

The Development of Healthcare Model and Memory Rehabilitation of Elderly with Dementia by Using Community-based Participation

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Abstract

This research aimed to develop a healthcare model and memory rehabilitation of the elderly with dementia by using community-based participation and to examine the satisfaction of the participating elderly towards the healthcare model and memory rehabilitation. The population in this research was the elderly people, whose age was 60 years and over, living in Nong Phueng, Yang Noeng and Saraphi subdistrict municipalities, Chiang Mai province. The purposive sampling method was applied to select the sample group of 100 male and female elderly people. The data collection instruments comprised a structured interview about dementia and community contexts, a focus group discussion, Thai Mental State Examination (TMSE), and a satisfaction questionnaire for the elderly. The data were statistically analyzed using mean and standard deviation. The results showed that the healthcare model and memory rehabilitation of the elderly with dementia by using community-based participation was developed. It was composed of three phases, including community preparation phase, research phase, and post-research phase. Furthermore, the questionnaire results revealed that the overall satisfaction of the participating elderly was at a high level, with the mean of 4.46 (± 0.52).

Keywords: Dementia, Elderly, Healthcare model, Memory rehabilitation, Community-based participation

Introduction

Because of the changes in the global demographic structure as the results from economic and national development and advances in science, technology and medicine; the proportion of the elderly populations has been increasing rapidly from 5.9% in 1980 to 9.7% in 2020 (Jitapunkul et al., 1999). Similarly, in Thailand, the number of elderly people has been increasing rapidly from three million in 1987 to 10.78 million in 2020 (Senanarong et al., 2001). This information shows that Thailand has officially become an aging society. The result of the population structure change in Thailand causes a great increase in health problems due to the deterioration of the functions of various systems that decreases both physically and mentally in the elderly population (Jaroensin, 2017). According to World Health Organization (2023), it has been reported that one of the top 7 causes of death among the elderly is dementia. It is predicted that dementia will become one of the top five causes of death among the elderly in the future.

According to the effects of dementia on the elderly, it can be seen that dementia brings about enormous burdens on patients themselves, their families and society (Brodaty et al., 1998). From the analysis of long-term care costs in the elderly, it was found that caring for the elderly with a high level of dependency or total dependency had an average total cost of 44,329 baht per year. However, the cost of long-term care for households was approximately 4,953 million baht, which included 2,567 million baht for the opportunity cost of a caregiver, 783 million baht for hiring a caregiver from outside the household, 634 million baht for daily life care, and 1,341 million baht for others (Suwanrada & Kamwachirapitak, 2009). It is evident that caring for the elderly results in a large burden of expenses. It affects not only the patients themselves, but also other people such as their families and community members. Therefore, new ways to reduce health problems that cause all-round effects should be sought in an attempt to slow down the onset of dementia among the elderly in the community. According to Jinantaya (2006), there is a concept of community-based health promotion for the elderly. It is the concept of building community beliefs in developing health promotion processes. This concept will focus on developing strong community potential to jointly solve health problems of the elderly by creating cooperation and exchanging integrated knowledge between the elderly, family, and all stakeholders in the community. From the concept above, the process of developing personal skills must be emphasized. The individual, group and community systems should be emphasized to be able to control and improve one's physical, mental, social, intellectual and spiritual health and wellbeing; as well as to develop an environment conducive to health-promoting behaviors. Additionally, the 13th National Economic and Social Development Plan requires that community empowerment be promoted and encouraged for communities to solve their own problems and become self-reliant as well as interdependent, which would ultimately lead to sustainable human resource development (Office of the National Economic and Social Development Council, 2022).

Saraphi District is one of the first five districts with the highest number of elderly people (24.45%) (National Statistical Office (NSO), 2021). This has made the district to become an ageing society and the elderly are likely to encounter increasing risks of dementia as they age. It was found from the interview of the people in the area that the behavior of many elderly in the area can cause faster dementia because they rarely use their brains for doing activities. In addition, there is no screening and survey for the risks of dementia in the primary level of the elderly in the community. In the past, Thai Mental State Examination (TMSE) was used by only medical personnels to patients. It was also in the paper form which was difficult and take time to interpret the results. As a result, this research aimed to develop a healthcare model and memory rehabilitation for the elderly with dementia by using community-based participation

in order to respond to the needs of the community and in line with the Action Plan for the Elderly, Phase 2 (2002 - 2022), 2nd revised edition, 2020. Strategy 2 of this plan focuses on promoting health, preventing illness and supporting basic self-care. It also encourages health promotion activities in a variety of formats that are appropriate for the elderly and their families.

