ORIGINAL ARTICLE

Effectiveness of a hybrid practice-based training program for community-based elderly caregivers in Chiang Rai during the COVID-19 pandemic

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ABSTRACT

The study aimed to evaluate the effectiveness of the program, which was a hybrid practice-based training program for community-based elderly caregivers in Chiang Rai during the COVID-19 pandemic. It was a mixed-methods design. Research instruments included caregiver knowledge and skill assessment and the hybrid practice-based caregiver training program adapted for the COVID-19 situation. Phase 1 involved program refinement based on feedback from 39 stakeholders. Phase 2 examined the influence of individual learning modules on caregiving skills. The sample consisted of 165 purposively selected caregivers from 16 districts. The sample size was determined using the Bentler and Chou ratio. Phase 3 evaluated program effectiveness in 60 caregivers using a two-group pretest–posttest design. The sample size was calculated based on a large effect size, $\alpha = 0.05$, and power = 0.80. Data analysis comprised qualitative synthesis from focus-group discussions, multiple regression analysis, t-test, Mann–Whitney U test and the Wilcoxon signed-rank test.

The results from the multiple regression analysis showed that all learning modules were significant predictors of scores of caregiving skills ($R^2 = 0.57$, $p < .001$). In the quasi-experimental phase, post-training scores of the experimental group on knowledge and skills were significantly greater than those of the control group with a large effect size (knowledge: $t = 14.13$, $p < .001$, $r = 0.85$; caregiving skills: $U = 0.00$, $p < .001$, $r = 0.87$). Therefore, the hybrid practice-based caregiver training program with mentorship could improve caregiving knowledge and skills. However, larger-scale studies with longer follow-up periods are needed before broader implementation.

Keywords:
Hybrid learning, Caregiver, Elderly care, COVID-19 pandemic

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INTRODUCTION

The elderly population in the world is rising at an unprecedented rate. It is predicted that the number of people aged 60 years and more will increase from 1.1 billion to 1.4 billion in 2030[1]. Thailand has already been the third-fastest-aging country in the world. It is expected to overtake Singapore and become the second-largest within the next eleven years.[2,3] This contributes to shortcomings in the preparedness of the public health, economic, and social service systems.

The COVID-19 pandemic had an impact on older adults all around the world. Thailand had very little time to prepare. In 2021, older adults comprised 11% of COVID-19 cases and nearly 70% of related deaths in Thailand.[4] Many also had to deal with economic and psychosocial challenges, including work interruption or income loss (36%), poor perceived health (40%), and psychological distress (25%).[5] Prolonged social distancing and limited health literacy further restricted daily activities and access to health information.[4,6] Consequently, caregivers played a crucial role in protecting older adults' health and maintaining their quality of life during the pandemic.[7]

The demand for long-term care in Thailand has grown sharply, yet the overall competency of caregivers remains a serious concern.[7-10] Previous studies indicate that many caregivers have limited educational backgrounds, and 25.8% of the caregivers who underwent training showed poor caregiving performance.[8,11] Government spending has been directed to old-age allowances and the acquisition of medical equipment, and little has been directed towards the development of the capacity of caregivers.[10] In 2020, the Asian Development Bank (ADB) noted that Thailand experiences a lack of qualified elderly-care volunteers, which is why formal training and certification systems are necessary to enhance the quality of care and expand professional opportunities.[9,12]

Thailand has many caregiver training programs, which are short term programs and advanced caregiver training programs, up to 420 hours. The majority of them are based on face-to-face training with different assessment standards.[8] During the COVID-19 pandemic, most of such programs were discontinued when caregivers desperately needed new knowledge and skills. Nevertheless, there is limited evidence regarding the effectiveness of online learning, hands-on practice, and long-term mentorship-based hybrid training programs. Specifically, it is not clear how the individual training modules lead to the development of caregiving skills. Moreover, Chiang Rai Province has a greater percentage of senior adults (23%), compared to the national average (20%).[13] Therefore, enhancing a qualified workforce is an urgent priority.

