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A Program for Reinforcing Lifestyle Change Motivation and Lifestyle Behavior to Prevent Dementia in Community-Dwelling Middle-Aged and Older Adults: Applying the Health Belief Model

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Abstract

This study aimed to explore the applicability of a dementia prevention lifestyle change program based on the Health Belief Model in the community. A total of 9 participants were included in this study. The participants completed a 10-session program using the KEEP strategy. Assessments, qualitative interviews, and a 4-week follow-up were conducted to evaluate the effectiveness of the program. Lifestyle change motivation significantly improved, particularly perceived benefits ($P = .018$) and self-efficacy ($P = .034$). Lifestyle behaviors also significantly improved, including cognitive, social, and health-promoting activities ($P = .016$, 0.011, and 0.027, respectively). Multifaceted lifestyles showed significant improvements in physical activity and activity participation ($P = .008$ and 0.011, respectively). Depression significantly decreased ($P = .018$). The postintervention interviews revealed high participant satisfaction and positive changes in dementia prevention motivation and behaviors. The 4-week follow-up showed that most participants successfully implemented the plans. The dementia prevention lifestyle change program based on the Health Belief Model is effective and applicable in the community, demonstrating significant improvements in various health-related aspects.

Keywords

dementia, health belief model, lifestyle, middle-aged and aged, motivation

- A dementia prevention lifestyle change program based on the Health Belief Model was developed and its applicability in the community was examined.
- Lifestyle change motivation significantly improved, particularly in perceived benefits and self-efficacy.
- Lifestyle behaviors significantly improved in cognitive, social, and health-promoting activities, as well as the total score.
- Multifaceted lifestyles improved in physical activity, active participation, and the total score, and depression significantly decreased.
- Participants reported high satisfaction and positive changes in both dementia prevention motivation and behaviors. The 4-week follow-up confirmed successful plan implementation.

Introduction

Dementia is a significant public health issue affecting approximately 55 million people worldwide, and this number is expected to triple by 2050.[1] Furthermore, approximately 10 million new cases are reported annually. In 2020, the number of patients with dementia aged 65 years and older in South Korea was 832 000, and this number is expected to increase to 3.02 million by 2050.[2] Furthermore, patients with early-onset dementia (<65 years of age) account for 11% of the total number of patients with dementia.[3] Dementia causes memory, language, and orientation problems and significantly impairs activities of daily living, thereby placing a heavy burden on patients and their families as the disease progresses.[4]

No cure for dementia has been found. Therefore, dementia prevention and management are critical. Healthy lifestyle habits have a significant effect on reducing dementia risk.[5] The World Health Organization recommends lifestyle changes, such as regular exercise, healthy eating, and alcohol and

tobacco avoidance, for dementia prevention.[6] Furthermore, 40% of dementia cases can be prevented by addressing modifiable risk factors, such as obesity, depression, and lack of physical activity.[7] Many studies have investigated the effects of lifestyle interventions on dementia prevention and reported that adhering to a healthy lifestyle can improve cognitive function and reduce or delay dementia risk.[8]

The South Korean government has promoted dementia prevention lifestyle practices through initiatives such as the "3.3.3 Dementia Prevention Guidelines" and related exercise programs.[4] Despite these efforts, the practice level among Korean seniors remains low, with average scores of 40 to 64 out of 100, and the practice frequency is limited to 2 to 3 days a week.[9-11] Awareness and attitudes toward dementia prevention have been reported to be poor among individuals in their 50s and 60s,[12] which highlights the need for education programs targeting younger age groups.

