Community-based flood disaster management for older adults in southern of Thailand: A qualitative study

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ABSTRACT

Objective: This study explored the approaches for community-based flood disaster management for older adults in Southern Thailand. It sought to understand community culture for supporting older adults and promoting community strength in case of flood disaster.

Method: This was a qualitative content analysis study using data from observation, in-depth interviews, secondary data, and focus group discussion. One hundred and twenty-seven people in total were selected specifically for the study, including Local Administration Organization (LAO), community leaders, public sector officers, civil groups, and older adult groups and family caregivers.

Results: The results of this study were two main themes, focusing on 1) approaches to community-based flood disaster management for older adults as follows: eight approaches in the phase of prevention and preparedness in flood disaster management for older adults, eight approaches in the phase of response in flood disaster management for older adults, and six approaches in the phase of recovery and rehabilitation in flood disaster management for older adults; and 2) factors contributing to success in flood disaster management for older adults has four factors, including the human factor, the work factor, the data factor, and the resource factor.

Conclusion: The findings showed significant roles in improving the potential and strength in community-based flood disaster management for older adults and providing suggestions for community nurses and health practice personnel involving in flood disaster management to mitigate the potential influence on older adults in the community.

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What is known?

- There were community-based flood disaster management approaches for all populations in the community.
- There were many aspects of flood disaster management for older adults in the community, but they managed on their own mandate.
- There were few disaster community networks which linked four key actors in the community to disaster management for older adults.

What is new?

- The community-based flood disaster management approach for older adults in the community
- This community-based flood disaster management for older adults linked the other four key actors in the community, including Local Administration Organization (LAO), community leaders, public sector officers, and civil groups, to flood disaster management for older adults.
- The disaster management networks enhanced social capitals in terms of sharing information and learning experiences of flood disaster management for older adults, including 1) eight approaches in the phase of prevention and preparedness in flood disaster management for older adults, 2) eight approaches in the phase of response in flood disaster management for older adults, and 3) six approaches in the phase of recovery and rehabilitation in flood disaster management for older adults.

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1. Introduction

In 2018, about 315 reported disasters had affected more than 68.5 million people, approximately 11.804% of the total population, with an economic loss of US $ 132 billion globally. In Asia, 17.1 million people were affected by storms; and 88% of populations were affected globally [1]. In Thailand, due to its geographical location, the country is highly exposed to hydrometeorological hazards. Disaster statistics recorded the following categories: floods (1989–2011), tsunami (2004), mudslides (1988–2012), storms (1988–2009), fire (1989–2009), drought (1989–2009), and wildfires (1989–2009) which have occurred in a total of 40,000 up to 60,307 times. The most devastating disaster was the “great flood” in 2011, which affected 64 out of 77 provinces, including the capital Bangkok. About 5.2 million households, a total of 16 million people, were affected [2]. When the great flood occurred, most civilians were not well prepared. They had not been trained to manage such incidents, particularly among older adults. Although these groups were at high risk for being most severely impacted by the disaster, they were often ignored [3].

Thailand has become an aging society since 2005. The older adult population rose from 11.6 million to 17.6% of the entire population in 2022. It is expected that Thailand will have a fully aged society, in which 20% of the population will be older adults [4]. Within an aging group, 20.5% are bedridden from 55.14% of the entire disabled population [5]. Despite Thailand's revision of the National Plan for the older adults in 2009 to make sure it aligned with changing social and environmental conditions and its current deployment of the second National Plan for the older adults (2002–2021) to provide a framework for relevant sectors in managing elderly-related work, there have been no concrete measures for protecting older adults who are vulnerable to and at risk of being affected by natural disasters. Thai older adults often firmly believe that their home is the safest place. Consequently, 60.9% of the older adults refuse to evacuate and continue to live in affected areas, leading to potential risks of injury and death from flooding [6]. It is important to bear in mind that older adults suffer from reductions in physical competency, poorer sensory perception, chronic illness, and other social and economic limits. These factors contribute to the limited nature of their disaster management preparation, leading to risks and delays in their recuperation [7]. During the disaster phase, we had found that older adults were often ignored and discriminated against and received little help. Those who suffered from chronic illness did not receive proper treatment support, and they were allocated inappropriate shelters [8]. In the post-disaster phase, many older adults suffered from stress disorder due to traumatic incidents [9,10], higher rates of dementia, and lower levels of well-being [11–13].

