

# Exploring the psychosocial determinants of cognitive health in the elderly: An exploratory factor analysis approach



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**Abstract** This study investigates the psychosocial determinants influencing cognitive health in the elderly within Vietnam's rapidly transforming socio-cultural context. Utilizing data collected from 200 older adults and applying multivariate linear regression analysis, the research identifies four critical factors—social engagement, mental health, physical activity and lifestyle, and cognitive stimulation—as significant contributors to cognitive well-being. Social engagement enhances cognitive resilience by fostering emotional support, reducing loneliness, and encouraging interpersonal interaction, which is essential for maintaining neural plasticity. Mental health, encompassing emotional and psychological stability, mitigates neurobiological risks associated with anxiety, depression, and inflammation, thus preserving executive function and memory. Concurrently, physical activity and a healthy lifestyle—including regular exercise, balanced nutrition, and adequate sleep—support brain function, reduce the incidence of chronic diseases, and strengthen cognitive performance. Cognitive stimulation, through activities such as reading, learning, and problem-solving, is crucial in reinforcing cognitive reserve and delaying neurodegeneration. The findings underscore the interdependence of these psychosocial factors and their collective impact on cognitive health, offering a holistic understanding of healthy aging. Situated within Vietnam's unique cultural setting, where traditional values intersect with rapid modernization, this study fills a critical gap in the literature by providing localized insights into aging and cognitive function. The research highlights the importance of culturally tailored, multidimensional strategies that integrate traditional practices and modern interventions to enhance elderly care. These insights are valuable for healthcare practitioners, policymakers, and community leaders aiming to design inclusive programs that promote resilience, independence, and well-being among older adults. Ultimately, this study contributes to the global discourse on aging by offering a context-sensitive framework for supporting cognitive health in aging societies.

**Keywords:** cognitive health, psychosocial determinants, social engagement, healthy aging, Vietnam

## 1. Introduction

Cognitive decline among the elderly has become a pressing global concern in the 21st century as populations age at unprecedented rates. Cognitive deterioration impairs memory, reasoning, and problem-solving abilities, significantly diminishing the quality of life for older adults (Williams & Kemper, 2010; Ghisletta et al., 2006). Moreover, it imposes economic and social burdens on families, communities, and healthcare systems (Fisher et al., 2017; Barnes & Yaffe, 2011). This challenge is particularly acute in developing countries like Vietnam, where demographic transitions are rapidly altering traditional family roles and support systems (Nguyen et al., 2021).

Historically, Confucian values have shaped Vietnam's society by emphasizing filial piety, collectivism, and intergenerational cohabitation (Lowenstein, 2007; Park et al., 2014). However, rapid urbanization and economic restructuring have disrupted these dynamics, with younger generations increasingly migrating to urban centers for employment, leaving elderly relatives in rural areas with diminished emotional and physical support (Nguyen & Trevisan, 2020). Although Vietnam has made notable progress in healthcare delivery, the focus remains mainly on physical health, while cognitive and mental health are often overlooked, despite their growing relevance to quality of life and long-term dependency risks (Jesus et al., 2018; Van et al., 2021).

While international literature affirms the importance of psychosocial factors such as social engagement, emotional well-being, physical activity, and cognitive stimulation in preventing cognitive decline (Fratiglioni et al., 2004; Hertzog et al., 2008; Rovio et al., 2005), localized research in Vietnam that contextualizes these variables remains limited. The combined effects of traditional beliefs, modernization, digital transformation, and regional disparities create a unique socio-cultural environment that necessitates culturally grounded empirical investigation (Ahluwalia & Balhara, 2024).



This study addresses this research gap by examining how psychosocial dimensions—including social interaction, mental well-being, lifestyle patterns, and intellectual engagement—affect cognitive health among the elderly in Vietnam. Understanding these relationships is crucial for developing effective and culturally appropriate strategies that support individual well-being, public health systems, and social cohesion in the face of population aging.

The implications extend beyond personal health. As Vietnam's elderly population grows, preserving cognitive independence will have far-reaching effects on national productivity, caregiving systems, and intergenerational solidarity. Addressing cognitive decline is a medical necessity and a developmental imperative (Van Regenmortel & De Witte, 2023). Creating environments that support healthy aging can mitigate economic burdens, reduce healthcare costs, and allow older adults to remain active contributors to society.

Ultimately, this study seeks to illuminate the importance of a multidimensional framework to promote healthy cognitive aging in Vietnam. The findings aim to inform policymakers, healthcare professionals, and community leaders in their efforts to design inclusive and resilient aging policies, while also contributing to global discussions on the interplay between culture, modernization, and cognitive health.

## 2. Literature Reviews

This literature review explores the psychosocial determinants of cognitive health in the elderly by examining four key factors: social engagement, mental health, physical activity and lifestyle, and cognitive stimulation. Each of these determinants has been identified as pivotal in preserving cognitive function, with evidence highlighting their interconnected roles in reducing the risk of cognitive decline and promoting healthy aging.