Understanding health-related choices is crucial. Several social-cognitive models have been developed to identify specific beliefs and attitudes that influence behaviors involving complex cognitive processes, such as perceived benefits and barriers.[13,14] Therefore, understanding internal factors such as attitudes and beliefs about dementia prevention is necessary.[15,16] The Health Belief Model (HBM) is widely used to understand health behaviors and promotions.[17,18] This model can be used to identify internal factors necessary for behavioral changes and predict preventive health behaviors.[15,19] The HBM suggests that individuals are more likely to engage in health behaviors when they perceive susceptibility to a disease, recognize its severity, believe in the benefits of changing behaviors, and identify fewer barriers to changes.[20,21] The HBM initially used 4 main constructs—perceived susceptibility, perceived severity, perceived benefits, and perceived barriers—to predict various health behaviors, including dementia prevention. Later, additional constructs—cues for action, general health motivation, and self-efficacy—were added.[22-25]

Several studies using the expanded HBM have investigated the belief factors influencing dementia prevention behaviors.[26,27] Oh reported that self-efficacy plays a significant role in preventing dementia-related behaviors in older adults. Additionally, Li et al[26] reported that perceived susceptibility, perceived barriers, and self-efficacy are significantly associated with health-promoting lifestyles. These findings underscore the importance of health beliefs in dementia prevention behaviors and highlight the need for further intervention studies. However, intervention studies based on the HBM and those applying lifestyle interventions for dementia prevention are lacking,[28] thereby hindering the development of effective dementia prevention strategies based on health beliefs and lifestyle changes.

Therefore, this study aimed to investigate the applicability of a "dementia prevention lifestyle change motivation and behavioral reinforcement program" based on the HBM in community-dwelling middle-aged and older adults. Additionally, this study aimed to demonstrate the importance of health beliefs and behaviors in dementia prevention by evaluating changes in dementia prevention lifestyle motivation, lifestyle behaviors, multifaceted lifestyles, and depression. The findings of this study can contribute to the establishment of foundational data for developing and implementing effective community-based dementia prevention programs.

Methods

Study Design and Data Collection

This study used a mixed-method approach with a one-group pretest-posttest design to examine the intervention effects by collecting quantitative and qualitative data. The study followed the following sequence: preassessment, intervention program implementation, post assessment, follow-up management, and data analysis. This study was conducted at Yonsei University's Mirae Campus, Wonju, South Korea from December 27, 2023 to March 6, 2024, with a total duration from preassessment to the study's conclusion of 10 weeks. Figure 1 shows the study procedure. Additionally, the study has followed the relevant EQUATOR guidelines for reporting, the STROBE cohort reporting guidelines.

Study Participants

This study included community residents of Wonju City, Gangwon Province, South Korea, aged 55 years and older. Participants were recruited through advertisements at Yonsei University's Wonju Campus. A total of 9 individuals were recruited for the study, and all met the inclusion criteria and did not meet any exclusion criteria. The inclusion criteria were community-dwelling individuals, those aged ≥ 55 years, and those not diagnosed with dementia. The exclusion criteria were individuals suspected of having mild dementia (a Korean-Mini-Mental Status Examination [K-MMSE] score

