



Development of strategies for promoting early childhood development by elderly village health volunteers

Supattra Nuttarugs^a, Sanor Klingam^a, Trairong Pliansaeng^b, Nichakorn Permpronsakul^a, Sarinna Chantachot^a, Jindapron Silathong^a and Wannaprai Yamma^{a*}

^a Faculty of Nursing and Allied Health Sciences, Phetchaburi Rajabhat University, Phetchaburi, 76000, Thailand

^b Faculty of Education, Kamphaeng Phet Rajabhat University, Kamphaeng Phet, 62000, Thailand

Abstract

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This mixed-methods study aimed to develop strategies for promoting early childhood development (ECD) by elderly Village Health Volunteers (VHVs) in Phetchaburi Province, Thailand. The study addressed limited evidence on how elderly VHVs can practically support ECD through intergenerational community-based work. Pender's Health Promotion Model explained elderly VHVs' participation in ECD promotion, while Giddens' Structuration Theory explained structural and social conditions affecting community-based practice. Quantitative data were collected from 400 elderly VHVs and analyzed using frequency, percentage, mean, standard deviation, and Pearson's correlation coefficient. Qualitative data were obtained from 30 key informants through in-depth interviews and analyzed using content analysis until data saturation was reached. The quantitative findings showed that elderly VHVs had a moderate overall level of readiness for ECD promotion (mean = 3.03, SD = 0.48). Their main strengths were willingness to participate, awareness of child development, and pride in community contribution, whereas their main limitations included physical constraints, limited ECD skills, weak peer-learning mechanisms, and low digital communication access. Pearson's correlation analysis indicated that past ECD promotion activities ($r = .505$), formal training ($r = .468$), and direct childcare experience ($r = .425$) were significantly associated with the ECD promotion situation ($p < .01$). Qualitative findings confirmed the need for practical manuals, mentoring, safe activity spaces, digital support, and social recognition. The study produced six strategies: defining common goals, disseminating positive attitudes, developing practices and intergenerational interaction, delivering empowerment and digital resources, determining standards and procedures, and dignifying social recognition and values. At the policy level, these strategies can be integrated into local quality-of-life development plans, DSPM-based child development surveillance systems, and local budget allocation. At the community level, they provide an operational model for co-creating child-development activities, referral pathways, community mentor systems, and age-friendly volunteer roles.

* Corresponding author : wannaprai56@gmail.com

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1. Introduction

Early childhood development (ECD) is a fundamental foundation for lifelong health, learning capacity, social adaptation, and human capital development [1, 2]. In Thailand, ECD promotion is guided by the Ministry of Public Health through the Developmental Surveillance and Promotion Manual [1], which provides standardized guidance for age-appropriate developmental surveillance, screening, caregiver counseling, referral of children with

suspected developmental delay, and systematic follow-up [1]. The DSPM emphasizes holistic development across physical, motor, language, cognitive, personal-social, and adaptive domains. In addition, current ECD promotion increasingly recognizes executive function (EF), including inhibitory control, working memory, and cognitive flexibility, as an essential foundation for self-regulation, learning readiness, and adaptive behavior [1]. Therefore, community-based ECD promotion should not be limited to

identifying developmental delay but should also create repeated, meaningful, and play-based interactions that strengthen EF and socio-emotional development [3, 4].

Village Health Volunteers (VHVs) are an important community health workforce in Thailand. Their roles include health communication, disease surveillance, health promotion, household visits, basic care, coordination with Sub-district Health Promoting Hospitals (SHPHs), and mobilization of community participation [5]. In ageing communities, elderly VHVs represent valuable social capital because they combine volunteer experience, family trust, local wisdom, and practical child-rearing knowledge. Phetchaburi Province was selected as the study setting because it has an ageing community structure and a large number of elderly VHVs distributed across districts [6]. This context provides an appropriate setting for designing a community-based strategy that links child development promotion with active ageing, intergenerational participation, and local health systems [7].

From a nursing perspective, this study was primarily guided by Pender's Health Promotion Model, which explains health-promoting behaviors through individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcomes. The model emphasizes perceived benefits, perceived barriers, perceived self-efficacy, interpersonal influences, and situational influences that shape individuals' commitment to health-promoting action [8]. In this study, elderly VHVs' participation in ECD promotion was conceptualized as a health-promoting behavior influenced by their previous childcare experience, training, perceived value of community contribution, confidence, physical limitations, social support, and access to supportive resources. Therefore, Pender's model provides the main nursing theoretical foundation for designing strategies that enhance elderly VHVs' motivation, capacity, and sustained participation in community-based ECD promotion.

