The Model of Occupational Health and Safety Management by Community- Based Approach of Self- Employed Elderly Workers in Uttaradit Province, Thailand

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Abstract

This study employed participatory action research (PAR) , aimed to analyze the occupational health and safety (OHS) situations of self-employed elderly workers and develop community participation processes for OHS management. It also sought to create and evaluate OHS management models in urban, semi- urban, and rural communities in Uttaradit province, Thailand. The research involved 350 self- employed elderly workers, selected through simple random sampling, and 60 key informants from the public sectors, selected purposively. Data were collected using structured interviews and group discussions, with content analysis employed for data interpretation.

Urban elderly workers predominantly reported musculoskeletal discomfort due to prolonged sitting, while rural elderly faced heat- related illnesses. Semi- urban elderly encountered both ergonomic and physical hazards, including lifting heavy objects. Tailored interventions were identified: disease prevention for urban elderly, workplace safety training for semi-urban workers, and chemical safety practices for rural workers. Ergonomic challenges were pervasive across all settings. The development of community participation model involved situational analysis, priority setting, planning, knowledge management, and reflective practices. This evidence-based model is critical for addressing the specific OHS needs of self-employed elderly workers and enhancing health promotion and disease prevention within the community.

Keywords: Occupational health and safety, Elderly workers, Community-based approach, Safety management

Introduction

The transition to an aging society has profound implications on demographic, economic, and social structures, especially in rural areas. In Thailand, the multi-dimensional poverty rate among the elderly in rural regions stood at 18.1% in 2021 (Office of the National Economic and Social Development Council, 2021), highlighting significant socioeconomic challenges. Many elderly individuals continue to work to support themselves and their families, as evidenced by the 2021 survey by the National Statistical Office, which revealed that over half of the early elderly (aged 60-69) desired employment for financial reasons (National Statistical Office, 2022).

However, elderly workers face a high health risk of developing occupational diseases or injuries due to job characteristics that involve exposure to various health hazards, such as agricultural chemicals, pathogens, light, heat, and stress (Chantaramanee, 2017).

Occupational health and safety issues among elderly informal workers reveal a high level of health risks in the workplace. These include working conditions that negatively impact health, such as lifting heavy objects or performing tasks in postures that cause muscle pain. Additionally, work environments may contain dust, expose workers to hot weather conditions, and increase the risk of injuries from sharp objects (Phetliap et al., 2023). Elderly workers exhibit poor self-care behaviors, including daily smoking (5.8%), alcohol consumption (3.3%), and insufficient sleep (23.2% sleeping <6 hours). Health promotion is inadequate, with 58.0% in Bangkok avoiding exercise due to time and income concerns (Suksamai et al., 2012). Additionally, 73.3% engage in improper work postures, increasing musculoskeletal pain risks (Kaewmanee et al., 2011).

In Uttaradit Province, older adults account for 26.16% of the total population, classifying the province as a "complete aged society." This demographic shift presents a significant challenge for the province. Notably, 26.97% of the elderly population remain economically active, with the majority engaged in the agricultural sector (Uttaradit Provincial Labor Office, 2025). Additionally, many elderly workers have chronic health conditions, with the most prevalent being essential hypertension, followed by diabetes (Uttaradit Provincial Statistical Committee, 2024). In semi-urban areas such as Pai Lom Subdistrict, Laplae District, a substantial 39.65% of older adults continue to work as farmers to sustain their livelihood, with 69.10% suffering from chronic diseases, most commonly hypertension (43.51%) (Jaikhamwang et al., 2020).

Given the aforementioned situation, it is imperative to prepare for the challenges faced by the elderly by developing and managing various aspects that enable them to maintain good health and self-care for a high quality of life. This approach must be elderly-centered, promoting self-reliance and a sense of belonging within the community. Community involvement is crucial, with a focus on volunteer networks to manage and support these efforts. Health promotion and disease prevention among informal elderly workers necessitate a community-based approach, which has proven essential in developing individuals' capacity to contribute effectively within their communities (Hoffmeister & Mensink, 1990). This concept has been applied by researchers in creating a model for occupational health and safety management tailored to informal elderly workers within the community. This model encourages elderly workers to actively participate in their development in a manner that aligns with the local context and culture.

