thank the Vibhavadi Hospital staff who were dedicated to their efforts throughout this project. Our gratitude also goes to the participants; this study would have taken much longer without their cooperation. We greatly appreciate the support of Suratthani Rajabhat University, the Faculty of Public Health at Chiangmai University and the Research Center for Prevention and Care for People in Emergency and Trauma at Prince of Songkla University. This research project received grants from the National Research Council of Thailand.

**Authors' Contribution**

PP, TS, JS, and PS designed the study. PP and TS contributed the literature review. Data collection were conducted by PP, TS, JS, and NC. PP undertook the statistical analysis. PP drafted the manuscript and reference check. All authors critically reviewed and approved the final version of manuscript. All authors take responsibility for the integrity of the data and the accuracy of the data analysis. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

**Funding Source**

The grants of this research project were supported by the National Research Council of Thailand. (Grant number: 2563/004)

**Conflict of Interest:** None declared.

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