Prevalence of Dementia among Population Age Over 45 Years in Chiang Mai, Thailand

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Objective: *To determine the prevalence of dementia in Thai people with age 45 years and above.*
Material and Method: *This project used a cross sectional research design to study the prevalence of dementia in Chiang Mai. Door-to-door technique was assigned in condition with multi-stage probability random sampling to obtain subjects representing the population of Chiang Mai between Oct 2004 and Sep 2005. The researchers collected the data from the subjects aged 45 years and above. All subjects were located from every Amphurs of Chiang Mai. They were first screened with Thai Mini Mental State Examination (TMSE) and Thai Beck Depression Inventory (BDI). The subjects whose TMSE was less than 24 were assessed and diagnosed by a neurologist. Subjects who were determined as having dementia might be laboratory analyzed and classified based on DSM-IV and NINDS-AIREN criteria.*
Results: *The authors enrolled 2,311 people and screened them with Batteries test. One thousand four hundred ninety two people qualified with 610 males and 882 females, whose mean age was 59.7 $\pm$ 10.4 years. The authors found that among the 35 people with dementia, the mean age was 67.9 $\pm$ 8.9 years (45-88 years). The prevalence of dementia among the study participants was 2.35%. In the present study, Alzheimer's disease was the most common type of dementia diagnosed (75.0%) and vascular dementia was the second most commonly diagnosed (12.5%).*
Conclusion: *The prevalence of dementia in Chiang Mai was 2.35%, which does not differ from the previous study. Alzheimer's disease was the most common type of dementia diagnosed.*

Keywords: *Prevalence, Dementia, Vascular dementia, Alzheimer's disease*

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Dementia is a syndrome of acquired cognitive decline that affects multiple intellectual functions, produces occupational and social disabilities[1], and is not a feature of normal aging. To put it simply, dementia is a result of degenerative brain disorders that seriously undermine a person's ability to carry out daily activities. The prevalence of dementia increases with age, leading to community health problems[2] as it is a high-cost disease that affects families, caregivers, medical resources, and the economy[3,4]. There is no known cure although scientists are increasingly aware of major risk factors, which if adhered to, can drastically reduce the risk of developing symptoms.

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There are many forms of dementia but the most common are Alzheimer's disease (AD) and Vascular dementia (VaD), which amount to 90% of the total dementia diagnoses. In Thailand, studies show that the prevalence of dementia is 1.8-10.2% in the age group 55 years and above[5,7]. According to Harvey et al[8], the prevalence of mild dementia symptoms in people aged 45-64 years was not represented in this group. If early onset can be discovered for this group, before it surfaces at age 65 and above, the social and financial cost saving are very important for caregivers, patients, and governments[9].

In Thailand, Jitapunkul et al[6] surveyed the prevalence of dementia in Thai people. They were assessed by Chula Mental Test (CMT) and Barthel ADL but without clinical assessment. Senanarong et al

studied the prevalence of dementia by clinical assessment and symptoms indicated in the DSM IV in people aged over 60 years who live in Bangkok.

The purpose of the present project was to study the prevalence of dementia by clinical assessment in Northern region of Thailand. The authors chose a target group with an age greater than 45 years because some types of dementia can occur in this age group such as alcoholic dementia, frontotemporal lobe dementia (FTLD), and hypothyroidism. In people aged less than 45 years, dementia is less prevalent than in group above the age of 45. Therefore, the authors would have needed more samples in this younger age group. The subjects in the present study were over 45 years of age.

Material and Method

The design of the present study was a cross section random survey of people in Chiang Mai province and conducted between October 2004 and September 2005. The inclusion criteria were 1) Thai people who live in Chiang Mai, both male and female; 2) Aged 45 years old and above; 3) Basic literacy level - ability to read and write and 4) volunteer to assess their cognitive function by interview and battery tests. People who had moderate to severe depression, had a history of psychological or mental problem, did not stay in their house, or refused to participate were excluded.

A stratified multi-stage random sampling was performed at district level in stage 1, at the sub-district level in stage 2, and at the community level in stage 3. The survey used door-to-door interview technique.

The cognition of the subjects was assessed by Thai Mini Mental State Examination (TMSE)[10], Thai Beck Depression Inventory (BDI)[11]. Subjects with TMSE scores less than 24 were evaluated further by neurologists to determine dementia symptoms according to DSM-IV criteria[12] and their functions were assessed by activity daily living (ADL) assessment[13] and Clock drawing test (CDT)[14].