Objectives

1. To analyze the occupational health and safety (OHS) situations of self-employed elderly workers.
2. To develop OHS management model of self-employed elderly workers by using the community participation process.
3. To create and evaluate OHS management models in urban, semi-urban, and rural communities in Uttaradit Province.

Methodology

This participatory action research was conducted in four phases based on the framework proposed by Moule & Goodman (2014), consisting of: 1) Fact-finding or reflection, 2) Planning, 3) Action, and 4) Evaluation or reflective practice.

The study adopted a community-based approach, emphasizing community ownership in promoting health and occupational safety, aligned with the principles outlined by Hoffmeister and Mensink (1990). This approach encompassed seven core components: 1) Community focus, 2) Community member participation, 3) Intersectoral collaboration, 4) Substantial resource mobilization, 5) Long-term program development, 6) Multifaceted interventions, and 7) Population-level health and safety outcomes. The implementation was divided into four phases as previously described.

This study employed participatory action research (PAR), a community-based approach that empowers local residents or community representatives to generate new knowledge for themselves and their communities. The process involved data collection, problem analysis, and collaborative problem-solving through planning, implementation, and evaluation of actions to address identified issues. The ultimate aim was to ensure solutions were accurate, relevant, and aligned with community needs. External researchers acted as facilitators to guide and support the research process in achieving its objectives (Walaithes, 2005).

Population and sample

The study population consisted of two groups:

1. Elderly Informal Workers (Group 1): A total of 2,121 individuals aged 60–70 years, literate in Thai, and actively engaged in self-employment. Sample sizes were calculated using Krejcie and Morgan's table, resulting in 350 participants distributed proportionally across urban (150), semi-urban (150), and rural (50) communities.
2. Community Health Leaders (Group 2): A purposive sample of 60 individuals, comprising village health volunteers (VHVs), elderly care volunteers, elderly leaders, housewife group leaders, and members of local government organizations, with 20 participants from each community type.

Inclusion Criteria: Participants were required to be recognized by their community, have no plans to relocate within a year, and consent to participate. Community health leaders had to be aged 20 years or older.

Exclusion Criteria: Participants who withdrew or were unable to engage in all activities were excluded.

Research Method

This study was conducted in three types of communities in Uttaradit province, Thailand: urban (Tha It Sub-district), semi-urban (Tha Sao Sub-district), and rural (Chai Jum Phon Sub-district). These communities were selected based on the varying levels of occupational health and safety (OHS) practices among elderly informal workers.

A total of 350 informal older workers and 60 community-based health volunteers participated in the community analysis during Phase 1. They were actively engaged in the participatory process of community-based occupational health and safety (OHS) management, which included: 1) Joint planning, 2) Implementation of the plan, and 3) Participatory reflection and lesson learned activities during Phase 2. In Phase 3, the community-based health volunteers also played a key role in monitoring and evaluating the outcomes of community actions.
The research procedure was divided into three phases as follows:

Phase 1: Community Analysis

This phase involved assessing the capacity of community health leaders to manage occupational health and safety (OHS) for elderly informal workers. Data were collected through focus group discussions conducted once per sub-district, resulting in three sessions. These discussions aimed to identify current strengths, limitations, and community-specific OHS challenges.

Phase 2: Developing Community Participation Processes

This phase emphasized fostering collaborative efforts between community members and leaders to create sustainable OHS management practices.

2.1 Presentation of Community Analysis Results:

Feedback Session: Research findings were presented to the community to build awareness of the current situation, encouraging participants to provide additional input and feedback.

Problem Analysis and Planning: Participatory meetings were held to analyze problems, prioritize issues, and collaboratively plan solutions, conducted once per sub-district, totaling three sessions.

2.2 Brainstorming and Action Planning:

Workshops for Planning: Designed plans, projects, and activities tailored to community needs in OHS management.