To address this gap, the researcher has developed a hybrid practice-based training program with four key features: 1) an integrated curriculum with the theoretical instruction (17 days), laboratory practice (13 days), and community-based fieldwork (20 days) 2) a context-specific and skill-based innovation, which comprises both technical and psychosocial training; 3) a collaborative and global skill development, which entails multilingual and digital literacy training; and 4) a mentorship system to support continuous learning and professional growth. This study aimed to examine the effects of individual training modules on caregiving skills. In addition, it evaluated the effectiveness of the program and provided practical recommendations for its future implementation.

METHODS

Study Design and Population

This program employed a multi-stage mixed-methodology to refine,

implement and evaluate a hybrid practice-based training program applied to the COVID-19 situation in Chiang Rai Province, Thailand. The Human Research Ethics Committee of the Chiang Rai Provincial Public Health Office, Thailand approved this study (Approval No. CRPPHO 91/2565, August 2, 2022). The study was carried out in the period of March 2022 to February 2023.

Phase 1: Program improvement and adaptation

The program was revised according to the structure of the 420-hour caregiver training program created by the Department of Health, Ministry of Public Health (2014)[14] and later adjusted to the setting of the Chiang Rai Province during the COVID-19 pandemic. A total of 39 purposively chosen stakeholders in 18 districts (18 elderly caregivers, 18 elderly care managers, and 3 academic experts) were used to gather feedback. The participants should have had at least five years of experience in elderly care and voluntarily agreed to participate. The scholarly professionals, including a nursing educator, a registered nurse, and a public health scholar offered suggestions for the further development of the program to make it contextually and professionally relevant.

Phase 2: Program effectiveness testing

The effectiveness of the revised program was tested on the basis of a one-group pretest-posttest quasi-experimental design. The target population consisted of 1,062 elderly caregivers currently practicing in Chiang Rai Province[15]. The stratified random sampling method was used on the basis of the distribution of the elderly population in 16 districts and a sample of 165 subjects was obtained. The inclusion criteria were: 1) active community caregiver, 2) at least one year of experience, 3) at least 1 hour of training history, 4) informed consent, 5) at least 70% attendance during the program, and 5) living in Chiang Rai Province. However, caregivers who could not participate were excluded because of illness or relocation during the period of the study.

Sample size was calculated using Bentler and Chou's ratio of sample size to estimated parameters, at a minimum of 10:1.[16] The minimum sample size was 70, based on seven parameters; but it was raised to 165 to provide adequate statistical power.

Research Instruments

Two major instruments were used: 1) structured questionnaires and 2) Intervention. The questionnaires were validated for content by three experts in geriatric nursing, community nursing, and educational psychology using the Item-Objective Congruence (IOC) index, and tested for reliability among 30 caregivers with similar characteristics following the procedure of Polit and Beck[17]. The details are as follows:

1. Structured questionnaires

The structured questionnaires consisted of 3 parts:

1) General information questionnaire: a questionnaire with 6 items based on sex, age, marital status, religion, education level, and occupation (IOC = 1.00).

2) Pre and post training knowledge test: a 75-item multiple choice test (1 point each) with three choices. A score of 75 was considered a total and a score of ≥80% (≥56 points) was considered a passing grade. The example items covered the issue of infection prevention during COVID-19 and geriatric care. The instrument was pilot tested among 30 similar caregivers. The instrument demonstrated good content validity (IOC = 0.92) and internal consistency reliability (KR-20 = 0.86).

3) Caregiving skills checklist: a 10-item checklist that evaluates major skills in caregiving. Each item was rated on a three-point scale (0 = unable to perform, 1 = able to perform with errors, 2 = able to perform correctly without errors). The total score was 20 and a pass was given for ≥70% (≥16 points). The checklist contained 10 essential skills in caregiving, including vital-sign measurement and safe mobility or fall-prevention activities. The instrument had good validity (IOC = 0.96) and reliability (Cronbach's alpha = 0.92).

2. Intervention

The intervention was a 420-hour Hybrid Practice-Based Training Program delivered over 50 days. It was created based on the Department of Health curriculum and adjusted to the specifics of Chiang Rai through participatory collaboration. In addition, it integrated online theoretical instruction with on-site skills practice and supervised fieldwork. The program was adapted to COVID-19 restrictions and designed to strengthen caregiving knowledge and skills.

