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A quality of life promoting model for the elders Apllying social laboratory concept in health region 5, ministry of public health

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Abstract: This research and development project aimed to promote and evaluate the effectiveness of a quality of life of the elders applying social laboratory concept. The study was conducted in three phases, Phase 1: Situational analysis to identify quality of life issues among 270 elders' participants. Phase 2: Development of the model and piloting with a sample of 30 participants. Phase 3: A pilot implementation and evaluation of the model with 30 experimental and 30 control participants. The study was conducted from June to September 2024. The tools used included, A WHOQOL–BREF–THAI questionnaire for assessing the quality of life of elders, A questionnaire on lifestyle behaviors, and A quality-of-life enhancement model for elders applying social laboratory concept. Data were analyzed using t-tests. Findings, Phase 1: The quality of life of elders in Health Region 5 of the Ministry of Public Health was found to be at a moderate level. Phase 2: A prototype model was developed, emphasizing participatory planning based on social action concepts. The PRIME Model was introduced, comprising, P: Purpose, Plan, and Partnerships, R: Research, Response, and Reflection, I: Insight, Interest, and Influence, M: Materials, Monitoring, and Maintenance, E: Experience, Empowerment, and Environment. This model was aligned with six key lifestyle behaviors for elders. Phase 3: The prototype model was applied to the experimental and control groups, each consisting of 30 participants, over a six-week period. The results revealed, A significant improvement in the quality of life among the experimental group compared to pre-intervention levels (p-value < .001). A significant enhancement in lifestyle behaviors in the experimental group compared to pre-intervention levels (p-value < .001). A significant improvement in overall health status among the experimental group compared to pre-intervention levels (p-value < .001). To sustain and improve the quality of life and health behaviors of elders, continuous application of the quality-of-life enhancement model based on the social laboratory concept is essential.

Keywords: *Elders, Quality of life, Social laboratory concept.*

1. Introduction

The aging population is increasing rapidly (Foundation of Gerontology Research and Development Institute & Institute for Population and Social Research, 2019). It is projected that the proportion of elder's individuals will rise from 12% of the global population in 2015 to 22% by 2050, with an average annual growth rate of 4%. The population of those aged 80 and above is expected to grow at an average of 7% per year, increasing from 7.6 million in 2017 to 8.6 million in 2021, representing a 13% growth (United Nations, 2019). Thailand entered a "complete aging society" in 2022 and is projected to become a "super-aged society" by 2033 when the proportion of individuals aged 60 and above reaches 28% (United Nations, 2019) Additionally, by 2040, Thailand is expected to have 20 million elders' individuals, accounting for one-third of the population, with 3.5 million aged 80 and above, or 5.2% (Office of the National Economic and Social Development Board, 2022). This trend poses significant social, economic, and healthcare challenges at both global and regional levels. Many countries, including Thailand, prioritize quality of life, as a healthy population facilitates faster and more efficient national

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development (World Health Organization Quality of Life Group, 1998). Thus, enhancing the quality of life for elders has become a critical focus. However, aging societies face challenges, primarily health issues due to declining physical efficiency. Secondary challenges include social and economic problems arising from diminished physical capacity, inability to work as before, reduced income, and financial insecurity among the elders. Other issues include social needs, such as acceptance and trust from others, maintaining relationships, societal integration, family problems, and broader societal development challenges (Puengphothisapha N., & Chanprasit T., 2014).

Historically, government-led initiatives have driven efforts to enhance the quality of life for elders through policies, programs, and supportive legislation (Information Center. National Health Commission Office., 2019). Government mechanisms or partnerships with other sectors have been critical, alongside the involvement of elders, their families, and communities. Communities must develop self-care plans for pre-aging preparation to ensure a stable life within society. This requires collaborative efforts to enhance the quality of life of elders, emphasizing social integration and community engagement.