Based on previous flood responses, it was evident that government sectors were unable to handle the situation on their own [14]. Thailand’s current approach to disaster management emphasizes on a community-based approach, which encourages community members to help manage disasters [15]. Such an approach is based on the concept of community healthcare, deploying the community and the concept of self-strengthening community. Nevertheless, older adults are a risk group who has limited capacity for managing flood disasters. The community-based flood disaster management approach stresses self-management within the community and the concept of self-strengthening community. Although the government has assigned tasks to relevant authorities, the process still lacks integration with local operations, leading to the separation of working processes. As a nurse in charge of promoting well-being for civilians, particularly for older adults during normal and disastrous incidents, in this context, the present study aimed to assess procedures and activities to understand community culture for supporting older adults and promoting community strength in case of flood disaster and to inform policymakers and local governments and communities on how to approach older adults in terms of flood disaster management that would help reduce the risk and the severity of such disastrous incidents in the future. These findings would provide evidence for designing and developing strategies on the potential use of community participatory approach in flood disaster management for older adults.

2. Methods

2.1. Study design

The qualitative research for this study employed the following data collection methodologies: observation, in-depth interviews, secondary data, and focus group discussion. The objective of this research was to study the community-based flood disaster management approaches used for older adults in Southern Thailand in order to better understand the past operations in relation to the culture, knowledge which derived from the social and cultural contexts of the community in Southern Thailand.

2.2. Setting

This research focused on one specific sub-district in the southern of Thailand. This sub-district was a model area for community-based flood disaster management for older adults and a pilot area for national disaster management. This area is a suburban area (i.e., semi-rural and semi-urban), which consists of 476 social capitals and potentials. The entire area expands across 26.6 square kilometers and is divided into 10 villages. There were a total of 2,120 households, of which 48.4% of households had older adult members. This means that 21.33% of the total 6,621 populations were older adults. This area was affected by repeated floods annually due to its location near the equator and the peninsula. With the Bantad Mountains and Nakhon Sri Thammarat Mountains located at its center, the area was affected by southwestern and northeastern monsoons. The areas for managing flood disasters include 165 trained disaster volunteers, 184 volunteers from public health, 100 staff from the village guard team, and 190 volunteers from the civil defense department.

2.3. Research instrument and reliability verification

The main open-ended questions directed at key informants and activities respondents regarding community-based flood disaster management for older adults were as follows: 1) How was the situation for older adults in your community? 2) What operations and activities had you organized in order to mitigate impacts from
flood disasters for older adults? 3) What were the results of flood disaster management for older adults? 4) Who gained benefits from your operation? 5) What was your opinion on improving operations and activities for flood disaster management for older adults? How should the community proceed? 6) What were the key success factors in flood disaster management for older adults? Later, more questions were added in order to gain insight relevant to the objective of this study. The researcher verified and analyzed the obtained information with her supervisor in order to reduce any potential bias. Moreover, the researcher checked the information using triangulation and verifying it with the respondents. The researcher also consulted subject experts to confirm her research results.

2.4. Participants

The researcher approached key respondents through gatekeepers by employing a purposive sampling method. There were total of 127 key respondents, categorized into five groups: 1) LAO which included nine individuals, of which one is Chief Executive of the LAO, one Deputy Chief Administrator of the LAO, three associated staff, and two members of the LAO; 2) Community leaders which included 46 individuals, of which two were volunteers from the disaster management team, four board members of the disaster management center, 14 presidents of savings/funding/financial institution groups, 11 community volunteers, 10 occupational group leaders, and one community developer; 3) Public sector officers which included three individuals, of which one is director of the sub-district health promotion hospital, one professional nurse and one public health academic; 4) Civil groups which included 46 individuals, of which two were volunteers from the disaster management team, four board members of the disaster management center, 14 presidents of savings/funding/financial institution groups, 11 community volunteers, 10 occupational group leaders, and one community developer; and 5) Older adult groups and their family caregivers which included 59 distinctive individuals, of which seven were social bound individuals, 12 home bound individuals, 15 bed bound individuals, 13 disabled individuals and 12 individuals with chronic illness.

2.5. Ethical considerations

This study was approved by the Khon Kaen University Ethics Committee Human Research, Thailand. The approval number was HE622074 on 15 May 2019. The researcher asked for permission from the LAO. The researcher informed key informants regarding to the object and detailed information before performing the study, and in the case of the older adult who had some health problems or was bedridden, the informed consent form would be obtained from the family caregiver. Key informants gave informed consent before taking part in the study. The researcher concerned about their privacy and respected their decision. The rights of the informants were protected. Results of this study and the moral principles were also considered as follows: 1) Respect for a person, and 2) Beneficence or non-maleficence and justice.