Intergenerational learning suggests that meaningful activities between older adults and young children, such as storytelling, traditional games, singing, art, and cultural play, can support children's language development, motor coordination, social skills, problem-solving, empathy, and EF [4, 9, 10]. This mechanism is consistent with Vygotsky's sociocultural theory, in which experienced adults serve as more knowledgeable others who provide scaffolding within children's zone of proximal development [3]. At the same time, elderly VHVs may benefit from purposeful participation, reduced social isolation, increased self-worth, and recognition as knowledge holders within the community [7, 9, 10].

However, a clear knowledge gap remains. Previous ECD studies in Thailand have mainly focused on developmental screening coverage, parental involvement, child development centers, community potential, or VHV training [2, 11, 12]. Limited evidence explains how elderly VHVs can be systematically prepared and supported to promote ECD and EF through intergenerational activities under real community conditions. In particular, practical guidance

remains insufficient on how to integrate DSPM standards, Pender's nursing health-promotion concepts, age-friendly volunteer roles, digital learning resources, local wisdom, and multisectoral collaboration into a strategic model for elderly VHVs [1, 7, 8, 13].

This gap is important because elderly VHVs often face physical limitations, limited confidence in standardized developmental assessment, and uneven digital health literacy, despite their strong volunteer spirit and community credibility [12, 13]. Without clear strategies, their potential may remain underutilized, and ECD promotion may continue to depend mainly on health professionals rather than a broader community network. Therefore, a practical, age-sensitive, nursing-informed, and locally owned strategy is needed to strengthen the role of elderly VHVs in community-based ECD promotion [8, 11, 14].

The objectives of this research were: (1) to investigate the situation and factors related to the promotion of early childhood development by elderly VHVs; and (2) to develop concrete strategies and operational guidelines for promoting early childhood development by elderly VHVs that are consistent with DSPM standards, Pender's Health Promotion Model, local contexts, and community-development needs.

2. Materials and Methods

This study employed an explanatory sequential mixed-methods design consisting of two phases. The quantitative phase used a survey to investigate the situation and factors related to early childhood development (ECD) promotion by elderly Village Health Volunteers (VHVs). The qualitative phase used in-depth interviews to explain and expand the quantitative findings and to synthesize practical strategies for promoting ECD by elderly VHVs.

The research process consisted of five steps: (1) reviewing relevant literature, Pender's Health Promotion Model, Giddens' Structuration Theory, and public health standards, including the Developmental Surveillance and Promotion Manual (DSPM) [1, 8, 15]; (2) developing the conceptual framework and research instruments; (3) collecting and analyzing quantitative data; (4) conducting qualitative interviews until data saturation was reached; and (5) integrating quantitative and qualitative findings to develop the strategic model and operational guidelines. The conceptual framework of the study is presented in Fig. 1.

The study was conducted in Phetchaburi Province, Thailand. The target population consisted of 7,835 elderly VHVs aged 60–69 years across eight districts, based on provincial health service data [6]. Three districts, namely Mueang, Ban Laem, and Ban Lat, were selected using purposive sampling because they had ageing community characteristics and active VHV networks relevant to community-based ECD promotion. The selection of these districts was intended to provide information-rich community settings for developing practical strategies under real local health-system conditions.