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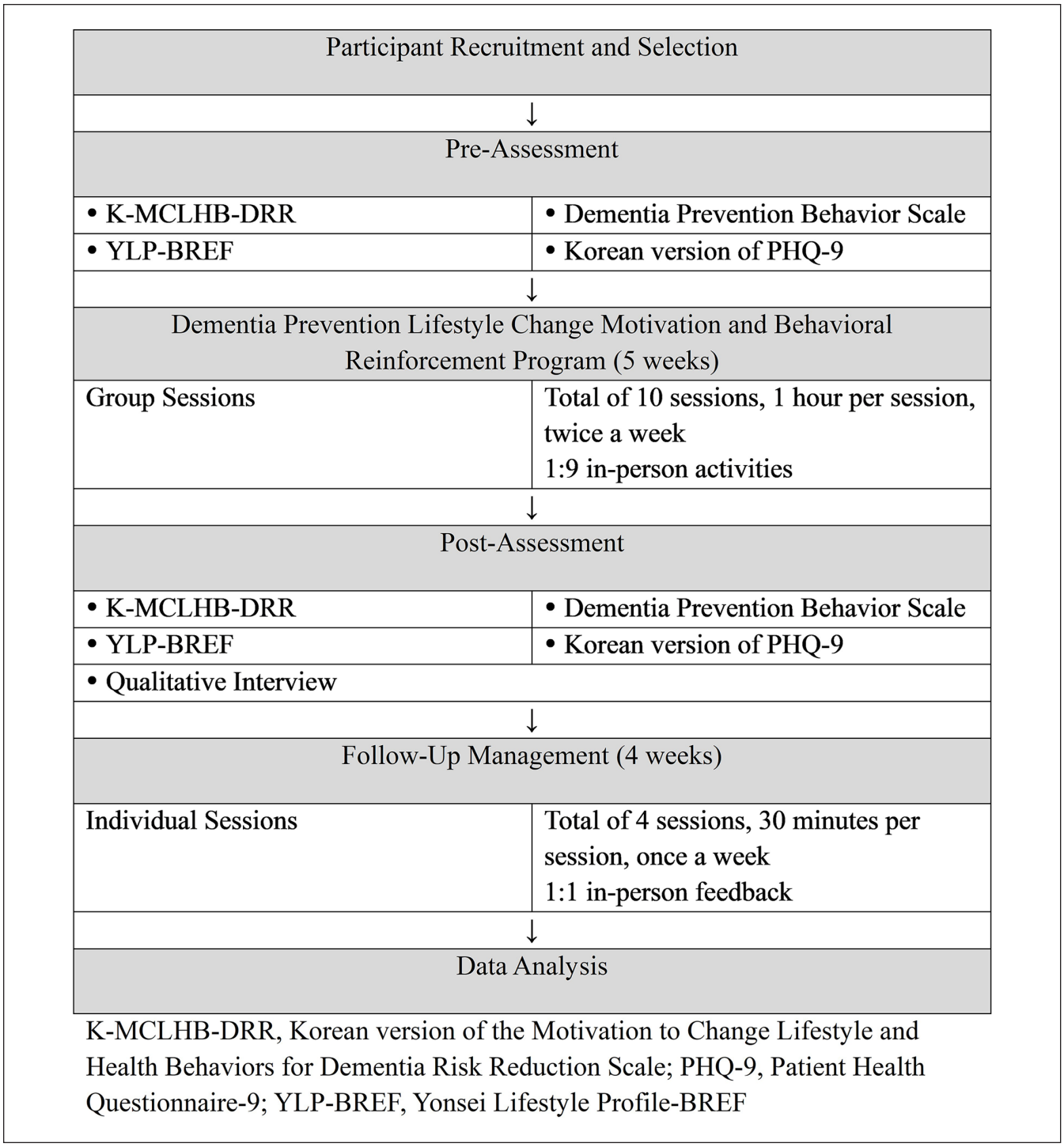

Figure 1. Research process.

of≤19) and those who refused to participate or decided to withdraw from the study.

This study was approved by the Yonsei University Mirae Campus' Institutional Review Board (approval no: 1041849-202311-SB-223-02), which was conducted in accordance with the Declaration of Helsinki. Informed consent was obtained from all participants before the assessments.

Outcome Measures

The questionnaire used in this study is a collection of validated instruments.

The Korean Version of the Motivation to Change Lifestyle and Health Behaviors for Dementia Risk Reduction (K-MCLHB-DRR) Scale

The original MCLHB-DRR scale was developed by Kim et al[16] and translated into Korean by An et al[29] The K-MCLHB-DRR scale assesses beliefs about lifestyle changes to reduce dementia risk in adults aged ≥ 50 years. The scale comprises 26 items covering 7 HBM domains: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues for action, general health motivation, and self-efficacy. All items are scored on a 5-point Likert scale. The higher the score, the stronger the beliefs. The K-MCLHB-DRR scale demonstrated high reliability (Cronbach's $\alpha = .82–.90$).

The Dementia Preventive Behavior Scale

The Dementia Preventive Behavior Scale was developed by Yu[30] and revised by Oh.[27] The Dementia Preventive Behavior Scale evaluates cognitive, social, and health-promoting dementia prevention behaviors. The scale comprises 13 items. The items are scored on a 4-point scale. The higher the score, the better the behavior. The scale demonstrated high reliability (Cronbach's $\alpha = .72–.85$).