2.6. Data collection and data analysis

The data collection took place from June 2019 to July 2020. The researcher collected data from all the informants. Interviews lasted for about 45–60 min for each key informant with a total of 101 key informants including five groups: 1) LAO, 2) community leaders, 3) public sector officers, 4) civil groups, and 5) older adult groups and family caregiver. Notes were taken during the interviews, observation of informants, procedures, and activities which related to community-based flood disaster management for older adults at their workplaces and houses. About 5–8 key informants participated in a 2-h long focus group discussion with a total of six focus group discussions. Interviews and focus group discussions were scripted and tape-recorded using an audio recorder after obtaining consent.

Text data were analyzed using field note analysis and content analysis. The transcripts were read, and responses were listed by themes. Codes samples of the transcripts were identified the similarities and differences. Between data were identified to reflect on procedure and activities, the process of flood disaster management for older adults and key actors or social groups, community organizations, and related organizations. We conducted the analysis along with the collection and reviewed all the data with the informants afterward for triangulation purpose [19,20]. In order to determine the trustworthiness of the study, Lincoln and Guba’s criteria, including credibility, dependability, transferability, and conformability, were considered [21].

3. Results

The result can be categorized into two themes: 1) community-based flood disaster management approaches for older adults; and 2) factors that contribute to successful disaster management for older adults. The former comprised of three phases, which were pre-disaster, during disaster, and post-disaster.

3.1. Community-based flood disaster management approaches for older adults

3.1.1. Prevention and preparedness in flood disaster management for older adults

The pre-disaster prevention and preparedness in flood disaster management for older adults comprised eight approaches.

(1) Data system development and data deployment in disaster management for older adults. Examples included general data in terms of society, health conditions (social bound group, home bound group, and bed bound group), economics, environment, politics and governance, disaster, and integrated data (using manual plans to list out older adult households and symbols for help priority). The community members co-created such data and deployed it to design plans for various cases of older adult care and disaster management for older adults, which covered all three phases of pre-disaster, during disaster, and post-disaster.

(2) Potential development in preparation for disaster, which consisted of 1) training older adults and their caregiver (i.e., by following the disaster warning news, preparing medication, food, evacuation points and routes); 2) training workshops for volunteers in disaster management, making sure that they have the knowledge and skills in disaster management for older adults (i.e., understanding principles of disaster management, communication system, tool and device application for evacuation); 3) increase the number of caregivers for older adults in response to their issues and demands; 4) establish a support guideline for older children in flood disaster; and 5) encourage older adults to socialize and do activities together (i.e., older adult clubs, occupation groups, and exercise groups).

(3) Disaster management plan rehearsal at least once a year. This approach included 1) team meetings for preparing and plan reviewing; 2) providing and checking the functionality of tools and devices; 3) coordinating with associated sectors regarding plan rehearsal; 4) a table exercise meeting; 5) full-
scale plan rehearsal in a virtual situation during daytime and night-time; and 6) rehearsal evaluation and appropriate plan adjustment.

(4) **Public communication regarding disaster warning for older adults and their families.** Using the motto, “fast notification, various platforms, reach all older adult individuals,” the approach features 1) the disaster management center and the LAO communicating via their Facebook pages and line groups to the sub-district development board, leader groups, and disaster management volunteers; 2) sub-district headmen and village leaders communicating to villagers in village meetings, via a village’s broadcasting center, car announcements, telephone, and line groups; 3) volunteers from the village health group and disaster management group communicating directly to older adults in their responsible zone by paying them a visit at home; and 4) religious leaders such as imams and monks warning older adults regarding disasters after their religious activities at the temple or their prayer times at the mosque.

(5) **Providing tools, devices, and medical supplies for older adults,** which features 1) the sub-district disaster management center and local government organization supplying and repairing tools and making plans for buying tools (i.e., motorboats, life jackets, ropes, and radio communication); 2) the sub-district health promotion hospital providing medical supplies including medication, colored flags to classify disaster victims, wheelchairs and stretchers, and coordinating with community hospitals to prepare sufficient medication supply.