Plan Implementation: Distributed responsibilities among community groups, established project teams, mobilized local and external resources, and provided training to enhance skills.

Lessons Learned Sessions: Conducted four times per sub-district (12 sessions in total), these focus groups reflected on implementation progress and adjusted plans as needed.

Phase 3: Evaluation

A structured evaluation process was carried out to assess both implementation and outcomes of the intervention.

Process Evaluation: Continuous monitoring and assessment of each phase, focusing on alignment with community needs and contextual adjustments. Conducted every four weeks via focus groups, totaling 12 sessions.

Summative Evaluation: A final evaluation was conducted after completing all activities to assess overall project outcomes. Focus groups and participatory lessons learned sessions were held once per sub-district, totaling three sessions.

Data Collection

Data were collected through multiple methods to ensure a comprehensive understanding of OHS practices:

1. Semi-structured Interviews: Focused on the role of community health leaders in OHS management for elderly informal workers.
2. Participant Observations: Recorded interactions, participation levels, and engagement of study participants during activities.
3. Field Notes: Documented insights from group discussions and participatory workshops conducted across all phases of the study.

Validation and Reliability of the Research Instrument

The interview guide was validated for content accuracy and alignment with the research objectives by three experts specializing in occupational health, gerontology, and behavioral science, using the Index of Item-Objective Congruence (IOC). A pilot test was conducted with a sample of 30 participants who shared similar characteristics to the target population. The reliability of the instrument was assessed using Cronbach's Alpha, which yielded a coefficient of 0.89, indicating a high level of internal consistency.

For the focus group discussion guide, experts reviewed the instrument for accuracy, coverage, and relevance to the study objectives, and the IOC was used to assess item-objective alignment. Revisions were made based on expert feedback to ensure content validity.

In addition, data triangulation was employed to enhance the credibility of the findings, using the following strategies: 1) Data triangulation, by comparing data from different times, locations, and sources; 2) Investigator triangulation, by rotating interviewers or observers; and 3) Methodological triangulation, by using multiple data collection methods.

Data Analysis

Content analysis and triangulation techniques were employed to ensure validity and reliability. Data were systematically categorized to identify key themes and patterns in OHS practices and community participation. Triangulation was achieved through the integration of data from interviews, observations, and field notes, enhancing the robustness of findings.

Research Validity

The validity of the research was strengthened through participatory approaches, ensuring alignment with community needs and local contexts. Focus group discussions, reflective sessions, and periodic evaluations provided iterative feedback loops to refine the research process.

Ethics Statement

The research protocol was approved by the Human Research Ethics Committee of Uttaradit Rajabhat University (COA No. 071/2022). All participants provided informed consent prior to engagement in the study, with assurance of confidentiality and the right to withdraw at any stage. Ethical considerations included the protection of participant autonomy, privacy, and respect for community traditions.

Results

The research findings can be summarized according to each phase of the study as follows:

Phase 1: Community Analysis

The area-based situational assessment indicated that older workers in urban, semi-urban, and rural communities were predominantly female, accounting for 66.70%, 67.30%, and 52.00%; respectively. The average age was 64.94 years in urban areas, 64.90 years in semi-urban areas, and 64.40 years in rural areas. The majority of older adults in urban and rural areas were classified as obese based on Body Mass Index (BMI) (31.33% and 28.00%; respectively), whereas those in semi-urban areas mostly had a normal BMI (31.30%). The primary occupations of older workers varied by setting: self-employment was predominant in urban areas (38.67%), daily wage labor in semi-urban areas (36.00%), and agriculture in rural areas (58.00%).

Chronic illnesses were commonly reported across all three areas. In all settings, injuries from sharp objects such as lacerations or puncture wounds from knives and thorns were frequently reported as work-related health issues. Older workers in semi-urban communities were more likely to be exposed to heat or work outdoors compared to those in urban and rural areas. Similarly, they experienced poor lighting conditions and worked in environments with dust, smoke, or unpleasant odors. However, older adults in rural areas report higher levels of chemical exposure during work processes. Musculoskeletal disorders from heavy lifting were most found among older workers in semi-urban areas. Across all regions, the most common symptom reported was body aches and muscle strain from prolonged sitting.