### 2.1. Social engagement

Social engagement, by active participation in daily relationships and community activities, has been widely recognized as a protective factor against cognitive decline. Research demonstrates that social interactions foster cognitive resilience by engaging memory, communication, and problem-solving skills, thereby maintaining neural plasticity and cognitive reserve (Fratiglioni et al., 2004). Additionally, socially active individuals often partake in other healthy behaviors, such as physical exercise and proper nutrition, indirectly enhancing cognitive health (Dominguez et al., 2021).

Emotional support derived from social connections plays a critical role in buffering against loneliness and depression, two significant risk factors for accelerated cognitive decline. Depression has been linked to structural brain changes, including reduced hippocampal volume, which can impair memory and executive function (Steffens et al., 2006). Furthermore, the sense of belonging cultivated through meaningful relationships provides psychological stability and motivation for engaging in intellectually and physically stimulating activities.

Empirical studies confirm the relationship between social engagement and improved cognitive outcomes. Research by Berkman and Syme (1979) highlights lower risks of cognitive impairment among individuals with robust social networks. Additionally, Kuiper et al.'s (2015) meta-analysis revealed that frequent participation in social activities significantly reduces dementia risks. Within the Asian cultural context, norms emphasizing family cohesion and intergenerational support provide unique opportunities for the elderly to stay socially connected and engaged (Lowenstein et al., 2007). However, Vietnam's rapid urbanization and shifting family dynamics may diminish these traditional forms of support, increasing older adults' vulnerability to cognitive challenges. Given these findings, this study shows that fostering social engagement can serve as a foundation in promoting cognitive health among Vietnam's aging population, particularly in mitigating the adverse effects of modernization and changing social structures, proposing the following hypothesis:

Hypothesis 1: Social engagement positively and meaningfully impacts Cognitive Health in the Elderly.

### 2.2. Mental health

Mental health encompasses emotional, psychological, and social well-being and is a critical determinant of cognitive function in aging individuals. Poor mental health conditions such as depression and anxiety are consistently associated with neurobiological changes, including increased inflammation, elevated cortisol levels, and hippocampal atrophy, all of which contribute to cognitive decline (Daulatzai, 2014). These conditions can impair executive functioning, memory retention, and decision-making abilities, accelerating the onset of neurodegenerative diseases such as Alzheimer's (Gatz et al., 2005).

Conversely, according to Waldman-Levi et al. (2015), positive mental health fosters emotional resilience, stability, and an overall sense of purpose, enabling older adults to engage in cognitively enriching activities. Psychological well-being is particularly crucial for maintaining motivation, which supports engagement in physical activities and intellectual pursuits, both vital for cognitive preservation.

In Vietnam, addressing mental health is often hindered by cultural stigmas and limited access to psychological services (Van et al., 2021). The increasing urbanization speed and the erosion of traditional family structures intensify these barriers. As a result, many elderly people find themselves isolated, often overlooked, and vulnerable to undiagnosed mental health conditions. Given the interplay between mental health and cognitive function, this study underscores the necessity of

integrating mental health care into broader frameworks for elderly support. Based on theoretical frameworks and empirical evidence, this study proposes the following hypothesis:

Hypothesis 2: Mental health positively and meaningfully impacts Cognitive Health in the Elderly.

### 2.3. Physical activity and lifestyle

Physical activity and lifestyle choices are widely recognized as critical factors influencing cognitive health in aging populations. Regular physical activity and adopting a healthy lifestyle not only enhance overall physical well-being but also play a key role in maintaining cognitive function and reducing the risks of cognitive decline and dementia (Rovio et al., 2005).

The relationship between physical activity and cognitive health operates through several biological and psychological pathways. For instance, regular exercises increase cerebral blood flow, improve the delivery of oxygen and nutrients to the brain, and support neurogenesis in critical areas like the hippocampus, which is essential for memory and learning (Fabel, K., et al., 2008). Furthermore, physical activity reduces inflammation, lowers oxidative stress, and promotes the release of brain-derived neurotrophic factor (BDNF), which is critical for maintaining neuronal health and plasticity (Walsh et al., 2020).

Lifestyle factors, such as sleep quality, diet, and purposeful daily activities, also significantly impact cognitive health. A healthy lifestyle that incorporates balanced nutrition, adequate hydration, and sufficient sleep collectively helps maintain metabolic health, which is closely linked to cognitive performance. On the other hand, sedentary lifestyles and unhealthy habits like smoking or excessive alcohol consumption are strongly associated with accelerated cognitive decline (Zhang et al., 2023).

Empirical research consistently demonstrates the positive impact of physical activity on cognitive health among the elderly. For example, a systematic review by Sofi et al. (2011) revealed that moderate to high levels of physical activity significantly reduce the risk of cognitive impairment and dementia. Likewise, a longitudinal study by Buchman et al. (2019) showed that higher levels of daily physical activity were correlated with slower rates of cognitive decline in older adults, even in cases where Alzheimer's disease pathology was present.