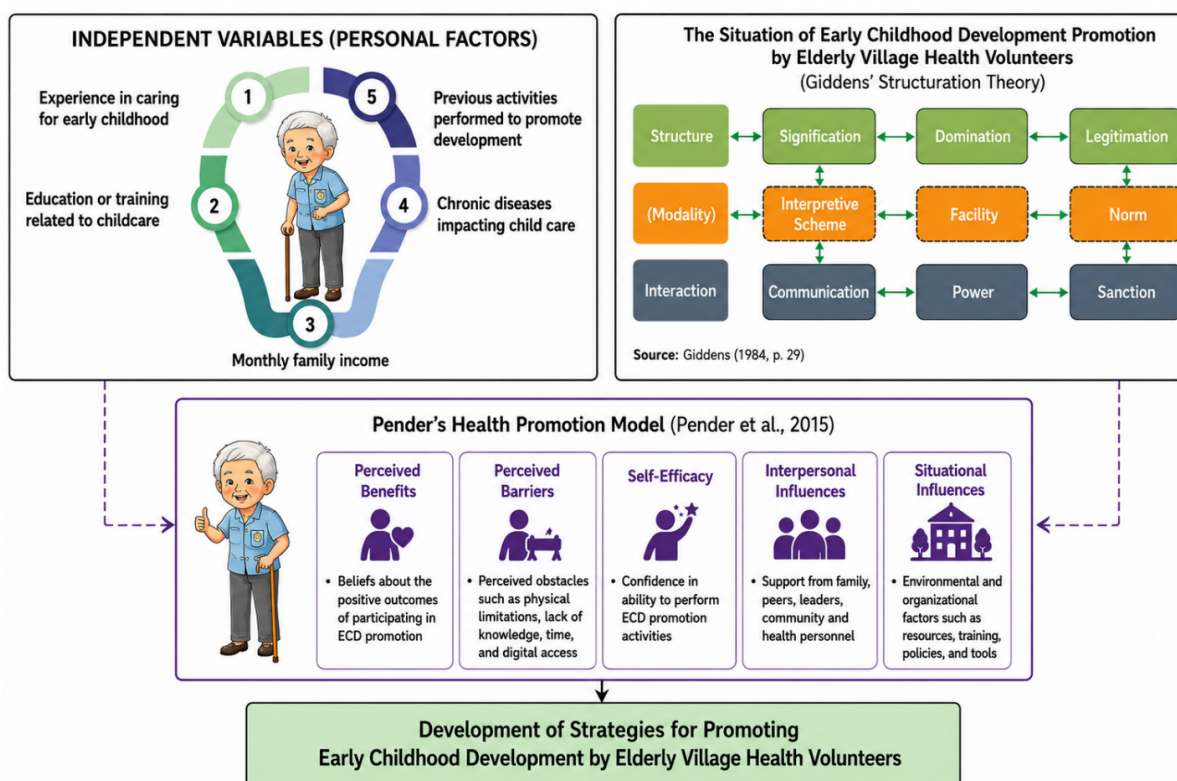


Fig. 1 Conceptual framework of the study. Pender's Health Promotion Model was used to explain elderly VHVs' participation in early childhood development promotion through perceived benefits, perceived barriers, self-efficacy, interpersonal influences, and situational influences. Giddens' Structuration Theory was applied to explain structural and social conditions affecting ECD promotion. Together with personal factors, these concepts informed the development of strategies for promoting early childhood development by elderly Village Health Volunteers.

The quantitative sample consisted of 400 elderly VHVs residing in Mueang, Ban Laem, and Ban Lat districts. The sample size was calculated using Taro Yamane's formula at a 95% confidence level [16]. Participants were selected using purposive sampling from lists of eligible elderly VHVs in the selected districts.

The inclusion criteria were: (1) being an elderly VHV aged 60–69 years; (2) residing and serving as a VHV in Mueang, Ban Laem, or Ban Lat district; (3) being able to read and write Thai; and (4) being willing to participate in the study. The exclusion criteria were severe illness or physical limitations that prevented participation in data collection, inability to communicate or provide reliable information, or withdrawal before completing the questionnaire.

For the qualitative phase, 30 key informants were selected using purposive sampling from elderly VHVs and relevant community health stakeholders with experience or involvement in ECD promotion. The number of interviews was not predetermined as a fixed requirement. Interviews were conducted continuously until data saturation was reached, meaning that no substantially new themes emerged from additional interviews.

The conceptual framework was primarily guided by Pender's Health Promotion Model and complemented by Giddens' Structuration Theory. Pender's model was used to

explain elderly VHVs' participation in ECD promotion as a health-promoting behavior shaped by individual characteristics, perceived benefits, perceived barriers, self-efficacy, interpersonal influences, situational influences, and commitment to action [8]. Giddens' Structuration Theory was used to explain how structural conditions, including rules, resources, operational procedures, support systems, training opportunities, and access to information, enable or constrain elderly VHVs' participation in community-based ECD promotion [15].

The questionnaire was developed by incorporating key concepts from Pender's Health Promotion Model and Giddens' Structuration Theory. Pender's model guided items related to motivation, perceived benefits, perceived barriers, self-efficacy, interpersonal support, situational influences, and participation in ECD promotion, whereas Giddens' theory guided items related to rules, resources, roles, operational support, community systems, and access to information. The item "desire to be an integral part of the community in child development promotion" was clarified as a motivational readiness indicator reflecting perceived benefits, interpersonal influence, and commitment to community-based health-promoting action.

The quantitative instrument was a structured questionnaire consisting of two sections: demographic and background information, and the situation of ECD

promotion by elderly VHVs using a 5-point Likert scale. Content validity was reviewed by three experts, yielding an Index of Item-Objective Congruence (IOC) of 0.87. A try-out was conducted with 30 elderly VHVs with similar characteristics to those of the study participants, and reliability was assessed using Cronbach's alpha coefficient. The qualitative instrument was a semi-structured interview guide exploring experiences, perceived roles, motivation, perceived benefits and barriers, confidence, support needs, contextual limitations, and recommendations for ECD promotion.

The term "6-D Strategy" in this study refers to the six strategic dimensions synthesized from the quantitative and qualitative findings, Pender's Health Promotion Model, Giddens' Structuration Theory, DSPM standards, and active ageing principles [1, 7, 8, 15]. It was not directly adopted from the 6Ds® training-transfer framework developed by Wick, Pollock, Jefferson, and colleagues.

