Interdisciplinary Research Review
Volume 19, Number 2, Pages 30 – 39

Prevalence and Associated Factors of Dementia among the Older People in Chiang Mai Province

Nutreutai Arunsirot[1,*], Pitchaporn Opas[2], Jarunee Pattharawongthana[3] and Ninooch Boonyarittanon[4]
[1,2] Faculty of Humanities and Social Sciences, Chiang Mai Rajabhat University
[3] Faculty of Innovation Technology & Creativity, Far Eastern University
[4] Faculty of Business Administration, Far Eastern University

Abstract

This cross-sectional descriptive study investigated the prevalence and associated factors of dementia among older people in Saraphi District, Chiang Mai Province. A sample of 877 older people residing in Nong Phueng, Yang Noeng, and Saraphi Subdistricts was selected using purposive sampling method. Data were collected using a questionnaire to obtain general background information and the Thai version of the Mini-Mental Status Examination. Statistical analysis included frequency, percentage, chi-square test, and Fisher's exact test.

The result revealed that the prevalence of dementia was 15.39%, with 84.61% of participants being non-demented. Significant factors associated with dementia included current employment status, personal health conditions, smoking, alcohol consumption, exercise, and social activity participation. Factors not associated with dementia were gender, marital status, education, previous occupations, brain injury, food supplementation, family history of dementia, and hobbies.

The study identified a substantial prevalence of dementia among the older people in Saraphi District. The associated factors highlight the importance of addressing modifiable risk factors and providing tailored interventions to prevent and manage dementia in Saraphi District, Chiang Mai Province.

Keywords: dementia, older people, prevalence and associated factors

Article history: Received 10 March 2023, Revised 06 September 2023, Accepted 12 December 2023

1. Introduction

Thailand has transitioned into an aging society, with a growing population of older people. According to the 2023 statistics, Thailand's total population was approximately 66 million, with individuals aged 60 years and older accounting for 19.74% or 13 million of the population. This proportion has been steadily increasing over the years, primarily attributed to advancements in medical treatments and effective public health interventions. However, increased longevity is often accompanied by a higher prevalence of age-related health concerns. Dementia is one of the health problems that is rapidly growing in older people. It is a progressive neurological syndrome characterized by the gradual and sustained deterioration of brain cells, leading to cognitive impairments and memory loss. This condition affects an individual's ability to recall both short-term and long-term memories. Consequently, dementia has emerged as one of the five most prevalent chronic diseases among older people in Thailand. Additionally, Akter et al. [2] projected that the global number of dementia patients would nearly triple to 153 million by 2050. Within the Southeast Asian region, Thailand has reported a significant prevalence of dementia, estimated at 9.7% in 2022 [3]. This prevalence rate exhibits a gender disparity, with 7.8% in males and 9.61% in females. Notably, the prevalence of dementia in Thailand has been observed to double every five years.

As dementia not only affects the individuals diagnosed with the condition, leading to memory loss, cognitive decline, and forgetfulness that impair their daily functioning, it also has significant physical, mental, behavioral, social, and economic impacts on their caregivers and family members [4]. Prior research has focused on investigating factors associated with dementia prevalence in various regions of Thailand. Airada [5]

*Corresponding author; e-mail: sudrutai_aru@cmru.ac.th

revealed that area-specific aspects bring about different factors for dementia [6] [7] [8] [9] [10]. The factors most related to dementia in older people comprise economic status, individuals, health-related behaviors, activity participation, family history with dementia, and congenital ailments respectively [11]. Furthermore, Baumgat et al. [12] noted that genetic factors, age, gender, marital status; behavioral factors, such as, eating habits, overweight, smoking, excessive alcohol consumption, lack of physical exercise, and exposure to toxins; and cardiovascular risk factors are all factors that affect dementia.

