

Nursing Informatics and Digital Technology Using in Aging Home Care Delivery Development

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ABSTRACT

This participatory action research aimed to enhance nurses' role in informatics and digital technology for aging home care delivery at 13 health-promoting hospitals, in Kantharawichai District, Mahasarakham Province, Northeastern Thailand from January - December 2021. There were 139 participants; 13 nurses, 52 community caregivers, 37 family caregivers, and 37 bed-bound elderly. The researchers facilitated the participants sharing of their own experiences and reflected on aging home care. This research included four phases; 1) Assessment; data was collected through in-depth interviews, small group dialogue, and observation of nurses and caregivers practicing, 2) Intervention planning; three times brainstorming was created for health problem identification and intervention planning, 3) Intervention; participants joined aging home care delivery, 4) Evaluation; brainstorming was created for each health promoting hospital evaluation. Content analysis was used for data analysis. Results showed that; Nurses as care managers of this PAR cooperative learning efforts increased knowledge, attitude, and practice in informatic and digital technology to develop aging home care. They formulated strategies to supervise caregivers caring for bed-bound elderly; 1) enhancing caregivers' knowledge through the application, raising awareness and skill regarding informatics and digital technology applied for care plan and counseling, 2) promotion of online reports for aging caregiver activities, 3) creation line official for supervising caregiver caring, and 4) online network development of aging home care delivery linked to district hospital for medical consulting and local administrative organization for economic and social consulting. The empowering participatory process of this PAR could encourage nurses to create a way for effective supervision and cooperative primary care through line official effectiveness. This process can be applied to create and enhance informatics and digital technology for complex caring in rural areas.

1. Introduction

Thailand has entered an aging society and is faced with complex health problems among the elderly that need an integrated approach from multidisciplinary healthcare providers and community volunteers (Suranartvatchavong & Sudnongbau, 2022). Elderly people encounter more than one chronic disease, such as hypertension with diabetes mellitus and chronic kidney disease, or heart disease with injury from home accidents or stroke (Bodenheimer et al., 2022; Pecina et al., 2011). The associated health problems have rapidly increased among the senior population and the course to complexity needs a multidisciplinary approach for dealing with not only health problems but also economic and social problems healing (Thiin, 2018; Chung et al., 2014).

The National Health Security Office (NHSO) piloted the health care burden for Long-Term Care (LTC) program to encourage multi-sectoral collaboration for aging community-based care in Thailand. The goal of LTC is to support the dependent aging who are living with chronic diseases and disabilities (Rosen et al., 2010). Health Promoting Hospital is the primary health administrative organization located in local communities that needs to prepare an effective aging home care delivery network for dealing with an upcoming aged society (Tapasee et al., 2017). Since the launch of the LTC program, the Thai government has allocated an annual budget to the NHSO for distributing the funds to provincial administrative organizations and asked for supervision by health-promoting hospitals and

sub-district administrative organizations. The service leader of health-promoting hospitals encourages professional nurses to work as care managers as the staff of primary health care service (Robru et al., 2024). The care manager works with local caregivers who are the village health volunteers that continued their working for more than 5 years and attended 70 hours of caregiver training at NHSO to propose their cooperation for community-based aging home care that needs financial backup from the LTC program (Sittipakorn et al., 2021).

The professional nurses who work as the care managers at the sub-district health-promoting hospital try to cooperate with multidisciplinary and community committees to maximize the benefits for service recipients of the LTC program to support the different activities, including the local government organizations' projects to develop the safety housing environment for elderly and prepare local transportation to take bedridden aging people to hospitals (Bowles et al., 2015; Dowding et al., 2012). Many local government organizations also collaborate with state-owned hospital staff in training a village health volunteer to be a caregiver and trained professional nurse to be a care manager at sub-district health-promoting hospitals. Care managers lead the caregivers and plan for strategic aging home care within their communities such as health checkups and medication management (Seubniam et al., 2022; Persson et al., 2023).

This research tried to develop the capability of nurses who work as care managers in nursing informatics and digital technology to develop aging home care delivery at Kantharawichai District, Mahasarakham Province in the northeastern part of Thailand which has changed to an aging society and the elderly people need health care management in their own home and taking to physical checkup and giving medicines.