Objectives

1. To develop a healthcare model and memory rehabilitation of the elderly with dementia by using community-based participation.
2. To examine the satisfaction of the participating elderly towards the healthcare model and memory rehabilitation.

Methodology

This research was a participatory action research with the participation of the research team; together with medical personnel, public health volunteers, and community representatives to develop a healthcare model and memory rehabilitation of the elderly with dementia in the community.

Population and sample

The population in this research was 6,985 elderly people, whose age was 60 years and over, living in Nong Phueng, Yang Noeng and Saraphi subdistrict municipalities, Chiang Mai province. The purposive sampling method was applied to select the sample group of 100 male and female elderly people. The criteria were that they could be either male or female who had education from elementary school onwards, owned Android smartphones, resided in Nong Phueng, Yang Noeng, and Saraphi municipalities, Saraphi district, Chiang Mai province, and were able to help themselves. They needed to have an Android smartphone and be willing to cooperate until the end of the research project with the research team. Moreover, they had to be screened by implementing the Thai Mental State Examination (TMSE) and the result scores must be less than 23 points which were considered as having dementia (Train the Brain Forum Committee, 1993). The sample comprised an equal distribution of males and females. They were further stratified based on geographical location, with 35 participants recruited from Nong Phueng subdistrict municipality, 30 participants from Yang Noeng subdistrict municipality, and 35 participants from Saraphi subdistrict municipality.

Research method

1. The process of developing a healthcare model and memory rehabilitation of elderly with dementia by using community-based participation.

The research method for developing a healthcare model and memory rehabilitation of elderly with dementia by using community-based participation was divided three phases as follows:

Phase 1: Community preparation phase

1) Documentary research on dementia in the elderly, caregivers of the elderly with dementia, health promotion for the elderly, community participation-based model in health promotion, and community-based health promotion for the elderly with dementia was reviewed.

2) Official letters were sent from Chiang Mai Rajabhat University to the mayors of Nong Phueng, Yang Noeng and Saraphi Municipalities for their permission to conduct the study with the sample group.

3) A meeting was convened for the mayors and heads of the elderly association of the three municipalities in order to clarify the purposes of the research and to request their collaboration for data collection.

Phase 2: Research phase

1) The purposive sampling method was applied to select the sample group of 100 male and female elderly individuals, who passed all the criteria mentioned earlier.

2) A focus group discussion was organized with the sample group by the research team; together with medical personnel, public health volunteers, and community representatives. This was to assess their health needs and to find out about dementia problems among the elderly in the community, operational goals, operational guidelines, and procedures for determining the healthcare model and memory rehabilitation for the elderly with dementia through community-based participation.

3) Each process of developing the healthcare model and memory rehabilitation for elderly with dementia was executed based on the operational plan that was formulated.

Phase 3: Post-research phase

The research team examined the effectiveness of the community participation-based healthcare model for the elderly with dementia.

2. The measurement of participant satisfaction towards the healthcare model and memory rehabilitation.

1) The satisfaction of the participating elderly was examined about the implementation of the healthcare model and memory rehabilitation. The questionnaire was used in this part. It consisted of 18 five-point-rating scale, divided into three aspects. The results were calculated to obtain the mean and standard deviation of the questionnaire items, based on the Likert scale questions that rated the satisfaction levels from highest, high, moderate, low, and lowest, yielding a description of the elderly's satisfaction with the healthcare model and memory rehabilitation. The elderly's satisfaction levels were interpreted (Best, 1986) as follows.

- 4.50 – 5.00 Highest
- 3.50 – 4.49 High
- 2.50 – 3.49 Moderate
- 1.50 – 2.49 Low
- 1.00 – 1.49 Lowest

The satisfaction questionnaire was checked by three experts using the index of item-objective congruence (IOC). The average result of the IOC was 0.925 indicated the content validity of the questionnaire.

2) The assessment results were submitted to a civil society forum in order to incorporate the results for further community development.

Research tools and data analysis

Research tools included a structured interview about dementia and community contexts, a focus group discussion, Thai Mental State Examination (TMSE), and a satisfaction questionnaire for the elderly. The data were statistically analyzed using mean and standard deviation.

Rights protection of the sample group

This research was approved by the Board of Human Research Ethics, Chiang Mai Rajabhat University, under the research project, “The Development of a Community Participation- Based Healthcare Model and Memory Rehabilitation for the Elderly with Dementia”. The registration number is IRBCMRU 2022/165.08.08, dated October 26, 202

Results

1. The development of a healthcare model and memory rehabilitation of elderly with dementia by using community-based participation.