Saraphi District is among the five districts in Chiang Mai with the highest proportion of older people population, accounting for 24.45% [13]. This demographic shift has led to an aging society, increasing the likelihood of dementia prevalence among older people. Despite this, there have been no prior screening or surveys conducted at the primary level to assess dementia risk in the community. Moreover, no investigations have been carried out to identify the factors influencing dementia risk in the area. In light of this knowledge gap, the present study aimed to investigate the prevalence and associated factors of dementia among older people in Saraphi District, Chiang Mai Province. The findings of this research will provide valuable insights for developing targeted interventions to prevent and manage dementia in this population. Also, the findings underscore the significance of regular health check-ups, early detection, and prompt treatment in enhancing the quality of life for individuals with dementia and their caregivers

2. Research Objective

This research aimed to investigate the prevalence and associated factors of dementia among older people in Saraphi District, Chiang Mai Province.

3. Research Conceptual Framework

A conceptual framework for this research is illustrated in Figure 1.

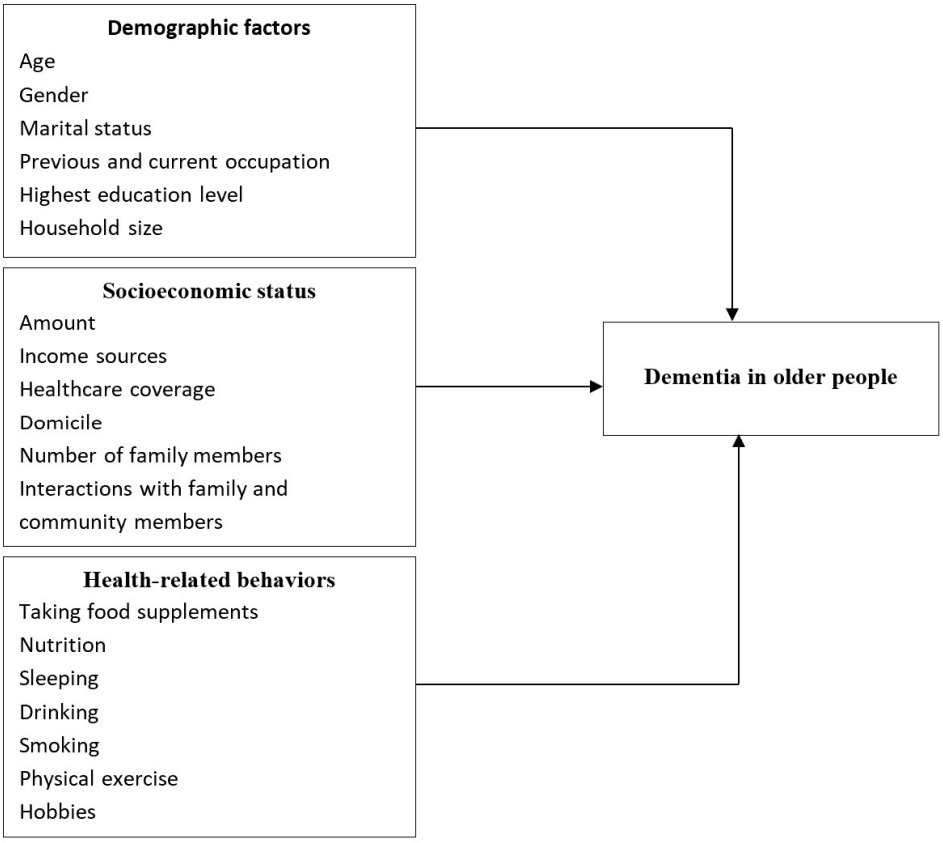

Figure 1. A conceptual framework

4. Research Methodology

This cross-sectional descriptive survey was conducted as follows:

