Cognitive Status in the Community Dwelling Thai Elderly†

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Abstract

Objective : To survey the prevalence of cognitive impairment in the elderly and to estimate the prevalence of dementia in the community dwelling Thai population. To assess the psychometric property of Thai Mental State Examination (TMSE).

Material and Method : We conducted a countrywide survey of 3,177 Thai elderly who were 60 years old and over from 1995 to 1997. Medical history and ability to carry out daily activities were taken by trained medical personnel. Thai Mental State Examination (TMSE) was used for cognitive study. Every elderly person involved in this study was examined by either an internist or a neurologist. Blood was taken for haematological and biochemical analysis. SPSS 6.0 was the main statistical analysis of the data.

Results : Three thousand one hundred and seventy seven elderly people were enrolled in this study, thirty eight point eight per cent were male and sixty one point two per cent were female. There was correlation between age, education and TMSE ($r=-0.345$, $r=0.473$, $p<0.001$). We found no correlation between TMSE, mean arterial blood pressure (BP), systolic BP, diastolic BP, haematocrit, cholesterol, triglyceride, blood sugar and syphilitic serology. Multiple cut off points of TMSE was proposed to utilise the twenty fifth percentile in each five yearly age interval. Those who were under the 25th percentile of TMSE and had impaired daily activities were diagnosed as dementia. The prevalence of dementia was 9.88 percentiles in our study.

Conclusion : Dementia is a common problem in the Thai elderly. As treatment has become available for several etiologies of dementia, early detection and assessment

of dementia with a cognitive screening test are essential. Public education to distinguish between dementia and old age needs to be emphasised.

Key word : Cognitive Status, Elderly Thai

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Dementia is one of the major causes of disability in the elderly. The Institute of Population Study, Mahidol University estimated that the Thai population aged 60 years and over will be more than 5 million by the year 2000. The number of patients with dementia will rise as the ageing population increases. The care of demented patients will have an impact on both the family and the society as a whole. Callahan et al[1] reported that seventy six per cent of the elderly with moderate to severe dementia were not diagnosed as dementia based on the chart reviewing. Peck JC and Benson DF[2] announced that a dementing illness is a very common condition but largely unrecognised and known as the silent pidemic.

In the United States, the estimated prevalence of dementia in a community with people aged 65 and over is around 8 per cent[3,4] while the prevalence rates in Japanese studies are about 4.5 per cent[5,6]. Most researchers employ the DSM-III-R[7] or DSM IV[8] criteria for a case definition of dementia. Though, the contribution of functional impairment which seems to be the decline and impairment in social and occupational functioning, and the definition of dementia needs to be emphasised.

A cognitive screening instrument for dementia is also important in an epidemiological study. The Mini Mental State Exam (MMSE) was recommended as a primary screening test of cognitive function in the routine clinical examination of the elderly in 1987[9]. Previous studies have shown an association between education, age and MMSE scores and questioned the use of the MMSE in poorly educated persons[10-12]. Train the Brain Forum Committee of Thailand Chaired by Poungvarin N developed the Thai Mini Mental State Examination (TMSE) with some adaptation of testing and scoring to suit the culture of the Thai population as well as education and socioeconomic status of the Thai people[13]. Those who score under 24 points from 30 points of TMSE are suspected of having dementia as a screening basis.

Objective

We surveyed the prevalence of cognitive impairment and estimated the prevalence of dementia in a community dwelling Thai elderly. We expected to demonstrate the different norms for various ages and education strata.

MATERIAL AND METHOD

We conducted a countrywide survey of 3,177 Thai elderly who lived in a community and were 60 years old and over from 1995 to 1997. The survey was undertaken in four provinces namely Amphoe Nakhon Chaisi (Nakhon Pathom Province: representing the Central Region), Amphoe Hang Chat (Lampang Province: represen ting the

