ORIGINAL ARTICLE

Three-Year Conversion Rate and Associated Factors of Mild Cognitive Impairment to Dementia in Thai Tertiary Care Outpatient Populations

Nichaporn Chiracharasporn, MD[1], Sookjaroen Tangwongchai, MD[1,2]

[1] Department of Psychiatry, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand; [2] Center of Excellence in Cognitive Impairment and Dementia, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

Background: Dementia is a common neurocognitive disorder associated with aging, causing considerable distress and impairment for both affected individuals and their families. Mild cognitive impairment (MCI) serves as an intermediate stage of cognitive decline between normal aging and dementia, with an increased risk of progressing to dementia.

Objective: To explore the three-year conversion rate of MCI to dementia and associated factors in the real-world outpatient setting.

Materials and Methods: A retrospective cohort study was carried out by reviewing the out-patient medical records of the patients visiting King Chulalongkorn Memorial Hospital, a Thai tertiary care hospital between 2018 and 2019. Two hundred participants aged 50 years and above with MCI were enrolled and followed for three years.

Results: Among recruited participants, the three-year conversion rate was 20%. MCI patients who converted to dementia tended to have a shorter duration since symptoms onset (p=0.005), body mass index (BMI) of less than 23 kg/m^2 (p=0.039), history of delusion (p=0.003), or hallucination (p=0.010), and were more frequently prescribed antidepressants (p=0.011) and cognitive enhancers (p=0.002). The forward stepwise regression analysis demonstrated that the duration since symptom onset within five years (OR 5.13, 95% CI 1.77 to 14.83, p=0.003), the prescription of cognitive enhancers (OR 5.03, 95% CI 1.05 to 24.02, p=0.043), and antidepressants (OR 3.56, 95% CI 1.22 to 10.42, p=0.020) were the significant predictors for the conversion from MCI to dementia.

Conclusion: One out of five participants progressed from MCI to dementia during the three-year follow-up period. The predicted factors included the shorter duration since symptom onset, the prescription of cognitive enhancers, and antidepressants, which represented the cases with more severe cognitive impairment and the presence of clinically significant neuropsychiatric symptoms.

Keywords: Mild cognitive impairment (MCI); Dementia; Conversion rate; Thailand; Outpatients; Cognitive dysfunction

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The world is witnessing a significant demographic shift towards an aging population. Projections indicate that the number of individuals aged 60 years and older will rise from one billion in 2020 to 1.4 billion by 2030, and it is expected to double by 2050[1]. Among the various health challenges associated with aging, dementia stands out as one of the most disabling and burdensome conditions globally. Dementia is characterized by a loss of cognitive function severe enough to impact daily independence, and its prevalence increases with age. It is estimated that the number of elderly individuals with dementia will reach 114 million by 2050[2]. Thailand exemplifies this trend, emerging as one of the fastest-aging nations. In 2022, approximately 600,000 people in Thailand were living with dementia, with this number expected to rise annually as the country becomes a fully aging population within the next decade[3]. This demographic shift and the increasing number of dementia cases will have profound implications for caregivers and society, highlighting the critical importance of early detection and intervention to slow the progression of the disease.

Mild cognitive impairment (MCI) is an intermediate stage of cognitive decline that lies between normal aging and dementia. Unlike dementia, MCI does not interfere significantly with

Correspondence to:

Tangwongchai S.

Department of Psychiatry, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand.

Phone: +66-2-2564000 ext. 71501

Email: sookjaroen@gmail.com

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daily activities. Individuals with MCI may experience cognitive complaints that gradually worsen over years before being diagnosed as dementia[4]. These issues are often first recognized by patients or their families, prompting medical attention. Individuals with MCI had three main trajectories, remaining stable MCI, which is where the majority lie[5], returning to normal cognition, and converting to dementia of any type.

The conversion of MCI to dementia has been well-studied for decades, as well as its possible associated risk factors, to facilitate early interventions to slow down the progression of dementia. The annual conversion rate ranges between 10% and 25%[6]. A large retrospective cohort analyzing patients with MCI from medical records found that the annual conversion rate of MCI to dementia was 13.7%, and the conversion rate after the three-year follow-up period was 34.3%[7]. A recent clinical-based study in Thailand reported an annual conversion rate of 18.4%[8]. The variation in conversion rates can be attributed to differences in study design, study setting, study population, follow-up duration, and diagnostic criteria of MCI, and dementia[9].