Content and modules: The program incorporated both theoretical and practical education in 50 days (420 hours), divided into seven learning modules:

Module 1: Principles of Basic Elderly Care.

This module covers the basics of geriatric care, including the diseases that are most prevalent among older adults. The curriculum included 2 days of theory and 2 days of training with a total of 32 hours.

Module 2: Pandemic and Crisis Management of Elderly Care.

The module focuses on senior care in the case of a pandemic and crisis management, such as the response to COVID-19, with first aid, drug administration, and the care of the elderly with low self-care capacity. The module included 72 hours (5 days of theory and 4 days of practice).

Module 3: Complex Geriatric Conditions and Nutrition Management in the elderly.

This module emphasizes the management of complicated geriatric conditions, nutritional needs, specific meal preparation for diseases, dementia prevention, and fall prevention interventions. The plan has 56 hours (4 days of theory and 3 days of practice).

Module 4: Mental Health and Psychosocial Support of Older Adults.

This module deals with the mental health problems of older adults, coping with the stress of caregivers, effective communication, and end of life preparation. The module is comprised of 32 hours (two days' theory and two days' practice).

Module 5: Legal Rights, Local Wisdom and Recreation for Older Adults.

This module includes the rights of the elderly, labor laws, professional ethics and Lanna indigenous wisdom and recreational activities. The program included 24 hours (2 days' theory and 1 day practice).

Module 6: Cross-Cultural Communication and Digital Literacy in Caregiving.

This module improves the level of English and Japanese language skills, cross-cultural communication skills, and the use of digital technologies. The module is comprised of 24 hours (2 days' theory and 1 day practice).

Module 7: Supervised Practicum in Community and Service Settings

This training was implemented in community and service settings, and focuses on the development of care innovations. The practicum comprises 180 hours (20 days' practice, 9 hours per day). The instructors included professional nurses, public health and care managers, and language instructors who jointly supervised both the theoretical and practical components of the course.

Exposure intensity and delivery: The intervention program was an integrated curriculum that was administered during 50 training days involving theoretical teaching (17 days), laboratory practice (13days), and field practice (20days). The online sessions were held through Zoom and recorded. The on-site sessions were presented in subdistrict health-promoting hospitals and the community. The sessions generally started with some theoretical education in the morning and practical training in the afternoon, which was supervised. The reinforcement of skills application was performed through post-session assignments.

Engagement and feedback: Participants received ongoing feedback through a structured mentorship system. This included supervised practice, performance feedback, and guided reflection. Mentors provided feedback on skills performance and supported problem-solving for complex situations.

Behavior-change strategies: The program focused on improving the knowledge of the caregivers as a necessary tool that can be used to improve caregiving skills. This was enhanced by the practice, supervised practice, feedback, and reflections. All these strategies were aimed to promote the emergence of caregiving competence and caregiver self-efficacy.

Phase 3 : Program effectiveness evaluation

Statistical results on phase 2 showed that non-predictive elements (Module 2) were removed. The revised program was evaluated using a two-group quasi-experimental design. The participants were chosen purposely in two districts. However, it may introduce selection or institutional bias. To reduce baseline differences, participants in the experimental and control groups were matched using frequency matching. Therefore, sex, age, marital status, religion, and educational level were used as matching variables. Inclusion criteria were the same as for the previous phase.

The minimum of 56 participants was obtained by calculating the sample size with G*Power version 3.1. The primary outcomes were caregivers' knowledge score (0–75) and caregiving skill score (0–20). Sample size estimation assumed a large effect size (Cohen's d = 0.80), a two-tailed independent-samples t-test, a significance level (α) of 0.05, and statistical power (1 – β) of 0.80.[18] In the case of possible attrition, 10 percent was included leading to 60 participants (30 in each group).

Study Area

The study was conducted in the 18 districts of Chiang Rai Province. Phase 3 was performed in two districts with similar characteristics, whereas the rest of the 16 districts were the study area of Phase 2.

Statistical Analysis

Phase 1: Content analysis was used to analyze phase 1 qualitative data of focus group discussions to identify important themes to be used to refine the program.