Quality-of-life promotion models for elders should focus on fostering relationships with society, encouraging families and communities to recognize the importance of various factors that contribute to elders' well-being, and promoting community participation (Hassan, Z. (2014). Such initiatives aim to sustainably enhance the quality of life of elders as community members. Given the complexity of elderly care, it requires interdisciplinary integration to improve quality of life effectively. Past policies have primarily focused on institutional services, lacking clarity for building a strong social foundation for elderly care. A multidisciplinary participatory approach is essential to address the multifaceted issues of public health, education, economics, society, and culture as key determinants of health (Suwan, P., 2020). The concept of interdisciplinary expertise involves studying and addressing complex problems through social experiments, fostering awareness, learning, idea exchange, and collaboration among social network members for mutual benefit (Hassan, Z. (2014).

This research aims to develop a quality-of-life promotion model for elders applying social laboratory concept in Health Region 5, under the Ministry of Public Health.

2. Objectives

1. To analyze the situation and identify quality-of-life issues among elders in Health Region 5 under the Ministry of Public Health.

2. To develop a quality-of-life promotion model for elders applying social laboratory concept in Health Region 5 under the Ministry of Public Health.

3. To evaluate the quality-of-life promotion model for elders applying social laboratory concept in Health Region 5 under the Ministry of Public Health.

3. Methodology

This study is a research and development (R&D) project conducted from June to September 2024. Following participation in activities for 4 weeks and an evaluation 6 weeks post-experiment, the research is divided into three phases:

Phase 1: Situation Analysis and Identifying Quality-of-Life Issues Among Elders, the situation analysis will be conducted from June to July 2024. The study population includes individuals aged 60 years and older in Health Region 5 under the Ministry of Public Health, spanning eight provinces, with a total population of 927,860 (Health Data Center, 2023). A sample of 270 participants will be randomly selected from various areas in Health Region 5 using the G*Power program (version 3.1.9.2). The sample size calculation is based on a power level (β) of .95, a significance level (α) of .05, and an effect size of .89. Additionally, 20 key informants will be included, consisting of geriatric specialists, healthcare professionals responsible for elderly care, and 10 elders from social networks. The research tools include: 1. Qualitative Data Collection Tools, In-depth interviews addressing: Quality-of-life issues across four dimensions: physical, mental, social relationships, and environment. Lifestyle behaviors of elders. Recommendations for improving quality of life in all four dimensions. 2. Quantitative Data

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Collection Tools,1) WHOQOL-BREF-THAI Questionnaire (26 items) for assessing quality of life (WHOQOL Group, (1994). 2) Lifestyle Behavior Questionnaire focusing on three sections, General Information: Age, gender, education, occupation, marital status, average monthly income, income sufficiency, chronic diseases, social group membership, regularity of participation, household size, social security status, and physical-mental-social health status. Health Status: Chronic diseases, health insurance status, medical history, healthcare visits, and measured health parameters such as body mass index (BMI), waist-to-hip ratio, and blood sugar levels (most recent measurement within a month). Lifestyle Behaviors: Daily activities, including dietary habits (15 items), exercise (7 items), stress management (12 items), sleep (9 items), medication use (4 items), and interpersonal relationships (8 items), totaling 55 items with a 4-point Likert scale. Behavioral frequency is scored as follows: 5 days/week (4 points), 3-4 days (3 points), 1-2 days (2 points), and none (1 point). The objective of Phase 1 is to identify quality-of-life issues, lifestyle behaviors, and community needs, and to inform the development of a quality-of-life promotion model for elders applying social laboratory concept.

Validation and Reliability, Content validity was ensured by calculating the Content Validity Index (CVI) for all items, with a required CVI > 0.8 (Davis, L. L., 1992). Reliability was measured using Cronbach's alpha coefficient. A pilot test was conducted with a group of 30 individuals similar to the target population, yielding a reliability coefficient of 0.981.

Phase 2: Development of a Quality-of-Life Promotion Model for Elders Applying Social Laboratory Concept in Health Region 5, Ministry of Public Health, this phase, scheduled for July 2024, focuses on developing a quality-of-life promotion model for elders in collaboration with elderly network members in Health Region 5. The model incorporates the social laboratory concept (Hassan, Z. 2014) and experiential learning activities, guided by six core principles: 1) Collaborative thinking, planning, action, and shared benefits. 2) Community-centered problem-solving. 3) Learner-focused approaches. 4) Experiential learning. 5) Andragogy (adult learning principles) and 6) Community empowerment. The aim is to design a comprehensive, integrated health care model for elders. Activities will emphasize six key lifestyle behaviors, Quality of life, Nutrition, Physical activity, Stress management, Environmental management and Smoking cessation. These activities will be implemented throughout the study to refine and validate the proposed model for promoting the quality of life of elders in Health Region 5.