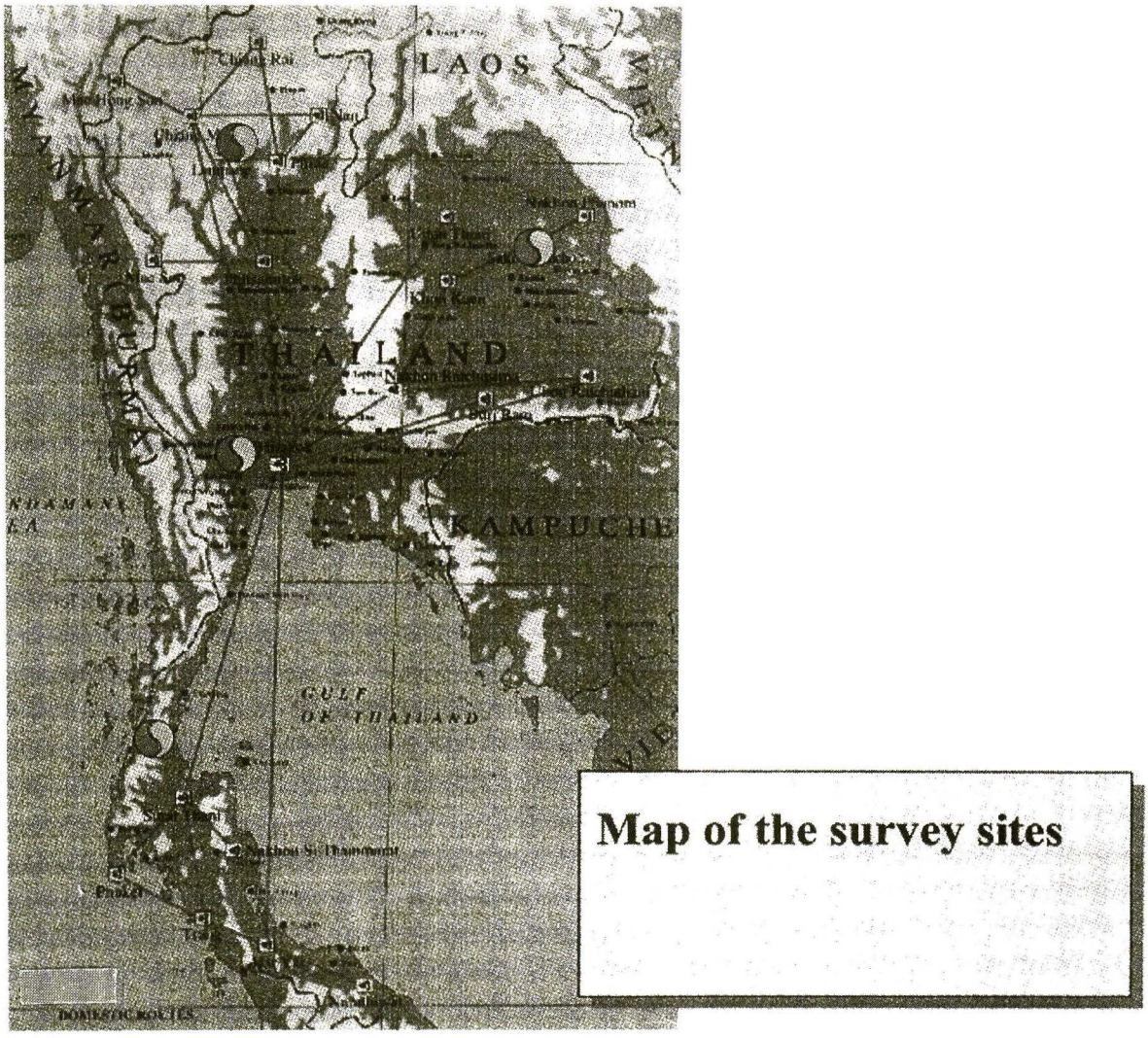


Fig. 1. A map of the survey sites: Nakhon Pathom, Lampang, Sakon Nakhon and Ranong provinces.