(6) **Improving older adults’ residences,** which included 1) surveying older adults’ living residences; 2) establishing a project to apply for support funds from the communal organization institutions for older adult residence repair; 3) fundraising or donation collection for essentials and tools from community organization groups; 4) gathering resources for improving, repairing, and building houses for older adults; 5) adjusting the environment and making sure that it is conducive for older adults such as building ramps, handrails, and bathrooms; 6) improving houses, e.g., by villagers leaders and volunteer mechanics elevating the house ground level and moving the electric meter higher.

(7) **Providing support welfare for older adults,** which included 1) encouraging older adults to become members of community organization groups such as a savings group, a village fund group, and a village bank in order for them to receive welfare in the form of money, goods, and essentials in case of illness, emergency, and disaster; 2) establish a sub-district disaster fund by raising funds from community organization groups to buy tools for disaster management and providing welfare for older adults. Both Thai Muslims and Buddhists believe that donation (Zakat), compassion and kindness from helping others will bring merit and virtue upon their lives. Examples of such funding groups included a firewood funding group, a rice funding group, an abandoned rice field funding group (a social capital where members do rice farming to produce at least 15-days of rice supplies for the entire sub-district population in case of disaster), drinking water funding groups to provide free drinking water during disaster, and occupational groups for older adults; and 3) government welfare such as registering older adults and disabled people for pensions and social welfare cards.

(8) **Occupation promotion for older adults,** which included 1) gathering and analyzing economic data of older adults; 2) utilizing the data in planning for occupational promotion for older adults; 3) encouraging older adults to take part-time jobs to increase their household income through projects (i.e., beekeeping, Baegu planting, making crispy bananas, laying hens farming, and making desserts); 4) promoting household vegetable farming and animal farming for household consumption to reduce household expense and increase income; 5) coordinating with associated sectors (i.e., those that provide occupational training, product processing, and asking for support in vegetable seeds and fish); and 6) increase selling platforms for products produced by older adults (i.e., wholesale, district annual selling event, national exhibitions, and online platforms). Some of the interesting relevant quotes in this regard are as follows:

“…” We placed importance on the data, establishing participation in data collection. We analyzed the gained data in order to draw up a work plan, manual maps and to determine risk areas. Then, we located older adult houses, evacuation routes and shelter centers. We rehearsed the plan once to twice a year for the whole sub-district and contacted community hospitals for emergency ambulance to manage the emergency help plan for older adults…” (Board of sub-district disaster management center, 60 years old)

“…” The sub-district disaster management center was a training center that improved competency in disaster management within one’s sub-district and, together with the sub-district health promotion hospital, the center trained disaster volunteers in older adult support skills…” (Professional nurse, 34 years old)

“The board of sub-district disaster management center checked, repaired, and bought various tools such as boat engines, ropes, life jackets, oars, boats, and radio communication systems (walkie-talkies). The sub-district health promotion hospital offered sufficient medication supply and medicines. For the emergency warning for older adults, the village leaders announced it in the village meeting and via the broadcasting center every morning. For houses that were located far away, the disaster team volunteers would visit those older adults…” (Coordinator of disaster management network, 59 years old)

“…” The village headman had us survey older adults’ household and we found that a large number of older adults’ houses were in a dilapidated state. So, we wrote a project and applied to The Sufficiency House. Our sub-district received 16 houses from The Sub-District Sufficiency House Project and received donated building materials such as tiles, roofs, and wooden boards. Then, we gathered a volunteer workforce, community leaders to build houses…” (Board of Sufficiency House operation team)

“…” We encouraged older adults to become members of community organizations, so that they would have some savings and social welfare services…” (Village headman, 54 years old).

3.1.2. Response in flood disaster management for older adults

The response during disaster in disaster management for older adults includes eight approaches.

(1) **Emergency public warning communication for older adults,** which included 1) the board of the sub-district management center monitoring the water level and informing the sub-district disaster management center and relevant sectors; 2) the sub-district disaster management center acting as emergency warning center and informing
each village leader and disaster management volunteer team via the red walkie-talkie; 3) village leaders working alongside disaster management volunteers and village health volunteers to make announcements via the village broadcasting tower; and 4) in case of power outage, disaster management volunteers in each village going to inform older adults in each household.

