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Lifestyle Intervention Strategies for Maintaining Cognitive Health Middle Adulthood: A *Scoping Review*

Abstract

Decline in cognitive function among middle-aged adults (40–60 years) is a significant issue. This study aims to map out lifestyle intervention strategies to maintain cognitive health in this age group. The method used was a PRISMA-ScR-based scoping review, with literature from Scopus, PUBMED, and SpringerLink. Of the 94 articles found, 11 met the criteria for analysis. The results showed that a healthy diet, physical activity, cognitive stimulation, social interaction, and management of physical conditions such as chronic pain and frailty were effective in slowing down brain function decline. A multidomain and personalized approach through shared decision making proved to be more optimal than a single strategy. In conclusion, healthy lifestyle interventions in middle-aged adults play an important role in preventing dementia and improving quality of life, so they need to be integrated into public health programs.

Keywords: Lifestyle, Cognitive Health, Middle-Aged Adults.

Introduction

The development of digital technology has also influenced cognitive health, especially in middle-aged adults (40–60 years) who are prone to physical decline, memory loss, and psychosocial challenges (Ferdyansyah & Masfufah, 2023) . Sanches & Fernandes (2021) state that almost all cognitive functions decline with age, including numerical ability, verbal ability, spatial orientation, *delayed recall,* and reasoning. Naylor et *al*., (2024) confirm that this occurs globally, characterized by a slowing of information processing and a reduction in the ability to remember new information (Shidiqie *et al.*., 2023) . Cognitive decline in individuals aged 50–60 affects concentration, memory, attention span, problem-solving abilities, and the organization of daily information (Pramadita *et al.*., 2019) , impacting all functional aspects (Park *et al.,*2019) . This condition underscores the importance of adopting a healthy lifestyle as an effort to maintain cognitive health, while also enhancing satisfaction and quality of life in middle adulthood.

According to Walker *et al*. (1987) in Muzadi & Febriani (2024) , a healthy lifestyle is a pattern of perception and behavior that individuals apply to maintain and improve their well-being, self-actualization, and self-fulfillment. Research shows that middle-aged adults who adopt a healthy lifestyle with tend to have a high level of life satisfaction (Jun *et al.*, 2023) . Other studies confirm that healthy

lifestyle behaviors, such as a balanced diet, regular exercise, not smoking, and limiting alcohol consumption, are associated with better health-related life satisfaction (Tian & Tien, 2020) . Meanwhile, research on middle-aged adults in rural Africa found that unhealthy behaviors, such as alcohol dependence, low physical activity, and tobacco use, increase the risk of persistent depression and continuously decrease life satisfaction (Peltzer & Pengpid, 2022) .

This study aims to systematically map lifestyle intervention strategies focused on maintaining cognitive health in middle-aged adults, who have received less attention than the elderly or young adults. This approach is expected to provide guidance for the implementation of effective strategies to improve the quality of life and maintain cognitive function in middle-aged adults in an increasingly complex society.

Method

This study used a *scoping review* method, designed based on *the* PRISMA-ScR *Checklist* as developed by McGowan *et al*(2020) . This method is an adaptation of the PRISMA Statement, which emphasizes a systematic process in reviewing literature, including the stages of article selection, data screening, and content analysis of literature (Chiu *et al*., 2023) . PRISMA, which stands for *Preferred Reporting Items for Systematic Reviews and Meta-Analyses,* includes four main steps: identifying the research problem, searching for relevant literature, selecting data sources, and compiling and reporting the results of the study in a transparent and structured manner(Pourkiaei & Romain, 2022) .

In this study, the literature search strategy followed the *Population, Concept, and Context* (PCC) framework recommended by *the Joanna Briggs Institute* (JBI), which aims to ensure that the focus of the study remains relevant and comprehensive (Santos & . Literature data were collected from reputable international databases, namely Scopus, PUBMED, and SpringerLink, with inclusion and exclusion criteria. This approach allows the study to systematically review the latest evidence, identify research gaps, and provide a comprehensive literature map in the field under study.