Despite the extensive research on MCI conversion to dementia, there are few studies focused on Asian populations, particularly within clinical settings, where patients with more decline in cognitive function are referred for specialist. The present study aimed to determine the three-year conversion rate and progression-associated factors identified in Thai tertiary care settings where MCI patients received close follow-ups, and the diagnoses and interventions for dementia patients were valid. Besides the well-known modifiable risk factors of dementia like less education, depression, comorbidities of high cholesterol, hypertension, diabetes, and obesity[10,11], other additional factors potentially linked to dementia progression were studied as well.

Materials and Methods

The present study was a retrospective cohort study conducted at King Chulalongkorn Memorial Hospital (KCMH) in Thailand. All data were reviewed and collected from the electronic medical records (EMRs). The protocol was approved by the Ethics Committee and Institutional Review Board of the Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand (Certificate of Approval no. 1610/2023).

The present study included participants with a diagnosis of MCI aged 50 years or older, who visited these outpatient clinics between January 2018 and August 2019, including the general psychiatry clinic, geriatric psychiatry clinic, dementia clinic, cognitive fitness center, elderly clinic, neurocognitive clinic, internal medicine clinic, and neurology clinic. All participants were followed for three years. Participants who were followed for less than one year were excluded. The diagnosis of MCI was based on the corresponding ICD-10 code F067 and dementia on ICD codes F001, F002, F009-12, F018-24, F028, and F030 for its different types, all determined by physicians.

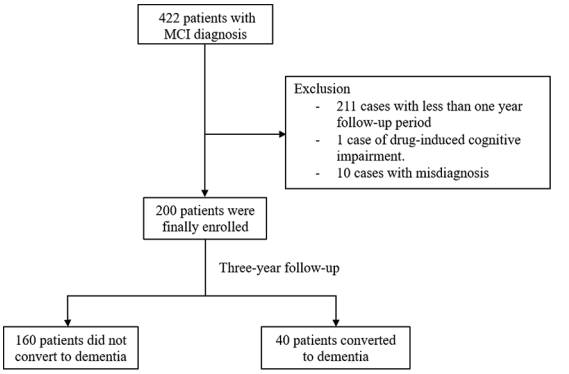

Figure 1. Flow chart of the study.

The sample size was calculated by using the formula from n4studies with the categorical outcome to estimate a finite population proportion[12]. The present study used 0.21 as the parameter for proportion to calculate sample size, where 0.21 was an estimated prevalence of MCI subjects who converted to dementia during the three-year follow-up period[13]. The definite sample size after adjustment was 179.

Four hundred forty participants with MCI diagnosis were initially identified. Two hundred twenty-two cases were excluded as presented in Figure 1 and 200 participants were finally enrolled.

Data collection

The final diagnosis outcomes were recorded as normal cognition, stable MCI, and dementia of any type. All variables were defined and recorded based on notes documented by a physician in the EMRs. The data noted in fewer than half of the participants were excluded from the analysis. The variables included for analysis were the clinics where each participant visited, their presenting symptoms, and their onset of symptoms, demographic data, and body mass index (BMI). Smoking and alcohol history were recorded if noted by the physician as past or current use. The consumption levels were not classified.

Underlying diseases or comorbid conditions included hypertension, diabetes, dyslipidemia, cerebrovascular diseases, chronic renal failure, delirium, and obesity according to a BMI of 30 kg/m² or more[14]. Chronic renal failure was defined as a diagnosis of chronic kidney disease (CKD), regardless of which stage, made by the physicians. The data of prescribed medications were collected for the use of antidepressants, anticholinergic drugs with the anticholinergic cognitive burden (ACB) scale of two to three[15], and the use of cognitive enhancers. A cognitive enhancer is a pharmacological agent or intervention that aims to improve or restore cognitive functions such as memory, attention, executive function, or processing speed. The duration for which patients were prescribed these medications during the three-year follow-up period was also recorded in months. Since not all participants were newly diagnosed with MCI, some had already been taking antidepressants or cognitive enhancers prior to their inclusion in the present study during the designated period. Lastly, the number and frequency of follow-up visits between appointments were also documented.