Phase 2: Descriptive statistics were used to summarize the characteristics of the participants in Phase 2. Multiple regression analysis (Enter method) was conducted to examine the effects of learning modules on caregiving skills with a significance level of $p < 0.05$.

Phase 3 : The normality was assessed using the Shapiro–Wilk test. T-test, Mann–Whitney U test and the Wilcoxon signed-rank test were used to determine the differences in knowledge and skill scores between and within groups. The significance level was set at $p < 0.05$.

RESULTS

The findings are given in three consecutive steps as follows:

Phase 1: Program improvement and adaptation

The revision stage resulted in an improved caregiver training program that was specific to Chiang Rai Province. The improvements concerned the curriculum content and delivery model.

Regarding the program content, some other health-related issues were added for the older adults in Chiang Rai, such as fall prevention, dementia, insulin injection in diabetic patients, elderly care in the case of an outbreak of infectious diseases, mental health issues, positive communication with older adults, end-of-life preparation, and assessment skills. Specific assessment instruments were added which included ADL, TAI, MMSE, MOCA, ST5, 2Q, 9Q, and 8Q. Japanese and English language training and innovation development for the care of the elderly were also introduced.

In terms of the delivery model, the program was divided into seven learning modules. Theoretical classes were conducted online through Zoom, and the video recordings could be reviewed. Hands-on sessions were held in subdistrict health-promoting hospitals under the guidance of experienced mentors. The training days were divided into morning theory sessions, followed by afternoon skills practice and community-based field practice. Post-session assignments were given to the participants to ensure that they applied their newly acquired skills. The trainers had to possess a degree in a related area or have at least three years of direct experience in the field of the care of the elderly. The training contents were divided into module-based booklets to make it easy to understand and apply.

Phase 2: Effectiveness of testing the Program.

The second phase examined the influence of each learning module on caregiving skills among the 165 participants. Most of them were female (92.2%), aged 40-59 years (61.8%), married (65.5%), and Buddhist (99.4%). The majority of the participants had a high school or vocational diploma (50.9%), and they were general laborers (27.9%).

The multiple regression analysis (Enter method) showed that most of the learning modules had a significant positive influence on the scores of caregiving skills except Module 2, which did not show any predictive relationship ($p = 0.779$). The regression model explained 57 percent of the variance in the scores of the skills ($R^2 = 0.57$, $p < .001$). The assumptions of multiple regression analyses were all verified and met, including normality of residuals, error independence (Durbin-Watson = 1.52), no multicollinearity (VIF range = 1.24 - 2.06), and homoscedasticity (Table 1).

The regression equation was the following:

Skill Score = 3.085 + 0.211(M1) – 0.021(M2) + 0.219(M3) + 0.570(M4) + 0.299(M5) + 0.424(M6)

Table 1. Multiple regression analysis predicting caregiving of the elderly skill scores

Variable	b	SE_b	β	t	p-value
Module 1	.211	.088	.140	2.397	.018
Module 2	-.021	.075	-.016	-.282	.779
Module 3	.219	.087	.157	2.514	.013
Module 4	.570	.126	.325	4.541	<.001
Module 5	.299	.139	.161	2.146	.033
Module 6	.424	.136	.228	3.123	.002

Constant 3.085; SE test=±1.62
R=.755; R^2=.570; F=34.969; p-value=.000

In addition to the qualitative analysis, some participants reported that the program should be refined. Caregivers who had previously completed basic training in crisis management were given an option to skip Module 2 (Pandemic and Crisis Management of Elderly Care). Participants also indicated that basic skills, including vital sign measurement were taught before the content on advanced disease management. In addition, mentors were also encouraged to seek more advice on complex matters. Some of the field activities were substituted with supervised practice on the ground because of the COVID-19 restrictions.

Phase 3 : Program effectiveness evaluation.

The demographic characteristics were similar in the experimental and control groups. No significant differences were found in groups on sex, age, marital status, religion, or education ($p > 0.05$). Each group consisted of 30 participants and the majority of whom were female (96.67%), married (76.67%), Buddhist (96.67%), and had completed secondary education (63.33%) (Table 2).