Table 1. PCC Format

No	*PCC Element*	*Keyword*
	Population	*Middle-aged Adults*
2	*Concept*	*Lifestyle interventions to prevent cognitive decline, including nutrition, physical activity, stress management, and social relationships*
3	*Context*	*Studies on the application of lifestyle strategies to support cognitive health in community, clinical, or research settings worldwide.*

Inclusion and exclusion criteria were used to screen articles that were not relevant to the research objectives.

Table 2. Inclusion and Exclusion Criteria

No	Criteria	Keyword
1	Inclusion Criteria	- The article contains keywords in the title, abstract, or full text - Published in an accredited journal - Published between 2020 and 2025 - The article is available in *full text* and is *open access*
2	Exclusion Criteria	- Articles do not contain keywords in the title, abstract, or *full text* - Publications in the form of books, essays, editorials, or opinions that have not undergone *peer* review

Of the total 94 articles found through the search process, 11 articles were deemed eligible and met the criteria for further analysis.

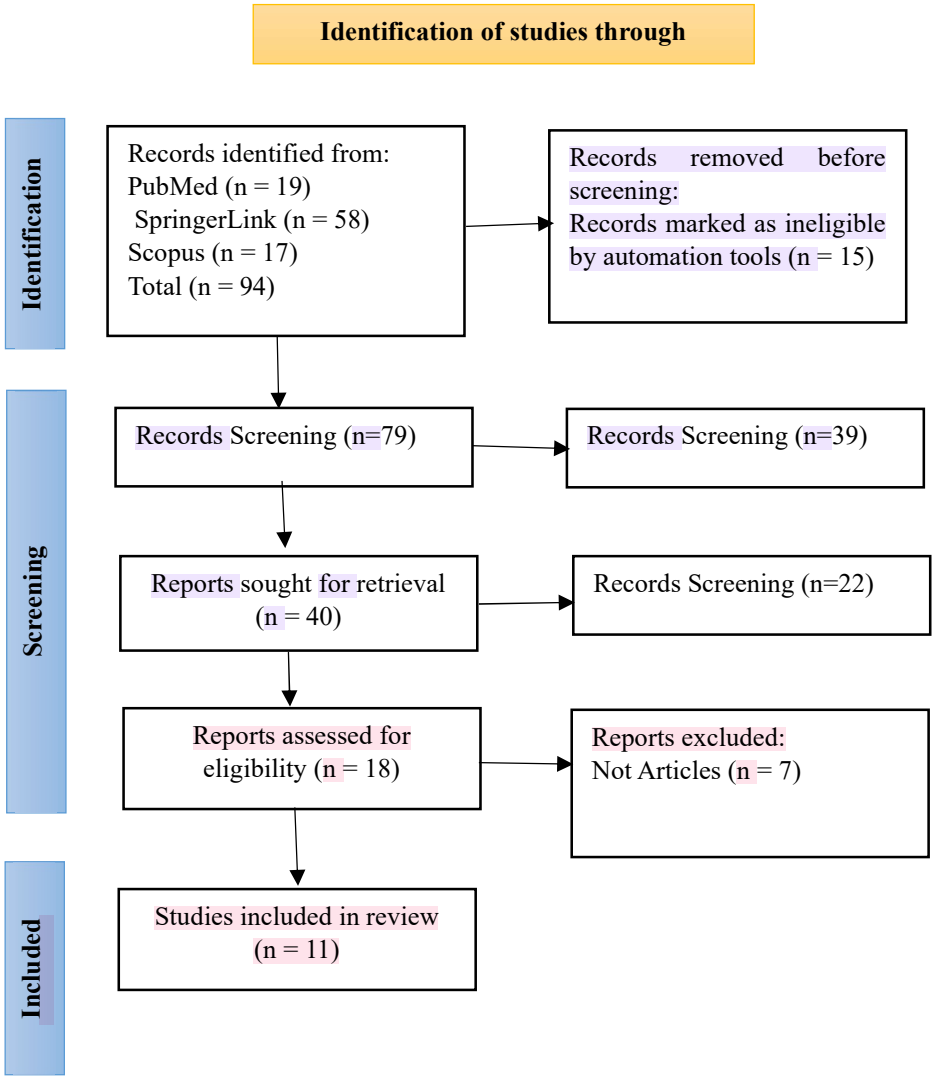

Figure 1. PRISMA-ScR Flow Diagram

The instrument used in this study was content analysis of publications related to the research topic, covering aspects such as the number of publications per year, main research focus, and country of origin of the publications. The collected data were then systematically compiled in tabular form to facilitate interpretation.

Table 3. Journals Observed

No	Title	Author	Year
1	Sustainable Participation in Community Health Programs to Promote a Healthy Lifestyle and Prevent and Protect against Dementia among Rural Taiwanese Middle-Aged and Older Adults	L. Chang *et al*	2024
2	Older adults' community participation, physical activity, and social interactions during and post-	Claire Gough *et al*	2023

	s following COVID-19 restrictions in Australia: a mixed methods approach		
3	Association Between Healthy Lifestyle and Cognitive Function in Middle-Aged and Older Adults	Rouba Khalil Naaman *et al*	2025
4	Healthy Lifestyle and the Likelihood of Becoming a Centenarian	Yaqi Li *et al*	2024
5	Adherence to dietary guidelines and cognitive decline from middle age: the Doetinchem Cohort Study	Astrid CJ Nooyens *et al*	2021
6	General practitioners' perspectives on lifestyle interventions for cognitive preservation in dementia prevention	Josefine Kappe *et al*	2024
7	Community participation in activities and places among older adults with and without dementia	Habib Chaudhury *et al*	2021
8	Temporal association between chronic pain and frailty occurrence, and the modifiable role of a healthy lifestyle in Chinese middle-aged and older population: a community-based, prospective cohort study	Chao Li *et al*	2025