North), Amphoe Muang (Sakon Nakhon Province: representing the North East) and Amphoe Muang (Ranong Province: representing the South). Medical history and ability to carry out daily activities, instructured questionnaires were taken from the elderly, relatives, or proxies by trained medical personnel. Every elder was examined by either an internist or a neurologist. The Thai Mental State Examination (TMSE) was employed for the cognitive study. After six hours of fasting, blood was drawn from the elderly for analyses of haematocrits, white cell counts, platelet counts, fasting blood sugar, cholesterol, triglyceride and serology for syphilis (VDRL). Arterial blood pressure was measured with a mercury sphygmomanometer with subjects sitting and resting for an hour before the record. Two readings were done and the lower reading was recorded. Systolic and diastolic blood pressure were defined as Korotkoft phases 1 and 5 respectively. We used descriptive analysis by SPSS 6.0 in this study.

RESULTS

The demographic data of our population of study is tabulated in Table 1. Only twenty point six per cent of the elderly were aged 75 and over. Female to male sex ratio was 1.58:1. The majority (59%) were married and living

Table 1. Demographic data of the studied population.

		%
Population (≥60 years of age)	3,177	
Sex :		
Female	1,945	61.2
Male	1,232	38.8
Mean age (yrs) :		
mean±SD (min,max)	69.63±6.86 (60, 99)	
Age 60-64	994	32.2
Age 65-69	845	27.4
Age 70-74	615	19.9
Age 75-79	355	11.5
Age 80+	280	9.1
Marital status :		
Single	87	2.74
Married	1,870	58.86
Widowed	1,139	35.85
Divorced	61	1.92
Priests	20	0.63
Years of education :		
0	794	24.99
1-4	2,160	67.99
5-7	96	3.02
11-12	0	0
>12	32	1.01
Occupation :		
Government officers	159	5
Farmers	1,938	61
Wage earners	508	15.99
Office employees	32	1
Business	413	12.99
House wives	32	1
Others	95	2.99

with a spouse. In this population, ninety-three per cent had four years or less of education. The majority of the elderly (61%) had been farmers.

Two hundred and eighty six subjects (9%) had fasting blood sugar ≥140 mg per cent. One thousand and eighty (34%) had blood pressure ≥140/90 mmHg. Only two hundred and thirty three (7.3%) of the elderly had relatives who were suspicious that the elderly might have dementia.

Of these three thousand one hundred and seventy seven elders, we demonstrated that the distribution of TMSE scores was skewed to the right in both male and female subjects. With 24 as a cut-off point, there were 1654 (52.06%) subjects who had cognitive impairment. There was a significantly statistical difference of TMSE and various occupational attainment ($p < 0.001$).

In our study, there was correlation between age and TMSE ($r=-0.345$, $p<0.001$), education and TMSE ($r=0.472$, $p<0.001$). There was no correlation between TMSE and haematocrit, blood sugar, serum cholesterol, serum triglyceride, mean arterial blood pressure, systolic blood pressure and diastolic blood pressure.

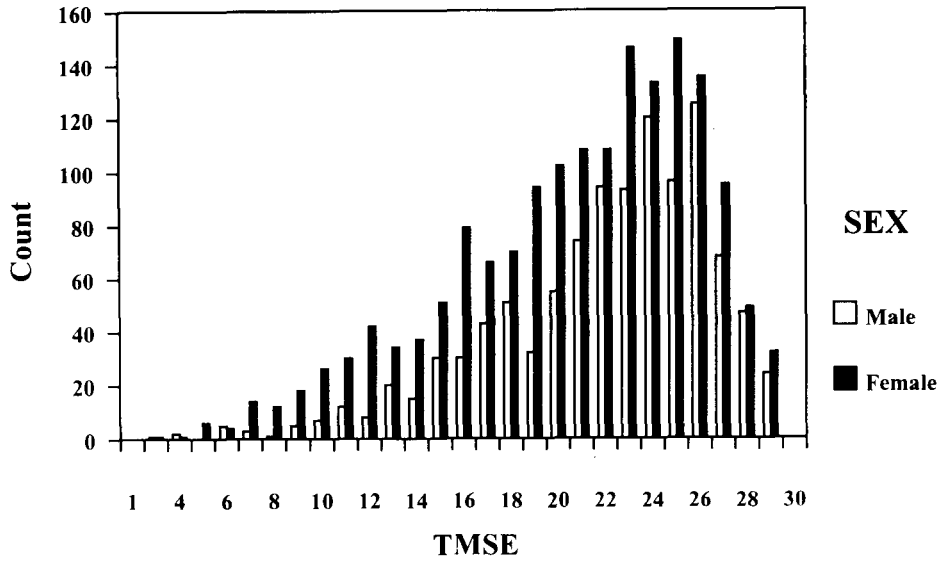
Because the distribution of the TMSE was not normal but skewed to the right, utilising 24 point as a cut-off point for cognitive impairment may have yielded a low positive predictive value. We therefore, proposed using multiple cut-off values of the TMSE according to the age group at 25th percentile. (Table 2)