These findings highlight the need for targeted interventions to address these challenges within the community.

The survey on the health issues among elderly informal workers across urban, semi-urban, and rural areas identified four key findings:

1. **Occupational Injuries**

The most prevalent occupational health risk across all three geographic areas was trauma induced by sharp objects, such as lacerations or puncture wounds from knives and thorns. The incidence rate was disproportionately higher among older adults in rural areas compared to their urban and peri-urban counterparts, suggesting an elevated occupational hazard due to the nature of rural labor practices.

2. **Workplace Environmental Hazards**

Exposure to excessive heat and outdoor working conditions was significantly more common in peri-urban areas than in urban and rural settings. The physiological manifestations associated with these exposures included dehydration, exertional fatigue, thermoregulatory strain (excessive sweating), and visual discomfort due to suboptimal or excessive lighting. Additionally, environmental contaminants such as airborne particulate matter, occupational smoke inhalation, and noxious odors were frequently reported as contributing to adverse health outcomes.

3. **Chemical Exposure**

Occupational exposure to hazardous chemical agents was more prevalent among older workers in rural settings than in urban and peri-urban areas. This may be attributed to the widespread use of agrochemicals and a lack of regulatory oversight or personal protective measures in rural occupational environments.

4. **Ergonomic and Musculoskeletal Strain**

The burden of physically strenuous labor, particularly tasks involving heavy lifting, was markedly higher among older adults in peri-urban areas compared to those in urban and rural settings. Despite geographic variations in work-related biomechanical strain, musculoskeletal discomfort, particularly mild but persistent myalgia and fatigue, was a universally reported occupational health concern among older workers across all three areas.

The findings led to collaborative efforts in managing occupational health and safety (OHS) for informal elderly workers within the community. This participatory approach fostered local understanding of the problems and the development of context-specific solutions, raising awareness across all three pilot areas. Key interventions included:

1. **Chemical Hazard Management**: Community members were trained in the safe and appropriate use of chemicals, the proper use of personal protective equipment (PPE), and correct work attire.
2. **Ergonomic Risk Reduction**: Initiatives included promoting exercise and proper posture during work, forming village-level exercise groups, and utilizing traditional remedies such as herbal medicine, massage, and hot compresses to alleviate musculoskeletal discomfort.

3. **Health Promotion and Work-Related Disease Prevention**: Communities introduced appropriate tools for safer work, increased safety awareness, conducted accident prevention training, and disseminated information through various local communication channels such as LINE groups, community broadcast towers, elderly clubs, and monthly village meetings.
4. **Mitigation of Environmental Hazards (Light, Dust, and Smoke)**: This included provision and use of suitable PPE and educational sessions to prevent harm from poor lighting, airborne dust, and smoke exposure.

In phase 1, community participation contributed to mobilizing local resources and support networks to develop interventions and activities for protecting informal older workers. These efforts have led to a reduction in work-related health issues and improved access to efficient health services for the aging workforce.

Phase 2: Development of Community Participation Processes

The community engagement process led to significant improvements in the awareness and practices of elderly informal workers. Four key areas were addressed:

1. Nutritional Self-Care: Promoted better dietary practices for health improvement.
2. Prevention of Musculoskeletal Disorders: Encouraged self-care to reduce strain and injury.
3. Toxicity Prevention: Educated on safe handling of agricultural chemicals.
4. Pollution Mitigation: Raised awareness on how to protect against dust and smoke exposure.

In Phase 2, qualitative findings obtained through interviews enhanced the credibility and depth of the proposed model. The target group engaged in discussions about their perceived needs and challenges, aiming to promote health-enhancing behaviors and prevent work-related illnesses. This participatory dialogue led to a collective consensus on practical solutions for occupational disease prevention and health promotion tailored to their context.