Phase 3: Implementation and Evaluation of a Quality-of-Life Promotion Model for Elders Applying Social Laboratory Concept, this phase, conducted from August to September 2024, involves testing the developed quality-of-life promotion model applying social laboratory concept. The study includes an experimental group and a control group, each consisting of 30 participants, over a six-week period. The model is evaluated through pre- and post-test assessments using questionnaires to measure the quality of life and lifestyle behaviors of the elderly participants. Data Collection and Intervention, 1) Pre-Intervention, Baseline data on the quality of life, lifestyle behaviors, and health status of 30 elders in both the experimental and control groups will be collected using validated questionnaires. 2) Intervention Phase:
The experimental group will receive the quality-of-life promotion model incorporating the social laboratory concept. Key activities include: 2.1) Learner-centered and experiential learning activities, Collaboration with community volunteers to care for elders. Guided by principles of participatory planning, community focus, learner-centered approaches, experiential learning, andragogy (adult learning), and community empowerment. 2.2) Implementation of the PRIME framework through six activities: Activity 1: P (Purpose, Plan, Partner) A 60-minute workshop to collaboratively develop health care plans for elders with community networks, utilizing mind-mapping techniques for health care planning. Activity 2: R (Research, Respond, Reflect).

A 60-minute session to share experiences through seminars where community networks present successful health care strategies for elders. Activity 3: I (Inform, Inspire, Influence) A 60-minute session aimed at fostering community empowerment for sustainable care of elders, assigning community volunteers as health behavior advisors across six lifestyle domains: quality of life, nutrition, physical activity, stress management, environmental management, and smoking cessation. Activity 4: M (Material, Monitoring, Management) A 60-minute activity to create a supportive environment by surveying and modifying community spaces to better accommodate the needs of elders.

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Activity 5: E (Experience, Empower, Environment) A 60-minute integrated health care session featuring health promotion videos presented by health experts and creating environments conducive to health across the six behavioral dimensions. The PRIME model will guide all interventions, aligning health promotion efforts with behavioral modifications tailored to the elderly's needs. (Mahatnirankul, S., Tantipivatanasakul, W., & Phumphaisanchai, W. 2021)

Evaluation, Post-intervention, both groups will undergo assessments to evaluate changes in their quality of life and lifestyle behaviors. Data analysis will compare pre- and post-test results, assessing the model's effectiveness in improving the quality of life of elders. As shown in Figure 1.