The subjects with dementia, according to DSM-IV criteria, were evaluated by laboratory assessment using the clinical practice guidelines for dementia[15] including the complete blood count (CBC), fasting plasma glucose (FPG), blood for BUN/creatinine, liver function test (LFT), serology for syphilis and thyroid function test (TFT), and CT brain scan with contrast. Subjects with Alzheimer's disease and alcoholic dementia were classified under DSM-IV, while those with vascular dementia were classified according to NINDS-AIREN criteria[16]. Hypothyroidism was diagnosed by clinical symptoms and laboratory tests. The laboratory reference of hypothyroidism was TSH and the cut off level for diagnosis was greater than 10 mIU/L[17].

The sample size was calculated from the table of "the determining sample size for research activities" by Krejcie and Morgan, which stated a need for a minimum sample size of 417 from the 528,375 population aged 45 and over in Chiang Mai.

The data was analyzed with descriptive statistics by mean, SD, and percentage.

Results

In 2004, Chiang Mai province had 522,859 people aged over 45 years, 254,380 males and 268,478 females.There were initially 2,311 subjects in the present study. Eight hundred nineteen of the subjects could not read and write and thus did not qualify for the study. The final number of qualified subjects was 1,492 (Fig. 1). Demographic data of the present study is shown in Table 1.

Table 1. Demographic basic data of subjects

Variable	Frequency	Percent
Sex		
Male	610	40.9
Female	882	59.1
Age		
45-49	306	20.5
50-54	276	18.5
55-59	204	13.7
60-64	206	13.8
65-69	172	11.5
≥ 70	328	22.0
Occupation		
Employee	419	28.1
Agriculture	346	23.2
Business	243	16.3
Un-employed	432	28.9
Official	52	3.5
Marital status		
Single	54	3.6
Married	1,116	74.8
Widowed/divorced	322	21.6
Education		
Primary	1,361	91.2
High school	96	6.5
Pre-university	12	0.8
Tertiary	23	1.5

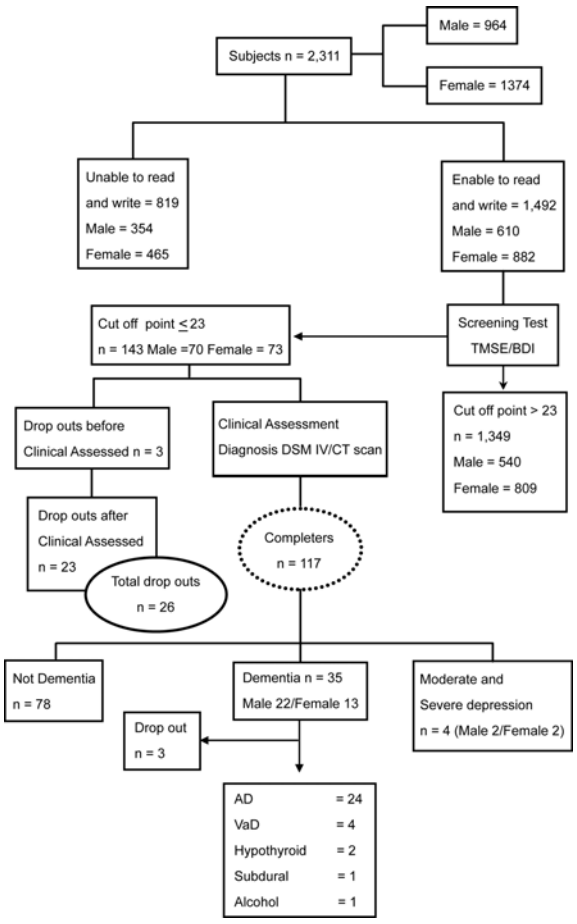

Fig. 1 Random assignment and amount of dementia subjects

The prevalence of dementia in subjects aged 45 years and above was 2.35% and the prevalence of dementia in subjects aged 60 years and above was 3.82%. The prevalence of dementia in the age group 45-64 years old was 1,209.7 per 100,000. The mean of the ages of the present study is shown in Table 2.

In the group diagnosed with dementia, the largest number was found between 65-74 years, making up 40% of the total. When dementia was classified by type (Table 3), Alzheimer's disease was the largest group at 75.0%. Vascular dementia (VaD) was 12.5%, Hypothyroidism was 6.3% and subdural hygroma and alcoholic dementia were 3.1%. The prevalence of dementia was increased by age (Fig. 2).

Discussion

The prevalence of dementia in Thailand is between 1.8-10.2%. This prevalence rate increases with age and is similar to dementia studies in other countries[18-20].