The Yonsei Lifestyle Profile-Bref (YLP-BREF)

The YLP-BREF was developed by Park et al.[31] The YLP-BREF assesses multifaceted lifestyles, including physical activity, activity participation, and nutrition, in older adults. The YLP-BREF comprises 22 items. The items are scored on a 5-point scale with cutoff scores for each domain. The YLP-BREF demonstrated high reliability (Cronbach's $\alpha = .80$).

The Korean Version of the Patient Health Questionnaire-9 (PHQ-9)

The original PHQ was developed by Spitzer et al[32] and translated into Korean by Han et al[33] The PHQ-9 evaluates depression over the past 2 weeks. The questionnaire comprises 9 items. The items are scored on a 4-point scale. The total score ranges from 0 to 27, with a clinical cutoff of 5. The PHQ-9 demonstrated high reliability (Cronbach's $\alpha = .88$).

Postintervention Interview

One-on-one interviews were conducted to evaluate the qualitative outcomes related to changes in dementia prevention lifestyle motivation and lifestyle behaviors, complementing the quantitative results measured using assessment tools. The interviews were conducted by the first author, a licensed occupational therapist who made every effort to maintain objectivity throughout the process. These semistructured interviews evaluated perceived changes and program satisfaction and allowed participants to share their experiences through open-ended questions. The semistructured interview guide was reviewed by a faculty member from the Department of Occupational Therapy to ensure its validity and rigor. The 10 to 15-min interview data were analyzed and categorized to provide additional insights into a more comprehensive understanding of the participants' experiences.

Intervention

The dementia prevention lifestyle change motivation and behavioral reinforcement program was implemented by the first author through group sessions with middle-aged and older adults. The program consisted of 10 sessions delivered twice a week for 5 weeks. Each session lasted for 1 h. Before implementation, the program was reviewed by 3 professors with experience in older adults-related research from the Department of Occupational Therapy and 1 occupational therapist from a dementia relief center to confirm its appropriateness and direction.

Overall Program Composition by Themes and Intervention Strategies

Overall program composition by themes. The program incorporated 2 main themes: dementia prevention lifestyle change motivation and dementia prevention lifestyle behavior. Based on the HBM, the dementia prevention lifestyle change motivation addressed perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues for action, general health motivation, and self-efficacy.[16,29] The dementia prevention lifestyle behavior followed the "3.3.3 Dementia Prevention Guidelines" and included exercise, diet, communication, reading, and health checkups.[2]

The first 7 sessions of the program covered topics based on the 7 HBM constructs and the 3.3.3 Dementia Prevention Guidelines. The final 3 sessions focused on lifestyle change motivation for exercise, diet, and reading and on the development of plans for dementia prevention behaviors to be practiced independently after the program. The participants were provided personalized support, including customized exercise methods, nutritional guidelines, and cognitive activity materials, to help them develop individualized strategies. A ceremony was held at the end of the program for awarding certificates, and a "self-habit formation kit" was provided to support the implementation of the plans. This kit was designed to help participants independently execute their exercise, dietary, and reading plans over the 4-week period after the program. It was part of the intervention to reinforce the introduced lifestyle changes and dementia prevention

Table 1. Overall Program Composition by Themes and Intervention Strategies.

