

Original article

Prevalence and predictors of dementia among older adults with memory complaints at a primary care hospital in Nakhon Ratchasima province

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Abstract

Background: Thailand's rapid transition into a completely aged society has brought cognitive impairment and dementia to the forefront of public health challenges. In primary care settings, the lack of systematic screening in routine practice often leads to delayed or missed diagnoses of dementia.

Objectives: This study aimed to determine the prevalence of dementia and related factors among older adults presenting with memory complaints at the geriatric clinic of Phimai Hospital, a general hospital in Nakhon Ratchasima Province, Thailand.

Methods: This cross-sectional descriptive study included 125 older adults aged 60 years or older who attended the geriatric clinic with memory complaints. Data were collected using a demographic questionnaire; the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE); the Thai Geriatric Depression Scale (TGDS-15); the Mini-Mental State Examination, Thai 2002 version (MMSE-Thai 2002); the Montreal Cognitive Assessment (MoCA); the Barthel Activities of Daily Living (ADL) Index; the Chula ADL Index; and clinical diagnosis based on DSM-5 criteria. Data were analyzed using descriptive statistics, the chi-square test, Fisher's exact test, Pearson's correlation coefficient, and binary logistic regression.

Results: The participants were predominantly female (60.8%), with a mean age of 76.7 years. Clinical diagnosis showed prevalences of dementia, mild cognitive impairment (MCI), and depression of 45.6%, 44.8%, and 4.8%, respectively. Factors independently associated with dementia in the binary logistic regression analysis included being without a partner (adjusted odds ratio [aOR] = 2.733), monthly income below 5,000 Thai baht (aOR = 15.530), poor self-perceived health status (aOR = 4.482), lack of regular exercise (aOR = 3.577) and abnormal IQCODE result (aOR = 6.921).

Conclusion: In a geriatric clinic of a general hospital, nearly half of the older adults presenting with memory complaints were diagnosed with dementia. Systematic cognitive screening and identification of associated factors may support early diagnosis and individualized care planning for cognitive impairment.

Keywords: Aged, prevalence; primary health care, dementia, hospital, Thailand.

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Thailand has officially entered a complete aged society, with more than 14 million adults aged 60 years and older since 2025, accounting for over 20.0% of the total population.⁽¹⁾ Along with this demographic transition, age-related health conditions, particularly cognitive impairment and dementia, have become increasingly important public health challenges.⁽²⁻⁷⁾ Mild Cognitive Impairment (MCI) represents a critical transitional state between normal cognitive aging and early dementia. Identifying MCI is highly relevant as it provides a crucial window of opportunity for early detection and intervention before the onset of severe functional decline. Dementia is a common geriatric syndrome and a major cause of disability, functional decline, frailty, and dependence in later life.⁽⁸⁾ However, previous studies have shown that dementia is frequently overlooked or underdiagnosed, especially in primary care settings.^(9,10) where time constraints, limited resources, and reliance on brief cognitive screening tools may hinder accurate diagnosis.⁽²⁻⁷⁾ Cognitive screening alone may not be sufficient to establish a diagnosis of dementia, as comprehensive assessment including functional status, informant-based history and clinical evaluation is often required. Therefore, systematic screening and multidimensional assessment are essential for early identification and appropriate management of dementia in Thai older adults. In Thailand, clinical practice guidelines for dementia diagnosis and management have been developed through multidisciplinary collaboration among healthcare professionals and relevant professional organizations, with three successive editions published by the Neurological Institute, Department of Medical Services to support standardized dementia care nationwide.⁽¹¹⁾ These guidelines are based on the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5).⁽¹²⁾

Phimai District in Nakhon Ratchasima Province has a large older population. At Phimai Hospital, many older patients present with memory loss, cognitive difficulties, and impaired self-care. However, screening in routine practice has remained limited, which may delay diagnosis relative to clinical assessment using gold-standard diagnostic criteria. This gap highlights the need for systematic screening and identification of factors associated with mild cognitive impairment and dementia.

This study aimed to determine the prevalence of dementia and to identify clinical and sociodemographic

profiles of older adults presenting with memory complaints at the geriatric clinic of Phimai Hospital. Identifying factors associated with a clinical diagnosis of dementia in this high-risk population may provide evidence to support systematic case detection, early diagnosis, and targeted prevention and care planning in primary and geriatric care settings.