In Vietnam, traditional lifestyles have historically included forms of physical activities such as gardening, farming, or cycling, which support cognitive health among older adults. Nevertheless, rapid urbanization and modernization trends have shifted towards more sedentary lifestyles, notably among urban elderly populations. Additionally, dietary habits influenced by fast food and processed products consumption are replacing traditional, nutrient-rich diets, potentially magnifying health risks (Nguyen et al., 2020).

Despite these challenges, Vietnam's elderly population has shown a growing interest in community-based physical activities, such as group exercises and tai chi, which fit well with cultural values and promote physical and cognitive health (Huang et al., 2025). However, research designed to examine how these activities affect cognitive decline systematically remains sparse.

Although international studies have provided robust evidence of the benefits of physical activity and a healthy lifestyle for cognitive health, Vietnam-specific investigations that capture how these elements interplay with local cultural and environmental factors remain limited. Therefore, there is a need for studies that consider the differences between urban and rural settings and how these variations shape the lifestyle patterns of Vietnam's elderly, leading to the following hypothesis:

Hypothesis 3: Physical activity and lifestyle positively and meaningfully impact Cognitive Health in the Elderly.

### 2.4. Cognitive stimulation

Cognitive stimulation, defined by incorporating the brain in complex and meaningful tasks, is widely recognized as a key factor in conserving cognitive capabilities and mitigating cognitive deterioration among older adults. Activities such as reading, solving puzzles, learning new skills, and participating in intellectually stimulating conversations have been shown to enhance neural activity and fortify cognitive resilience (Hertzog et al., 2008). These activities provide the brain with opportunities to solidify its neural circuits and maintain plasticity, even in aging populations.

The protective effects of cognitive stimulation on cognitive health are rooted in the concept of cognitive reserve. This refers to the brain's ability to adapt to and offset age-related structural and functional changes, thereby preserving cognitive function in the face of neurodegeneration (Centorbi, M., et al., 2024). By challenging the brain to process new information and tackle novel problems, cognitively stimulating activities help build and uphold this reserve, encouraging neural plasticity.

Additionally, engaging in cognitively stimulating activities has been shown to reduce the risk of neurodegenerative conditions, such as Alzheimer's disease, by delaying the onset of symptoms (Valenzuela & Sachdev, 2009). These activities enhance executive functions, memory retention, and attention, cognitive areas that frequently show early signs of decline with aging. Moreover, cognitive stimulation can offer emotional and psychological benefits by lowering the risk of depression and social isolation, both of which are risk factors for accelerated cognitive decline (Fisher et al., 2017).

Empirical studies consistently support the hypothesis that cognitive stimulation positively impacts cognitive health in the elderly. The ACTIVE study (Advanced Cognitive Training for Independent and Vital Elderly), for example, demonstrated that structured cognitive training programs led to improved memory, reasoning, and processing speed, with benefits persisting-

even after five years (Ball et al., 2002). A meta-analysis by Lampit et al. (2014) similarly found that cognitive training interventions significantly strengthened cognitive outcomes in healthy elderly populations and those at risk for dementia.

Observational studies further underscore the importance of cognitive stimulation. For instance, the longitudinal study by Hertzog et al. (2008) revealed that elderly individuals who engaged in regular intellectual activities, such as reading books or playing chess, experienced a slower progression of cognitive decline compared to those whose engagement was less frequent. These findings suggest that consistent cognitive engagement can protect against age-related cognitive impairments.

Traditional customs and cultural norms in Vietnam often emphasize lifelong learning and intellectual engagement. Activities such as studying Buddhist texts, engaging in community storytelling, and participating in cultural festivities provide opportunities for meaningful cognitive stimulation among the elderly (Park et al., 2014). Yet, urbanization and increasing technology adoption have reshaped the landscape of cognitive engagement, offering both challenges and opportunities. Whereas traditional intellectual activities are declining in some areas, the rise of digital platforms and online learning presents new avenues for cognitive stimulation (Ahluwalia & Balhara, 2024).

Despite these cultural and technological shifts, research on the impact of cognitive stimulation on cognitive health in Vietnam's elderly population remains limited. Studies rarely explore how cultural practices and modern cognitive activities interact to affect the trajectory of cognitive decline, creating a pressing need for localized evidence.

While global evidence highlights the benefits of cognitive stimulation, few studies have considered how it affects in Vietnam's distinctive sociocultural context. Specifically, there is limited research on how traditional activities and modern cognitive engagement influence cognitive health among Vietnam's elderly. This study addresses this gap by exploring the relationship between cognitive stimulation and cognitive decline in Vietnam's aging population, thereby proposing the last hypothesis:

Hypothesis 4: Cognitive stimulation positively and meaningfully impacts Cognitive Health in the Elderly.