Data collection was conducted after approval from the Human Research Ethics Committee. The research team coordinated with community leaders and Sub-district Health Promoting Hospitals to identify eligible participants, explain the study objectives, obtain informed consent, and collect data.

Quantitative data were analyzed using frequency, percentage, mean, standard deviation, and Pearson's

correlation coefficient. Pearson's correlation coefficient was selected because the main variables were measured as continuous or summed Likert-scale scores and the study aimed to examine linear relationships between personal factors and the ECD promotion situation. Spearman's rank correlation was not selected as the primary analysis because the study focused on linear associations among continuous composite scores rather than rank-order associations. Qualitative data were analyzed using content analysis, and the findings were integrated with the quantitative results to develop practical strategies and operational guidelines.

3. Results and Discussion

This study used an explanatory sequential mixed-methods approach to investigate the situation and factors related to early childhood development (ECD) promotion by elderly Village Health Volunteers (VHVs) and to develop practical strategies consistent with community needs. The findings are presented in four parts: (1) personal characteristics of elderly VHVs; (2) the situation of ECD promotion by elderly VHVs; (3) relationships between personal factors and the situation of ECD promotion; and (4) strategies for promoting ECD by elderly VHVs. The demographic profiles and basic information of the 400 elderly VHVs are summarized in Fig. 2.

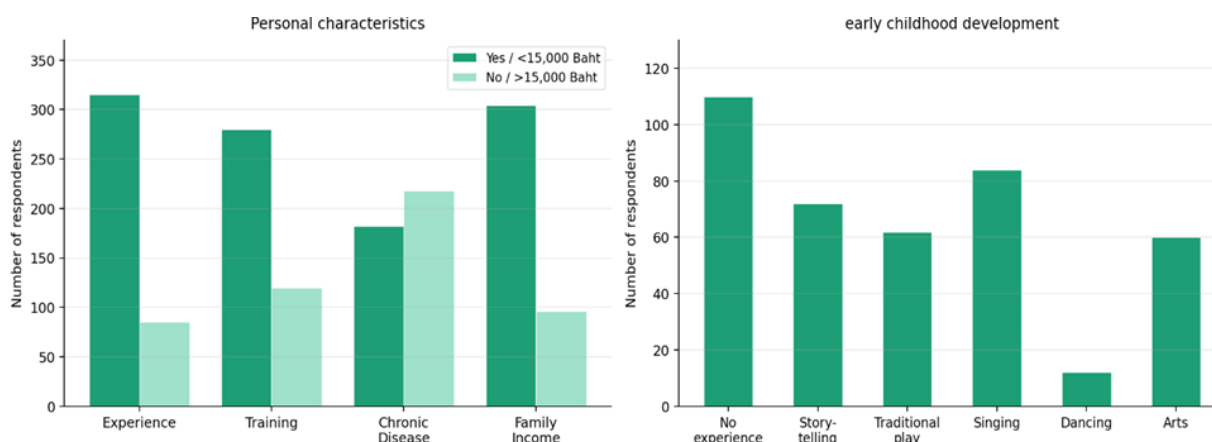


Fig. 2 Number of respondents' personal characteristics and previous activities for promoting early childhood development (n = 400).

Part 1: Analysis of Participants' Personal Characteristics

The findings showed that most participants had previous experience in early childhood care (78.80%) and had received education or training related to childcare or child development (70.00%). Most participants reported a monthly family income of less than 15,000 THB (76.00%). Regarding health status, more than half of the participants (54.00%) reported chronic diseases that could potentially limit their participation in child development activities, such as hypertension, heart disease, or diabetes.

In terms of previous ECD promotion activities, 27.50% of the participants had never performed such activities. Among those with experience, the most common activities

were singing (21.00%), storytelling (18.00%), and traditional games or play (15.50%).

These findings indicate that elderly VHVs possess important individual characteristics and experiential resources for supporting ECD, particularly through previous childcare experience, training, local wisdom, and participation in child-related activities. From the perspective of Pender's Health Promotion Model, these characteristics represent individual experiences that may shape perceived benefits, confidence, and commitment to participation in health-promoting action [8].

This is also consistent with previous studies emphasizing that community health volunteers are valuable frontline

actors because they understand household contexts, maintain trust with families, and connect communities with primary health services [5, 14]. However, the high proportion of elderly VHVs with chronic diseases suggests that ECD promotion roles should be designed in an age-friendly manner. Tasks should consider physical limitations, safe activity spaces, appropriate duration of participation, and support from health professionals [7]. Therefore, the personal characteristics of elderly VHVs support the need for strategies that do not merely assign additional duties to older volunteers but provide appropriate support systems that allow them to contribute safely and meaningfully.