Data analysis

Statistical analyses were performed using IBM SPSS Statistics, version 29.0 (IBM Corp., Armonk, NY, USA)[16]. An estimated three-year conversion rate was calculated. The associations between the conversion to dementia and baseline characteristics of participants were tested by using the independent t-test for continuous variables and the chi-square or Fisher's exact test for categorical variables. To predict each variable separately, univariate binary logistic regression was performed by selecting 1) variables that were found to be statistically significant in the present study, 2) variables that were known to increase the risk of MCI conversion to dementia including female, lower-level education, unmarried, hypertension, and depression, and 3) four neuropsychiatric symptoms that were of particular interest including apathy, disinhibition, anxiety, and delirium. A conservative p level (<0.10) was chosen to identify the variables that were subsequently entered into a multivariable forward stepwise regression algorithm. A p-value of less than 0.05 was considered statistically significant.

Results

Of all the eighteen clinics that were initially included in the inclusion criteria, the most visited clinic was the general psychiatry clinic, at 40.5%, followed by the dementia clinic, at 21.5%. Sixty-four percent presented with cognitive complaints, followed by 8.5% and 5.5% for sleep disturbance and depression, respectively. Other symptoms were reported with similar frequency for motor disturbance, headache, check-up visit, and anxiety. The mean duration since symptom onset was 6.38±3.55 years and ranged from 0 to 23 years. The average duration for the non-converters group was 6.80±3.57 years, while for the converters group was 4.88±3.07 years. This difference reached statistical significance (p=0.005). Seventy-seven patients had duration since onset symptoms within five years, of these, 25 patients converted to dementia (p=0.003). The average mean number of follow-up visits was 11.15±4.37 times. The lowest number of visits was two times, and the highest was 33 visits. The mean duration between each visit was 4.08±3.15 months, with the least interval occurring every 14 days and the longest interval being 24 months between visits.

Among the 200 patients, 72.5% of the subjects were female and the mean age was 73 years, with a range of 52 to 90 years. Most patients were in the age group of 71 to 80 years. There were missing data that were not documented by physicians in the EMRs as presented in Table 1. The average mean years of schooling was 11.39±5.62 years, with great proportion of the patients, or 64.1%, having lower or equal than 12 years of education. In terms of marital and residential status, most patients were married, at 58.8%, and lived with their family members or caregivers, at 94.8%. Four cases (2%) had a history of smoking and seven cases (3.5%) had a history of alcohol use. The mean BMI was 23.67±3.79 kg/m². The cut off level of BMI was categorized as less than 23 kg/m² or 23 kg/m² or more, following the Asia-Pacific BMI classification for weight[17]. The most common medical comorbidities were hypertension in 64.5%, and dyslipidemia, in 65%. Sleep disturbance in 22.7% was the most prevalent neuropsychiatric symptom, followed by depression in 19.7% and anxiety in 14.7%.

Among the 200 patients, 112 were prescribed antidepressants, 143 were prescribed cognitive enhancers, and 17 were taking anticholinergic drugs. The average duration of medication used was 31.38±9.40 months for antidepressants, 25.47±0.28 months for anticholinergic drugs, and 32.31±8.99 months for cognitive enhancers. There were no significant differences in the mean duration of medication used between the converters and non-converters groups.