We investigated a variety of activities of daily living (ADLs) in Thai culture. All the elderly were interviewed by well-trained medical personnel using structured questionnaires of the ADLs. These ADLs involved ability to walk 400 meters, community contact, taking transportation, shopping in a store or going to an open market, having hobbies, laundry work, dish washing, cooking, ability to clip nails, walk upstairs, take a bath or a shower, incontinence, taking medicine, money handling, communication, and dressing.

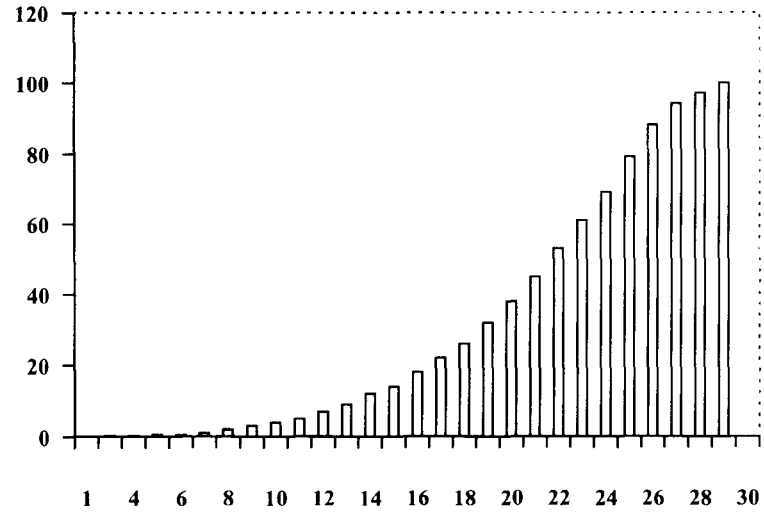
Some activities of these ADLs could distinguish elders who scored under the 25th percentile on the TMSE from those who scored over the 25th percentile on the TMSE (Table 3). Dementia was defined by those with TMSE scores less than the 25th percentile of the appropriate age group and with impaired ADLs appropriate for each age group. Three hundred and fourteen elders met this criteria. The estimated prevalence of dementia in our study was 9.88 per cent. (95%CI = 8.85%, 10.92)

DISCUSSION

We were concerned about the recruitment procedure in our study. Therefore, we conducted history taking from both the elderly and relatives or proxies. Rielel-Heller SG. demonstrated that considering face-to-face interviews with the community-dwelling individuals, there was a prevalence of moderate to severe dementia of 5.3 per cent. When including information from proxy or institutionalized individuals, the prevalence rate increased to 6.3 and 10.5 per cent, respectively[14]. We thought that an interview with informants would facilitate a better result of health survey.



Graph 1: The distribution of TMSE scores



Graph 2: Cumulative percents of TMSE

Our data did not show a correlation between cognitive function and any biochemical risk factors for dementia, though these biological tests are routine diagnostic tests in dementia[15]. The percentages of reversible dementia varied widely in several studies from 37.5 to 2.9 per cent[16-19]. Most frequent causes of reversible dementia were depression and intoxication. In a critical review, Clarfield AM[20] concluded that in actual reversal, partial recovery was seen in 8 per cent and full recovery in 3 per cent of patients. The true prevalence of reversible dementia in the community was probably lower due to several biases. However, because the cost of

Graph 3: Occupational attainment and TMSE

Table 2. The correlation of the TMSE and age.