(2) Providing shelters for older adults, which included 1) setting up shelter in each village (i.e., the central pavilion, schools, temples, mosques, the village headman office, and well-being development centers for older adults and disabled people); 2) assigning tasks for individuals who are responsible for keeping each shelter ready, making sure that the environment is conducive for older adults, containing utilities (i.e., beds, toilets, safe and clean water, food for those with medical problems, ramps, handrails, public utility systems and first aid points); 4) setting up 24-h emergency patient transfer by rescue teams 1669; 5) creating a database of those who settle in each shelter and analyzing the problems and demands of those affected by flooding in each shelter point; 6) providing shelter and food for different animal breeds such as grass, hay, and paddies; 7) setting up 24-h surveillance guard to safeguard lives and assets within the shelter center.

(3) Establishing a front command center for disaster management, which included 1) setting up a sub-district front command center and having the board of sub-district disaster management center follows up the situations, problems, and demands of older adults and their families; 2) assigning tasks to disaster management volunteers to help older adults (i.e., surveying affected areas, evacuating older adults, moving and carrying belongings, evacuating pet animals, providing provisions and shelter, surveying water routes, and facilitating travel routes); 3) coordinating with hospitals in case of patient transfer; 4) coordinating and informing relevant sectors of the situation and asking for their help for older adults.

(4) Evacuating and transferring older adults support, which included 1) emergency warning for evacuation; 2) village leaders and disaster management volunteers coordinating with older adults regarding evacuation; 3) proceeding according to plan to evacuate older adults from their homes to shelter or to their relatives’ homes; 4) sponsoring evacuation tools and devices such as lifted cars, flat-bottomed boats, life jackets and ropes; 5) the sub-district disaster management center sponsoring a rapid force volunteer team specialized in handling severely affected areas which are beyond the village level of competency; 6) coordinating with the sub-district health promotion hospitals for first aid, screening older adult patients and transferring them to the hospital in case of emergency, casualty, and illness.

(5) Monitoring the safety and assets of older adults, which included 1) setting a 24-h surveillance guard in the village in at-risk areas and visiting affected older adults at home; 2) monitoring shelter for settlers and animals.

(6) Setting up a community kitchen that provides food for older adults, which included 1) volunteers from housewives’ groups (Thai Buddhists and Thai Muslims) preparing food and drinks; 2) disaster management volunteer teams distributing provisions to older adults in their homes and shelter; 3) providing survival bags (i.e., rice, dried food, water, and milk).

(7) Providing physical and mental healthcare for older adults, which included 1) prioritizing disaster victims; 2) assessing their health conditions; 3) controlling infection and preventing communicable diseases; 4) first aid and preliminary treatment; 5) distributing medications and essential instruments (i.e., wound dressing kits, peritoneum dialysis solutions, blood sugar level testers, pain killers and fever relief medication, and athlete); 6) providing 24-h health consultation via various platforms (i.e., shelter, line groups, telephone, and Facebook); 7) screening for stress, depression and anxiety, then following up by providing consultation, and passing on the information; 8) home visiting; 9) transferring older adults to hospital in case of emergency and injury; 10) facilitating travel routes for older adults (i.e., sponsoring lifted cars, flat-bottomed boats, motorboats, life jackets, and having disaster management volunteers stationed in the areas where roads are disrupted to facilitate older adults).

(8) Helping and supporting affected older adults, which included 1) reviewing information regarding affected older adults; 2) coordinating with relevant sectors regarding social welfare and support such as the LAO, the Red Cross, and the Social Development and Human Stability Organization; 3) gathering workforce from community organizations, leaders, volunteers, and disaster management volunteers to repair houses and public utilities and 4) fundraising to provide social welfare for older adults (i.e., providing essentials, clothes, textiles, and survival kits). Some of the interesting relevant quotes in this regard are as follows:

“... Our sub-district installed a telemeter at the headwater. If the water level was high, the sub-district disaster management center would announce the situation and emergency. Then, the village leader would announce a state of emergency and the disaster management volunteers would inform older adults at their homes immediately. They would also estimate the support and help required for individual older adults and send the team to assist them ...” (Village leader, 52 years old)

“... Our sub-district set up a shelter in every village. There were sleeping areas and toilets that were suitable for older adults, utility systems and sufficient amount of water and electricity ...” (President of the LAO, 51 years old)

“We [the sub-district health promotion hospital] also visited the shelter and helped establish a public health system, making sure that there were service points in case of sickness, a screening service, blood pressure measuring, wound dressing. In case of emergency illness, we coordinated with the hospital to make an immediate patient transfer there. There were staff on 24-h shifts, ready to contact the 1669 rescue team ...” (Director of sub-district health promotion hospital, 57 years old)