Materials and methods

Study design and participants

This cross-sectional descriptive study was conducted among older adults aged 60 years or older who attended the geriatric clinic at Phimai Hospital. Based on service records, a total of 182 older adults with memory complaints attended the clinic during the preceding one-year period. The required sample size of 125 participants was calculated using Taro Yamane's formula. Participants who met the inclusion criteria during the study period were consecutively enrolled without random selection until the target sample size was achieved. Eligibility criteria included the ability to verbally communicate, absence of significant hearing impairment, attendance with a relative or caregiver who could provide collateral information, and provision of voluntary informed consent.

Research instruments

Data were collected using a demographic questionnaire; the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE)⁽¹³⁾; the Thai Geriatric Depression Scale (TGDS-15)⁽¹⁴⁾; the Mini-Mental State Examination, Thai 2002 version (MMSE-Thai 2002)⁽¹⁵⁾; the Montreal Cognitive Assessment (MoCA)⁽¹⁶⁻¹⁸⁾; the Barthel Activities of Daily Living (ADL) Index⁽¹⁹⁾; the Chula ADL Index⁽²⁰⁾; and a final clinical diagnosis established by a physician. The study was specifically designed to integrate findings from all assessment components into routine clinical evaluation in the geriatric clinic, allowing the physician to use the combined assessment results as supportive clinical information for cognitive evaluation and diagnostic decision-making. Final clinical diagnoses were established by an attending physician at the geriatric clinic, who was not a member of the research team. The diagnostic process was conducted as part of the hospital's routine clinical consultation system for patients suspected of cognitive impairment. To ensure diagnostic reliability, the consulting physician is board-certified in Preventive

Medicine (Community Mental Health) and has completed specific training programs in dementia care and geriatric psychiatry. Furthermore, the physician routinely applies the dementia clinical practice guidelines, third edition, developed by the Neurological Institute of Thailand⁽¹¹⁾, in their daily clinical practice. These guidelines are based on the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5).⁽¹²⁾ Data were collected through face-to-face interviews, cognitive and functional assessments, and review of medical records. The study protocol has been approved by the Institutional Review Board of the Faculty of Medicine, Chulalongkorn University under approval no. 1498/2024, with ethical approval granted on December 12, 2024.

Statistical analysis

Data were analyzed using IBM SPSS Statistics version 28.0. Descriptive statistics were used to summarize participants' demographic and clinical characteristics, as well as the distribution of physician-based clinical diagnoses among older adults presenting with memory complaints, including cognitively normal, depressive disorder, mild cognitive impairment (MCI), and dementia. Data were expressed as mean $\pm$ standard deviation (SD). Associations between categorical variables and clinical diagnosis of dementia were examined using the chi-square test or Fisher's exact test, while correlations between continuous variables were assessed using Pearson's correlation coefficient.

For the binary logistic regression analysis, physician-based clinical diagnosis was dichotomized into two outcome groups, with dementia coded as 1 and cognitively normal or mild cognitive impairment (MCI) coded as 0. Participants with MCI were combined with the cognitively normal group because the number of cognitively normal participants was relatively small, which could potentially affect the stability of the regression model. Binary logistic regression analysis was subsequently performed to identify factors associated with a clinical diagnosis of dementia among older adults presenting with memory complaints and to determine independent predictors of dementia in this population. Statistical significance was defined as a two-tailed P-value of less than 0.05.

Results

A total of 125 older adults with memory complaints were included in the study. The participants were predominantly female, representing 60.8% of the sample, with a mean age of 76.7 years (SD = 8.4). Most participants had completed primary education, accounting for 79.2% of the sample, while 91.2% were unemployed or retired and 83.2% reported a monthly income of less than 5,000 Thai baht. The majority of participants (68.0%) reported that their income was sufficient for daily living expenses but did not allow for savings. Participants diagnosed with depression-related cognitive symptoms ($n = 6$) were excluded from the analysis because the sample size was insufficient for meaningful subgroup comparisons. Consequently, the descriptive characteristics of the remaining 119 participants are presented in **Table 1**. Nearly half of the participants were living without a partner, including those who were single, widowed, or divorced, representing 47.9% of the sample. In addition, 70.6% had a history of employment exceeding 30 years. With respect to health and lifestyle characteristics, 72.3% of participants had cardiometabolic comorbidities, including diabetes mellitus, hypertension, or hyperlipidemia. A substantial proportion reported a lack of regular physical exercise (63.9%), while 33.6% perceived their overall health status as poor. Other notable clinical characteristics included a family history of dementia in 18.5% of participants, hospitalization within the previous six months in 9.2%, and a history of severe head injury in 4.2%.