### 3. Methodology

#### 3.1. Instrument and participant

The research employed a structured questionnaire designed to explore the psychosocial determinants influencing cognitive health among the elderly, developed by following a thorough review of existing literature and consultations with experts specialized in gerontology and cognitive health, as Tabachnick et al. (2013) suggested. This systematic approach ensured the questionnaire's relevance for capturing the nuances of cognitive health determinants, including social engagement, mental well-being, physical activity, and cognitive stimulation. The questionnaire was divided into two major parts: The first collected demographic information (e.g., age, gender, education, income) to contextualize participants' backgrounds (Fowler, 2013). The second focused on items linked to the independent and dependent variables, informed by prior research on psychosocial influences on cognitive health (Stern, 2002; Valenzuela & Sachdev, 2009; Ownby et al., 2006; Barnes & Yaffe, 2011).

To validate the instrument's reliability and applicability, a pilot survey was administered to 40 elderly individuals. Feedback from the pilot survey informed refinements aimed at enhancing clarity, precision, and cultural fit (Hair et al., 2019; Linåker et al., 2015). After incorporating expert recommendations, the finalized questionnaire was distributed for the main survey.

The study targeted elderly individuals aged 60 and above, residing in Hanoi and neighboring northern provinces of Vietnam, ensuring a diverse demographic spectrum that captured differences across gender, marital status, education, income level, and health status. In total, 200 participants took part, a sample size adequate for applying exploratory factor analysis and multivariate regression, ensuring the validity of the findings (Tabachnick & Fidell, 2013; Hair et al., 2019). Random sampling was conducted through community networks and local organizations, ensuring inclusivity across urban and rural elderly populations.

The data collection process was conducted directly by the research team in early 2023. Participants completed the questionnaire using pencil and paper, ensuring immediate data capture and a 100% response rate. The survey coincided with a culturally vibrant time of the year, potentially enhancing participant engagement and reflecting real-life cognitive and psychosocial interactions during traditional Vietnamese events.

Ethical safeguards were integral to the research process. All participants provided informed consent, ensuring their voluntary participation and understanding of the study's purpose. Participant confidentiality was strictly maintained, adhering to ethical guidelines (American Psychological Association, 2020). This commitment to ethical principles underscores the respect and care extended to all participants.

Table 1 presents a comprehensive depiction of participant characteristics. This descriptive information highlights variations in marital status, education, income, and health conditions, providing a deeper context for understanding the psychosocial determinants of cognitive health in the elderly.

#### 3.2. Reliability analysis

Because the present study concerns the psychosocial determinants of cognitive health in the elderly, verifying the reliability of the data collection tool was essential, since reliability reflects the stability and consistency of an instrument across varying contexts. Cronbach’s alpha was used as the primary measurement to evaluate the internal consistency and reliability of the scales in this research. As noted in the established guidelines, a Cronbach’s alpha value of 0.7 or above indicates high internal consistency and is considered acceptable for most surveys (Kline, 2023; Nunnally et al., 1994). Values between 0.6 and 0.7 may be acceptable for exploratory scenarios but could point to potential item revisions (Cortina, 1993; Kline, 2023), while values below 0.6 are typically considered inadequate, suggesting the need for substantial revisions to the questionnaire (Kline, 2023; Nunnally et al., 1994).

**Table 1** Demographic characteristics of survey participants.

		Marital_Status			
		Divorced/Widowed		Married	
		Count	Row N %	Count	Row N %
Age	70 75 years old	13	39.4%	20	60.6%
	60 65 years old	8	38.1%	13	61.9%
	65 70 years old	24	30.0%	56	70.0%
	70 75 years old	21	51.2%	20	48.8%
	over 75 years old	5	20.0%	20	80.0%
Gender	female	26	28.6%	65	71.4%
	male	45	41.3%	64	58.7%
Education	Bachelor’s Degree	43	37.7%	71	62.3%
	High school	16	47.1%	18	52.9%
	Postgraduate	12	23.1%	40	76.9%
Monthly Income	5 10 million VND	43	37.7%	71	62.3%
	Above 10 million VND	11	23.4%	36	76.6%
	Below 5 million VND	17	43.6%	22	56.4%
Current_Health_Status	Average	23	37.1%	39	62.9%
	Excellent	18	45.0%	22	55.0%
	Good	19	27.9%	49	72.1%
	Poor	11	36.7%	19	63.3%

The reliability of the questionnaire was tested for each scale, as summarized in Table 2. Cronbach’s alpha values for all scales exceeded the acceptable threshold of 0.7, indicating a robust internal consistency and reliability of the constructs used to measure engagement, mental well-being, physical lifestyle, cognitive stimulation, and cognitive health. Moreover, the smallest total variable correlation for each scale also remained within acceptable limits, further confirming the robustness of the survey instrument.

In addition to reliability, the validity of the questionnaire was evaluated using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), both of which supported the construct validity of the scales. Convergent validity was evident, meaning each scale’s items effectively captured their intended construct (Fornell & Larcker, 1981). Furthermore, discriminant validity was confirmed, as each item showed stronger correlations with its respective construct than with alternate constructs (Fornell & Larcker, 1981; Hair et al., 2019). These findings validate the questionnaire’s suitability for exploring the psychosocial determinants of cognitive health in the elderly, providing a robust foundation for subsequent analyses and conclusions.