9	Healthy Aging Nutrition Matters: Start Early and Screen Often	Susan B Roberts *et al*	2021
10	Effects of multidomain lifestyle interventions on cognitive decline and Alzheimer's disease prevention: A literature review and future recommendations	Sasja Noach *et al*	2023
11	Practical approaches to lifestyle interventions for enhancing brain health in older adults: A selective narrative review	Raymond L Ownby & Joshua Caballero	2025

Results and Discussion

According to the WHO, there are currently around 55 million people worldwide experiencing cognitive decline, with projections increasing to 78 million by 2030 and reaching 139 million by 2050. The main risk factors contributing to this condition include advanced age, lifestyle, and health conditions. In Indonesia alone, more than 20% of middle-aged adults are reported to show symptoms of memory impairment, including dementia (Widyaningsih *et* al., 2024) . In the early stages, cognitive decline in middle-aged adults is often not obvious. This condition is generally triggered by a decrease in the number of brain cells, exposure to free radicals, pollution, and a decline in nutritional quality and physical activity. These changes can trigger brain dysfunction, which usually begins with mild symptoms,

such as forgetfulness (Manungkalit *et al*., 2021) . Cognitive impairment directly impacts the quality of life of older adults, including by causing stress and anxiety. This condition also increases the need for older adults to receive support from healthcare professionals in carrying out daily activities, which, if unmet, can further worsen their quality of life (Fridolin *et al* , 2022) .

Lifestyle plays a significant role in overall health. Lifestyle for middle-aged adults emphasizes a balanced, nutrient-rich diet, regular physical activity, and avoiding smoking. A comprehensive approach that combines dietary intervention, exercise, and cognitive training has been shown to be more effective in maintaining brain health and delaying cognitive decline (Naaman *et al*., 2025) . Research conducted by L. Chang(2024) shows that adopting healthy lifestyle factors makes the body more energetic. In addition, it is important for community health centers to provide sustainable and varied activities through health programs that cover various aspects to strengthen understanding of the prevention of cognitive decline. For example, participants engage in physical and musical activities (such as laughter yoga, drumming, or playing the kazoo) using popular songs. During the activities, they receive praise, motivation, and greater opportunities for social interaction, which gradually improves physical function while fostering healthy living behaviors. These results are consistent with the findings of the following studies: Gough *et al*., (2023) ; Kappe *et al*, (2024) : Chaudhury *et al,*(2021) .