Bivariate analyses demonstrated that several sociodemographic and health-related factors were significantly associated with a clinical diagnosis of dementia, including age ($P < 0.001$), marital status ($P = 0.018$), duration of employment ($P = 0.011$), monthly income ($P = 0.016$), self-perceived health status ($P = 0.005$), regular physical exercise ($P < 0.001$), and a history of hospitalization in the past 6 months ($P = 0.028$). Participants diagnosed with dementia were significantly older, more likely to be without a partner, have lower monthly income, report poorer perceived health status, lack regular physical exercise, and have a higher rate of recent hospitalization compared with those diagnosed as cognitively normal or with MCI.

Table 1. Sociodemographic and health-related characteristics according to physician-based clinical diagnosis (n = 125).

Variables	Total n = 119	Normal n = 6	MCI n = 57	Dementia n = 56
	n (%)			
Age (mean $\pm$ SD)	77.4 $\pm$ 8.0	69.2 $\pm$ 4.6	75.6 $\pm$ 7.8	79.9 $\pm$ 7.7
Female gender	71 (59.7)	3 (50.0)	34 (59.6)	34 (60.7)
Year of education > 6 years	23 (19.3)	2 (33.3)	14 (24.6)	7 (12.5)
Single/widowed/divorced	57 (47.9)	2 (33.3)	20 (35.1)	35 (62.5)
Marital status				
Duration of employment > 30 years	84 (70.6)	1 (16.7)	42 (73.7)	41 (73.2)
Monthly income < 5,000 Thai baht	104 (87.4)	5 (83.3)	44 (77.2)	55 (98.2)
Poor self-perceived health status	40 (33.6)	0 (0.0)	13 (22.8)	27 (48.2)
Lack of Regular exercise	76 (63.9)	1 (16.7)	29 (50.9)	46 (82.1)
Psychiatric comorbidity	9 (7.6)	0 (0.0)	3 (5.3)	6 (10.7)
Medical comorbidity	86 (72.3)	6 (100.0)	39 (68.4)	41 (73.2)
History of severe head injury	5 (4.2)	1 (16.7)	3 (5.3)	1 (1.8)
Family history of dementia	22 (18.5)	2 (33.3)	4 (7.0)	16 (28.6)
History of hospitalization in the past 6 months	11 (9.2)	0 (0.0)	2 (3.5)	9 (16.1)
IQCODE score (mean $\pm$ SD)	3.5 $\pm$ 0.5	3.1 $\pm$ 0.1	3.3 $\pm$ 0.5	3.8 $\pm$ 0.4
TGDS score (mean $\pm$ SD)	3.3 $\pm$ 2.2	2.5 $\pm$ 1.5	3.2 $\pm$ 2.1	3.6 $\pm$ 2.4
MMSE score (mean $\pm$ SD)	13.5 $\pm$ 5.8	21.8 $\pm$ 3.1	16.3 $\pm$ 4.1	9.9 $\pm$ 4.7
MoCA score (mean $\pm$ SD)	10.5 $\pm$ 5.2	20.0 $\pm$ 4.5	13.9 $\pm$ 4.0	6.1 $\pm$ 3.4
Barthel ADL index score (mean $\pm$ SD)	14.2 $\pm$ 6.2	19.8 $\pm$ 0.4	18.5 $\pm$ 2.4	9.4 $\pm$ 4.3
Chula ADL index score (mean $\pm$ SD)	5.9 $\pm$ 2.6	8.8 $\pm$ 0.4	7.9 $\pm$ 1.3	3.7 $\pm$ 1.7

Continuous variables are presented as Mean $\pm$ SD. Categorical variables are presented as n (%). Participants diagnosed with depression-related cognitive symptoms (n = 6) were excluded from this analysis due to insufficient sample size for subgroup comparison.

Furthermore, regarding clinical assessments, the dementia group exhibited significantly lower mean scores in global cognitive functions (MMSE-Thai 2002 and MoCA) and functional independence (Barthel ADL and Chula ADL) compared to the other groups ($P < 0.001$ for all). Conversely, informant-reported cognitive decline (IQCODE) scores were significantly higher among patients with dementia ($P < 0.001$). There was no significant difference in depression screening (TGDS) scores across the diagnostic groups ($P = 0.573$).