There are many type of dementia. The most common in the present study was Alzheimer's disease, followed by vascular dementia; a preventable form of dementia of which the patient is aware and control atherosclerotic risk factors, which was found in 12.5%. The third most common type of dementia in the present study was hypothyroidism, which is a treatable form of dementia that can be treated with thyroid hormone replacement, reversing some patients' symptoms to normal.

TFT is necessary for classifying types of dementia and the present study indicated the prevalence of hypothyroidism in the aged group 45 years and above at 0.14%, while the prevalence for those 60 years and above is 0.26%. It does not mean that this figure is likely to increase with advancing age. Hypothyroidism has a wide range of clinical symptoms, from asymptomatic, especially in the elderly, to overt symptoms of hypothydroism. With an asymptomatic patient or a patient with subclinical hypothyroidism, a laboratory test is needed to diagnose hypothyroidism. Serum TSH is the most reliable test to diagnose hypothyroidism. If TSH levels are over 10 mIU/L, it is a clear indicator of hypothyroidism. If TSH levels are between 4.5 mIU/L and 10 mIU/L, the patient must have symptoms of hypothyroidism for diagnosis. In the present study the patients had no obvious symptoms of hypothyroidism so the cut off levels of TSH were more than 10 mIU/L.

Table 2. Prevalence and mean age of subjects

Subjects	Frequency	Prevalence (%)	Sex (%)		Mean age (year)
			Male	Female	
Subjects	1,492	-	40.9	59.1	59.7 ± 10.4
Score TMSE ≤ 23	143	9.58	48.9	51.1	65.9 ± 10.8
Dementia	35	2.35	62.9	37.1	67.9 ± 8.9

Table 3. Type of dementia in Chiangmai population age 45 and above

Classification	n	Percent
Alzheimer's disease	24	75.0
Vascular dementia	4	12.5
Hypothyroidism	2	6.3
subdural hygroma	1	3.1
Alcoholic dementia	1	3.1
Total	32	100

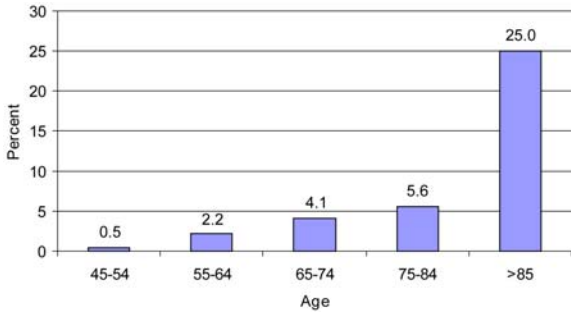

Fig. 2 Age-specific prevalence of dementia among Chiang Mai population

The reason this research used the TMSE cut off point at 23 or below from the total score of 30 is because this cut off point revealed the high sensitivity (93.88%) and specificity (84.16%)[21]. So, the present study used 23 or below as the TMSE cut off point.

The result of the present study is different from Harvey,et al in their study of dementia for the age group 45-64 years which showed the rate of dementia at 98.4 per 100,000, while the presented figures are slightly higher at 1,210 per 100,000. In fact, the subjects of the study had a lower level of education, higher alcohol intake and rates of hypothyroidism. There are strong indications that the prevalence of dementia from the present study is markedly higher than it should have been because most subjects were disqualified from participation in the present study through illiteracy, and lack of ability to read and write. In reality, the particular group of people represents the most high risk group due to their lack of education and mental stimulation, with increasing evidence that mental activities can provide a high degree of protection by reducing the risk of developing dementia[22]. If subjects of the present study were assessed by MMSE Thai 2002[15] and IQCODE[22], the number of dementia would probably be higher.

The subjects of the present study include mild depression because Airaksinen E, et al[23] were found in minor depress disorder but were not found to be associated with cognitive dysfunction but other types of depression were associated with cognitive impairment. Vinkers DJ et al[24], found depression appears to be a concomitant symptom of cognitive impairment instead of an independent risk factor. Furthermore, Lechtenberg PA et al[25] found the level of depression can predict the level of cognitive functioning.

From Table 2, the mean of the aged in TMSE $\leq$ 23 group and dementia group was higher than the population group. It must be early assessed in people who have cognitive functional problem or assessed in people who are aged 59.7 ± 10.4 years.

This data can be used for planning the public health strategy of Chiang Mai province. Hypothyroidism, an issue of concern for the public health care field, is a reversible form of dementia. Patients should receive a TFT test or TSH screening test for hypothyroidism during their medical check-ups, and receive thyroid hormone supplement if they are found to have hypothyroidism. Additionally, alcoholism is a public health problem and can be a cause of dementia, especially in males aged less than 60 years. Public health in Chiang Mai should promote education to reduce alcoholism that might be affected by the prevalence of dementia.