Objectives

- 1) Empower the nurse at subdistrict health-promoting hospital to develop nurse's role as care manager toward nursing informatics and digital technology in aging home care delivery
- 2) Evaluate the effectiveness of care managers toward nursing informatics and digital technology in aging home care delivery

Conceptual Framework

The researchers applied Stephen Kemmis and Robin McTaggart's concept of Participatory Action Research, PAR focused on the nurse as health personnel and care manager empowerment to participate and learn from their own experiences through sharing, reflection during group dialogue, and brainstorming to increase understanding, awareness, develop caring, and cooperative for integrated intervention to result in better home care delivery (Kemmis et al., 2005). Care managers, and CMs at the health-promoting hospital need to learn by contacting the patient, family, community, and local organizations essential to the health program's success. CM learns and develops coordination for medical treatment, physical and mental health assessments, developing care plans, monitoring medication compliance, and advocating for the patients and families connecting with social and community support systems for the continuation of care. CM also uses digital and information technology (IT) in telecommunications, web solutions, and social networking tools to educate, support, enhance, and lead to a fundamental redesign of home care processes based on the integration of electronic communication at all levels. IT platforms may lead to patient, family, and community caregiver empowerment and a transition from a passive role to an active role, in which the patient is informed, has choices, and is involved in the decision-making process.

2. Methodology

Designs: This research conducted Participatory Action Research, PAR to empower the nurses at subdistrict health-

promoting hospitals to develop nurses' role as care managers toward nursing informatics and digital technology in aging home care delivery.

Ethical consideration: This research was approved by the Research Ethics Principles Committee of Mahasarakham University, No. HE 041-001/2564. Researchers collected the qualitative data after asking for approval from the director and the nurse of a health-promoting hospital by a letter and asking them to be research participants. Researchers had qualitative research experiences for more than 10 years. The open-ended guideline interview was approved by three experts. Data collection involved nurses from health-promoting hospitals and caregivers. Collecting data was done with the nurse as participants and data was analyzed in parallel in the same period. All research participants were provided information on how they could terminate the recall of information whenever they wanted to stop any activity through this research process.

Setting: The research setting area was 13 Health Promoting Hospitals in Kantharawichai District, Mahasarakham Province in the northeastern part of Thailand which has aging health problems of non-communicable chronic disease; diabetes mellitus, hypertension, stroke, and disabilities from falling.

Participants: This study applied PAR during January - December 2021. There were 139 participants by purposive sampling, starting with 13 nurses who worked as care managers at 13 health-promoting hospitals. The snowball technique was used to call for the small group dialogue and the brainstorming participants; 52 community caregivers and 37 family caregivers, 37 elderly bed-bound, were introduced by nurses and they joined with in-depth interviews and observation by the researchers.

Data collection: The open-ended questionnaire was used by the researchers during in-depth interviews, group dialogue, and brainstorming the researchers facilitated the participants sharing their own experiences and reflected on the effectiveness of care managers toward nursing informatics and digital technology in aging home care delivery.

Data analysis: Content analysis was used for qualitative data analysis by the researchers to organize data content and distinguish carefully the organization of all information. The content analysis of perceived and real data from real situations in the same context to phenomena classification and theme analysis to identify the main and minor concepts relating to the effectiveness of care managers toward nursing informatics and digital technology in aging home care delivery. Triangulations were used to confirm the data reliability of all elderly home care management and caring methods to ensure reduced data bias and also ensure research credibility (MIS Quarterly, 2003).

Research Process: This research applied PAR for four phases; 1) Care managers' role assessment, 2) Intervention planning, 3) Intervention, and 4) Evaluation, as follows;

1. Care managers' role assessment: The researchers sent an official letter to the directors of 13 health-promoting hospitals in Kantharawichai District. Introduced the research process and questionnaire for data collection to the nurse who had experience as a care manager in nursing informatics and digital technology in aging home care delivery. Nurses volunteered to be the key participant group who had rich information for in-depth interviews on elderly home care and they were introduced to contract community caregivers, and family caregivers of the ill elderly people in their communities under the responsibility of the 13 health promoting hospitals which were asked for research participation. The researchers set up small group discussions involving 10-15 participants in each group; family caregivers, community caregivers, and the care manager of one health-promoting hospital for 1 group, and 13 small groups involving a total of 139 participants as follow; 13 nurses who worked as care manager, 37 family caregivers who took care 37 bed-bound elderly, and 52 community caregivers. Each group dialogue was collected for 60 minutes at each health-promoting hospital after they had visited bed-bound elderly together and participant observation was used during group dialogue about IT use for aging home care delivery.

2. Intervention planning: The researchers, nurses, and caregivers set one day of brainstorming for each health-promoting hospital for problem identification and planning, and another two days of brainstorming for 13 subdistricts with 10-15 participants who were the same participants who took part in the small group dialogue. Each care manager network of 13 health-promoting hospitals concluded health problem identification and initiated intervention planning as the whole district planning for developing nurses' role as care managers toward nursing informatics and digital technology in aging home care delivery.