4.1 Population and Sample Group

877 older people were selected as the sample group. The criteria for selecting the sample group were as follows: age 60 years and over; both genders; good ability to see, hear and communicate in Thai; not disabled or bed-ridden; residing in the three municipalities: Nong Phueng, Yang Neong and Saraphi Municipalities in Saraphi District, Chiang Mai province; and willingness to participate in this research. The sample size was calculated from the following formula: Older population in Saraphi District (N) = 16,138, Error (d) = 0.05, Alpha (α) = 0.05, $Z_{\alpha/2}$ = 1.96, deff = design effect, the value of 2 was selected and prevalence of dementia proportion (p) = 0.56 which was obtained from Kawitu [14]. Also, 10% of the average samples were additionally collected to prepare for a case of participant's withdrawal, so the total number of samples in this study was 877.

$$n = \frac{deff\ x\ Z^2_{\alpha/2}P(1-P)N}{Z^2_{\alpha/2}P(1-P)+Nd^2}$$

$$n = \frac{2\ x\ (1.96)^2(0.56)(1-0.56)(16138)}{(1.96)^2(0.56)(1-0.56)+(16138)(0.05)^2} = 739.89$$

4.2 Research Instruments

1. The questionnaire on general information of older people was meticulously designed to capture a comprehensive profile of their demographics, socioeconomic status, and health-related behaviors. It comprised three distinct sections. The general information of older people was composed age, gender, marital status, previous and current occupation, highest education level, and household size. For socioeconomic status, there were multiple-choice items that included amount, income sources, healthcare coverage, domicile, number of family members, and interactions with family and community members. Information about health-related behavior consisted of levels of general health, sicknesses, and history of brain injuries to the point of becoming unconscious. Other health-related behaviors included taking food supplements, nutrition, sleeping, drinking, smoking, physical exercise, and hobbies. The questionnaire underwent rigorous validation procedures. Three experts independently assessed the congruence between each item and its intended objective, resulting in an Index of Item-Objective Congruence (IOC) of 0.90, indicating a high level of content validity.

2. The Mini-Mental State Examination-Thai 2002 (MMSE-Thai 2002) was employed as the primary screening tool for dementia in this study. Developed by the Institute of Geriatric Medicine, Department of Medical Services, Ministry of Public Health, the MMSE-Thai 2002 is a standardized test adapted from the original Mini-Mental Status Examination by Folstein, Folstein, and McHugh [15]. The MMSE-Thai 2002 consists of two versions tailored to the educational level of the older participants: a 30-item version for literate individuals and a 23-item version for illiterate individuals. The test assesses cognitive function across various domains, including orientation to time and place, memory, attention, language, and visuospatial skills. The total score on the MMSE-Thai 2002 ranges from 0 to 30, with higher scores indicating better cognitive function. Interpretation of the scores varies based on the educational level of participants. For illiterate individuals, a score of 14 or higher is considered normal, while for those with primary school education, a score of 17 or higher is indicative of normal cognitive function. For individuals with education beyond primary school, a score of 22 or higher is considered normal. Participants who scored below the established cut-off points for their respective educational levels were considered at risk for dementia.

4.3 Data collection

1. Prior to data collection, the research protocol was submitted for ethical review and approval through the online research compliance platform of Chiang Mai Rajabhat University. The study was approved by the Board of Human Research Ethics, Chiang Mai Rajabhat University, under the research project titled, "The Development of Screening Test and Evaluation Systems of the Risk of Older People with Dementia in Saraphi District, Chiang Mai Province, by Using the Data Mining Technique." The registration number is IRBCMRU 2022/164.08.08, dated August 11, 2022.

2. A comprehensive review of the literature on dementia and dementia screening instruments was conducted.

3. Following the receipt of ethical approval, a letter of approval from Chiang Mai Rajabhat University was submitted to the mayors of the three participating municipalities to obtain permission to conduct the research within their jurisdictions.

4. Prior to data collection, meetings were held with the mayors and heads of the older people associations in the three participating municipalities. During these meetings, the research objectives, data collection methods, and the requested collaboration for data collection were thoroughly explained and discussed.

5. A total of 877 older people were recruited from the Nong Phueng Older People Association, Yang Neong Older People Association, and Saraphi Municipality Older People Association, using simple random sampling. Before participation, the purpose of the study, data collection procedures, and potential benefits and risks were thoroughly explained to each participant. Ample opportunity was provided for questions and clarification. Informed consent was obtained from all participants before proceeding with data collection.