Table 1. Demographic data and baseline characteristics of participants with MCI and summary characteristics for the non-converters and converters group

Study variables	Participants with MCI	Non-converters	Converters	p-value
Age (years) (n=200); mean±SD	72.76±8.09	72.64±8.14	73.23±7.96	0.682
Onset of presenting symptoms (years) (n=156); mean±SD	6.38±3.55	6.80±3.57	4.88±3.07	0.005*
5 years or lower	77 (49.3)	52 (42.6)	25 (73.5)	0.003*
>5 years	79 (50.6)	70 (57.4)	9 (26.5)	
Female (n=200); n (%)	145 (72.5)	114 (71.3)	31 (77.5)	0.553
Level of education (years) (n=131); n (%)				1.000
12 years or lower	84 (64.1)	65 (63.7)	19 (65.5)	
>12 years	47 (35.9)	37 (36.3)	10 (34.5)	
BMI (kg/m^2) (n=160); mean±SD	23.67±3.79	23.89±3.60	22.67±4.54	0.116
<23 kg/m^2; n (%)	69 (43.1)	51 (38.9)	18 (62.0)	0.039*
23 kg/m^2 or higher; n (%)	91 (56.9)	80 (61.1)	11 (38.0)	
Marital status (n=119); n (%)				0.848
Single, separated, divorced, or widowed	49 (41.2)	38 (42.2)	11 (37.9)	
Married	70 (58.8)	52 (57.8)	18 (62.1)	
Residential status (n=155); n (%)				0.581
Living alone	8 (5.2)	5 (4.2)	3 (8.3)	
Living with family member or caregiver	147 (94.8)	114 (95.8)	33 (91.7)	
Smoking (n=161); n (%)	4 (2.0)	4 (3.2)	0 (0.0)	0.585
Alcohol use (n=160); n (%)	7 (3.5)	6 (4.7)	1 (9.7)	1.000
Underlying diseases and comorbid conditions; n (%)				
Hypertension (n=200)	129 (64.5)	105 (65.6)	24 (60.0)	0.631
Diabetes Mellitus (n=198)	54 (27.3)	42 (26.6)	12 (30.0)	0.814
Dyslipidemia (n=197)	128 (65.0)	98 (62.4)	30 (75.0)	0.193
Cerebrovascular disease (n=198)	46 (23.2)	35 (22.2)	11 (27.5)	0.613
Obesity (n=197)	5 (2.5)	4 (2.5)	1 (2.5)	1.000
Chronic renal failure (n=197)	29 (18.0)	17 (10.8)	4 (10.3)	1.000
Delirium (n=198)	5 (2.5)	2 (1.3)	2 (5.1)	0.057
Neuropsychiatric symptoms; n (%)				
Delusion (n=197)	9 (4.6)	3 (1.9)	6 (15.0)	0.003*
Hallucination (n=197)	11 (5.6)	5 (3.2)	6 (15.0)	0.010*
Agitation/aggression (n=197)	4 (2.0)	2 (1.3)	2 (5.0)	0.184
Depression (n=198)	39 (19.7)	32 (20.3)	7 (17.5)	0.866
Anxiety (n=197)	29 (14.7)	23 (14.6)	6 (15.0)	1.000
Apathy (n=198)	4 (2.0)	2 (1.3)	2 (5.0)	0.182
Disinhibition (n=198)	3 (1.5)	2 (1.3)	1 (2.5)	0.494
Irritability/liability (n=198)	18 (9.1)	12 (7.6)	6 (15.0)	0.213
Motor disturbance (n=198)	16 (8.1)	11 (6.9)	5 (1.3)	0.326
Sleep disturbance (n=198)	45 (22.7)	38 (24.1)	5 (13.2)	0.502
Appetite abnormality (n=198)	4 (2.0)	3 (1.9)	1 (2.5)	1.000
Medications (n=200); n (%)				
Taking Antidepressants	112 (56.0)	82 (51.3)	30 (75.0)	0.011*
Taking Anticholinergic drugs	17 (8.5)	11 (6.9)	6 (15.0)	0.115
Taking Cognitive enhancers	143 (71.5)	106 (66.3)	37 (92.5)	0.002*
Total number visits for 3 years (n=200); mean±SD	11.15±4.37	10.39±3.76	14.18±5.31	<0.001*
Mean duration of each follow-up visits (months) (n=200); mean±SD	4.08±3.15	4.40±3.41	2.80±1.07	0.004*

MCI=mild cognitive impairment; BMI=body mass index; SD=standard deviation
* $p<0.05$ is considered as statistically significant