Session	Themes	Composition
1	Enhance perceived susceptibility and introduce prevention exercises	(K) Definition, causes, and demographics of dementia (E) Self-evaluation and discussion (12 risk factors checklist and personal risk assessment) (E) Dementia prevention exercise (P) Daily exercise plan
2	Enhance perceived severity and promote exercise methods	(K) Public fear statistics and dementia symptoms (E) Self-evaluation and discussion (dementia fear checklist and personal worries) (E) Strengthening exercises using resistance bands (TheraBand) (P) Daily TheraBand exercise plan
3	Enhance perceived benefits and promote dietary habits	(K) Benefits of lifestyle changes (E) Self-evaluation and discussion (dietary changes and new information) (E) Experience with the MIND (Mediterranean-DASH Diet Intervention for Neurodegenerative Delay) diet and meal planning (P) Daily dietary habits and meal plans
4	Address perceived barriers and promote social relationships and participation	(K) Barriers to lifestyle changes (E) Self-evaluation and discussion (social activity barriers and overcoming obstacles) (E) "Manitto" mission for social relationships and community café visits for social participation (P) Daily social participation plan
5	Enhance cues for action and promote reading (cognitive activities)	(K) Dementia signs and mild cognitive impairment (E) Self-evaluation and discussion (cues for action and key influencers) (E) "Exciting Brain Exercises" program: completing tasks to improve attention, working memory, executive function, and other cognitive skills (P) Daily brain exercise plan
6	Enhance general health motivation and promote health checkups	(K) Concept and status of subjective health (E) Self-evaluation and discussion (health status and efforts to monitor health) (E) Early screening for dementia using the "Dementia Check App" and health checkups at the Flagship Park (P) Daily use of the Dementia Check App
7	Enhance self-efficacy and promote stress management	(K) Concept of self-efficacy and its association with dementia (E) Self-evaluation and discussion (Self-Efficacy Scale Checklist, exercise, diet, and reading in "3.3.3 Dementia Prevention Guidelines") (E) Learning stress management techniques through mindfulness meditation and keeping a gratitude journal (P) Daily mindfulness meditation and gratitude journal
8-10	Enhance motivation and promote integration habits after the program	(K) Review of motivation for exercise, diet, and reading (E) Self-evaluation and discussion of each habit (E) Selection and creation of an implementation strategy for each habit (P) Daily pilot application for exercise, diet, and reading

Notes. All themes are described as "dementia prevention lifestyle change motivation: 7 constructs of the HBM" and "dementia prevention lifestyle behaviors: topics from the 3.3.3 Dementia Prevention Guidelines."

behaviors. Supplemental Figure S1 shows a detailed list of the kit components.

Overall program composition by intervention strategies. Based on the Lifestyle-Decision, Execution, Personal Factor, Environment, Resources model, the KEEP strategy was used to promote a healthy lifestyle through 4 stages: knowledge (K), evaluation (E), experience (E), and plan (P).[34] The knowledge and evaluation stages involved group sessions to introduce concepts and individual sessions for self-assessment following the HBM to facilitate dementia prevention lifestyle changes. The experience and plan stages were used to practice behaviors and develop action plans. Supplemental Table S1 shows a detailed explanation of the KEEP strategy. Table 1 shows an overview of the overall program composition by themes and intervention strategies. A specific example of applying the program composition is shown in Figure 2.

Follow-up management. The participants followed the exercise, diet, and reading plans for 4 weeks using the self-habit formation kits, recording their weekly implementation and reflections in habit logs. Habit formation logs were used to record weekly implementation frequencies, and the participants provided feedback on their practices. Additionally, a 30-min one-on-one feedback session was conducted weekly to assess progress and provide tailored practical guidance for

Figure 2. Example of the application of the program composition by themes and intervention strategies.

sustainable improvement. Exercise adjustments, such as chair squats, were made to accommodate the health status and minimize pain. Dietary guidance involved alternative foods and increased water and vegetable intake. Reading activities were supplemented with cognitive exercises, such as Sudoku and word puzzles. The success of the participants' exercise, diet, and reading plans was evaluated after 4 weeks, and the total weekly implementation rate was calculated.

Data Analysis

Sociodemographic data were analyzed using descriptive analyses, whereas the pre- and postprogram changes in lifestyle change motivation, lifestyle behaviors, multifaceted lifestyle, and depression were analyzed using the Wilcoxon signed-rank test. In this study, the Wilcoxon signed-rank test, a nonparametric test proposed by Wilcoxon and commonly used in pre- and postexperimental comparisons,[35] was used due to the small sample size and non-normal data distribution.[36-38] All analyses were performed using IBM SPSS version 27.0. A P-value $<.05$ indicated statistical significance.

Results

General Characteristics of the Participants

A total of 9 participants were included in this study. All participants were females with a mean age of 62.44 (standard deviation [SD] = 1.59) years. The mean K-MMSE-2 score of the participants was 26.89 (SD = 1.62). Most participants

Table 2. General Characteristics of the Study Participants.