6. After a thorough explanation of the study's purpose, procedures, and potential implications, informed consent documents were distributed to all potential participants. Participants were given ample time to review and understand the document before providing their written consent to participate in the research.

7. All 877 older people underwent dementia assessment using the Mini-Mental State Examination-Thai 2002 (MMSE-Thai 2002) Test. The assessments were conducted by trained medical personnel to ensure accuracy and consistency.

8. Data collection was conducted through questionnaire administration via interviews to gather information on dementia within three districts. The collected data encompassed demographic characteristics, disease status, and health-related behaviors. The data collection process spanned seven months due to disruptions caused by the COVID-19 pandemic.

4.4 Data Analysis

The data collected from the questionnaire were analyzed using statistical tests, including the chi-square test and Fisher's exact test. These tests were employed to determine the prevalence of dementia among older people in Saraphi District, Chiang Mai Province, and to identify factors associated with dementia.

5. Research Findings

The study sample comprised 877 older people, of whom 679 (77.40%) were female and 198 (22.60%) were male. The age distribution of the participants ranged from 60 to 84 years, with the majority (448 or 51.08%) falling within the 60-69 age group. The 70-79 age group accounted for 285 participants (32.50%), while the 80-89 age group included 144 participants (16.42%). Regarding educational attainment, 542 participants (61.87%) had completed six years of schooling or less. A total of 229 participants (26.14%) had completed 7-12 years of education, while 71 participants (8.11%) held diplomas or equivalent qualifications. Undergraduate education was completed by 27 participants (3.08%), and 7 participants (0.80%) had attained education beyond the bachelor's degree level.

The preliminary screening using the MMSE-Thai 2002 revealed that 135 (15.39%) of older people had dementia, while the remaining 84.61% did not. To determine the prevalence and associated factors of dementia among older people in the district, statistical analyses were conducted. The results are presented in Table 1.

Table 1. The analysis of the prevalence and associated factors of dementia among older people in Saraphi District

Factors	With Dementia		Without Dementia		Statistics	P-value*
	frequency	percentage	frequency	percentage		
Gender						
Male	161	81.3	37	18.7	Fisher's Exact	0.632
Female	581	85.6	98	14.4		
Age (year)						
Young-old (60-69 ปี)	441	98.4	7	1.6	χ^2=54.554	$< 0.001^*$
Middle-old (70-79 ปี)	222	77.9	63	22.1		
Old-old (80-89 ปี)	79	54.9	65	45.1		
Marital status						
Married	557	92.5	45	7.5	χ^2=6.200	0.087
Single	102	72.9	38	27.1		
Widowed	34	48.6	36	51.4		
Separated	29	65.9	15	34.1		
Divorced	10	50.0	10	50.0		
Educational level						
Lower than primary education or primary education	477	89.5	56	10.5	χ^2=4.805	0.249
Secondary education	180	75.3	59	24.7		
Diploma	59	83.1	12	16.9		
Bachelor degree	20	74.1	7	25.9		
Higher than bachelor's degree	6	85.7	1	14.3		
previous occupations						
Agriculture	227	76.9	68	23.1	Fisher's Exact	0.782
Business	150	92.6	12	7.4		
Technical specialist	99	88.4	13	11.6		
General administration	78	86.7	12	13.3		
Civil service	67	94.4	4	5.6		
Specific professional specialist	20	87.0	3	13.0		