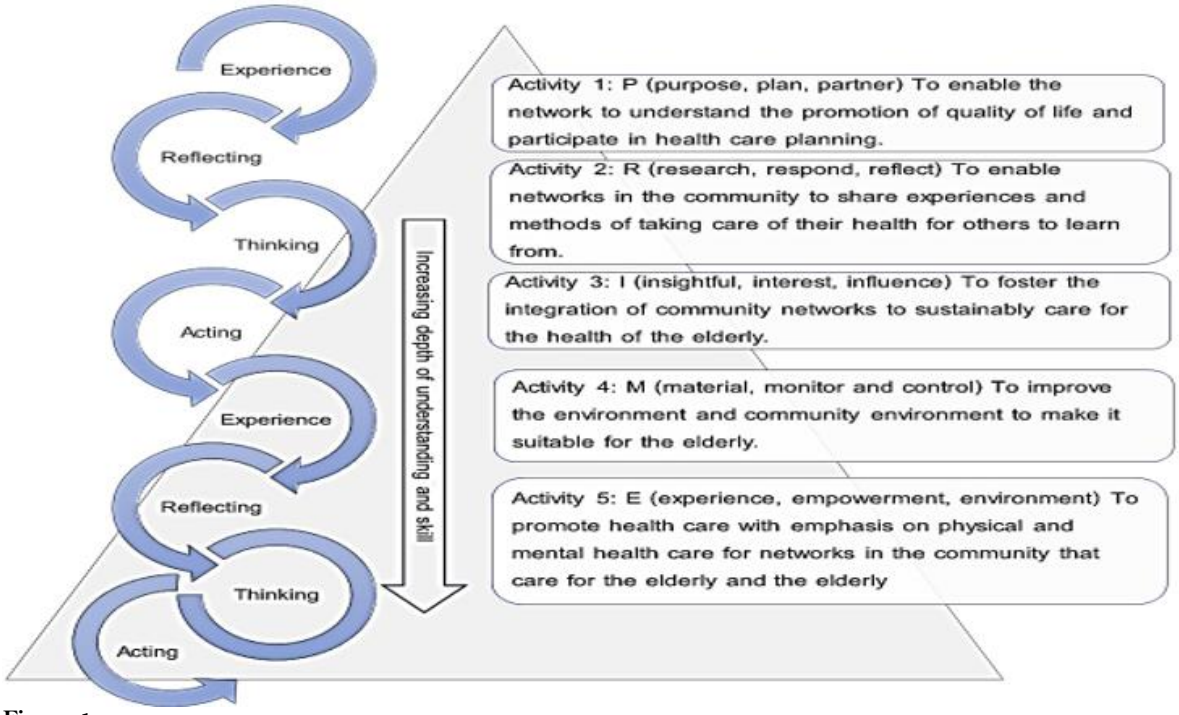

Figure 1.
PRIME model; A quality of life promoting model for the elders applying social laboratory concept in region 5 health public, ministry of public health.

Research Instruments, the study employed a range of research instruments, including the WHOQOL–BREF–THAI questionnaire, consisting of 26 items (WHOQOL Group, (1994), and a lifestyle behavior questionnaire for elders. The latter differs from the questionnaire used in Phase 1 (situation analysis and identification of quality-of-life issues) and comprises four sections: 1) Quality of Life Assessment, The WHOQOL–BREF–THAI questionnaire, consisting of 26 items, assesses various dimensions of quality of life among elders. 2) Lifestyle Behavior Assessment, Section 2.1: General Information, Data include demographic and socioeconomic factors such as age, gender, education, occupation, marital status, average monthly income, income sufficiency, chronic diseases, participation in social groups, frequency of attendance, household size, social security, and physical, mental, and social health status. Section 2.2: Health Status, covers chronic diseases, health insurance coverage, medical history, doctor visits, and health measurements, including body mass index (BMI), waist-to-hip ratio, and blood sugar levels (measured within one month of the survey date). Section 2.3: Daily Life Behaviors, comprises 55 items across six domains, Nutrition (15 items), Physical activity (7 items), Stress management (12 items), Sleep (9 items), Medication use (4 items), Interpersonal relationships (8 items), Responses are rated on a four-point scale based on weekly frequency (5 days = 4 points, 3-4 days = 3 points, 1-2 days = 2 points, no behavior = 1 point).

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These instruments aim to identify quality-of-life issues, lifestyle behaviors, community needs, and guide the development of the quality-of-life promotion model based on the social laboratory concept.3) Activity Satisfaction Questionnaire, consists of 20 items rated on a five-point Likert scale (5 = excellent, 4 = good, 3 = moderate, 2 = below average, 1 = needs improvement). 4) Community Outcome Evaluation, This tool measures outcomes in three domains, Social Capital (6 items), Human Capital (5 items), Intellectual Capital (5 items). Each item is rated on a five-point scale (5 = excellent, 4 = good, 3 = moderate, 2 = below average, 1 = needs improvement). Additionally, a checklist evaluates environmental factors conducive to elder' health (20 items), with binary scoring (0 = no, 1 = yes).

The analysis process is as follows, Step 1: Scoring responses. Group 1 consists of three negative statements. Each statement is rated on a 1–5 scale, where 5 means "Not at all" and 1 means "Very much.". Group 2 consists of 23 positive statements. Each statement is rated on a 1–5 scale, where 5 means "Very much" and 1 means "Not at all.". Step 2: Aggregating scores, Calculate the total score for each item and determine the minimum, maximum, mean, and standard deviation (S.D.).