One informal older worker expressed:

> *"We need a project that provides knowledge about self-care and how to prevent occupational illnesses. The training should cover musculoskeletal disorders and the proper and safe use of agricultural chemicals, including clear guidance on correct practices."*

The participatory process followed a four-step approach:

1. Acceptance of Individual Differences: Empowered elderly workers by acknowledging their personal limitations and fostering confidence in self-management.
2. Creating Awareness: Facilitated knowledge exchange among peers, enhancing health awareness.
3. Raising Problem Awareness: Highlighted the health risks stemming from dietary habits, lack of exercise, and exposure to chemicals and pollution.
4. Understanding Problem-Solving: Encouraged active problem-solving by linking personal experiences to health practices, motivating lifestyle changes.

This process has contributed to the development of a structured learning process for community-based occupational health and safety (OHS) management. The process is driven by collaborative mechanisms involving two key sectors: (1) the academic sector and its allied networks, and (2) the community sector. The approach comprises six core components as following: 1) the use of senior-friendly learning materials, 2) application of clear and simplified language, lecture-based instruction integrated with gamification techniques, and content relevant to daily living, 3) repetition of key concepts to enhance retention, 4) lecture sessions incorporating practical demonstrations, 5) showcasing and presenting best practices through role models, and 6) engaging community-based group activities involving health volunteers

and local leaders. These strategies were designed to align with the learning capacities of older adults and promote participatory and experiential learning within the community context. (Figure 1)