**Table 2** Summary of reliability.

Scales	Number of variables observed	Reliability coefficients (Cronbach Alpha)	The correlation coefficient of the smallest total variable
Engagement	4	0.748	0.496
Mental_Health	4	0.786	0.563
Phy_Lifestyle	4	0.767	0.517
Cog_Stimulation	4	0.773	0.537
Cog_Health	4	0.752	0.529

### 3.3. Factor analysis

Factor analysis is a widely utilized statistical approach in social sciences, designed to identify underlying dimensions or factors within a dataset. Examining correlations among multiple variables consolidates them into fewer latent components



(Gorsuch, 2014). The determination of the appropriate number of factors to extract is often guided by scree plots and eigenvalues, where eigenvalues above 1 typically indicate evidence of meaningful factors (Fabrigar et al., 1999). Beyond simplifying complex datasets, factor analysis also refines research models and hypotheses (Hair et al., 2014), providing insights into the core dimensions that explain relationships among variables.

Table 3 summarizes the factor analysis results conducted to validate the research questionnaire used in this study. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.928, exceeding the usual threshold of 0.5, indicating that the data are well-suited for factor analysis. Additionally, Bartlett's test of sphericity was statistically significant (Chi-Square = 1452.500; df = 190; Sig. = 0.000), confirming the presence of sufficient correlations among the observed variables to proceed with the analysis.

The factor loading coefficients for all variables were at or above 0.5, demonstrating strong linkage with their respective factors. As the general guideline, factor loadings of 0.3 are generally considered minimum, 0.4 can be seen as essential, and 0.5 or higher is deemed practical for significance, indicating the robustness of the extracted factors (Hair et al., 2019; Tabachnick et al., 2013). The total variance explained by the extracted factors reached 60.401% (>50%), confirming the model's ability to account for a significant portion of data variability. Additionally, the initial eigenvalues of all extracted factors exceeded 1.00, reinforcing their statistical legitimacy.

Using Principal Component Analysis and Varimax rotation as extraction, the factor solution converged in seven iterations, yielding a clear structure that reflects the survey's fundamental constructs. The extracted factors align with the theoretical framework, representing the dimensions of mental health, physical lifestyle, cognitive health, cognitive stimulation, and engagement—key psychosocial determinants of cognitive health in the elderly. Furthermore, the robust factor loadings and high total variance confirmed the instrument's effectiveness in capturing the constructs under investigation.

This analysis highlights the importance of aligning factor structures with specific cultural and environmental contexts, particularly in Vietnam. Future studies should delve deeper into how these factors interact in shaping and influencing cognitive health outcomes among diverse populations, further illuminating effective methods for promoting healthy aging.

### 3.4. Correlation analysis

Correlation analysis is another crucial statistical tool used to evaluate the strength and direction of the linear relationship between two variables. By measuring the variations in one variable that correspond with variations in another, this method offers a straightforward measure of their interconnection (Tabachnick et al., 2013). The Pearson's coefficient is the most commonly used index for this analysis, with values ranging from -1 to 1, signifying perfect negative linear correlation at -1, perfect positive linear correlation at 1, and no linear relationship at 0 (Field, 2013; Hair et al., 2021). Despite the fact that correlation analysis provides valuable insights into the relationships among variables and supports predictive analyses, correlation alone does not imply causation, as additional factors may influence the observed relationships (Agresti & Finlay, 2009).

Table 4 summarizes the correlation analysis at a 95% confidence level, where a significance value (Sig.) below 0.05 implies statistically significant relationships. The Pearson correlation coefficients reveal moderate to strong positive correlations among the variables, indicating meaningful interconnections between cognitive health and the independent variables, including engagement, mental health, physical lifestyle, and cognitive stimulation. Notably, all correlations are statistically significant at the 0.01 level (2-tailed), reflecting robust relationships. Engagement shows the strongest correlation with Cognitive Health ( $r = .582$ ), followed by Physical Lifestyle ( $r = .557$ ), Cognitive Stimulation ( $r = .551$ ), and Mental Health ( $r = .544$ ). These findings highlight how closely the psychosocial determinants are interconnected in influencing cognitive health.

By highlighting such robust linkage, the positive correlations observed in this study underscore the importance of considering multiple psychosocial factors when evaluating cognitive health in the elderly. These results provide a foundation for subsequent analyses, particularly multivariate linear regression, aimed at identifying the most significant determinants of cognitive health while controlling for potential confounding variables (Larose & Larose, 2014). Furthermore, the presence of statistically significant relationships confirmed the relevance of the hypothesized constructs and their validity within the proposed research model.

By systematically exploring these correlations, this study contributes to a deeper understanding of how engagement, mental health, physical lifestyle, and cognitive stimulation collectively influence cognitive health in the elderly. These insights are critical for developing targeted interventions and policies to improve the overall well-being of the aging population in Vietnam.