Part 2: Situation of Early Childhood Development Promotion by Elderly VHVs

The overall situation of ECD promotion by elderly VHVs was at a moderate level (mean = 3.03, SD = 0.48). When considering individual items, the highest mean score was found in the desire to be an integral part of the community in child development promotion (mean = 4.03), followed by awareness of the importance of child development (mean = 3.93) and pride in self-worth when contributing to the community (mean = 3.86). These results reflect that elderly VHVs had strong motivational readiness and positive attitudes toward participation in ECD promotion.

However, several limitations were identified. Participants perceived ageing as a physical constraint to participation (mean = 3.93). Low mean scores were found in specialized ECD skills, particularly understanding the nature and needs of early childhood (mean = 2.44), the presence of clear shared activity schedules within the community (mean = 2.44), and opportunities for peer-to-peer experience exchange (mean = 2.41). The lowest mean score was access to information through online public relations channels such as LINE and Facebook (mean = 2.31), indicating a digital communication gap among elderly VHVs.

These findings can be interpreted through Pender's Health Promotion Model. Elderly VHVs' willingness to participate, awareness of child development, and pride in community contribution reflect perceived benefits and commitment to health-promoting action [8]. In contrast, physical limitations, limited specialized ECD knowledge, weak peer-learning mechanisms, and low digital communication access reflect perceived barriers and situational constraints. Therefore, strategies for elderly VHVs should not focus only on knowledge transmission but should also enhance self-efficacy, strengthen interpersonal support, reduce perceived barriers, and create enabling environments for sustained participation in ECD promotion.

The results are consistent with studies showing that VHV capacity development requires structured training,

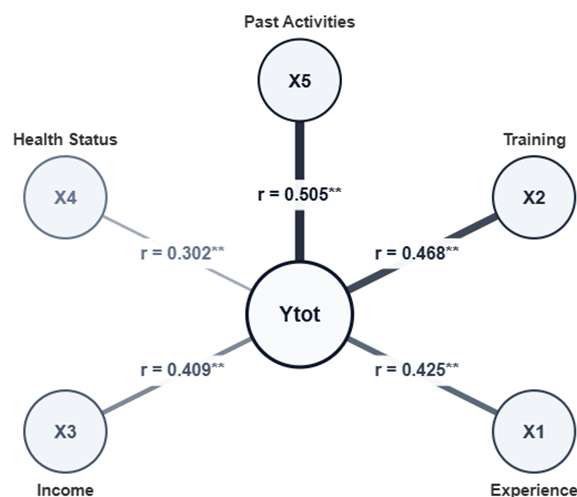
mentoring, user-friendly tools, and continuous professional support [5, 12]. The low scores in specialized knowledge and digital communication access also align with literature emphasizing the importance of age-appropriate learning resources, digital support, and hands-on demonstration for older community volunteers [12, 13]. In the context of DSPM-based child development promotion, elderly VHVs should therefore be supported with simplified manuals, practical demonstrations, mentoring systems, and accessible communication channels rather than relying only on formal training [1].

The finding that "desire to be an integral part of the community" received the highest score should be interpreted as a motivational readiness indicator rather than a structural condition. It reflects elderly VHVs' willingness, perceived social role, and sense of belonging in community development. This is consistent with active ageing concepts, which emphasize continued participation, social contribution, and recognition of older adults as valuable members of society [7]. Thus, the situation of ECD promotion among elderly VHVs includes both health-promotion factors, such as perceived benefits, perceived barriers, self-efficacy, and interpersonal support, and structural factors, such as support systems, resources, and access to information.

Part 3: Relationship between Personal Factors and the Situation of ECD Promotion

Pearson's correlation analysis showed that all examined personal factors had statistically significant positive relationships with the situation of ECD promotion at the 0.01 level. Past ECD promotion activities had the strongest relationship with the overall ECD promotion situation ($r = .505$), followed by formal training ($r = .468$) and direct childcare experience ($r = .425$). Monthly family income ($r = .409$) and physical health status ($r = .302$) also showed positive relationships with the ECD promotion situation, as shown in Fig. 3.

These results indicate that practical experience, formal training, and previous participation in child development activities are key factors associated with elderly VHVs' readiness and capacity for ECD promotion. From the perspective of Pender's Health Promotion Model, past ECD activities and direct childcare experience can be understood as individual experiences that strengthen perceived benefits, confidence, and commitment to health-promoting action [8]. Formal training may also enhance self-efficacy by increasing elderly VHVs' knowledge, skills, and confidence in performing ECD-related roles. These findings support previous studies showing that hands-on experience and training can enhance community volunteers' knowledge, confidence, and role performance [5, 12].