Table 2. Conversion rate during three-year follow- up period

	Conversion rate (%)	Number of converters	Converted to vascular dementia n (%)	Converted to Alzheimer's disease n (%)	Converted to other dementia n (%)
1st year	8.5	17	8 (47.0)	4 (23.5)	5 (29.5)
2nd year	16.0	15	7 (46.7)	6 (40.0)	2 (13.3)
3rd year	20.0	8	2 (25.0)	4 (50.0)	2 (25.0)
Total		40	17 (42.5)	14 (35.0)	9 (22.5)

Forty out of 200 patients progressed to dementia over three years, to vascular dementia with 17 cases, followed by 14 cases with Alzheimer's disease, eight cases with unspecified dementia, and one case with dementia in Parkinson's disease. Of the 40 converters, 55% initially visited the general psychiatry clinic, and 22.5% attended the dementia clinic. The estimated three-year conversion rate was 20%. One hundred fifty-nine patients remained diagnosed with MCI, while only one participant's cognition reverted to normal. The number of converters and conversion rates for each year are presented in Table 2.

As shown in Table 1, converters to dementia were more likely to have shorter duration of the onset of presenting symptoms (p=0.003). These individuals also had BMI less than 23 kg/m² (p=0.039), classifying them as non-overweight[18]. Additionally, converters were more likely to exhibit psychotic symptoms, which were delusion (p=0.003) and hallucination (p=0.01). They were also more frequently prescribed antidepressants (p=0.011) and cognitive enhancers (p=0.002). Lastly, converters had more frequent follow-up visits (p<0.001) and shorter intervals between each visit (p=0.004). The possible explanation could be because patients who received appointments more often showed a higher likelihood for conversion and greater concern by their physicians to make sure they needed to be more frequently followed up.

In the univariate logistic regression model (Table 3), the risk of conversion was significantly associated with the onset of presenting symptoms within five years prior to conversion, lower BMI, presence of delusion or hallucination, history of delirium, and the use of antidepressants, and cognitive enhancers. These seven variables met a cutoff for significance (p<0.1) and were chosen to run a multivariable model. They were then selected in the stepwise algorithm to select the best subgroup of significant predictors as shown in a final model of binary logistic regression analysis (Table 4). The odds of MCI conversion to dementia remained significantly associated with the duration and symptoms within five years, the use of antidepressants, and cognitive enhancers.

Table 3. Association between baseline variables and the conversion of MCI to dementia using the univariate binary logistic regression model

Predictor	Odds ratio (95% CI)	p-value
Delusion	9.06 (2.16 to 38.04)	0.003*
Delirium	6.32 (1.02 to 39.22)	0.048*
Taking cognitive enhancers	6.28 (1.85 to 21.31)	0.003*
Hallucination	5.37 (1.54 to 18.61)	0.008*
Apathy	4.11 (4.56 to 30.01)	0.165
Onset of presenting symptoms within 5 years	3.74 (1.61 to 8.68)	0.002*
Taking antidepressants	2.85 (1.31 to 6.23)	0.008*
BMI <23 kg/m²	2.52 (1.10 to 5.76)	0.029*
Disinhibition	2.00 (0.18 to 22.63)	0.575
Sex	1.39 (0.61 to 3.15)	0.430
Level of education	1.08 (0.46 to 2.57)	0.859
Anxiety	1.03 (0.39 to 2.72)	0.955
Marital status	0.84 (0.35 to 1.97)	0.683
Depression	0.84 (0.34 to 2.06)	0.696
Hypertension	0.79 (0.39 to 1.60)	0.507

BMI=body mass index; CI=confidence interval
* p<0.05 is considered as statistically significant

Table 4. Association between baseline variables and the conversion of MCI to dementia using multivariable analysis with forward stepwise entering method[1]

Predictor	Adjusted odds ratio (95% CI)	p-value
Onset of presenting symptoms within 5 years	5.13 (1.77 to 14.87)	0.003*
Taking cognitive enhancers	5.03 (1.05 to 24.02)	0.043*
Taking antidepressants	3.56 (1.22 to 10.42)	0.020*

[1] After adjusted for onset of presenting symptoms, BMI, delusion, hallucination, delirium, antidepressants, and cognitive enhancers (n=121)
* p<0.05 is considered as statistically significant