Age(yrs)	Total	60-64	65-69	70-74	75-79	80+
No.	3,177	994	845	615	355	280
Percentage	100	32.2	27.4	19.9	11.5	9.1
TMSE						
Mean±SD	22.21±5.0	23.58±4.0	23.10±4.5	21.89±5.1	19.93±5.5	18.7±5.71
Median	23	24	24	23	20	18
Mode	27	27	24	25	22	13
Percentile						
5	12	16	14	12	9	9
10	15	18	17	14.9	12	11
15	17	19	18.2	16	14	12
25	19	21	21	19	17	13
50	23	24	24	23	20	18
75	26	27	26	26	24	23
85	27	27	27.8	27	26	25
95	29	29	29	29	27	27

these tests is low in comparison to CT brain scan or single photon emission computed tomography (SPECT), these biochemical screening tests are still recommended as a routine in the diagnosis of dementia.

In our study, there was a correlation between the TMSE and years of education and there was also a significant difference in cognitive function for occupational attainment. These levels of occupational attainment may reflect the effect of education on an opportunity to succeed. Uhlmann RF[21] reported that the Mini-Mental State Examination (MMSE) receiver operation characteristics (ROC) curve areas among three strata of educational attainment: middle school, high school and college/graduate school was 0.95-0.96. Nevertheless, the most accurate sensitivities and specificities of the MMSE

Table 3. Activity of daily living which distinguished subject with TMSE ≤ the 25th percentile from the rest of each age group.

Age (yrs)	Activities of daily living	p value
60-64	Walking 400 meters	0.029
	Community contact	0.0001
65-69	Nail clipping	0.0137
	Community contact	0.0007
70-74	Cooking	0.0226
	Social activity in the community	0.0472
	Hobbies	0.0096
	Taking transportation	0.0002
	Community contact	0.0063
	Taking medicine	0.0267
75-79	Hobbies	0.0025
	Community contact	0.0003
	Taking medicine	0.0058
	Heavy house work	0.0331
80+	Going to and open market	0.0236

scores were 21 for middle school (0.82/0.94), 23 for high school (0.79/0.97) and 24 for college/graduate school (0.89/1.00) attainment. He concluded that education specific norms optimized performance of the MMES as a screening test for Alzheimer's dementia in elderly outpatients.

Cummulative data of the TMSE scores in our study demonstrated a skewed to the right distribution curve. Thus, the use of assumptions of normal theory can not be applied in our study. Our median score across each age group ranged from 18 in the oldest to 24 in 60-69 year old group. We argued that there needs to be an adjustment of TMSE scores according to age. We proposed the cut-off values of the 25th percentile for each age group as screening for dementia. Crum FM et al[22] also found that cognitive performance measured by the MMSE varied with the population by age and education. They suggested that MMSE scores should be used to identify current cognitive impairment and not to make formal diagnosis.

Most diagnostic criteria need a condition of impairment of social functions or activities of daily living to fulfill a definition of dementia. Bassett SS and Folstein MF[23] showed that individuals with a low education and with low MMSE score were less able to perform tasks of everyday living, suggesting that these individuals might indeed be more cognitively impaired or demented. In this one step survey, we can only propose an estimated prevalence of dementia by defining dementia to those who scored 25th percentile or less on TMSE and had impaired certain activities of daily living. Our estimated prevalence of dementia in this population was consistent with previous reports[24-26]. We did not analyse the dementia subtypes in this study. If our study had been a two-step survey, we could have shown an etiology of dementia in Thai elderly.

SUMMARY

We proposed multiple cut-off values of the TMSE as a screening tool for dementia. Our estimated prevalence of dementia in this study was 9.88 per cent. However, relatives or proxies could perceive or suspect dementia in only 7.3 per cent of the individuals. Public education of the dementia syndrome is an urgent priority for early recognition, early diagnosis and early management of dementia.