“... The sub-district disaster management center would be elevated as the front command center, which was responsible for working with the government, monitoring problems and demands of older adults, sending the rapid rescue force team when the situation was beyond the village’s competency. For older adults with medical problems, if they had an appointment to collect medicine at the hospital, we would prepare lifted cars and motorboats to facilitate their traveling ...” (Coordinator of disaster management network, 59 years old)

“... During the flooding, we set up 24-h guard shifts, guards patrol the streets and homes of older adults. And we also had day and
night guard shifts in the animal shelter area. Nothing would get lost for sure ...” (Village leader, 52 years old)

“... The village headman sets up a community kitchen where a group of Thai Buddhist and Thai Muslim housewives helped prepare food. We had a system for managing survival bags and donations. The disaster management volunteers would bring them to older adults based on our database, so all older adults could receive them equally ...” (Islamic teacher, 59 years)

3.1.3. Recovery and rehabilitation in flood disaster management for older adults

The post-disaster recovery and rehabilitation in disaster management for older adults consisted of six approaches.

(1) **Gathering data of affected older adults households**, which included 1) surveying affected older adult households for damage to assets (i.e., houses, agricultural crops and other items); 2) the board of the disaster management center creating support plans for older adults (i.e., house repairs, public benefits, occupational tools, occupation restoration, and providing communal welfare); and 3) coordinating with and informing relevant sectors regarding the information (i.e., the LAO, the Provincial Social Development and Human Stability Office, Friends of Pa Charity, and the Red Cross).

(2) **Repairing the houses of affected older adults**, which included 1) establishing sponsorship plans for supporting older adults with house repairs; 2) fundraising and workforce gathering for internal cleaning, fixing electricity, and repairing houses for older adults.

(3) **Summarizing the lessons learned from flood disaster management for older adults**, which included 1) summarizing the lessons learned from flood disaster management; 2) analyzing the problems and demands of older adults prior to, during and after the disaster; 3) using the gained data to create or adjust disaster management plans for older adults based and integrate them into the permanent plan; 4) managing knowledge regarding flood disaster management for older adults, families, leaders, community leaders, and relevant sectors.

(4) **Restoring occupations for older adults and their families**, which included 1) providing support in repairing occupational tools; 2) promoting part-time occupational groups (i.e., skill and knowledge training sessions, providing no-interest occupational loans, sponsoring occupational tools); 4) providing a marketplace for selling goods and products such as exporting fruits abroad, conservative-style tourism, and selling products online.

(5) **Restoring the physical and mental health of older adults**, which included 1) visiting and following up with older adults at their homes to offer health assessments and preliminary treatment; 2) evaluating mental health to screen for depression in all older adults; 3) competency training for older adults regarding health promotion for older adults and organizing an exercise group in each village.

(6) **Adjusting the disaster management plan for older adults.**

Boards of sub-district disaster management centers co-evaluate the operation results in disaster management during the pre-disaster, disaster, and post-disaster phases. They analyzed problems and obstacles and sought solutions together, leading to an annual adjustment of a disaster management plan. Some of the interesting relevant quotes in this regard are as follows:

“... in case of damaged houses, the village leaders would go check them out and send the information across. The LAO helped in paying for materials, and the village headman, village leaders, and nearby villagers helped build the houses. We helped by sponsoring construction materials ...” (Public Disaster Mitigation Prevention staff member, 44 years old)

“... After the disaster restoration, the village leaders needed to report and send 24-h photographs to the district. We surveyed every affected household and older adult household. Then, we made arrangement for older adults to receive support for e.g. damaged houses, agricultural crops, pets, and occupational tools ...” (Village leader, 52 years old)

“... We summarized the lessons learned from disaster management in the area. After that, we used the summary to create an infographic, presenting to and exchanging knowledge with our network and adjusting the plan for older adults accordingly. Associated individuals could adapt the information and apply it to their responsible area ...” (Coordinator of disaster management network, 59 years old)

3.2. Factors in community-based flood disaster management for older adults

3.2.1. Human factor

Human factor included 1) build cooperation from community mechanisms, four key organizations in disaster management for the older adults, comprising LAO, community leaders, public sector officers, civil groups, and older adult groups and their caregivers in the family; 2) building and developing the capacity of volunteers for disaster management in caring for the older adults; 3) building a network of cooperation partners from agencies and organizations in the care of the elderly in case of disasters; and 4) the development of working mechanisms by the Sub-District Development Committee.