Maintaining cognitive health in middle adulthood is crucial because this period marks a transition phase toward old age, during which various risk factors for degenerative diseases begin to emerge. Several studies indicate that lifestyle interventions play a central role in slowing cognitive decline. Yaqi Li *et al*(2024) found that healthy lifestyle scores encompassing five aspects—non-smoking, controlled alcohol consumption, physical activity, a varied diet, and a balanced body mass index (BMI)—are associated with an increased likelihood of reaching old age in better health. Among these five factors, quitting smoking, regular exercise, and maintaining a diverse diet have been proven to be dominant factors supporting brain health, making them primary targets for lifestyle interventions in middle-aged adults.

Nutritional aspects also play an important role in supporting *cognitive reserve*. Longitudinal studies show that adherence to healthy diets, such as the Mediterranean diet, WHO guidelines, and the Dutch diet, is associated with better cognitive function and a slower decline in cognitive function (Nooyens *et al*, 2021) . Furthermore, Roberts *et al.* (2021) emphasize that a healthy, plant-based diet that is rich in nutrients, low in glycemic index, and avoids energy-dense but nutrient-poor foods has been proven effective in preventing various age-related diseases, including dementia. Therefore, lifestyle intervention strategies for middle-aged adults need to emphasize nutrition education and food choices that meet nutritional needs without increasing the risk of obesity or malnutrition.

In addition to nutrition, physical activity, cognitive stimulation, and social interaction are also important components in maintaining brain health. Multidomain intervention studies, such as FINGER and MAPT, show that a combination of a healthy diet, regular exercise, cognitive training, social activities, and management of vascular risk factors contributes to improved global cognition scores and a reduced risk of dementia (Noach *et al.*, 2023) . Physical activity, whether aerobic exercise or *mind-body exercise*, has been shown to support memory and executive function. These findings confirm that intervention strategies cannot focus on just one dimension, but must be multidomain in order to have a more significant impact on cognitive health.

Another aspect to consider is the link between physical condition, frailty, and cognitive health. Li *et* al .(2025) reports that chronic pain in middle age significantly increases the risk of frailty in later life, which can accelerate cognitive decline. However, adopting a healthy lifestyle can reduce this risk. Interventions that include pain management, regular exercise, and a nutritious diet not only strengthen physical health but also serve as protection against cognitive decline. Thus, a healthy lifestyle plays a dual role, preventing frailty while maintaining brain health.

Furthermore, lifestyle intervention strategies for middle-aged adults need to be personalized according to individual needs. Ownby & Xue(2025) emphasize the importance of implementing *shared decision making* (SDM) in healthcare practice, where patients are actively involved in determining intervention choices according

to their values, preferences, and conditions. Integrating SDM into healthy lifestyle promotion can enhance compliance, satisfaction, and intervention effectiveness. In this way, cognitive health strategies are not only evidence-based but also tailored to the individual's personal context.

Conclusion

The conclusion of this study shows that lifestyle interventions in middle-aged adults play a crucial role in maintaining cognitive health while preventing the decline in brain function that often occurs during the transition to old age. The implementation of a healthy diet, regular physical activity, cognitive stimulation, and social interaction has been proven effective in strengthening cognitive reserves and reducing the risk of dementia. Additionally, managing physical conditions such as chronic pain and frailty are also important factors in maintaining quality of life and cognitive function. A multidomain approach that combines nutritional, physical, mental, and social aspects, coupled with personalization through a *shared decision-making* model, can provide a more comprehensive, adaptive, and effective intervention strategy to support the cognitive health of middle-aged adults so that they can live more productive, healthy, and meaningful lives.

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