Factors	With Dementia		Without Dementia		Statistics	P-value*
	frequency	percentage	frequency	percentage		
Butler/housewife	101	81.5	23	18.5		
Current work						
Unemployed	253	65.2	135	34.8	Fisher's	< 0.001*
Employed	489	100.0	0	0.0	Exact	
Personal ailments						
Diabetes	29	93.5	2	6.5	Fisher's	< 0.001*
Diabetes +hypertension	72	75.0	24	25.0	Exact	
Diabetes + hypertension + hyperlipidemia	66	66.7	33	33.3		
Diabetes + hypertension + hyperlipidemia + stroke	0	0.0	5	100.0		
Hypertension	73	93.6	5	6.4		
Hypertension + hyperlipidemia	77	74.0	27	26.0		
Hyperlipidemia	69	95.8	3	4.2		
Bone and joint diseases	58	100.0	0	0.0		
Bone and joint diseases + hypertension	47	100.0	0	11.9		
Bone and joint diseases + hyperlipidemia	59	88.1	8	100.0		
Hypertension + stroke	0	0.0	5	50.0		
Hypertension + hyperlipidemia	6	50.0	6	100.0		
Hypertension + hyperlipidemia + stroke	0	0.0	10	0.0		
Heart disease	6	100.0	0	0.0		
Cancer + diabetes	1	100.0	0	0.0		
Cancer + hypertension	4	100.0	0	0.0		
Dyspepsia + diabetes	37	100.0	0	0.0		
Dyspepsia + hypertension	35	97.2	1	2.8		
Dyspepsia + hyperlipidemia	42	100.0	0	0.0		
Heart Disease +hyperlipidemia	8	72.7	3	27.3		
Heart Disease + hypertension	7	70.0	3	30.0		

Factors	With Dementia		Without Dementia		Statistics	P-value*
	frequency	percentage	frequency	percentage		
None	46	100.0	0	0.0		
Brain damage						
Yes	7	20.0	28	80.0	Fisher's Exact	0.511
no	735	87.3	107	12.7		
Use of dietary supplements						
Yes	113	71.1	46	28.9	Fisher's Exact	0.721
no	629	87.6	89	12.4		
Having siblings or relatives with dementia						
Yes	18	66.7	9	33.3	Fisher's Exact	0.783
no	724	85.2	126	14.8		
Smoking						
no	635	96.9	20	3.1	χ^2=38.230	$< 0.001^*$
Used to	41	35.0	76	65.0		
yes	66	62.9	39	37.1		
Drinking alcohol						
No	378	94.7	21	5.3	χ^2=46.782	$< 0.001^*$
Yes, occasionally	191	78.0	54	22.0		
Used to	144	75.0	48	25.0		
Yes, always	29	70.7	12	29.3		
Exercise						
Yes, occasionally	667	83.7	130	16.3	χ^2=27.230	$< 0.001^*$
Yes, always	73	100.0	0	0.0		
No	2	28.6	5	71.4		
Hobbies						
Yes	742	84.6	135	15.4	Fisher's Exact	0.322
No	0	0.0		0.0		
Participation in social activities						
At least once a month	476	89.1	58	10.9	Fisher's	

Factors	With Dementia		Without Dementia		Statistics	P-value*
	frequency	percentage	frequency	percentage		
					Exact	$< 0.001^{*}$
1 – 4 times per week	132	95.7	6	4.3		
No	56	44.1	71	55.9		
more than 5 times per week	78	100.0	0	0.0		

Table 1 presents the results of the statistical analyses examining the relationship between various factors and dementia among older people in Saraphi District. The factors found to be significantly associated with dementia include current work status, personal ailments, smoking, alcohol consumption, exercise habits, and participation in social activities. Factors that were not found to be significantly associated with dementia include gender, marital status, education level, previous occupations, history of brain damage, use of food supplements, family history of dementia, and hobbies.

6. Discussion of the findings

The prevalence of dementia among older people in Saraphi District was found to be 15.39%, which is comparable to the national prevalence rate of 16.4% reported by the Institute of Geriatric Medicine [16]. However, this finding differs from studies conducted in other regions of Thailand. Suwan & Trakulsithichok [17] reported a prevalence rate of 18.16% among the older people in Mueang District, Prathum Thani province, while Duangchan, Yodthong & Detduang [18] found a prevalence rate of 24.35% among older people in Phetchaburi Province. These variations in prevalence rates may be attributed to differences in demographic characteristics, educational levels, lifestyle factors, and cultural practices across different regions of the country.