Distribute the frequency and calculate the number and percentage for each response item. Step 3: Categorizing scores into three levels. The total quality of life score ranges from 26 to 130 and is compared against the standard criteria, Poor quality of life: 26–60 points, Moderate quality of life: 61–95 points and good quality of life: 96–130 points. The breakdown of quality-of-life levels by components is presented in Table 1.

Table 1.
Quality of life score levels categorized by components.

Components	Overall quality of life levels		
	Poor	Moderate	Good
1. Physical health	7-16	17-26	27-35
2. Mental health	6-14	15-22	23-30
3. Social relationships	3-7	8-11	12-15
4. Environment	8-18	19-29	30-40
Overall quality of life	26-60	61-95	96-130

Data Analysis, Descriptive statistics were used for general analysis, while paired t-tests evaluated pre- and post-intervention outcomes within groups. Independent t-tests compared results between the experimental and control groups, with statistical significance set at $p < 0.05$.

4. Results

Phase 1: Situation Analysis and Identification of Problems Regarding the Elderly's Quality of Life in Region 5 Health Public, Ministry of Public Health, A quantitative study was conducted to analyze the personal characteristics, health status, quality of life, and lifestyle behaviors of 270 elderly participants in Health Region 5 under the Ministry of Public Health. Findings: Gender: The majority of participants were female (71.5%). Age: Participants aged 60 and above were categorized into age groups, 60–69 years: 60.4%, 70–79 years: 29.3%, Marital Status: Most were married (59.3%), followed by widowed/divorced/separated (28.2%). Education Level: The majority had a primary education (61.1%), followed by lower secondary education or vocational certification (13.3%). Monthly Income: Below 5,000 THB: 33.7%, 5,001–10,000 THB: 33.3%, Most participants reported sufficient income for expenses (61.5%), followed by those with insufficient income but no debt (16.3%). Income Sources: The primary source was the elderly allowance (87.8%), followed by agricultural work (23.7%). Social Engagement: Membership in elderly clubs: 50.7%, However, 61.9% of members never participated in club activities, while 14.8% regularly attended (8 times per year). Living Arrangements: Most lived with their children or grandchildren (71.5%), followed by those living alone (15.6%). This data provides insights into the demographic, social, and economic context of the elderly population, highlighting key issues for further intervention.

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Health Status of Elderly Individuals Aged 60 and Above Chronic Diseases: The majority (81.1%) had chronic conditions, with 56.7% having more than one chronic illness. The most common conditions were hypertension (56.7%) and hyperlipidemia (38.1%). Health Insurance: Most participants were covered under elderly health insurance (56.7%), followed by retired civil servant benefits (6.7%). Doctor Visits: The majority attended all scheduled doctor appointments (90.7%), while 5.2% attended occasionally. Basic Health Check Results: Body Mass Index (BMI): Most participants were classified as obese level 1 (30.74%), followed by those within the normal weight range (27.04%). Waist Circumference: 75.2% had measurements above the normal range. Visceral Fat: 77.0% had higher-than-normal levels. Vital Signs: Heart Rate: Average of 78.45 beats per minute (range: 53–112 bpm). Blood Pressure: Systolic: Average of 130.46 mmHg (range: 79–181 mmHg). Diastolic: Average of 74.78 mmHg (range: 68–134 mmHg). Recent Blood Test Results (within one month): Fasting Blood Sugar (FBS): Average of 114 mg/dL (range: 70–274 mg/dL). Hemoglobin A1C (HbA1C): Average of 7.43% (range: 5.8–10.8%). These findings indicate a high prevalence of chronic conditions and related health risks among the elderly population, underscoring the need for targeted interventions. Findings on the Quality of Life of Elderly Individuals Aged 60 and Above (Phase 1), The overall quality of life among elderly participants was found to be at a moderate level, with a mean score of 88.75±11.79. The quality of life across all health dimensions was also moderate: Physical Health: Mean score of 23.02±3.94. Mental Health: Mean score of 20.60±3.22. Social Relationships: Mean score of 10.04±2.07. Environment: Mean score of 28.11±4.75. Findings on Elderly Behavior (Phase 1), The study revealed that interpersonal relationships were the most valued aspect, with the highest mean score of 2.55±0.84. This was followed by: Sleep quality (2.22±0.48), Food consumption (2.21±0.43), Physical activity (2.17±0.55), Stress management (1.92±0.50), and Medication adherence (1.67±0.72), which was the least prioritized behavior. Qualitative Insights, Key informants expressed a strong interest in participating in the program and were fully cooperative throughout its duration. They emphasized the importance of disseminating knowledge on improving elderly quality of life and promoting healthy behaviors among community members, particularly families with elderly members. Continuous efforts to enhance the quality of life and promote healthy living behaviors in the community were strongly highlighted.