Conclusion

Dementia is a disorder that involves memory loss and executive malfunction, leading gradually to total incapacity and a vegetative state. As there is already a percentage of the population stricken with dementia, both private and public institutions urgently need to anticipate this escalating social problem. With a rapidly aging population forming an increasingly sizable group, Thailand cannot ignore the problem of dementia. On one hand, it will pose major challenge to hospitals, medical professionals, and institutions; on the other, it will take its toll on caregivers and family members, while stretching government health budgets exponentially.

Early detection could shield patients and their families from the high cost financial impact especially the low income rural group. A multi pronged approach involving research as well as public health education and campaigns aimed at informing and educating the public of major risk factors are essential if Thailand is to keep pace with other Asian countries in dealing

with an aging population and an increase in age related disease.

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ความชุกของภาวะสมองเสื่อมในจังหวัดเชียงใหม่ในกลุ่มประชากรอายุตั้งแต่ 45 ปีขึ้นไป

ศุภรัศม์ วังทองคำ, พงศกร สุจริตกุล, นุชรัตน์ ศีลประเสริฐ, ฤดีถวิล อินทรจักร

วัตถุประสงค์*: เพื่อศึกษาถึงความชุกของภาวะสมองเสื่อมในประชากรไทยที่มีอายุตั้งแต่ 45 ปีขึ้นไป*

วัสดุและวิธีการ*: เป็นการวิจัยแบบตัดขวางเพื่อศึกษาถึงความชุกของภาวะสมองเสื่อมในจังหวัดเชียงใหม่ โดยใช้วิธีการเก็บข้อมูลแบบเคาะประตูบ้าน และเลือกสุ่มกลุ่มตัวอย่างจากความน่าจะเป็น แบบหลากหลาย เพื่อให้ได้กลุ่มตัวอย่างที่เป็นตัวแทนของกลุ่มประชากร ของจังหวัดเชียงใหม่ โดยทำการศึกษาตั้งแต่ ตุลาคม พ.ศ. 2547 ถึงกันยายน พ.ศ. 2548 จากประชากรอายุตั้งแต่ 45 ปีขึ้นไป ของทุกอำเภอในจังหวัดเชียงใหม่ โดยคัดกรองเบื้องต้นด้วยแบบทดสอบสมรรถภาพสมองไทย (TMSE) และแบบทดสอบภาวะความซึมเศร้าในคนไทย (Thai Beck Depression Inventory: BDI) นำกลุ่มตัวอย่างที่ได้คะแนนTMSE $\leq$ 23 มาประเมินทางคลินิกโดยอายุรแพทย์ระบบประสาท กลุ่มตัวอย่างจะได้รับการตรวจวิเคราะห์ทางห้องปฏิบัติการ, เอ็กซเรย์คอมพิวเตอร์สมอง และตรวจสภาพสมอง เพื่อจำแนกประเภทของภาวะสมองเสื่อมตามเกณฑ์การวินิจฉัยโรค DSM-IV และ NINDS-AIREN

ผลการศึกษา*: การศึกษานี้ได้เก็บข้อมูลจากกลุ่มประชากรจำนวน 2,311 รายและคัดออก 819 ราย เนื่องจากอ่านไม่ออก เขียนไม่ได้ คงเหลือกลุ่มตัวอย่าง จำนวน 1,492 ราย ที่มีคุณสมบัติตามเกณฑ์โดยแบ่งเป็น เพศชาย 610 คน เพศหญิง 882 คน, อายุเฉลี่ย 60.4 ปี พบว่ามีกลุ่มประชากรที่มีภาวะสมองเสื่อม 35 คน อายุเฉลี่ย 59.7 $\pm$ 10.4 ปี โดยสมองเสื่อมชนิดอัลไซเมอร์เป็นชนิดที่พบมากเป็นอันดับหนึ่งโดยพบ 64.2% และสมองเสื่อม ชนิดหลอดเลือดสมองและสมองเสื่อมจากพร่องไธรอยด์ฮอร์โมน พบได้เป็นอันดับสอง โดยคิดเป็น 14.3% ประเภทละเท่า ๆ กัน ซึ่งความชุกของภาวะสมองเสื่อมในการศึกษานี้พบ 2.35%*

สรุป*: ความชุกของภาวะสมองเสื่อมในจังหวัดเชียงใหม่พบ 2.35% ซึ่งไม่แตกต่างจากการศึกษาในอดีต และภาวะสมองเสื่อมชนิดอัลไซเมอร์เป็นชนิดที่พบบ่อยที่สุด*