The development of the healthcare model and memory rehabilitation for elderly with dementia involved the following three phases.

Phase 1: Community preparation phase

1) Preparations for entering the areas were conducted. Official letters were sent from Chiang Mai Rajabhat University to the mayors of Nong Phueng, Yang Noeng and Saraphi Municipalities for a permission to conduct the research.

2) The fundamental information about the community was investigated, which included the lifestyles of the elderly in the municipalities.

3) Staffers participating in these research activities were well prepared and informed. They included the researchers, the participating elderly, public health volunteers, the involved medical personnel, and the representatives from the local administrative organization, namely the mayors and their deputies.

At this phase, all aspects of the community were prepared. The research was approved to do in Nong Phueng, Yang Noeng and Saraphi Municipalities. Moreover, it was found that the lifestyles of the elderly in these municipalities were various. However, on every Sunday, the municipalities provided courses or activities for the interested elderly to do with one another, such as, painting, gardening, touring and so on. In addition, all staffers were prepared before the research phase.

Phase 2: Research phase

1) Research assistants were prepared. In this research, extraneous variables caused by the experimenter's bias were controlled. Two research assistants who were professional nurses with a five-year experience in health promotion, were recruited. The research assistants were involved in collecting the data from the sample group concerning the patients' memory measurements by using Thai Mental State Examination (TMSE) in the pre-experimental phase and after the experiment. The research assistants were informed about the research objectives, research methodology, and data collection.

2) The sample group was selected based on predefined eligibility criteria. Prior to participation, all participants were provided with detailed information regarding the study objectives, duration, and venues for research activities. Written informed consent was obtained from each participant, indicating their voluntary participation in the study. Participants were required to complete the Thai Mental State Examination (TMSE), a standardized assessment tool widely used in Thailand for screening cognitive impairment and dementia. The TMSE comprises 30 items and is structured into six sections: orientation, registration, attention, calculation, language, and recall. Administration of the TMSE was conducted by qualified medical professionals with expertise in cognitive assessment. In this study, a TMSE score of 23 or less out of a possible 30 was employed as the threshold for identifying cognitive impairment. Participants who scored below this threshold were classified as elderly individuals with dementia. The mean TMSE score for the sample group was 17.23, with a standard deviation of 2.214.

3) The data were collected from the sample group according to the qualifications in the pre-experimental phase by means of the interview.

4) There were four steps in the operation of promoting healthcare for the elderly with dementia by using community-based participation as follows:

Step 1 was the participation in health needs assessments. In this step, the researchers together with the medical personnel, the nurses, the public health volunteers, and

the representatives from the local administrative organizations in the three municipalities organized a civil society forum in order to obtain preliminary information about the situational contexts of healthcare of the elderly with dementia in Saraphi District, Chiang Mai Province. This included determining the prevalence of dementia among the elderly population, assessing the current healthcare services available, identifying specific dementia-related challenges faced by the community, and exploring potential risk factors contributing to dementia in the elderly.

Step 2 was concerned with an establishment of the operational goals and guidelines, role and responsibility assignments, and a plan for operating the project to promote healthcare for the elderly with dementia by using community-based participation. To establish an appropriate healthcare model for the elderly with dementia, subgroup meetings were held. After that, a symposium was organized to find out solutions and share conclusions with stakeholders in caring for the elderly with dementia.

Step 3 was an establishment of the healthcare model for the elderly with dementia by using community-based participation, which was based on the needs of the community in the district.

Step 4 was concerned with carrying out the activities to promote healthcare for the elderly with dementia according to the concept of participation of local government organizations in collaboration with civil society. There were two main activities with a total duration of one month as follows:

Main activity 1: The first main activity was concerned with health promotion for the elderly to prevent dementia. In the first week, a relationship was established among the researchers, caregivers of the elderly, and the elderly. The research team introduced themselves, informed the purposes of building a healthcare model for elderly with dementia by using community-based participation, and then provided a chance for the elderly to introduce themselves. This could help the team and the elderly to get to know one another and to create mutual trust, which resulted in a good relationship between the research team and the elderly group. After that, the research team presented the information about dementia, which includes its meanings, symptoms, stages of the disease, factors affecting dementia, and self-care guidelines.