### 3.5. Multivariate linear regression analysis

Multivariate linear regression analysis is a robust statistical technique used to examine the relationships between multiple independent variables and a single dependent variable. This method employs a linear equation to model how these independent factors affect the outcome, assigning coefficients that quantify both the magnitude and the direction of this impact (Greene, 2008). Furthermore, these regression coefficients are also instrumental in predictive analyses, enabling the

estimation of outcomes for the dependent variable based on changes in the independent variables (Hair et al., 1998). Widely applied in the social sciences, economics, and other disciplines, multivariate linear regression is a powerful tool for elucidating variable interactions and forecasting dependent variable outcomes (Bryk & Raudenbush, 1992; Hair et al., 1998).

**Table 3** Result of factor analysis.

	Rotated Component Matrix				
	1	2	3	4	5
Mental Health 3	.743				
Mental Health 4	.738				
Mental Health 2	.717				
Mental Health 1	.557				
Phy Lifestyle4		.749			
Phy Lifestyle 2		.738			
Phy Lifestyle 3		.641			
Phy Lifestyle 1		.615			
Cog Health 4			.745		
Cog Health 3			.672		
Cog Health 2			.652		
Cog Health 1			.597		
Cog Stimulation 1				.715	
Cog Stimulation 3				.698	
Cog Stimulation 4				.670	
Cog Stimulation 2				.625	
Engagement 3					.719
Engagement 4					.713
Engagement 2					.534
Engagement 1					.522

Extraction Method: Principal Component Analysis.  
 Rotation Method: Varimax with Kaiser Normalization.  
 Rotation converged in 7 iterations.  
 Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)= 0.928  
 Bartlett's Test of Sphericity (Chi-Square =1452.500; df=190; sig.=0.000)  
 Initial Eigenvalues = 1.012; Extraction Sums of Squared Loadings = 60.401

In this study, the multivariate regression model was used to examine the relationships between the dependent variable (cognitive health) and four psychosocial determinants: engagement, mental health, physical lifestyle, and cognitive stimulation, serving as independent variables. The model's validity is supported by the F-test ( $F = 43.590, p < 0.001$ ), confirming the overall significance of the regression model (Hair et al., 2019). Moreover, the variance inflation factor (VIF) values, all below 1.983, indicate that there is no problematic degree of multicollinearity among the predictors, ensuring the reliability of the estimation of regression coefficients (Kutner et al., 2005). An R Square of 0.472 indicates that approximately 47.2% of the variance in cognitive health is explained by the independent variables, while the Durbin-Watson value of 2.041 suggests no significant autocorrelation in the residuals, ensuring the reliability of the regression model (Table 5).

The ANOVA table (Table 6) confirms that the regression model is statistically significant, with a p-value of 0.000, indicating that the independent variables collectively influence cognitive health.

**4. Results**

In the multiple linear regression analysis (Table 7), social engagement has been shown to be a significant positive influence with a regression coefficient of  $\beta = 0.233$  and a p-value of 0.003, offering support for Hypothesis 1. This evidence highlights the value of maintaining active social networks and interpersonal interactions. Social engagement provides opportunities for cognitive stimulation, emotional support, and a sense of purpose, collectively enhancing neural activity and resilience against cognitive decline. These results align with previous research suggesting that frequent social interactions can delay the onset of cognitive impairments and improve overall cognitive function in older adults.



**Table 4** Correlation analysis results.

		Correlations				
		Cog_Health	Engagement	Mental_Health	Phy_Lifestyle	Cog_Stimulation
Cog_Health	Pearson Correlation	1	.582**	.544**	.557**	.551**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	200	200	200	200	200
Engagement	Pearson Correlation	.582**	1	.603**	.565**	.568**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	200	200	200	200	200
Mental_Health	Pearson Correlation	.544**	.603**	1	.483**	.550**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	200	200	200	200	200
Phy_Lifestyle	Pearson Correlation	.557**	.565**	.483**	1	.523**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	200	200	200	200	200
Cog_Stimulation	Pearson Correlation	.551**	.568**	.550**	.523**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	200	200	200	200	200

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Table 5** Model summary of the regression model.

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.687a	.472	.461	.58391	2.041
Predictors: (Constant), Cog_Stimulation, Phy_Lifestyle, Mental_Health, Engagement					
Dependent Variable: Cog_Health					

**Table 6** Anova analysis results for the regression model.

ANOVA					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	59.449	4	14.862	43.590	.000b
Residual	66.486	195	.341		
Total	125.935	199			
Dependent Variable: Cog_Health					
Predictors: (Constant), Cog_Stimulation, Phy_Lifestyle, Mental_Health, Engagement					

Mental health also significantly impacts cognitive health in the elderly, as evidenced by a regression coefficient of  $\beta = 0.180$  and a p-value of 0.008, supporting Hypothesis 2. Emotional and psychological well-being play a crucial role in preserving cognitive function; conversely, poor mental health conditions, such as depression and anxiety, are associated with neurobiological disruptions, including increased inflammation and hippocampal atrophy, which can accelerate cognitive decline. On the other hand, positive mental health fosters emotional stability, resilience, and motivation to engage in cognitively beneficial activities, further protecting against age-related cognitive deterioration. The findings underscore the necessity of addressing mental health challenges to improve cognitive health outcomes in the elderly.