Phase 2: Development of a Quality-of-Life Promotion Model for the Elderly Applying the Social Laboratory Concept in Region 5 Health Public, Ministry of Public Health. The initial phase of development revealed that the quality-of-life promotion model for the elderly, applying the social laboratory concept in region 5, involved a participatory planning approach grounded in social practice. The model emphasized active involvement from network members in planning, implementation, and receiving benefits. The activity planning process followed the PRIME Model, consisting of: P: Purpose, Plan, Partnership, R: Research, Response, Reflection, I: Insight, Involvement, Influence, M: Materials, Monitoring, Management, E: Experience, Empowerment, Environment, the integrated health and wellness education approach was designed to empower community networks to care for the elderly and create an environment conducive to health promotion. It aimed to enhance the quality of life and health through behavioral lifestyle practices for the elderly, focusing on six key aspects: Quality of life, Nutrition, Physical activity, Stress management, Environmental management, and smoking and alcohol cessation.

Phase 3: Implementation and Evaluation of a Quality-of-Life Promotion Model for the Elderly Applying Social Laboratory Concept. Part 1: Demographic Data This study included 60 participants, equally divided into an experimental group and a comparison group (n = 30 per group). The demographic characteristics of both groups were highly similar, ensuring comparability and independence essential for research validity. Key demographics included: 1) Gender: Females constituted 72.5% in the experimental group and 75.0% in the comparison group.2) Age: In the experimental group, 37.5% were aged 60–69 and 70–79, whereas 65.0% of the comparison group were aged 60–69. 3) Marital Status: 57.5% of the experimental group and 60% of the comparison group were married. 4) Education: Most participants had a primary education (65% in the experimental group; 55% in the comparison group). 5) Income: Monthly income below 5,000 THB was reported by 75% in the

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experimental group and 45% in the comparison group. Other variables, including source of income, family composition, and participation in senior citizen clubs, were also assessed, highlighting notable differences in social engagement and living arrangements. Part 2: Comparison of Quality of Life (QoL). After participating in the QoL activities, the experimental group showed significant improvements in overall QoL, increasing from a mean score of 66.88 ± 7.31 (moderate level) to 85.98 ± 5.87 (moderate to high level). Physical QoL: Improved from 22.23 ± 3.29 to 23.33 ± 2.04. Mental QoL: Increased from 19.85 ± 3.36 to 21.73 ± 2.49. Social Relationships: Advanced from 10.18 ± 2.07 to 11.38 ± 1.21. Environmental QoL: Rose from 27.65 ± 3.45 to 29.55 ± 2.33.

Compared to the comparison group, the experimental group demonstrated statistically significant improvements across all domains ($p < .05$). Part 3: Behavioral Changes in Daily Living post-intervention, significant improvements were observed in all lifestyle behaviors in the experimental group ($p < .001$): Dietary Practices: Increased from 2.24 ± .49 to 2.90 ± .26. Exercise: Improved from 1.98 ± .65 to 2.64 ± .43. Stress Management: Advanced from 1.97 ± .38 to 2.72 ± .24. Sleep: Enhanced from 2.15 ± .39 to 2.76 ± .34. Part 4: Health Outcomes

Notable health improvements were observed in the experimental group: BMI: Reduced from 23.07 ± 3.88 to 21.50 ± 3.91 ($p < .001$). Waist Circumference: Decreased from 79.60 ± 12.55 cm to 77.01 ± 12.54 cm ($p = .009$). Part 5: Participant Satisfaction. High levels of satisfaction were reported for the health promotion activities, with an overall satisfaction mean of 4.03 ± 0.23. Participants particularly appreciated the program's academic content, structure, and its impact on self-care skills. Part 6: Community Outcomes. Post-intervention, social, human, and intellectual capital within the community increased significantly. For example: Social Capital: Improved from 2.94 ± 0.80 to 3.97 ± 0.35 ($p < .05$). The findings emphasize the effectiveness of the Quality-of-Life Promotion Model in enhancing the quality of life of the elderly across multiple dimensions.