Note. ** $p < .01$. (Statistically significant at the 0.01 level)

Fig. 3 Correlation Network between Personal Factors and the Situation of Early Childhood Development Promotion

The positive relationships of monthly family income and physical health status with the ECD promotion situation suggest that socioeconomic and health-related conditions may function as situational influences and perceived barriers affecting elderly VHVs' participation. Elderly VHVs with better health status or fewer economic constraints may be more able to participate in community activities, attend training, and engage in home- or community-based ECD promotion. Therefore, strategies for elderly VHVs should include not only knowledge and skill development but also age-friendly working conditions, practical support, welfare consideration, and flexible participation arrangements [7, 8].

The correlation findings also justify the use of the quantitative survey as the first phase of this study. By first analyzing the actual needs, strengths, and limitations of elderly VHVs, the researchers were able to design strategies and operational guidelines that were grounded in empirical evidence rather than assumptions. This approach is consistent with community-based health development principles, which emphasize that interventions should be designed from local needs, stakeholder capacities, and real implementation conditions [11, 14]. Therefore, the survey results provided an essential foundation for developing the 6-D Strategy and the practical manual for elderly VHVs.

Part 4: Strategies for Promoting ECD by Elderly VHVs

Based on the integration of quantitative and qualitative findings, the study developed the "6-D Strategy for Enhancing Elderly VHVs' Capacity in Early Childhood Development." The six strategic dimensions were: D1: Define Common Goals; D2: Disseminate Positive Attitudes; D3: Develop Practices and Intergenerational Interaction; D4: Deliver Empowerment and Digital Resources; D5: Determine Standards and Procedures; and D6: Dignify Social Recognition and Values. These strategies were

empirically synthesized from the findings of this study and relevant theoretical and public health frameworks, as illustrated in Fig. 4. They were not directly adopted from the 6Ds® training-transfer framework. The strategic objective and key actions of each strategy are summarized in Table 1.

The first strategy, Define Common Goals, focuses on establishing shared policy commitments among local administrative organizations, public health agencies, universities, families, and community networks. From the perspective of Pender's Health Promotion Model, this strategy strengthens situational influences by creating supportive conditions, clear direction, and shared expectations for elderly VHVs' participation in ECD promotion [8]. It also aligns with Giddens' Structuration Theory by clarifying rules, resources, and roles within community and health-service structures [15]. This strategy responds to the need for role definition, resource allocation, and multisectoral collaboration, which are essential for sustainable ECD promotion [2, 11, 14].

The second strategy, Disseminate Positive Attitudes, aims to strengthen confidence and positive perceptions of elderly VHVs as community-based supporters of ECD. This strategy is closely related to perceived benefits and commitment to health-promoting action in Pender's model because it reinforces elderly VHVs' sense of value, pride, and meaningful contribution to children, families, and communities [8]. The findings showed that elderly VHVs already had high willingness and pride in community contribution. Therefore, communication strategies should emphasize their value as local wisdom holders and "modern community sages." This approach is consistent with active ageing and intergenerational learning literature, which suggests that older adults benefit from meaningful roles, social participation, and community recognition [7, 9, 10].



Fig. 4 The 6-D Strategy for Enhancing Elderly VHVs' Capacity in Early Childhood Development (ECD). The model illustrates six core strategies (D1–D6) developed from quantitative and qualitative findings and informed by Pender's Health Promotion Model, Giddens' Structuration Theory, DSPM standards, and active ageing principles. The strategy emphasizes multisectoral collaboration among public health agencies, local administrative organizations, universities, families, and community networks to support elderly VHVs as community-based ECD promoters.

Table 1 Strategic Objectives and Key Actions of the 6-D Strategy.

Strategies	Strategic Objectives	Key Actions
D1: Define Common Goals	To establish policy commitments and integrate a shared direction of success among network partners.	• Raise awareness at the administrative levels of Local Administrative Organizations and public health sectors. • Clearly define the roles, duties, and missions of each network partner. • Allocate strategic budgets to support instructional media and expert speakers.
D2: Disseminate Positive Attitudes	To build confidence and positive attitudes toward the role of elderly VHVs as "Modern Community Sages".	• Communicate through diverse channels, including traditional media and social media. • Focus on proactive door-to-door communication to reach groups with limited technology access. • Create platforms for knowledge exchange among VHVs, parents, and local leaders.
D3: Develop Practices and Intergenerational Interaction	To promote continuous intergenerational interaction and transfer local wisdom through appropriate recreational activities.	• Organize "Cultural Bond" activities (storytelling/traditional games) at least 1–2 times per month. • Design safe activity spaces suitable for the physical ergonomics of the elderly. • Enhance VHV skills in monitoring child development in collaboration with parents.

Table 1 Strategic Objectives and Key Actions of the 6-D Strategy (continued).