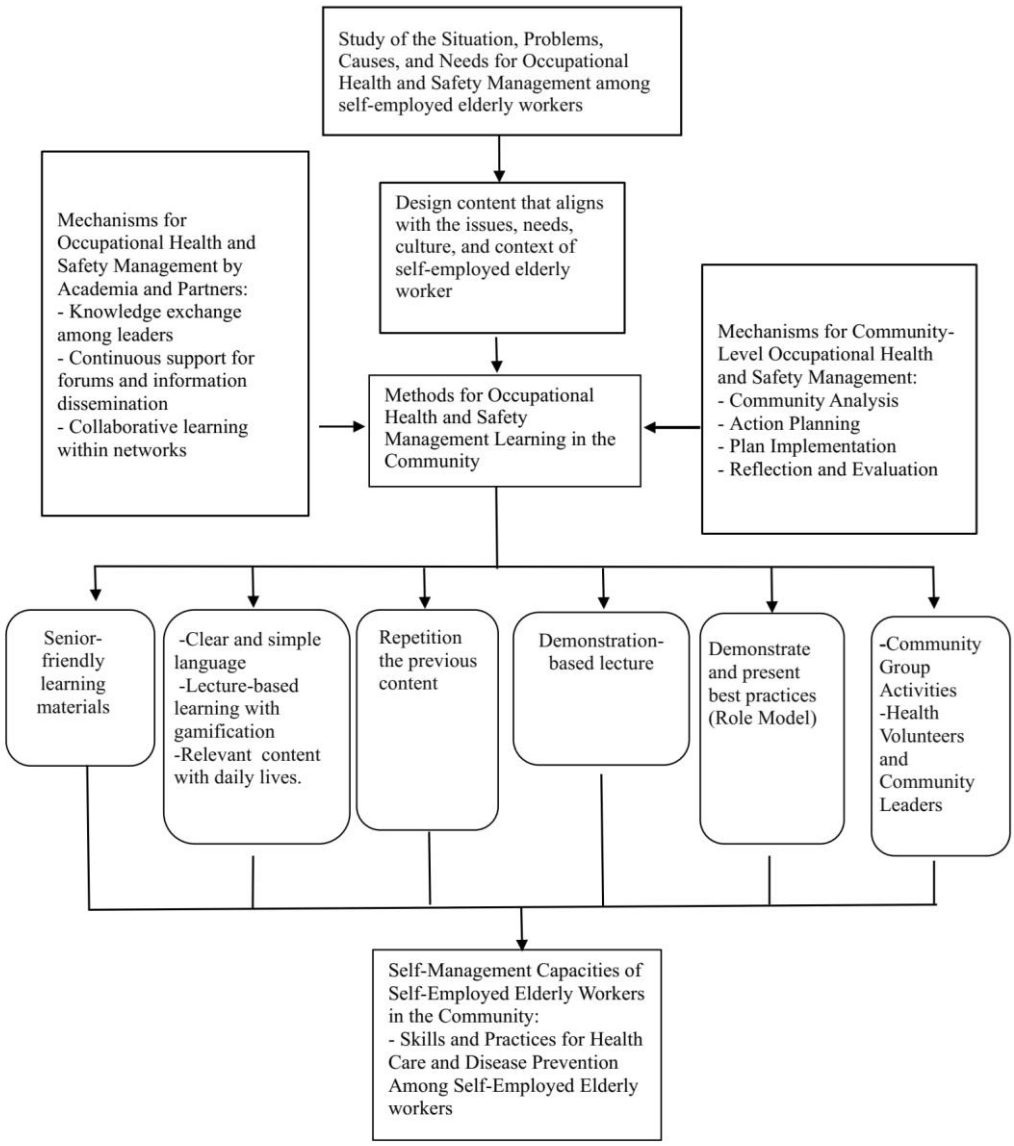

Figure 1 Development process of Occupational Health and Safety Management among Informal Elderly Workers in the Community, Uttaradit Province, Thailand

Phase 3: Evaluation of Occupational Health and Safety Management Model

The evaluation phase focused on the implementation and outcomes of the developed model for occupational health and safety management:

1. Knowledge Reinforcement: Strengthened the capacity of community health volunteers (CHVs) and leaders through home visits, under the guidance of public health officials.
2. Inter-Community Knowledge Exchange: Facilitated learning across communities to establish sustainable health promotion models.
3. Positive Behavioral Outcomes:

3.1 Elderly informal workers adopted healthier diets, exercised more, and improved self-care practices.

3.2 CHVs gained confidence in disseminating health knowledge and demonstrated improved skills in providing care.

4. Successful Adoption: Communities across urban, semi- urban, and rural areas effectively adopted self- care practices, addressing occupational health risks and enhancing the quality of life for elderly workers.

In Phase 3, qualitative data obtained from interviews further enhanced the credibility of the developed model. The findings revealed the following:

1. Most informal older workers were able to practice appropriate self- care for health promotion and prevention of occupational illnesses. They organized group exercise sessions and engaged in physical activity more regularly. Additionally, improvements in dietary behaviors were observed, including consuming all five essential food groups and avoiding undercooked food. One local health officer reflected:

"People in the community are now more enthusiastic about exercising. They eat a balanced diet and avoid raw foods. Group discussions about exercise postures have also taken place, and when I visit households, I often see people following the routines. They feel the postures are effective and really helpful."

2. The community collectively engaged in health promotion and disease prevention activities, particularly through group-based physical exercise. A community leader shared:

"Now we have formed exercise groups. Elderly members come to participate in the workouts. They see the benefits, and when they see us doing it, they're inspired to join in the activities."

The implementation of the research, which aimed to develop a model for Occupational Health and Safety (OHS) Management among informal elderly workers in the Community, Uttaradit Province, Thailand, was carried out in three main phases and led to the development of a comprehensive participatory model. The model began with a situational analysis in the community, focusing on both the health status and occupational hazards of the elderly workforce, as well as identifying key stakeholders. This was followed by the mobilization of community participation, emphasizing collaborative action through shared learning processes, and leadership and network development. In this phase, a Participatory Action Research (PAR) approach was integrated, involving community- based situational assessment, planning, implementation, and participatory reflection and evaluation. The final phase focused on the evaluation of OHS management for informal elderly workers. The evaluation centered on improved skills and practices related to occupational disease prevention, as well as a review of the local OHS systems and mechanisms, conducted with active community involvement. Details of the model are illustrated in Figure 2.