Table 2. Baseline demographic characteristics of participants. (n = 60)

Characteristics	Control group (n = 30)	Experimental group (n = 30)	p-value
Sex, n (%)			
Female	29 (96.67%)	29 (96.67%)	1.000
Male	1(3.33%)	1(3.33%)	
Age (years), mean ± SD	56.00±1.41	51.91±9.67	0.989
Marital status, n (%)			
Married	23(76.67%)	23(76.67%)	1.000
Not married (Single/ Widowed / Divorced	7(23.33%)	7(23.33%)	
Religion, n (%)			
Buddhist	29 (96.67%)	29 (96.67%)	1.000
Christian	1(3.33%)	1(3.33%)	
Education, n (%)			
Primary education	11(36.67%)	11(36.67%)	1.000
Secondary education	19(63.33%)	19(63.33%)	

Note: Continuous variables (age) were analyzed using an independent samples t-test. Categorical variables were analyzed using the Chi-square test (marital status and education) or Fisher's exact test (sex and religion).

Although the overall data distribution was approximately normal, several variables did not follow a normal distribution. Therefore, the t-test, Mann–Whitney U test, and the Wilcoxon signed-rank test were applied. Table 3 presents the comparison of caregivers' knowledge and caregiving skill scores between and within groups.

In the experimental group, caregivers' knowledge scores significantly increased after the intervention, with the mean score rising from 49.57 ± 4.69 to 67.43 ± 3.95 ($t = -17.12$, $p < .001$). In contrast, the control group showed no significant change in knowledge scores between pre-test and post-test (51.40 ± 4.80,51.10 ± 4.95; $t = 1.12$, $p = 0.271$). In addition, post-test between-group comparison showed that the knowledge and skill scores of the experimental and control groups were found to differ significantly ($t = 14.13$, $p < .001$) with a large effect size ($d = 3.13$).

Similarly, caregiving skill scores in the experimental group have improved considerably after the intervention with a median of 12.0 (IQR 11.00–13.00) at pre-test and 18.0 (IQR 17.00–19.00) at post-test ($Z = -4.80$, $p < .001$). In the control group, no significant pre- and post-differences were recorded (median 12.0 (IQR 10.75–12.25) and 11.0 (IQR 10.75–13.00); $Z = -1.24$, $p = 0.216$). In addition, post-test between-group analysis revealed that caregiving skill scores in the experimental group were significantly higher than those in the control group ($U = 0.00$, $Z = -6.70$, $p < .001$), with a large effect size ($r = 0.87$) (Table 3).

Table 3. Comparison of caregivers' knowledge and caregiving skill scores between and within groups (n = 60)

Outcome	Pre-test mean ± SD or median (IQR).	Post-test mean ± SD or median (IQR).	Within-group	p-value	Between-group (Post-test)	p-value	Effect size
Knowledge scores (0-75)							
Experimental group	49.57 ± 4.69	67.43 ± 3.95	t = −17.12	<.001	t = 14.13	<.001	d = 3.13
Control group	51.40 ± 4.80	51.10 ± 4.95	t = 1.12	0.271	-	-	d = 0.20
Caregiving skill score (0-20)							
Experimental group	12.0 (11.00–13.00)	18.0 (17.00–19.00)	Z = −4.80	<.001	U = 0.00	<.001	r = 0.87
Control group	12.0 (10.75–12.25)	11.0 (10.75–13.00)	Z = −1.24	0.216	-	-	r = 0.23

Note. Within- and between-group comparisons were conducted using parametric or non-parametric tests as appropriate. Effect sizes are reported as Cohen's *d* or *r*.

DISCUSSION

This study demonstrated that the learning modules were significant predictors of caregiving skills at a high level. The intervention was successful in enhancing the knowledge and skills of caregivers, with great effect sizes observed. These results suggest that the hybrid model of online and onsite training with practice-based learning was effective in improving the knowledge and skills of caregivers. Confidence was enhanced through the mentorship system, and practical skills were strengthened. The context-specific modules, including fall prevention and dementia management, assisted the caregivers in responding to community health issues in the most appropriate way.