Discussion

In summary, the data were analyzed from 200 patients with MCI aged 50 years or older in an out-patient setting and all patients were followed up for three years. The majority of the subjects were female and in their seventies, with 12 years of education or lower, and lived with family members

or caregivers. Hypertension and dyslipidemia were the most common comorbidities, and more than half of the population were on antidepressants or cognitive enhancers. Forty patients converted to dementia during a three-year follow-up period, with vascular dementia comprising 42.5% of these cases. Those who converted to dementia tended to have shorter durations since symptom onset, lower value of BMI, delusion, hallucination, taking antidepressants and cognitive enhancers, and had more frequent follow-up visits. Multivariate analysis revealed that symptoms of onset within five years and the use of antidepressants and cognitive enhancers were significant predictors of dementia conversion.

The three-year conversion rate of MCI to dementia was 20%, which is comparable with the previous prospective cohort review of Gabryelewicz et al.[13] and Ravaglia et al.[19], who reported conversion rates of 21.9% and 29% over three years, respectively. The present study reported the one-year conversion rate at 8.5%, lower than the 18.4% reported by Thaipisuttikul et al. in a similar Thai clinical setting[8], which included only newly diagnosed MCI patients at baseline, whereas the present study included many long-standing MCI cases. This difference in patient populations explains the lower one-year conversion rate, as many MCI cases may have remained stable over the study period.

One of the key findings was the association between more recent onset of presenting symptoms and the higher risk of converting to dementia. The authors found that patients with symptom onset within five years were 5.13 times more likely to progress to dementia (Table 4). This aligns with Studart & Nitrini[20] and two other prospective studies[21,22] that suggest that recent cognitive symptoms are linked to more rapid cognitive decline, while longer symptom duration indicates more stable cognitive function. However, among the 25 converters with presenting symptoms within five years prior to the conversion (Table 1), 17 patients presented with cognitive symptoms and eight patients presented with motor disturbance, sleep disturbance, depression, irritability, hallucination, and syncope. This suggests that in addition to cognitive symptoms, other neuropsychiatric symptoms could be important complaints that increase the risk of conversion to dementia. Further study on this topic could be beneficial.

Additionally, because symptoms in MCI patients are mild and have slow progression[23], it can take a longer follow-up period for patients with MCI to convert to dementia, potentially longer than our observed duration of 6.80±3.57 years (Table 1 in the non-converter group). A longer follow-up period for the MCI cohort might support this finding.

In the present study, among 30 converters who used antidepressants, 14 patients were prescribed the medication to treat depression. Some were receiving antidepressants to help with underlying depressive symptoms before the enrollment of the study. These patients primarily developed vascular dementia. The relationship between taking antidepressants and the conversion to dementia may be influenced by the underlying condition of depression since it is a well-established risk factor for dementia[24-26].

Antidepressants are also prescribed for other conditions such as anxiety disorders, neuropathic pain, fatigue, sleep disorders, and headaches[27]. Of the remaining 16 converters, 15 received antidepressants for neuropsychiatric symptoms, including sleep disturbance for eight subjects, mood dysregulation and irritability for five subjects, and anxiety for two subjects. These neuropsychiatric symptoms are known to increase the risk of dementia progression as well[10,28,29].

Therefore, the authors suggest that the use of antidepressants could indicate underlying depression or neuropsychiatric symptoms, which contribute to the faster conversion rate from MCI to dementia. Treating these symptoms may not significantly slow the progression. A large prospective study by Steenland et al.[30], which collected data from 30 Alzheimer's disease centers in the United States, found no significant association between treating depression with antidepressants and a lower risk of progression from MCI to dementia or from normal cognition to MCI. Similarly, two other prospective studies in mild to moderate Alzheimer's disease populations found no association between antidepressant use and improvement in the Mini-Mental State Examination (MMSE) score[31,32]. Still, providing interventions for depression, particularly midlife depression, to individuals without dementia may help lower their risk of developing the condition in the future[11].