Variables	Number (%)
Gender	
Female	9 (100)
Age, mean (SD)	62.44 (1.59)
K-MMSE-2 score, mean (SD)	26.89 (1.62)
Marital status	
Married	7 (77.8)
Divorced	1 (11.1)
Widowed	1 (11.1)
Educational level	
Elementary school graduate	3 (33.3)
Middle school graduate	3 (33.3)
High school graduate	3 (33.3)
Employment status	
Currently employed (university custodian)	9 (100)
Subjective health status	
Very healthy	1 (11.1)
Healthy	2 (22.2)
Neutral	4 (44.4)
Unhealthy	2 (22.2)
Chronic diseases (medication or treatment)	
None	3 (33.3)
Hypertension	1 (11.1)
Diabetes	1 (11.1)
Hyperlipidemia	1 (11.1)
Arthritis	2 (22.2)
Kidney disease	1 (11.1)
Inflammation	1 (11.1)
Relatives/friends diagnosed with dementia	
Yes	6 (66.7)
No	3 (33.3)
Caregiving relatives/friends with dementia	
Yes	1 (11.1)
No	8 (88.9)

Note. K-MMSE-2 = Korean-Mini-Mental Status Examination second Edition; SD = standard deviation.

were married (77.8%). All participants were employed as university custodians and had diverse educational backgrounds. Additionally, most of them had relatives or friends with dementia (66.7%), and only 1 was a caregiver. The participants had diverse health conditions. Regarding the subjective health status of the participants, 1 reported a very healthy status, 2 reported a healthy status, 4 reported a neutral status, and 2 reported an unhealthy status. All participants completed the 10-session program, with an average attendance of 9.67 sessions. Table 2 shows the participants' characteristics.

Pre- and Postintervention Changes in the Outcome Measures

The pre- and postscore changes in the outcome measures were analyzed using the Wilcoxon signed-rank test. A significant improvement was observed in participants' dementia prevention lifestyle change motivation, particularly in perceived benefits ($P = .018$) and self-efficacy ($P = .034$). However, no significant changes were observed in perceived susceptibility, perceived severity, perceived barriers, cues for action, and general health motivation ($P = .671$, 0.809, 0.057, 0.280, and 0.673, respectively). A significant improvement was observed in dementia prevention lifestyle behaviors, including cognitive ($P = .016$), social ($P = .011$), and health-promoting activities ($P = .027$) and the Dementia Preventive Behavior Scale total score ($P = .012$). Regarding multifaceted lifestyles, a significant improvement was observed in physical activity ($P = .008$), activity participation ($P = .011$), and the YLP-BREF total score ($P = .008$). However, no significant improvement was observed in nutrition ($P = .063$). Depression scores significantly decreased by 3.55 points ($P = .018$), with all participants scoring < 5 after the intervention, indicating no depression (Table 3).

Postintervention Interview Results

Supplemental Table S2 shows a summary and categorization of the postintervention interview responses. The postintervention interviews revealed that the participants were motivated to adopt dementia preventive lifestyles and showed positive changes in motivation and behaviors related to exercise, diet, and cognitive activities. Many participants appreciated the structured KEEP strategy, which integrated education with practical activities. Supplemental Table S3 shows responses in detail. Regarding dementia prevention lifestyle change motivation, Participant 1 shared a shift in perceived susceptibility, stating, "I realized that I can't continue living like this," and Participant 2 noted a change in perceived benefits, saying, "After participating in the program, I feel like I can reduce my risk of dementia." Regarding dementia prevention lifestyle behaviors, Participant 9 stated, "I started exercising in the morning, and I don't feel sluggish anymore," and Participant 5 described dietary changes, saying, "I rarely ate meat or fish before, but now I'm trying to eat a little more." The participants suggested expanding the age range, adding sessions, and extending the program duration to improve the program.