Bivariate analyses indicated that the IQCODE, MMSE-Thai 2002, Barthel ADL Index, and Chula ADL Index were significantly associated with a dementia diagnosis ($P < 0.001$), whereas the TGDS was not ($P = 0.889$). Notably, all participants with

abnormal MMSE-Thai 2002 scores (100.0%) and dependent functional status on both ADL indices (100.0%) were diagnosed with dementia. Furthermore, abnormal IQCODE results (98.2%) were heavily distributed within the dementia group, confirming the high clinical utility of these instruments.

Among contextual factors, older age (> 70 years), being without a partner, monthly income below 5,000 Thai baht, poor self-perceived health, recent hospital admission, family history of dementia, and lack of regular exercise were significantly associated with dementia ($P < 0.05$). Conversely, gender, education level, underlying medical or psychiatric comorbidities, history of brain injury, and sleep problems showed no significant associations. shown in **Table 2**.

Table 2. Associations between clinical diagnosis of dementia and cognitive/functional assessment tools among older adults with memory complaints at Phimai Hospital.

Factor	Non Dementia n = 62	(%)	Dementia n = 57	(%)	X ² /Fisher	P - Value
Age > 70 years old	42	67.7	51	89.5	8.169	0.004*
Female gender	37	59.7	34	59.6	0	0.998
Marital status (Single/widowed/divorced)	22	35.5	35	61.4	8.016	0.005*
More than 6 years of education	16	25.8	7	12.3	3.447	0.063
Monthly income < 5000 Thai baht	49	79.0	55	96.5	7.904	0.005*
Poor self-perceived health status	13	21.0	27	47.4	9.351	0.002*
Have medical comorbidity (DM, HT, hyperlipidemia)	45	72.6	41	71.9	0.007	0.936
Have psychiatric comorbidity or history of depression	3	4.8	6	10.5	1.341	0.318 ^a
History of severe head injury	4	6.5	1	1.8	1.621	0.366 ^a
History of hospitalization in the past 6 months	2	3.2	9	15.8	5.864	0.024* ^a
Family history of dementia	6	9.7	16	28.1	6.786	0.009*
Lack of regular exercise	30	48.4	46	80.7	13.528	< 0.001*
Insomnia (Sleep problems)	21	33.9	16	28.1	0.466	0.495
Abnormal IQCODE score	29	46.8	56	98.2	38.381	< 0.001*
Abnormal TGDS score	5	8.9	5	8.8	0.019	0.889
Abnormal MMSE score	44	71.0	57	100	19.516	< 0.001*
Dependent ADL on Barthel ADL index	0	0.0	57	100	119	< 0.001*

* $P < 0.05$; C², Fisher's exact test.

("Non-dementia" group is comprised of cognitively normal participants and those with MCI. Participants with depression-related cognitive symptoms were excluded from this analysis).

For the binary logistic regression analysis, participants diagnosed as cognitively normal and those with MCI were combined into a single comparison group. After adjustment for potential confounding factors which included age, marital status, monthly income, self-perceived health status, recent hospitalization, physical exercise, IQCODE score, diabetes mellitus, and hypertension independent predictors of dementia included being without a partner (adjusted odds ratio [aOR] = 2.733, 95% CI 1.120–6.669, $P = 0.027$), monthly income below 5,000 Thai baht (aOR = 15.530, 95% CI 2.631–91.656, $P = 0.002$), poor self-perceived health status (aOR = 4.482, 95% CI 1.648–12.189, $P = 0.003$), and lack of regular physical exercise (aOR = 3.577, 95% CI 1.405–9.106, $P = 0.008$), abnormal IQCODE result (aOR = 6.921, 95% CI 2.152–22.301, $P = 0.001$). In addition, a higher score on the modified Informant Questionnaire on Cognitive Decline in the Elderly

(IQCODE) was independently associated with an increased likelihood of dementia diagnosis; shown in **Table 3**.

The receiver operating characteristic (ROC) curve analysis was performed to evaluate the discriminative performance of the final binary logistic regression model for predicting dementia among older adults with memory complaints. The model demonstrated good discriminative ability with an area under the ROC curve (AUC) of 0.887 (95% CI 0.822–0.940). The optimal cutoff value determined using the Youden index was 0.553, yielding a sensitivity of 93.0% and specificity of 75.8%.