3. Intervention: This phase of PAR focused on care managers and community caregiver empowerment to participate

in home care manager system development and improve nurse capability in informatics and digital technology through the means for how to deliver effective home care delivery to the chronically ill and disabled elderly. The researchers ran one day of training at the Faculty of Nursing, Mahasarakham University with community caregivers, and care managers involving 6-8 participants from each health-promoting hospital (120 participants from 13 sub-districts). The nurse care managers shared their own experiences with caregivers from another subdistrict about bed-bound elderly health problems, and caring, and set up their network for sharing IT equipment for enhancing aging and their family caregivers' knowledge and practice.

3.1 Word processing training for aging home caring report: The researchers, care managers, and caregivers joined the workshop for 1) an aging home caring report about the development process of health problem assessment and identification; 2) the role and function of caregivers and networks; 3) health education for aging caregivers related to a healthy diet, exercise, sleeping, bathing, medication, health checkup, rehabilitation, and relaxation; 4) healthy housing and supportive community environment.

3.2 Group report in line with official training: The researchers, care managers, and caregivers set one day of training for practicing group reports in line official about their home care activities for the ill elderly and using information technology for meetings and online learning together. The community caregivers shared their caring activities, equipment, pictures, and videos for learning together to raise their knowledge, awareness, and caring skills.

4. Evaluation: A one-day meeting for evaluation was set up (Using a Zoom meeting) after one year of research practice with community aging home care networking. They subsequently agreed to set regular one-hour evaluation periods for their knowledge and caring skill development.

3. Result and Discussion

This PAR has applied to initiate active interventions for care manager and community caregiver empowerment in informatics and digital technology through the means how of delivering effective home care delivery to the chronically ill and disabled elderly in three main point interventions as follows.

1. Promote care manager effectiveness for integration clinical team: This PAR applied informatics and digital technology cooperation with community caregivers to help aging illness person learn with health personnel and medical doctors about effectively detecting, managing, and preventing their complex medical conditions. Care managers help the aging illness in the community deal with multidisciplinary and ask for the integration management from clinical teams such as medicine doctors, and physical therapists. Care managers helped elderly patients with chronic diseases and disability improve their clinical condition; pain, and hunger because they cannot eat and cannot use NG feeding, reducing unnecessary care from bed sore dressing. Care managers also be counselors to reduce expensive costs for doctor visits and transportation.

2. IT networks consulting for integrated caring: Care managers get more consultants not only health consultants or medical doctors, but they also have new referral systems with private organizations; such as 1) Aging nursing homes for referring elderly people to admit for replacement home caring in case who have no family caregiver, 2) Mahasarakham homestay for the elderly representative of the public service, 3) Senyosap homestay for the elderly representative of a Christian service, 4) Khon Kaen Nursing Home, and 5) Hug Nursing Home representative of a private service, 6) Nurse instructor networking with faculty of Nursing, Mahasarakham University for raising nursing care manager knowledge in complexity cases of home care delivery

3. Family caregiver development application: Three months after training community caregivers learning through application; nurses as care managers can initiate an application for community caregivers giving health education to family caregivers and demonstrating caring practice together with family caregivers. Every health-promoting hospital sets up IT monthly caregiver meetings to learn together and develop practical skills. Researchers, nurses, and aging caregivers set a one-hour online learning for sharing caregiver experiences on the last Friday of each month and tried to initiate new caring applications.

4. IT network for mental support of family caregivers and bed-bound elderly: Because nurses as care managers, community and family caregivers have excellent IT or online group learning skills for sharing caregiver experiences, this IT effectiveness practice encourages care managers and caregiver can consult their mental health problem, depress, insomnia with one who their respected in this group by IT counseling and improve mental rehabilitation. The family and community caregivers can give the effective caring for illness elderly by following care manager well management through IT cooperative integration working.

Discussion

This PAR process can promote care managers as health professionals in a primary care team who can apply informatics and digital technology to cooperate with community caregivers to help aging illness person and their families more effectively detect, manage, and prevent their complex medical conditions (Kemmis et al., 2005). Care managers help local people deal with completing chronic care management with the patients and families as a part of the integration of clinical teams such as medicine doctors, physical therapists, and rehabilitators, pharmacists, health professionals. This research has shown that care management could run an effective intervention in helping elderly patients with chronic diseases and disability to improve clinical conditions, reduce unnecessary care, and reduce healthcare costs to visit district and provincial hospitals. However, if not implemented effectively, care management can also be expensive and cause suffering through transportation caring for the elderly to doctor visits or follow-ups. This study found that all care managers encouraged community caregivers to use informatics and digital technology cooperation to improve the effectiveness of aging home care in their community. Care managers also had an external network for consultation by informatics and digital technology cooperation. This result showed that informatics and digital technology cooperation can reduce care managers' and community caregivers' struggles with home care delivery practices.