The analysis of the relationship between dementia and situational contexts of older people in Saraphi District revealed that age was related to dementia. This finding is consistent with that of Suwan & Trakulsithichok [17], revealing that dementia was most prevalent among older people aged over 80 years (51.2%) and was least prevalent among those aged 60-69 years (9.6%). This is due to the fact that, when a person get older, there are changes in the brain structure and frontal lobe, the number of neurons and glial cells reduces, and some cells are dead, resulting in abnormalities of the nervous system and decrease in memories [19] [20] [21]. Additionally, congenital ailments affect dementia. This is consistent with Muangphaisan [22] and Nanthakhwang & Wongma [23], noting that congenital ailments like hypertension, diabetes, high cholesterol, and heart disease, have direct and indirect effects on the reduction in the functions of the brain that may result in dementia later. The results of this investigation revealed that older people with cerebrovascular disease had a higher rate of dementia than those with other congenital diseases. Smoking and drinking are also the factors related to dementia. This is in line with Lertkrathok et al. [24], noting that smoking reduces blood flows in the cortex and sub-cortex, hastening cerebral atrophy. Likewise, excessive drinking affects Substantia Alba and frontal lobe, which are in charge of thinking, memory management, problem-solving, and creative thinking, on sending nervous signals from neurons [25]. Furthermore, Nanthakhwang & Wongma [22] found that smoking older people were more likely to have dementia than ex-smoking older people. Physical exercise is also related to dementia. Xu et al. [26] reported that physical exercise could prevent the degeneration of neurons, increase the efficiency of the heart system and neurons, and improve blood flow in the brain, making the brain function better, which could reduce the risk factors of dementia. Participation in social activities and current occupations are also related to dementia.

Lertkrathok et al. [24] revealed that participating in social activities of older people enabled them to move their bodies and get involved in activities and activate their brains to secrete neutrophils to improve the functions of afferent nerve fibers that connect neurons as well as reducing the risks of dementia. Duangchang, Yodthong & Detduang [18] added that involvement in occupations comprises activities that require body movements and the use of muscular strength and energy, bringing about the development of intellectual skills that could reduce the risk of dementia. However, the findings in this investigation revealed that there was no relationship between taking food supplements and dementia, which was not in line with Muangphaisan [22], revealing that food supplements, e.g., vitamins C, E, B, and fish oil could reduce the risk of dementia. In this investigation, it was found that 50.47% of older people took medicinal herbs, 26.66% took minerals, 16.51% took vitamins, and 6.37% took the essence of chicken. These food supplements do not reduce the risk of dementia and no relationship has been found between taking food supplements and dementia.

7. Limitations, Recommendations and Implications

The research faced limitations due to the COVID-19 pandemic, which impeded data collection through questionnaires on general older people information via interviews and diagnosis using the Mini-Mental State Examination-Thai 2002 (MMSE-Thai 2002). Older people expressed concerns about potential infection, necessitating stringent adherence to social distancing and infection control measures to ensure their safety during these procedures. In the visuoconstruction section of the MMSE-Thai 2002, which assesses dementia in older people, participants are required to draw a series of figures to evaluate eye-hand coordination. However, some individuals may be hesitant to draw with a pen or pencil due to underlying medical conditions, such as Parkinson's disease, which can impair fine motor skills. The technological gadgets designed to facilitate the drawing process should be implemented. Furthermore, due to a limited number of the sample group, it is recommended that a larger number of the sample group be included in future studies and more areas and districts in the province be covered in order to obtain clearer statistical data on dementia. However, the research's findings have significant implications for healthcare practice. Healthcare professionals in Tambon health-promoting hospitals should integrate these findings into their planning for older people healthcare services within their communities. Early detection and accurate diagnosis of dementia are paramount for improving the quality of life for affected individuals. By implementing the research's recommendations, healthcare providers can contribute to the well-being of the older people population.

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