5. Conclusions

From the experimental application of a model for improving the quality of life for elders based on the concept of social movement, research hypotheses were tested in Phase 3. The findings revealed that: 1) Improvement in Quality of Life. The experimental group demonstrated a statistically significant improvement in quality of life after applying the social movement-based quality of life enhancement model ($p<.05$). The results indicated positive changes in physical, mental, social, environmental, and overall quality of life. This aligns with studies by Smith, J., & Thompson, K. (2022), which found that community-engaged activities improved multiple dimensions of the elderly's quality of life. Kumar, R., & Patel, A. (2023) similarly reported the effectiveness of urban health promotion programs in enhancing environmental and social interaction. 2) Behavioral Changes. Lifestyle behaviors, including dietary habits, exercise, stress management, sleep, medication use, and interpersonal relationships, improved significantly in the experimental group after implementing the model ($p<.05$p). These changes reflect the positive impact of social movement concepts on elderly behavioral development, consistent with Wang et al. (2020) and Nguyen et al. (2019), who noted similar improvements in stress management and overall health behaviors. 3) Health Status Improvements. The experimental group experienced significant health status improvements, particularly in reduced body mass index (BMI), waist circumference, and abdominal fat, which are key factors in reducing chronic disease risk ($p<.05$). These findings corroborate prior research by Hwang, S., & Kim, J. (2021), and Johnson, R., & Garcia, A. (2022), which highlighted the benefits of physical activity and health promotion programs on elderly health outcomes. 4) Community-Level Changes: The model brought significant changes to the community in four dimensions: social capital, human capital, intellectual capital, and health-supportive environments ($p<.05$). For example, Social Capital: Increased community cooperation and network relationships, as evidenced by an average score increase from 2.94 to 3.97, aligning with Putnam, R. D. (2000) findings on social capital's role in community resilience. Human Capital: Enhanced skills and health knowledge, with scores increasing from 2.97 to 4.00, supporting Becker, G. S. (1964) human capital theory. Intellectual Capital: Improved knowledge sharing and participation in community health development, with scores rising from 2.98 to 3.99, echoing Edvinsson and Edvinsson, L., & Malone, M. S. (1997). Health-Supportive Environments: Positive changes were noted in physical, stress management, and

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spiritual dimensions, further supported by research on stress reduction activities and community engagement (Srisuwan, S., 2018), Khampusa, J., et al. 2019, Saengnuan, W., 2018 and Siripoka, S., & Sutakhan, P., 2018). These findings illustrate the effectiveness of applying social movement concepts to improve the elderly's quality of life while fostering broader community development in health and well-being.

6. Recommendations

1. Changes in the quality of life of elders following the implementation of the social activity-based quality of life development model demonstrated improvement across all dimensions. Therefore, this model should be applied in other community contexts or among groups of elders facing similar challenges to promote sustainable quality of life development.

2. Behavioral lifestyle changes among elders through the adoption of the social activity-based approach highlight the importance of developing impactful programs in this area. Efforts should focus on supporting the creation of additional programs that emphasize positive behavioral changes to enhance quality of life and reduce the risk of various diseases.

3. Health status improvements among elders through the social activity-based approach resulted in reductions in body mass index, waist circumference, and visceral fat for participants engaged in health-promoting activities. This approach should be considered when designing health programs aimed at managing risk factors for chronic diseases. These programs can also be extended to other groups of elders with similar characteristics to promote broader health benefits.

4. Community-level changes, including the development of social capital, human capital, intellectual capital, and health-supportive environments, reflect the broad impacts of applying social action principles in community development. Efforts should be made to expand or encourage the adoption of this approach in other communities to strengthen community resilience and enhance the quality of life for elders in additional aspects.

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