Main activity 2: From week 2 to week 4, the operation of each week consisted of the following sub-activities:

- Sub-activity 1: There was a preparatory activity with easy physical exercise starting from simple postures in order to gradually stimulate and strengthen the muscles and tendons. Then, the participants were encouraged to focus on breathing by taking deep breaths in order to help lower blood pressures, relax muscles, increase blood circulation, and regulate their heartbeats.

- Sub-activity 2: This was the memory training activities based on the Montessori Philosophy. The activities were divided into three sub-activities which took place in week 2, week 3 and week 4 respectively.

- ☐ Sub-activity 2.1: It was a connection activity by using events and stories to connect big things to small things or vice versa.

- ☐ Sub-activity 2.2: It was a connection activity by grouping things. The participants were required to group things together, tools, devices or data, in order to make them easy to remember.

- ☐ Sub-activity 2.3: It was a connection activity by sorting things. The participants had to prioritize what came before or after and what was important, so that what was more important would be dealt with first.

- Sub-Activity 3: It was a memory rehabilitation activity presented in the form of mobile games for the elderly with dementia, by implementing the memory training application to rehabilitate memories of the elderly with dementia, as shown in Table 1.

Table 1 The memory training application activity in the form of mobile games

Weeks	Games	Mobile Phone Screen
Week 2	Egg Games	
Week 3	Medicine Preparation Games	
Week 4	Shopping Games	

After the elderly were taught how to play each game, they were asked to play the games at home every day in order to practice their brains and train their memories. Moreover, each game had a progress display system which allowed the research team or the elderly themselves to monitor the progress of their game scores. Playing the games would be an incentive to do thoughtful activities of the elderly, which could stimulate the brain's cognitive functions and brain training. This could ultimately result in the prevention and memory rehabilitation of the elderly, which could lead to a better quality of their lives.

- Sub-Activity 4: It was the summary of the activity results. The participating elderly were encouraged and provided an opportunity to ask questions if they had any.

Phase 3: Post-research phase

The post-intervention phase focused on evaluating the effectiveness of the community participation-based healthcare model for elderly individuals with dementia. The research team collected assessment data and integrated it with feedback gathered from the community during a civil society forum. The mean TMSE score for the post-intervention assessment was 23.07, with a standard deviation of 2.268. Statistical analysis revealed a significant improvement in memory function among elderly participants following the implementation of the healthcare model and memory rehabilitation program. This finding suggests that the community participation-based approach was effective in enhancing cognitive outcomes for elderly individuals with dementia.

2. The satisfaction results of the participating elderly towards the healthcare model and memory rehabilitation.

After the implementation of the healthcare model and memory rehabilitation, the satisfaction of the participating elderly was explored and the results were shown in Table 2.

Table 2 The satisfaction results of the participating elderly towards the healthcare model and memory rehabilitation

Statements	Level of Satisfaction		
	Mean	S.D.	Level
1. Participation			
1.1 The activities are new and interesting.	4.68	0.47	Highest
1.2 There are opportunities for the elderly to express their opinions on various activities.	4.44	0.48	High
1.3 The elderly receive information about various activities which is clear and easy to understand.	4.04	0.49	High
1.4 The elderly are well taken care of while doing activities.	4.40	0.49	High
1.5 The elderly receive step-by-step instructions and steps in doing activities.	4.54	0.50	Highest
1.6 The elderly have opportunities to participate in various activities	4.66	0.48	Highest
1.7 The elderly receive the benefit of participating in the activities.	4.68	0.50	Highest
1.8 Various activities can actually train the memory of the elderly.	4.40	0.50	High
1.9 The elderly gain knowledge about dementia, recognize the symptoms of the disease and know how to take care of themselves.	4.04	0.47	High
Total	4.43	0.48	High
2. Time and Venue			
2.1 The venue is spacious.	4.40	0.47	High
2.2 The arrangement of the venue is in line with the guidelines for preventing the spread of COVID-19	4.40	0.49	High
2.3 Time for each activity is appropriate.	4.54	0.55	Highest
2.4 The environment of participating in the activities is appropriate.	4.40	0.50	High
Total	4.44	0.50	High
3. Activity Manual			
3.1 The colors and designs of the manual are interesting.	4.66	0.48	Highest
3.2 The font types of the manual are easy to read and beautiful.	4.54	0.65	Highest
3.3 The contents of the manual are easy to read and understand.	4.44	0.71	High
3.4 The arrangement of the manual contents is in a logical order, consistent and well connected.	4.36	0.48	High
3.5 The manual contents can facilitate the elderly to play the memory training games of each activity.	4.54	0.55	Highest
Total	4.51	0.57	Highest
Grand Total	4.46	0.52	High

From Table 2, the results of satisfaction assessment of the elderly towards the healthcare model and memory rehabilitation indicated that the overall satisfaction was at a high level with the mean of 4.46 (± 0.52). When each aspect was taken into consideration, it was found that the highest satisfaction was with the activity manual aspect, with the mean of 4.51

(± 0.52); followed by the time and venue aspect with the mean of 4.44 (± 0.50); and the participation aspect, with the mean of 4.43 (± 0.48) respectively.