Follow-Up Management Results

All participants attended the 4-week weekly one-on-one feedback sessions. Implementation was recorded as "O" (completed) or "X" (not completed) in the habit logs. Supplemental Table S4 shows the 4-week follow-up implementation results for the exercise, diet, and reading plans. The implementation rate for the exercise plan increased from 77.8% in week 1 to 88.9% in week 4. The implementation rate for the diet plan recovered to 100% in week 4 after a brief decline. The implementation rate for the reading plan increased from 66.7% in week 1 to 100% in week 4. These rates indicate participants' consistent implementation with the program's lifestyle goals across the 4 weeks.

Table 3. Pre- and Postintervention Changes in Outcome Measures.

Variables	Prescore Mean (SD)	Postscore Mean (SD)	*P*-value
K-MCLHB-DRR			
Perceived susceptibility	12.11 (2.42)	11.33 (3.12)	.671
Perceived severity	15.22 (1.86)	15.33 (2.29)	.809
Perceived benefits	16.22 (1.09)	18.44 (1.74)	.018*
Perceived barriers	13.00 (3.67)	10.89 (2.52)	.057
Cues for action	14.89 (3.18)	14.11 (3.10)	.280
General health motivation	18.00 (2.18)	18.44 (1.51)	.673
Self-efficacy	8.00 (1.32)	9.33 (0.87)	.034*
Dementia prevention behaviors			
Cognitive activity	8.56 (0.56)	10.00 (1.12)	.016*
Social activity	13.00 (1.66)	15.33 (0.71)	.011*
Health-promoting activity	19.22 (2.22)	21.22 (1.39)	.027*
Total score	40.78 (3.42)	46.56 (1.59)	.012*
YLP-BREF			
Physical activity	9.78 (0.97)	13.67 (2.40)	.008**
Activity participation	9.00 (0.97)	12.56 (2.79)	.011*
Nutrition	39.22 (7.68)	44.44 (2.92)	.063
Total score	58.00 (7.43)	70.67 (5.66)	.008**
PHQ-9	4.44 (4.45)	0.89 (1.36)	.018*

Note. *$p < .05$, **$p < .01$.
K-MCLHB-DRR = Korean version of the Motivation to Change Lifestyle and Health Behaviors for Dementia Risk Reduction; PHQ-9 = Patient Health Questionnaire-9; SD = standard deviation; YLP-BREF = Yonsei Lifestyle Profile-BREF.

Discussion

In this study, a dementia prevention lifestyle change motivation and behavioral reinforcement program was applied to community-dwelling middle-aged and older adults. Although significant progress has been made in preventive interventions for other diseases, research on dementia prevention is limited.[28,37,38] Therefore this study addressed this gap by reviewing the relevant literature and consulting experts to refine the program's design. The 10-session program, which integrates lifestyle motivation and behaviors, was implemented over 5 weeks.

The postintervention interviews identified "dementia prevention lifestyle behaviors" and "intervention strategies" as key factors for enhancing motivation and behavior. Furthermore, exercise planning sessions were found to be beneficial, emphasizing the need for tailored strategies.[39] Additionally, the participants valued the knowledge and evaluation components of the KEEP strategy for improving motivation. Engaging in activities such as exercise is crucial to activating readiness and behavioral change, which highlights the importance of applying acquired knowledge in practice.[37,38,40]

This study primarily assessed changes in dementia prevention lifestyle motivation and behaviors using the HBM. Measuring health beliefs is necessary for understanding behavioral changes.[28] This study showed improvements in dementia prevention motivation, with higher scores in all subdomains except perceived barriers. After the intervention, the participants showed reduced perceived barriers, perceived susceptibility, and cues for action. These findings indicate increased awareness and control over dementia risk.

This study showed significant improvements in perceived benefits and self-efficacy. These findings are consistent with those of Pipatpiboon et al.[41] Self-efficacy has been reported to have a mediating effect on the relationship between perceived benefits and lifestyle changes.[26] These variables have a greater impact on behavioral change than social norms or attitudes.[42] In this study, the participants demonstrated strong intentions to adopt the practices, reflecting an increased belief in the positive effects of their behaviors and confidence in making changes. Wilson et al[43] investigated barriers to dementia risk reduction behaviors and reported that participants were less informed about dementia risk reduction and perceived self-efficacy was lower for dementia than for other health conditions. Our program, which focuses on perceived susceptibility and barriers and educating participants about the benefits of lifestyle changes, helps address these gaps.