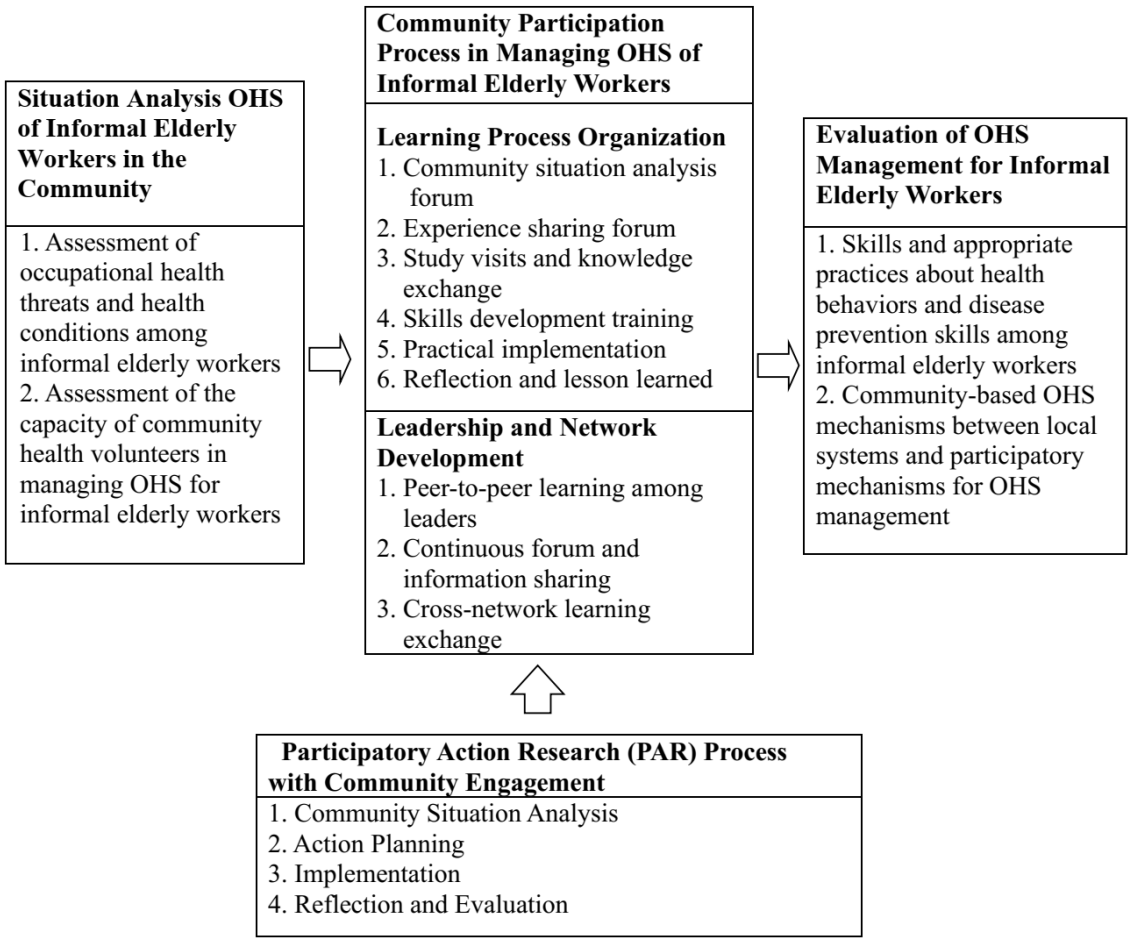

Figure 2 Model of Occupational Health and Safety Management among Informal Elderly Workers in the Community, Uttaradit Province, Thailand

Discussions

A participatory model for OHS management among informal elderly workers in Uttaradit Province was developed through three phases: situational analysis, community engagement using a Participatory Action Research (PAR) approach, and outcome evaluation. The model improved skills in occupational disease prevention and strengthened local OHS systems through active community participation**.** The discussion is structured according to the specific objectives of the research as follows:

1. Occupational health and safety concerns among informal elderly workers in urban, semi-urban, and rural areas primarily arise from exposure to hazardous and ergonomically unsuitable working conditions. These workers frequently encounter airborne pollutants, including dust and other environmental contaminants, while performing physically strenuous tasks in postural improper positions. Such occupational stress contributes to adverse health outcomes, including increased susceptibility to work-related musculoskeletal disorders and the adoption of unhealthy coping behaviors, such as poor dietary consumption and inadequate self-care practices. (Senanuch, & Suntonanantachai, 2018; Ranasinghe et al., 2023)

2. Developing a Community-Based Participatory Process for Occupational Health and Safety Management: Enhancing occupational health and safety management for informal elderly workers requires the community to first identify problems and their root causes. In addition, community-led problem analysis, collaborative efforts among relevant stakeholders

have been strengthened, leading to the development of operational models and mechanisms for health promotion and disease prevention (Ruksanont et al., 2023). These initiatives have been translated into projects and activities addressing occupational health and safety among older adults in the informal labor sector.

This enables them to manage and care for themselves while establishing a framework for community-based occupational health and safety management. The framework emphasizes: 1) Self-management through health-promoting dietary habits, 2) Prevention of musculoskeletal disorders, 3) Protection against toxic exposure from agricultural chemicals, and 4) Prevention of inadequate lighting, dust, and smoke exposure (Moule & Goodman, 2014). By fostering cooperation within the community, this participatory process raises awareness and encourages active involvement in problem-solving, planning, and decision-making. This approach aims to bring about changes in occupational health and safety management, promoting well-being and preventing work-related illnesses, ultimately reducing occupational health risks effectively (Nilwarangkoon et al., 2022)

3. A Community-Based Model for Occupational Health and Safety Management of Informal Elderly Workers: The development of an occupational health and safety management model requires participatory community action. As a form of social capital, community members play an active role in enhancing access to local knowledge, fostering contextual understanding, and mobilizing resources to support community-based actions. (Unthong et al., 2021)

This approach focuses on encouraging behavioral changes among informal workers to prevent occupational diseases and promote workplace health. The resulting model aligns with the cultural and contextual aspects of the community, fostering a shared understanding of the issues. Through collaborative decision-making, evaluation, and continuous reflection on practices, the community strengthens its capacity to effectively manage the occupational health and safety of informal elderly workers. (Garrido et al., 2020)

One crucial factor for successful behavioral change in health promotion among elderly informal workers is understanding the community's culture and context. This involves collaborative problem identification and cause analysis with community leaders and target groups, respecting and considering their perspectives and jointly making decisions for problem-solving, evaluation, and continuous improvement.

To effectively address the occupational health and safety needs of elderly informal workers, it is crucial for the Ministry of Public Health, the Ministry of Social Development and Human Security, and local government organizations to establish systems for knowledge exchange, continuous support forums, and collaborative learning within community networks. These mechanisms will help sustain improvements and ensure ongoing community engagement. Health authorities should adopt a proactive approach by implementing a four-step learning process: community analysis, action planning, plan implementation, and reflective evaluation. This approach will enable tailored interventions that address the specific health risks faced by elderly workers and ensure continuous improvement through community feedback and adaptation.

Conclusion and suggestions

The study successfully developed and evaluated community-based models for managing occupational health and safety among self-employed elderly workers. These models emphasized the importance of health promotion, disease prevention, and community involvement. The findings underscore the need for ongoing support and education to ensure the well-being of elderly workers in various settings.

New knowledge and the effects on society and communities

The Model of Occupational Health and Safety Management by Community- Based Approach of Self-Employed Elderly Worker in Uttaradit Province is research that is useful for the elderly group, which is currently increasing in number. The model emphasized situational analysis, community engagement, and skill development through a PAR approach. Results showed improved safety practices and local system strengthening by using six key components: senior- friendly materials; clear, simple language with gamified lectures; repetition of key concepts; practical demonstrations; role model presentations; and community group activities involving health volunteers and local leaders. This model can be adapted for use in other aging communities facing similar challenges.

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