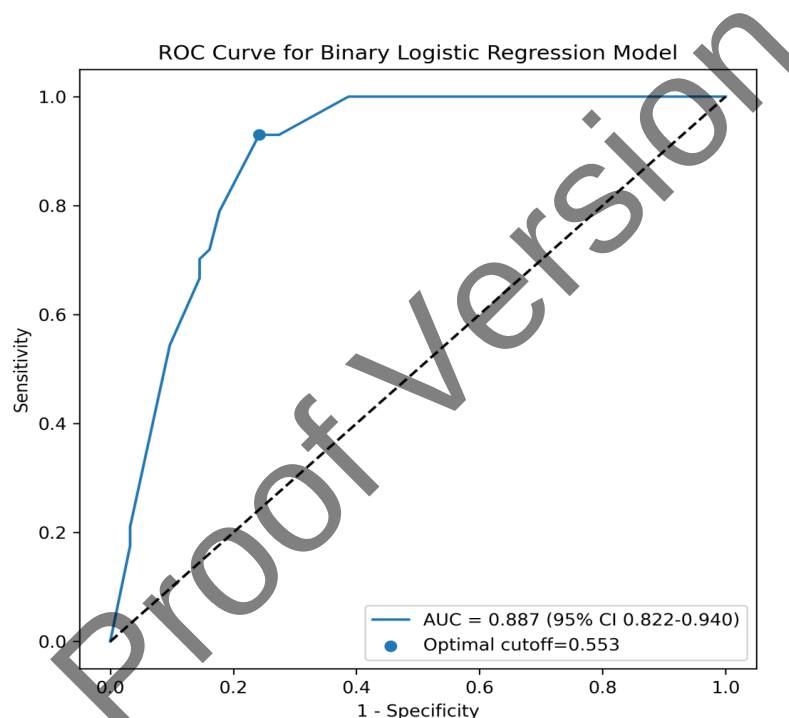
The final logistic regression equation was: Logit (p) = $-4.303 + 1.005(\text{No spouse}) + 2.743(\text{Low income}) + 1.500(\text{Poor health perception}) + 1.275(\text{No regular exercise}) + 1.453(\text{Abnormal IQCODE})$, as illustrated in **Figure 1**.

Table 3. Independent predictors of physician-diagnosed dementia identified by binary logistic regression analysis

Variables	B	S.E. (B)	P - value	Adjusted OR	95% CI of adjusted OR	
					Lower	Upper
Monthly income below 5,000 Thai baht	2.743	0.906	0.002*	15.53	2.631	91.656
Abnormal IQCODE score	1.453	0.589	0.001*	6.921	2.152	22.301
Poor self-perceived health status	1.5	0.51	0.003*	4.482	1.648	12.189
Lack of regular exercise	1.275	0.477	0.008*	3.577	1.405	9.106
Without partner (Marital status)	1.005	0.455	0.027*	2.733	1.12	6.669
Constant	-4.303	1.058	<0.001*	0.014		

* $P < 0.05$

*Note: Potential confounding factors adjusted in this model included age; marital status, monthly income; self-perceived health status, history of hospitalization in the past 6 months; physical exercise, diabetes mellitus; and hypertension.

**Figure 1.** Receiver operating characteristic (ROC) curve of the final binary logistic regression model for predicting dementia.

Discussion

This study demonstrated a high proportion of both dementia (45.6%) and mild cognitive impairment (44.8%) among older adults presenting with memory complaints at a geriatric outpatient clinic. The high prevalence of MCI underscores its clinical relevance, representing an essential target for proactive screening and early intervention. These proportions are considerably higher than those reported in community-based studies in Thailand⁽²¹⁻²³⁾, which may be explained by the clinical characteristics of the study

population, as all participants were referred for further evaluation because of subjective memory complaints or concerns raised by family members or healthcare providers. The findings highlight that older adults presenting to memory-focused geriatric services represent a high-risk group for cognitive disorders and support the importance of systematic multidimensional cognitive assessment in routine clinical practice. The World Health Organization has emphasized that early identification of cognitive impairment in primary care settings is essential for timely intervention and care planning.⁽⁸⁾