The analysis further shows that physical activity and lifestyle are significant predictors of cognitive health with a regression coefficient of  $\beta = 0.247$  and a p-value of 0.000, supporting Hypothesis 3. Routine physical activity benefits the brain by improving cerebral blood flow, optimizing oxygen and nutrient delivery, therefore supporting better memory, reasoning, and problem-solving abilities. Additionally, healthy lifestyle habits, such as balanced nutrition and adequate sleep, support metabolic health and further reduce the likelihood of chronic illnesses that can negatively impact cognitive health. The results reinforce the necessity of promoting physical activities and lifestyle interventions tailored to the needs of the elderly.

Finally, cognitive stimulation likewise stands out as a significant positive contributor to cognitive health, with a regression coefficient of  $\beta = 0.195$  and a p-value of 0.004, supporting Hypothesis 4. Engaging in intellectually stimulating activities like reading, solving puzzles, and learning new skills not only strengthens neural plasticity and builds cognitive reserve but also helps lower the chance of age-related diseases like Alzheimer’s. Moreover, cognitive stimulation provides psychological and emotional benefits, reducing the risks of depression and social isolation, which themselves heighten cognitive decline. The results suggest that fostering both traditional and modern cognitively enriching activities can significantly enhance cognitive health among the elderly, especially in culturally diverse contexts like Vietnam.



**Table 7** Results of multiple linear regression analysis.

Model	Coefficients					Collinearity Statistics	
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Tolerance	VIF
	B	Std. Error	Beta				
1 (Constant)	.391	.202		1.933	.055		
Engagement	.233	.076	.223	3.047	.003	.504	1.983
Mental_Health	.180	.067	.186	2.675	.008	.563	1.777
Phy_Lifestyle	.247	.069	.237	3.559	.000	.609	1.641
Cog_Stimulation	.195	.068	.198	2.881	.004	.572	1.747

Dependent Variable: Cog\_Health

In summary, the findings validate the theoretical framework of the study, that social engagement, mental health, physical activity, lifestyle, and cognitive stimulation are critical psychosocial determinants of cognitive health in the elderly. These results not only support the proposed hypotheses but also emphasize the linkage of these factors and their collective role in promoting healthy aging. Effective interventions and policies must therefore adopt a multidimensional approach that integrates these determinants, addressing both individual behaviors and broader social influences. This is particularly meaningful in Vietnam, where rapid modernization and urbanization are reshaping traditional support systems for the elderly.

**5. Discussion**

The findings of this study emphasize the significant and multifaceted influence of psychosocial determinants on cognitive health in the elderly. Social engagement has been identified as a pivotal factor in maintaining cognitive health, as it fosters opportunities for cognitive stimulation, emotional support, and a sense of purpose. These outcomes enhance resilience against cognitive decline, consistent with prior research emphasizing the protective role of active social networks and interpersonal interactions in delaying cognitive impairments (Kuiper et al., 2015; James et al., 2011). In Vietnam, where modernization and urbanization challenge traditional family and community support structures, maintaining such networks becomes essential for preserving cognitive and emotional benefits.

Mental health also emerges as a critical determinant, with emotional and psychological well-being contributing significantly to cognitive resilience. Poor mental health conditions, such as depression and anxiety, lead to neurobiological disruptions, including increased inflammation and hippocampal atrophy, which accelerate cognitive decline (Ownby et al., 2006; Steffens et al., 2006). Conversely, positive mental health fosters emotional stability and motivation, enabling engagement in cognitively enriching activities (Gatz et al., 2005). In Vietnam, where obstacles such as stigma and limited infrastructure hinder mental health services, initiatives that integrate mental well-being into elderly support frameworks can amplify other beneficial effects, such as improved social engagement and cognitive stimulation (Nguyen et al., 2021).

The role of physical activity and lifestyle is particularly notable, reinforcing the well-established connection between them and cognitive function. Regular physical activity improves blood circulation to the brain, promoting neurogenesis, sharpens memory and executive functioning (Erickson et al., 2011; Sofi et al., 2011). Additionally, healthy lifestyle habits, such as balanced nutrition and adequate sleep, reduce the risk of chronic illnesses that impair cognitive function (Barnes & Yaffe, 2011). Although traditional activities in Vietnam naturally incorporate physical activity into daily life, like farming and cycling, accelerating urbanization may contribute to increasingly sedentary lifestyles, particularly in urban areas (Nguyen et al., 2020). These findings highlight the need to design culturally appropriate strategies that encourage physical activity while addressing barriers in both urban and rural settings.