This study showed significant improvements in cognitive, social, and health-promoting behaviors. These findings indicate the positive impact of the 3.3.3 Dementia Prevention

Guidelines-based intervention. Furthermore, the participants reported adopting healthier behaviors in exercise, diet, and reading, indicating that the program led to increased motivation and tangible changes in daily life.

The intervention significantly improved physical activity and participation, with increased frequency and intensity of exercise and activities. Although no significant dietary changes were observed, the participants valued foods for preventing dementia and attempted to adjust their eating habits. Furthermore, a significant decrease in depression was observed, with the participants no longer meeting the depressive disorder criteria after the intervention. These findings are consistent with those of a previous study.[44] These findings indicate that the program boosted vitality, developed dementia prevention habits, and enhanced self-efficacy. Regarding the improvement in depression scores, the positive changes could also be influenced by the relational aspects of the intervention. While the intervention focused on lifestyle changes, the mentorship and emotional support provided by the occupational therapist may have played a key role in contributing to participants' emotional well-being and reducing depression.

The follow-up results showed increased implementation rates for exercise, diet, and reading plans, supported by qualitative insights from the interviews. These findings indicate the effectiveness of individualized strategies, such as self-habit formation kits and feedback, in maintaining lifestyle changes. Despite the limitations of public infrastructure for dementia management,[44] the success of this approach with minimal resources indicates its applicability in community settings.

The participants suggested incorporating exercise and cognitive sessions, extending the program duration, and broadening the age range to improve the program. These suggestions align with the fourth National Dementia Plan, which emphasizes the implementation of dementia prevention guidelines across the lifespan.[45] These improvements can enhance program satisfaction and applicability and contribute to community-based dementia prevention efforts.

Limitations and Recommendations for Future Studies

This study has some limitations. First, the small sample size and convenience sampling may limit the generalizability of the findings. Additionally, the sample size was not determined based on a power analysis, which could affect the reliability of the results. Future studies should consider random sampling and power analysis to ensure a more representative and adequately sized sample. Second, the one-group pretest-posttest design, which lacks a control group, limits causal inferences. Therefore, future studies with experimental and control groups are needed to strengthen the program's reliability. Third, the post-intervention interviews were conducted by the first author, which could introduce potential bias. Although standardized procedures were followed to maintain objectivity, the possibility of bias remains. This should be considered when interpreting the study findings.

Implications

To the best of our knowledge, this is the first empirical study to integrate lifestyle modification with actual behaviors in the context of dementia prevention. Previous studies have focused solely on theoretical approaches. This study employed the KEEP strategy to motivate participants and facilitate behavioral change. This approach highlights the importance of lifestyle modification for dementia prevention and promotes the adoption of healthy behavior. Furthermore, the self-habit formation kits and individualized feedback during follow-up significantly enhanced the participants' ability to independently maintain lifestyle changes. This indicates that collaboration with community organizations can effectively promote dementia prevention with minimal resources.

Conclusion

This study showed that the dementia prevention program based on the HBM has a positive impact on various aspects of participants' lives and can be applicable in community settings. As the first empirical attempt to integrate lifestyle motivation with behaviors, this study provides foundational data crucial to developing and applying effective dementia prevention programs for community-dwelling middle-aged and older adults.

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Author contributions (CRediT authorship contribution statement)

Hyunseo An: Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Writing – original draft, Project administration. Ickpyo Hong: Supervision, Writing – review & editing. Dae-Sung Han: Supervision, Writing – review & editing. Hae Yean Park: Supervision, Funding acquisition, Project administration, Resources, Writing – review & editing.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethical Approval and Informed Consent

The Yonsei University Mirae Campus' Institutional Review Board approved the study (approval no: 1041849-202311-SB-223-02), which was conducted in accordance with the Declaration of Helsinki. Informed consents were obtained from all participants before the assessments.

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Supplemental Material

Supplemental material for this article is available online.

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