Several sociodemographic and health-related factors were associated with dementia in both the three-group comparison and the dichotomized analysis used for logistic regression. In the adjusted analysis, being without a partner was independently associated with a higher likelihood of dementia. This finding may reflect reduced social engagement, emotional support, and cognitive stimulation, all of which have been proposed as protective factors against cognitive decline in later life.⁽²⁴⁾ Previous longitudinal studies and meta-analyses have shown that social isolation, loneliness, and reduced social participation are associated with increased risk of cognitive decline and dementia.⁽²⁴⁾

Similarly, low monthly income emerged as a strong predictor of dementia. These findings are consistent with the concept of social determinants of cognitive aging proposed by the World Health Organization. This framework posits that socioeconomic disadvantages, such as low income and limited education, create chronic psychosocial stress, restrict access to health resources, and limit cognitive reserve, ultimately accelerating cognitive decline and increasing vulnerability to dementia.⁽²⁵⁾

Poor self-perceived health status was also independently associated with dementia. Self-rated health has been recognized as an important indicator of overall physical and psychological well-being and has been shown to predict cognitive decline, incident dementia, and mortality in older adults.⁽²⁶⁾

In addition, lack of regular physical exercise was identified as an independent predictor of dementia. Regular physical activity has been shown to improve cerebral perfusion, cardiovascular health, metabolic regulation, and neuroplasticity, all of which may contribute to the preservation of cognitive function in older adults.⁽²⁷⁾ The World Health Organization and the Lancet standing Commission on dementia prevention, intervention, and care in their 2024 report have both identified physical inactivity, alongside diabetes, as crucial modifiable risk factors for dementia that should be targeted for risk reduction.^(28, 29)

In addition to sociodemographic and lifestyle factors, a higher score on the modified Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) was associated with an increased likelihood of dementia diagnosis, supporting the clinical value of informant-based assessment in older adults presenting with memory complaints. Informant-reported cognitive decline may provide clinically relevant information beyond direct cognitive testing, particularly in individuals with limited insight, low educational attainment, or functional impairment.^(12,30)

Taken together, these findings suggest that dementia among older adults presenting with memory

complaints is influenced by multidimensional factors, including social, economic, behavioral, and informant-reported cognitive changes. Incorporating multidimensional screening and comprehensive clinical assessment in a geriatric outpatient clinic setting may facilitate earlier identification of high-risk individuals and support timely intervention and individualized care planning.

This study has certain limitations that should be acknowledged. First, because the study population was exclusively recruited from older adults attending the geriatric clinic at a primary care setting, the findings may not be fully generalizable to the broader community-dwelling population. Second, the cross-sectional nature of the study precludes the ability to establish definitive causal relationships between the identified predictive factors and the onset of dementia. Third, the methodological and statistical decision to combine participants with normal cognitive function and those with MCI into a single group was necessary due to the small sample size of the normal group. However, this should be explicitly acknowledged as a limitation, and appropriate caution is advised when interpreting these findings across the cognitive continuum. Finally, some variables measured in this study, particularly self-reported ones such as family history of dementia, physical exercise, and sleep problems, may be prone to inaccuracy or recall bias.

Based on the study findings, it is recommended that proactive screening protocols combining the MoCA-B and IQCODE be systematically integrated into primary care and community healthcare settings, including subdistrict health-promoting hospitals, to enhance the early detection of MCI and dementia. Concurrently, healthcare facilities should establish lifestyle modification clinics that offer targeted programs for older adults, focusing on safe physical activity, nutrition counseling, sleep hygiene, and comprehensive caregiver education to potentially delay cognitive decline. To further validate and build upon these clinical implications, future research should employ population-based studies to minimize the selection bias inherent in hospital-based convenience samples, alongside longitudinal designs to accurately estimate the long-term conversion rate from MCI to dementia and observe the trajectory of functional impairment over time.^(31,32) Furthermore, to address the limitations of self-reported data, future research should consider employing objective measurement tools, such as actigraphy for sleep monitoring or wearable trackers for physical activity, to mitigate potential biases and provide more accurate assessments.

Conclusion

In a geriatric outpatient clinic of a general hospital, nearly half of the older adults presenting with memory complaints were diagnosed with dementia, and an almost equal proportion were identified with mild cognitive impairment. Significant predictors of dementia in this population included socioeconomic disadvantages, poor self-perceived health, lack of regular physical exercise, and higher informant-reported cognitive decline. Systematic screening and the identification of these multidimensional factors are crucial for early diagnosis, enabling timely and individualized care planning for older adults experiencing cognitive decline.

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