Cognitive stimulation is also shown to have a significant positive impact on cognitive health. Whether through reading, solving puzzles, and learning new skills, such pursuits enhance neural plasticity and cognitive reserve, delaying the onset of neurodegenerative diseases like Alzheimer’s (Stern, 2002; Valenzuela & Sachdev, 2009). Additionally, these activities reduce the risk of depression and social isolation, which further protects against deterioration in cognitive performance (Ball et al., 2002). At the same time, the availability of digital platforms presents new avenues for learning and interaction, underscoring the importance of balancing traditional and modern approaches to cognitive stimulation.

Overall, these findings highlight the link between psychosocial determinants and their collective role in promoting cognitive health in the elderly. To be effective, practical interventions must incorporate social engagement, mental health, physical activity, lifestyle, and cognitive stimulation. Such programs should be tailored to Vietnam’s unique cultural and socio-economic context. Addressing urban-rural disparities and ensuring equitable access to resources are critical steps in supporting cognitive health across diverse settings. These findings contribute to the broader understanding of healthy aging and provide a foundation for developing targeted policies and interventions to enhance the well-being of elderly populations in Vietnam and beyond.

**6. Conclusion**



This study highlights the significant role of psychosocial determinants - namely, social engagement, mental health, physical activity, lifestyle, and cognitive stimulation - in influencing cognitive health among the elderly. Against the backdrop of global aging and the rapid transformation of traditional social structures, particularly in Vietnam, this research underscores the necessity of addressing the challenges of cognitive decline. By focusing on Vietnam's socio-cultural context, the study bridges critical research gaps by exploring the unique interplay of traditional and modern influences on cognitive health, ultimately offering a culturally informed framework for designing effective interventions.

The findings demonstrate that all four psychosocial factors positively and significantly impact cognitive health. Social engagement enhances cognitive resilience by fostering opportunities for stimulation, emotional support, and a sense of belonging, aligning with prior research on its protective effects against cognitive decline (Kuiper et al., 2015). Mental health also stands out as a key determinant, with emotional well-being contributing to cognitive resilience and poor mental health conditions accelerating risks of impairment through neurobiological disruptions (Ownby et al., 2006; Steffens et al., 2006). Likewise, physical activity and a healthy lifestyle are shown to be critical for maintaining cognitive function, as they promote overall brain health and mitigate the risk of chronic illness (Erickson et al., 2011; Barnes & Yaffe, 2011). Additionally, cognitive stimulation through intellectually enriching activities fosters neural plasticity and cognitive reserve, thus potentially delaying the onset of neurodegeneration (Stern, 2002; Valenzuela & Sachdev, 2009). Collectively, these findings validate the proposed hypotheses and underscore how these psychosocial determinants intertwine to support healthy aging.

The study's practical and policy-related implications are broad. For practitioners and policymakers, the findings emphasize the need for multidimensional interventions that integrate social engagement, mental health support, physical activity, and cognitive stimulation into elderly care programs. In Vietnam's rapidly changing context, culturally appropriate strategies, such as leveraging both traditional practices and modern digital tools, are essential to address cognitive health challenges. It's also imperative to address urban-rural disparities, reduce mental health stigma, and promote physical activity in daily life. Beyond Vietnam, the study's insights extend to other socio-cultural contexts undergoing similar transitions, providing a valuable foundation for international applications.

Nevertheless, several limitations should be acknowledged. First, the study's focus on Vietnam may limit the generalizability of its findings to other cultural and socio-economic settings. Second, its cross-sectional design can restrict causal inferences about the relationships between psychosocial determinants and cognitive health. Third, reliance on self-reported data for some variables introduces potential biases related to recall and social desirability. Lastly, the study does not account for additional factors, such as genetic predispositions or healthcare access, which could further influence the relationships observed.

To advance knowledge in this area, future research should employ longitudinal studies to illuminate the causal links and track developments in cognitive health determinants. Comparative studies across different cultural and socio-economic contexts could provide a broader understanding of how these factors operate globally. Additionally, exploring mediating and moderating variables, such as socio-economic status, healthcare accessibility, and technological adoption, could offer deeper insights into the mechanisms underlying cognitive health. Incorporating qualitative methods could also enhance the findings by providing a more nuanced understanding of the elderly's lived experiences.

In conclusion, this study provides a robust foundation for understanding the psychosocial determinants of cognitive health in the elderly, particularly within Vietnam's socio-cultural context. By addressing critical research gaps in existing research, validating theoretical frameworks, and offering actionable implications, it contributes significantly to discussions on healthy aging. Future efforts can use these findings as a foundation for developing targeted, culturally relevant interventions aimed at enhancing the well-being of aging populations around the world.

### **Ethical Considerations**

This ethical statement was approved by the Vietnam Women's Academy, Pham Thanh Binh's affiliated institution, prior to the data collection phase of the study.

### **Conflict of Interest**

The authors declare no conflicts of interest.

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