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การศึกษาสมรรถภาพสมองของผู้สูงอายุไทยที่อาศัยในชุมชน†

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วัตถุประสงค์ : เพื่อสำรวจและศึกษาหาความชุกของประชากรที่มีภาวะการทำงานของสมองบกพร่อง (cognitive impairment) และประเมินหาความชุกของภาวะสมองเสื่อมในผู้สูงอายุไทยที่อาศัยในชุมชน ตลอดจนการประเมินการใช้แบบทดสอบคัดกรองภาวะสมองเสื่อมด้วย Thai Mental State Examination (TMSE) โดยใช้จุดตัดคัดกรองเพียงจุดเดียว

วิธีการ : คณะผู้วิจัยได้ศึกษาผู้สูงอายุไทยที่อาศัยในชุมชนทั่วประเทศทั้งในภาคเหนือ ภาคกลาง ภาคตะวันออกเฉียงเหนือและภาคใต้รวม 3,177 ราย โดยผู้สูงอายุมีอายุตั้งแต่ 60 ปีขึ้นไปจึงจะคัดเลือกเข้ามาในการศึกษาครั้งนี้ การสำรวจทำในระหว่างปี พ.ศ. 2537-2539 บุคลากรการแพทย์ที่ได้รับการฝึกฝนจะทำการซักประวัติ และประเมินการทำกิจวัตรประจำวัน ตลอดจนการตรวจโดยใช้แบบทดสอบคัดกรองภาวะสมองเสื่อมด้วย Thai Mental State Examination (TMSE) โดยนักจิตวิทยา ผู้สูงอายุทุกรายจะได้รับการซักประวัติและตรวจร่างกายโดยอายุรแพทย์หรือประสาทแพทย์ และจะได้รับการเจาะเลือดหาค่าทางชีววิทยาและโลหิตวิทยา การคำนวณข้อมูลทั้งหมดทางสถิติใช้โปรแกรม SPSS 6.0

ผลการวิจัย : ผู้สูงอายุจำนวนสามพันหนึ่งร้อยเจ็ดสิบเจ็ดราย ประกอบด้วยผู้ชาย ร้อยละ 38.8 ผู้หญิง ร้อยละ 61.2 คณะผู้วิจัยพบว่า TMSE มีความสัมพันธ์กับอายุ และระดับการศึกษาของผู้สูงอายุ ($r=-0.345$, $r=0.473$, $p<0.001$) แต่ไม่พบความสัมพันธ์ระหว่าง TMSE และความดันโลหิตโดยเฉลี่ย, ความดันโลหิต systolic, ความดันโลหิต diastolic, ค่า haematocrit, ระดับไขมันในเลือด, ระดับน้ำตาลในเลือดและผลการทดสอบเชื้อซิฟิลิส ผู้วิจัยเสนอให้ใช้จุดตัดของแบบทดสอบคัดกรองภาวะสมองเสื่อม TMSE หลายจุดที่แตกต่างกันไปในช่วงอายุต่างๆกัน โดยผู้สูงอายุที่ทดสอบได้ค่า TMSE ต่ำกว่า 25 percentile และมีความบกพร่องในการทำกิจวัตรประจำวัน ถือว่ามีภาวะสมองเสื่อมจากการประเมินโดยเกณฑ์นี้พบความชุกของภาวะสมองเสื่อมในผู้สูงอายุร้อยละ 9.88 (95%CI = 8.85%, 10.92%)

สรุป : ภาวะสมองเสื่อมเป็นภาวะที่พบบ่อยในผู้สูงอายุไทย เนื่องจากภาวะสมองเสื่อมมีสาเหตุที่แตกต่างกันเช่น อาจเกิดจากสาเหตุต่างๆที่สามารถรักษาได้ดังนั้น การวินิจฉัยและประเมินภาวะสมองเสื่อมด้วยการใช้แบบทดสอบคัดกรองอย่างเหมาะสมจะช่วยการวินิจฉัยโรคได้ตั้งแต่เริ่มต้น จึงสมควรส่งเสริมให้ประชาชนได้มีความรู้เกี่ยวกับอาการของภาวะสมองเสื่อมเพื่อจะแยกจากภาวะชราภาพในคนสูงอายุได้

คำสำคัญ : สมรรถภาพสมอง, ผู้สูงอายุไทย

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