Strategies	Strategic Objectives	Key Actions
D4: Deliver Empowerment and Digital Resources	To enhance capacity through accessible learning resources and digital innovations.	• Support applications or video media to reduce constraints related to technical data memorization. • Provide training on the correct use of the DSPM manual according to public health standards. • Develop experienced VHVs as "Community Mentors" to transfer knowledge.
D5: Determine Standards and Procedures	To establish integrated operational regulations and database systems under a unified standard.	• Develop the "Senior VHV for Kids" Standard Operating Procedure (SOP). • Improve reporting and referral systems for at-risk groups to Sub-district Health Promoting Hospitals. • Integrate health databases for children aged 0–6 years between communities and medical facilities.
D6: Dignify Social Recognition and Values	To create social measures that honor and value the contributions of elderly VHVs.	• Award competency certificates (Micro-credentials) and "Role Model" honors. • Promote a culture of respect and encouragement from parents and professional staff. • Support symbolic volunteer activities performed alongside preschool children in the community.

The third strategy, Develop Practices and Intergenerational Interaction, promotes repeated and meaningful activities between elderly VHVs and young children, such as storytelling, singing, traditional games, and cultural play. This strategy enhances interpersonal influences and commitment to action by creating regular interaction among elderly VHVs, children, parents, and community members [8]. These activities are also consistent with Vygotsky's sociocultural theory, in which experienced adults provide scaffolding for children's learning and development [3]. They support child development domains emphasized in the DSPM and can strengthen language, motor coordination, social skills, problem-solving, to perform ECD promotion activities [8]. For elderly VHVs, digital resources should be age-friendly and designed to reduce memory burden rather than increase technical complexity.

The fifth strategy, Determine Standards and Procedures, focuses on establishing clear operational guidelines, referral pathways, and data-sharing mechanisms between communities and Sub-district Health Promoting Hospitals. This strategy strengthens situational influences by creating a clear practice environment that supports consistent action [8]. It also reflects Giddens' concepts of rules, resources, and structural support by translating public health standards into practical community procedures [15]. This strategy is important because ECD promotion requires not only activities but also systematic surveillance, early detection,

empathy, and executive function [1]. Therefore, intergenerational activities provide mutual benefits for both children and elderly VHVs [4, 9, 10].

The fourth strategy, Deliver Empowerment and Digital Resources, directly addresses perceived barriers and self-efficacy. The findings showed that elderly VHVs had limitations in specialized ECD knowledge and digital communication access. Therefore, training should be practical, repeated, and supported by simple digital tools, video demonstrations, and DSPM-based learning materials [1, 12, 13]. From Pender's perspective, empowerment and accessible learning resources can reduce perceived barriers, increase confidence, and strengthen elderly VHVs' ability referral, and follow-up [1, 2]. Integrating elderly VHVs into DSPM-based child surveillance systems can help expand community participation while maintaining public health standards [1, 2, 11].

The sixth strategy, Dignify Social Recognition and Values, emphasizes dignity, recognition, encouragement, and social value for elderly VHVs. This strategy supports perceived benefits, interpersonal influences, and commitment to health-promoting action by reinforcing elderly VHVs' sense of self-worth and social contribution [8]. Recognition systems, such as certificates, role model awards, and public appreciation, can strengthen motivation and reduce age-related stereotypes. This is consistent with active ageing principles, which highlight participation, security, dignity, and social inclusion among older adults [7,

9, 10]. The roles of key network partners in implementing the 6-D Strategy are summarized in Table 2.

The major contribution of this study lies in the development of a practical and comprehensive strategy model grounded in nursing health-promotion theory and community-based evidence. The innovation of the model is its integration of Pender's Health Promotion Model, DSPM standards, Giddens' Structuration Theory, intergenerational

learning, active ageing, digital support, local wisdom, and multisectoral collaboration into one operational framework [1, 4, 7, 8, 13, 14, 15]. Unlike conventional ECD promotion approaches that mainly rely on health professionals, parents, or child development centers, this model expands the role of elderly VHVs as nursing-informed community health promoters and social capital within the community health system [2, 11].

Table 2 Summary of Network Partner Roles in Strategy Implementation.

Network	Key Role	Primary Action Guidelines
Ministry of Public Health (PHO / DHO / SHPH)	Academic Core and Surveillance System	Establish a "Nurse Mentor" system for positive supervision and proactive health database management.
Universities (Health Sciences)	Intellectual and Innovation Leadership	Conduct Research and Development (R&D) for age-appropriate instructional media, foster Empowerment, and produce public-minded graduates.

Overall, the findings are consistent with literature on community-based ECD promotion, VHV capacity development, intergenerational learning, health promotion, and active ageing [2, 7, 8, 9, 11, 12]. They show that sustainable ECD promotion requires more than developmental screening; it requires a supportive community system that enhances perceived benefits, reduces perceived barriers, strengthens self-efficacy, and connects families, elderly VHVs, health services, local administrative organizations, and universities. The proposed 6-D Strategy therefore provides both a policy direction and a practical community-development mechanism for improving child development while simultaneously promoting meaningful participation, self-worth, and active ageing among elderly VHVs.