This research-initiated intervention developed into the best practice for the community caregiver and care manager integration activities which developed from their own experiences sharing and reflection (MIS Quarterly, 2003). This process of care manager intervention development made community caregivers establish informatics and digital technology consultation guidelines for the prevention and reduction of complications of bed-riding home care, strengthening humanized or holistic home care. These were the ways to integrate for preserve local culture and global culture in IT aging home care. Integrated activities development of this informatics and digital technology consultation of senior's people is needed not only for the illness elderly but also need to prepare for healthy aging counseling to prepare themselves before they turn to be disabled. Care managers agreed to strengthen health funding and establish integrated multidisciplinary support for elderly physical devices and transportation, home care delivery services, and organizing continuous care systems (Nonghanpitak et al., 2013). These also promote the informatics and digital technology for the elderly in rural communities for developing health management, economic and social service systems in long-term care systems for elderly people to promote quality of life for aging and their relatives.

Nursing informatics and digital technology for aging home care delivery is based on the theoretical framework of participatory action research since it expands the scope of nursing and the role of nurses in informatics and technology. The proposed framework focuses on the participation of nurses, caregivers, and the elderly in the research endeavor to enhance knowledge, attitude, and practice regarding informatics and digital technology in-home care for older people. Considering the paradigms of PAR principles, the study encourages supervisors, case managers, and other healthcare professionals to enhance supervision techniques, strategies for care coordination, and interprofessional teamwork based on the principles of shared decision-making, collective reflection, and problem-solving. In addition to defining the research methodology, this theoretical framework corresponds with the overarching objective of supporting nurses in developing and strengthening informatics and digital technology for rich, complex caring in rural settings toward enriched aging home care delivery.

Nursing informatics and digital technology are vital in delivering home care services, especially when society is experiencing rapid aging. As the demographics of the population change and the types of

ailments that the elderly experience become more diverse, there is a clear call for a coordinated effort from doctors and paramedics from different branches of medicine and non-professional helpers from the community. Applying nursing informatics and digital technology is crucial to raising the efficiency of aging home care delivery by facilitating and providing care managers and caregivers with practical nursing and informatics knowledge, attitude, and nursing practice in informatics and digital technology. Such tools can embrace ones that support care planning and organizing, reporting caregiver activities online, and creating online networks for medical and social consultations. The instruction informatics and the use of digital technology are very useful in helping nurses and caregivers monitor and plan for the elderly, and this will allow them to have better and happier lives.

The research evidence on the PAR study of nursing informatics and digital technology in-home care for older people showed an overall enhanced knowledge attitude and practice of both the nurses and caregivers about the application of informatics and technology. The PAR was elaborated on and applied fruitfully to achieve the study's objective of improving informatics and digital technology for home care nurses to deliver to aging populations. As emphasized, the study results pointed out that the knowledge and skills of nurses as care managers were enhanced using informatics and digital technology to ensure the supervision of caregivers and facilitate care for bed-bound elders. This corroborates with earlier research, which pointed out the use of technological gadgets in care delivery by interprofessional healthcare teams for managing elderly clients. The proposed objectives of the study were to improve caregivers' access to knowledge, encourage the use of apps for reporting caregiver activities, and advance online platforms for networking home aging care delivery. Such aims are coherent with the previous research on the role of digital technology in aging home care and reflect the effective implementation of these strategies into the domain.

4. Conclusion and future scope

Utilizing digital technology to develop care services for the elderly at home can reduce congestion among chronically ill patients in service facilities. Implementing a database system to gather important health information has a positive impact on the treatment plan at home. Research results have shown that the action research experience helped nurses develop a strategy for establishing adequate supervision and fostering cooperative primary care, based on the proven effectiveness of the approach. This aligns with current literature suggesting that involving stakeholders in the planning and implementation of interventions improves care delivery and healthcare provider motivation. The study highlights the importance of utilizing nursing informatics and digital technology to enhance home care for the elderly, improving understanding of various concrete factors and approaches to enhance care management and interprofessional collaboration for rural clients. The findings support the study's objectives and offer recommendations for future research and the implementation of similar initiatives in various healthcare settings.

Suggestions

1. Local administrative organizations should develop informatics and digital technology in local public policy for aging home care delivery.
2. The multidisciplinary group can strengthen security cooperation with community organizations, public agencies, and the private sector to train and support nurses as care managers who need the potential to join informatics and digital technology in primary health care service.

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