3.2.2. Work factor

The community's approach for disaster management was to determine strategies for disaster management, creating patterns and utilizing tools and a co-operational approach in accordance with the community-based disaster management system. They created a volunteering culture, raised funds and resources from various groups, organizations, and funding groups through establishing a disaster fund, an abandoned rice field fund, and social welfare to support older adults in the community. Each community activity was organized while keeping older adults in mind. The sub-district disaster management center, the village headman, the sub-district health promotion hospital, and the LAO were the main sponsors who connect with relevant sectors, making sure that they could carry on the plans with social capital groups. Examples included potential development training for volunteers, training for older adults and their caregivers, disaster management plan rehearsal, sponsoring tools and devices, and providing shelter for older adults in case of disaster.

3.2.3. Data factor

The community data was gathered using a participatory approach, including 1) Thailand Community Network Appraisal Program (TCNAP), 2) Rapid Ethnographic Community Assessment Process (RECAP), 3) specific information on the issue of the older adults, and 4) specific information on the issue of disaster. This enabled the community to learn about their problems, demands, and the potential of their social capitals, leading to the design of a
comprehensive plan for flood disaster management for older adults. They also spread knowledge and awareness amongst the community and used the data on the different disaster phases to create plans and projects. Four main organizations included the public sector, local organizations, government sector, and the LAO in the area co-host such events according to their roles and missions.

3.2.4. Resource factor

The community raised internal funds and resources to contribute to older adult care. They set up the sub-district disaster management fund to support the disaster management operation to buy necessary tools and devices as well as providing welfare for disaster management volunteers for their occupation with the public sector. This included community organization groups which provided community welfare for older adult care in case of disaster. The LAO created sponsor plans for operation, older adult care, and disaster management, and the community collaborated with other associates for their operation and budget.

4. Discussion

The findings revealed the evidence from the LAO, community leaders, public sector officers, civil groups, and older adults and family caregivers. The overall procedure of the community-based flood disaster management for older adults was in the community in southern of Thailand. The overall flood disaster management for older adults approach appeared to follow community-based disaster management [8] in which the researcher found three phases as follows.

4.1. Prevention and preparedness in flood disaster management for older adults are the necessary foundation

The prevention and preparedness in flood disaster management for older adults included 1) data system development and data deployment in disaster management for older adults; 2) potential development in preparation for disaster; 3) disaster management plan rehearsal; 4) public communication regarding disaster warning for older adults and their families; 5) providing tools, devices, and medical supply for older adults; 6) improving older adult residences; 7) providing support welfare for older adults and 8) occupation promotion for older adults.

The findings of the study reflected that the community had approached to flood disaster management for older adults by applying knowledge and experiences gained from the practice at the individual level, family level and community level. In accordance with the American College of Emergency Physicians (2013), it suggested that each community create a map indicating the homes of the older adults and collecting information about the need for medical assistance of the older adults and linking the information to local incident commanders in using the information to help the older adults [22]. Enhancing knowledge and skill up for caregivers, older adults and volunteers in disaster preparedness, the health care institute must prepare especially medicines and medical history that are ready to be taken with them immediately in the event of an evacuation; and they have to be ready toward how to act when evacuating and setting up shelters [8,23,24]. The organizational management included 1) surveying vulnerable groups; 2) action plans for flood and non-flood situations such as creating a care plan and reviewing disaster prevention and mitigation plans; 3) providing assistance for individual needs such as preparing essential material and equipment, and disaster training for the team for all sectors as a part of community flood preparedness and response in flood scenario; 4) flood information dissemination such as daily water reports and flood warning system; and 5) preparation during a flood, families must decide whether to remain at home, move to an alternate location, or evacuate to a shelter and stay there until the water recedes [25]. A disaster and welfare fund was established while selecting and preparing safe places, as evacuation centers, offering assistance has been relevant [26]. Community health nurses played an important role in designing plans for disaster management, which included the community’s well-being, developing the nursing service system for disaster management, determining disaster-related work plans, developing competency in disaster nurses, and providing nursing resources for tackling the disaster [27]. However, it could be applied in response to the needs of older adults and family caregivers; the information could be used for marking the location of a household into the community mapping. Then this information could be shared with the disaster response team, who provided care and rescue during the crisis to evacuate the older adults to safer places or shelters.