Discussions

This research is concerned with the healthcare model and memory rehabilitation of the elderly with dementia by using community-based participation together with a set of collective operational guideline. It consisted of the purposes of the activities, the formulation of the activities, and the implementation of the activities by allowing the elderly to express their views on the types of organized activities. There was a collective problem-solving between the elderly and the research team during the participation. This enabled the team to realize and adjust in the activities so that they were most consistent with the community context. Furthermore, there was an adjustment of the method in offering activities to suit the needs of the elderly so that they could easily understand and benefit from those activities effectively. The established healthcare model for the elderly was composed of a dementia awareness activity in combination with memory training activities based on the Montessori Philosophy by exploiting the memory rehabilitation application in the form of games, which include Egg Games, Medicine Preparation Games, and Shopping Games. The results of the activities actually contributed to the memory improvement of the elderly as their memory scores after the experiment were higher than before the experiment. It was consistent with Robrujen (2017), who developed the elderly healthcare model for caregivers using the system theoretical framework (Sanguannam, 2002). This system comprised four phases including the study and analysis of the context and problem condition phase, the model development phase, the trial and evaluation phase, and the model improvement phase. According to the implementation of the aforementioned model, the findings showed that the mean of caregivers' knowledge after using the healthcare model was significantly higher than before the experiment with a statistical significance of .01. Furthermore, their satisfaction with the model was at the highest level. Therefore, this community participation-base healthcare model and memory rehabilitation for elderly with dementia was derived from the collaboration among all concerned parties within the community in designing the activities in the form of game application based on the Montessori Philosophy principle. This philosophy is a concept based on non-competitive and cooperative activities (Meinke, 2019). The research model emphasized and improved the elderly's personal skills in a balanced and holistic manner from simple activities to more difficult and complicated ones. This would lead to the three aspects of skill development, including life experience, sensory and academic aspects. These game-based activities would be able to enhance brain performances that could protect and restore memories of the elderly with dementia. This was corresponded with Chanthapremchit, Ruksapollmuang, and Prachuabmoh (2014) that the community participation-based learning for the elderly was essential. It should be cooperated by various sectors in the community. Similarly, the development of social networks has made caring for the elderly more beneficial (Rodjarkpai & Rojpaisarnkit, 2019). The participation of the community in caring for the elderly could raise awareness on the damage caused by dementia in the elderly and the created activities should be used on a regular basis in order to find out the disease at the beginning and curable stages. In addition, the elderly were satisfied with the model because the activities in the model were based on a focus group discussion which provided firsthand information that met the needs of the elderly. Furthermore, even the mobile activity, the elderly could play the games in their mobile phones as they had help and clear explanation from the staffs. Besides, the elderly often engaged in these types of activities provided in the games as part of their daily routine, such as cooking, shopping, or even preparing medicines. It was consistent with a long-term care model for the patients that the community should encourage health promotion by creating activities

to the early-stage patients including the elderly (Kokethong, 2012). This could make them comfortable and satisfied with the activities as well as could help improve the efficiency of the activities.

Conclusion and suggestions

The developed healthcare model and memory rehabilitation of elderly with dementia by using community-based participation consisted of three steps which were community preparation, research phase, and post-research phase. Additionally, overall satisfaction of the elderly with dementia towards the healthcare model and memory rehabilitation of elderly with dementia by using community-based participation revealed that there was a high level of satisfaction with the mean of 4.46 and the standard deviation of 0.52.

This healthcare model and memory rehabilitation for the elderly with dementia should be implemented in other areas in order to generate healthcare models suitable for and consistent with local situational contexts and needs.

New knowledge and the effects on society and communities

The research team obtained a community-based activity model for health care for elderly people with dementia. This model can be used or applied in other societies to slow down the deterioration of the brain of the elderly with early-stage dementia; as well as to reduce the burden on medical personnel and the costs of government hospitals that must be spent on caring for the elderly with dementia.

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