Different classes of antidepressants have varying associations with dementia risk[24,25]. For example, the anticholinergic effect of tricyclic antidepressants (TCAs) can interfere with memory improvement and shows a higher dementia risk compared to selective serotonin reuptake inhibitors (SSRIs)[33]. However, most subjects in the present study were prescribed SSRIs, not TCAs, hence the finding of the association

between antidepressant use and the conversion rate was less likely contributing to the adverse effect of antidepressants.

In the present study, Ginkgo biloba and Nicergoline were the most prescribed cognitive enhancers, despite ongoing controversy over their effectiveness in delaying dementia in MCI or normal cognition[34,35]. These nootropics are widely prescribed for their potential to alleviate cognitive and behavioral symptoms[36]. Like in the present study, physicians were prescribing cognitive enhancers up to 71.5% of MCI patients, regardless of the clear indication of cognitive decline severity. Still, some physicians tend to prescribe these medications more frequently to patients with significant memory impairments and rapid cognitive decline, hoping to slow the progression[37]. This could explain the association between the use of cognitive enhancers and conversion to dementia in the present study.

Despite knowing that lower educational level, especially less than 12 years, was one of the risk factors for dementia[32], the authors' result did not find a statistically significant difference between the less than or equal to 12 years and the more than 12 years group and the mean years of schooling were not statistically different between the converters and non-converters. This could be due to the higher socio-economic status of population in the tertiary care setting.

Limitation

The primary limitation was the retrospective design by medical record review, which led to incomplete data. To address this, the authors excluded variables with more than 50% missing data from the analysis. The reliance on diagnosis on ICD-10 codes for MCI and dementia also raised validity concerns. To prevent this issue, the authors only included participants from the clinics that the physicians were dementia experts. This could accurately provide the diagnosis. Despite the heterogeneity from selecting patients from various departments, this could represent the MCI patients in real-world practice that they could show up in various clinics, not specifically in dementia or cognitive clinics. Additionally, the involvement of psychiatrists, dementia specialists, neurologists, and internists ensured reliable and standardized treatment for these patients.

The present study did not include the scores of cognitive tests, one of the most important variables that were reported to be a robust predictive factor[8]. The small sample size also limited the study's statistical power and generalizability, highlighting the need for larger sample sizes in future research to confirm these findings and strengthen the evidence base. Lastly, this was a hospital-based study in a tertiary care setting where patients typically presented with complex medical conditions and assumed higher education. Therefore, caution should be taken when applying the present study analysis to community-based or primary care.

Conclusion

The present study analyzed data from 200 MCI patients aged above 50 in a Thai tertiary care hospital by reviewing patients EMRs. The retrospective study and the heterogeneity reflected real-life practice in managing MCI and dementia cases as well as provided insight into the clinical trajectory when follow-ups and assessments were not strictly controlled. Patients were mostly female and in their seventies. Hypertension and dyslipidemia were common, and over half used antidepressants or cognitive enhancers. During a three-year follow-up, 40 patients converted to dementia, predominantly vascular dementia. Those who converted had shorter symptom durations, lower BMI, experienced delusions and hallucinations, used antidepressants and cognitive enhancers, and had more frequent follow-ups. Symptom onset within five years and the use of these medications were significant predictors of dementia conversion.

What is already known about this topic?

Ten to twenty-five percent of the patients with MCI convert to dementia each year, but not all are at risk for rapid progression. Certain risk factors have been identified as predictors for the conversion to dementia, these include lower education levels, hypertension, dyslipidemia, low baseline cognitive test score, and the presence of neuropsychiatric symptoms, particularly depression.

What does this study add?

This study found that the three-year conversion rate of MCI to dementia was only 20%, which was lower than previously reported. Patients with a shorter duration of cognitive symptoms had higher odds of converting to dementia. Over half of the MCI cases progressed to vascular dementia, rather than Alzheimer's disease. It is due to the higher prevalence of cerebrovascular disease and amnestic MCI, multiple domains in these samples. The findings are consistent with other reports that the presence of neuropsychiatric symptoms, was the predictors

for the conversion to dementia. Additionally, this retrospective study highlighted the real-world practices for managing MCI and dementia cases by specialists.

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Conflicts of interest

The authors declare no conflict of interest.

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