4.2. Response in flood disaster management for older adults should meet the need of older adults

Response in flood disaster management for older adults included 1) emergency public warning communication for older adults; 2) providing shelters for older adults; 3) establishing a front command center for disaster management; 4) evacuating and transferring older adults support; 5) monitoring the safety and assets of older adults; 6) setting up a community kitchen which provides food for older adults; 7) providing physical and mental healthcare for older adults; and 8) helping and supporting affected older adults.

The findings of this study reflected that flood disasters management for the elderly was important in terms of the basic needs approach and response and the establishment of a shelter for the older adults [23]. The organization response to flood included the following: 1) evacuating high-risk groups to safe temporary shelters, activating disaster response teams for rescue and care, and providing food and water for affected people; 2) maintaining healthcare and sanitation services such as mobile and shelter healthcare services, sanitation and waste management and mental health support; 3) integration of response by the public and private sectors [25]. Organizing an assistance system for helping survivors through a referral system for emergency cases, enhancing skills of volunteers, and setting up the food and water distribution system for survivors and staff working at the sites were established [26]. Community health nurses played an important role in organizing the safety system for disaster victims and nursing staff during disaster management. They were also responsible for managing resources and utilities, allocating nursing staff during the disaster management operation [27]. However, the disaster volunteer had a significant contribution in providing disaster warning information to households of older adults and continuous care during floods. The response team who was activated during the crisis could be monitoring flood conditions and meeting the need of older adults requires multi-stakeholder collaborations between families, community, local governments, private sector, and non-governmental agencies in all phases of flood disaster to ensure community resilience.

4.3. Recovery and rehabilitation in flood disaster management for older adults focus on integrating multiple responses

Recovery and rehabilitation in flood disaster management for older adults included 1) gathering data of affected older adults households; 2) repairing the houses of affected older adults; 3) summarizing the lessons learned from flood disaster management
for older adults; 4) restoring occupations for older adults and their families; 5) restoring the physical and mental health of older adults, and 6) adjusting the disaster management plan for older adults.

The findings of this study reflected that in the post-disaster period, the focus was on the assistance to the older adults in terms of recovering their health, society, economy and environment so that they could return to their normal lives as quickly as possible. The database system of older adults since before the disaster and initiating a recovery needs survey as early as possible would enable faster service planning [28]. The setup of a home rehabilitation in disaster management for older adults. The factors preparedness in disaster management for older adults; 2) Response older adults, including three phases as follows: 1) Prevention and community-based disaster management approaches for older adults; our findings were based on older adults, family caregivers and social capital perception. Therefore, the context of each area must be considered when interpreting the results of this study.

5. Limitations of the study

The process of data collection took a long time which was 13-month. Therefore, the researcher performed data analysis throughout the data collection period. These community-based flood disaster management approaches for older adults; our findings were based on older adults, family caregivers and social capital perception. Therefore, the context of each area must be considered when interpreting the results of this study.

6. Conclusion and implication for health personnel practice

The findings of this study indicated an important understanding in community-based flood disaster management approaches for older adults, including three phases as follows: 1) Prevention and preparedness in disaster management for older adults; 2) Response in disaster management for older adults; and 3) Recovery and rehabilitation in disaster management for older adults. The factors in flood disaster management for older adults are comprised of four factors, including Human factor, Work factor, Data factor, and Resource factor. To contribute to the community-based flood disaster management for older adults, the recommendations are as follows.

(1) Nursing practice. Community nurses should 1) provide information related to health of older adults in the community in order to develop a monitoring and evaluation a flood disaster management plan; 2) encourage four key actors to the community-based flood disaster management for older adults; and 3) enhance knowledge and skill for disaster volunteer.

(2) Education. Educational institutions should design a short course training on the community-based flood disaster management for older adults.

(3) Research. Nursing institutions should develop a research project to community in order to strengthen flood disaster management for older adults.

(4) Policies. The Thailand Nursing and Midwifery Council should develop a guideline for community nurses to work with social capitals in flood disaster management for older adults and promote knowledge management about nursing roles in flood disaster management for older adults.

CRediT authorship contribution statement

Pairin Yodsuban: Conceptualization, Methodology, Software, Formal analysis, Investigation, Data Curation, Writing—original draft & editing, Visualization, Project administration, Funding acquisition. Khanittha Nuntaboot: Conceptualization, Methodology, Validation, Resources, Writing—review & editing, Supervision, Funding acquisition.

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Declaration of competing interest

The author has no conflict of interests.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijnss.2021.08.008.

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