4. Conclusion

The development of strategies for promoting early childhood development (ECD) by elderly Village Health Volunteers (VHVs) represents a community-based nursing and social innovation grounded in Pender's Health Promotion Model and integrated with public health standards, local wisdom, intergenerational learning, digital support, Giddens' Structuration Theory, and active ageing principles. The findings show that elderly VHVs have important strengths, including childcare experience, willingness to participate, community trust, and pride in social contribution. However, they also require systematic support in terms of standardized ECD knowledge, practical skills, digital communication, safe activity arrangements, mentoring, and social recognition.

The six strategies developed in this study provide an operational model for strengthening elderly VHVs' role in ECD promotion. At the policy level, the strategies can be applied by integrating elderly VHV-led ECD activities into local quality-of-life development plans, DSPM-based child development surveillance systems, local budget allocation,

and intersectoral collaboration among public health agencies, local administrative organizations, universities, families, and community networks [1, 2, 11]. At the community-development level, the strategies can guide Sub-district Health Promoting Hospitals and local partners in organizing intergenerational child-development activities, establishing community mentor systems, creating referral and follow-up pathways, providing age-friendly digital learning resources, and dignifying elderly VHVs as valuable community health and child-development supporters [7, 8, 12, 14].

Overall, this study contributes to Creative Science by translating nursing health-promotion theory, empirical evidence, public health standards, local wisdom, digital support, and community assets into a practical strategy model for strengthening early childhood development and active ageing. The proposed 6-D Strategy can strengthen early childhood development while enhancing perceived benefits, reducing perceived barriers, strengthening self-efficacy, and promoting meaningful participation and self-worth among elderly VHVs.

5. Suggestions

Significant policy and practical recommendations emerge from this research. At the policy level, Local Administrative Organizations (LAOs) and local public health agencies should integrate strategies for promoting early childhood development (ECD) by elderly Village Health Volunteers (VHVs) into sub-district quality-of-life development plans. This integration should be guided by the study findings, which showed that previous ECD activities and formal training were strongly associated with elderly VHVs' operational readiness. Policy implementation should also be aligned with the Active Ageing pillars of health, participation, and security to ensure that community health interventions support both child development and the holistic well-being of elderly volunteers.

To support implementation, strategic budget allocation should prioritize continuous hands-on training, DSPM-

based learning materials, mentoring systems, and age-friendly digital innovations that reduce memory burden and technical complexity for elderly VHVs. In line with Pender's Health Promotion Model, these supports should aim to enhance perceived benefits, reduce perceived barriers, strengthen self-efficacy, and promote sustained commitment to ECD-promoting actions. In addition, because economic factors were associated with participation, local agencies should consider appropriate morale-building mechanisms, welfare support, incentives, and public recognition systems. These measures can strengthen parental confidence, promote sustainable empowerment, and dignify elderly VHVs as "modern community sages."

At the operational level, priority should be given to safe and age-friendly working conditions that accommodate the physical limitations of elderly VHVs. Activities should be designed with appropriate duration, accessible venues, clear role assignments, and support from health professionals or community mentors. Such arrangements would enable elderly VHVs to participate effectively in ECD promotion while enhancing quality of life across generations.

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7. Declaration of Generative AI in Scientific Writing

A generative AI tool was used only to assist with language editing and improving the grammatical structure, clarity, and readability of the manuscript. All intellectual content, data analysis, interpretation of findings, references, and final revisions were reviewed, verified, and approved by the authors. The authors take full responsibility for the integrity, accuracy, and validity of the final manuscript.

8. CRediT Author Statement

Supattra Nuttarugs: Conceptualization, Methodology, Software, Validation, Investigation, Writing – Original Draft, Writing – Review & Editing **Sanor Klingam:** Supervision, Project Administration, Visualization **Trairong Pliansaeng:** Validation **Nichakorn Permpornsakul:** Conceptualization, Validation **Sarinna Chantachot:** Conceptualization, Validation

Jindapron Silathong: Conceptualization, Validation **Wannaprai Yamma:** Conceptualization, Methodology, Software, Validation, Investigation, Writing – Original Draft, Writing – Review & Editing

9. Research Involving Human and Animals Rights

All procedures performed in this study involving human participants were conducted in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. This study did not involve any animal experiments or animal subjects.

10. Ethics Approval and Consent to Participate

This study was approved by the Human Research Ethics Committee of Kamphaeng Phet Rajabhat University (COA No. 024/2026, REC No. 001/69). Written informed consent was obtained from all elderly Village Health Volunteers before participation in the survey and interview processes. Participants were fully informed about the study objectives, voluntary participation, and their right to withdraw from the study at any time without consequence. To ensure privacy and confidentiality, all data were anonymized, and personal identifiers were removed before data analysis.

11. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

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