The results are consistent with previous research indicating that training and practical experience are strongly related to the knowledge and skills of caregivers.[19,20] Practice experience and active learning have been shown to improve palliative care competence among healthcare workers,[21] and mentorship enhances confidence and the accuracy of the procedures.[2] [2] Practice increases understanding, proficiency and retention of skills, resulting in improved quality of care, quality of life maintenance and improved cognitive and functional outcomes in older adults.[21, 23, 24]

Online learning became an essential option during the pandemic that minimized the resources required and ensured the acquisition of knowledge and confidence.[25, 2 6] The hybrid format, which combines online and onsite learning has been demonstrated to enhance both technical and interpersonal interaction between learners and instructors, and participants tend to prefer hybrid to face-to-face approaches.[2 7] Practical sessions were also enhanced by mentor guidance that enhanced performance and confidence.[18] Small groups of caregivers received training under the supervision of registered nurse mentors, and the learner to mentor ratio was

8-12:1. The skill accuracy and the reproducibility of the training model were guaranteed by real-time feedback and short-term daily reflection. However, online training alone cannot train psychomotor skills fully in comparison with actual hands-on practice,[27, 28] which is why a Hybrid Practice-Based Learning approach that combines theory, practice, and mentorship is essential.

In addition, it is important to create context-specific training. The curriculum includes topics on complicated geriatric disorders, nutrition and dementia, and fall prevention. Falls are particularly common among older adults in Chiang Rai (85%),[29, 30] and are consistent with the findings of previous studies showing that caregivers lack knowledge about fall prevention and home-based care.[31] Consequently, the inclusion of locally specific content and the focus on community-based primary healthcare management are necessary elements of any future program improvement.

Although Module 2 (Pandemic and Crisis Management of Elderly Care) did not significantly predict caregiving skill scores, the analysis conducted on the module level offers important knowledge into the differentiation of the curriculum. The likely explanation is that most participants already had basic caregiving experience. Further changes include the introduction of more complex simulation-based exercises rather than simple reviews. In addition, the level of experience of the participants should be more varied in future research to enable a more comprehensive assessment.

STRENGTHS AND LIMITATIONS OF THE STUDY

The hybrid online-onsite curriculum offered a holistic theoretical, classroom-based and field-based training with the help of a well-organized mentorship system. This improved the potential of the learners to put their skills into practice. The program was focused on local contextual requirements and equipped caregivers with skills that are applicable to international care settings. Moreover, it incorporated a multidisciplinary teaching team that addressed the physical, psychological, and social dimensions of elderly care.

Nevertheless, there are some limitations, such as the use of purposive sampling and a lack of long-term follow-up, which could limit the generalizability of the findings. The allocation based on districts could have created selection and institutional bias as a result of not measuring the contextual differences. Even though there was a match and similarity of baseline characteristics, residual confounding was not eliminated.

CONCLUSION

This study presents initial results suggesting that a hybrid training program enhanced the knowledge and caregiving skills of caregivers. The research was performed in the form of a small-scale quasi-experimental trial. Accordingly, these findings should be interpreted cautiously. Further research studies using randomized controlled trial (RCT) designs with larger samples and extended follow-up periods are recommended to establish effectiveness and long-lasting sustainability.

AUTHORS' CONTRIBUTIONS

AE: Conceptualization, Methodology, Investigation, Formal analysis, Visualization, Writing – original draft, Writing – review & editing, and Funding acquisition. WR: Conceptualization, Methodology, Supervision and Funding acquisition. RP: Investigation. PT:

Investigation. NS: Investigation, Writing – review & editing, and Supervision.

ETHICAL CONSIDERATION

This study was approved by the Human Research Ethics Committee of Chiang Rai Provincial Public Health Office (Approval No. CRPPHO 91/2565, August 2, 2022), chaired by Dr. Watcharapong Kumla.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

USE OF ARTIFICIAL INTELLIGENCE

AI applications were only for making figures, refining references, and assisting with grammar checking. The authors reviewed and edited the content thoroughly. However, we take full responsibility for the accuracy and integrity of the final version of the manuscript.

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