The Distribution of Thai Mental State Examination Scores among Non-Demented Elderly in Suburban Bangkok Metropolitan and Associated Factors

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Objective: *To obtain the distribution of Thai Mental State Examination (TMSE) scores in the Thai population across different age groups and educational levels in men and women aged 50 years and older and its relationship with demographic factors. The different cutpoints in literate and illiterate participants and item performance in both groups were also determined.*
Material and Method: *Community-dwelling participants aged 50 years and over were invited to join the study. Personal information, general health history, and specific illness questionnaires including the activities of daily living, designed by the Survey in Europe on Nutrition and the Elderly, a Concerted Action (SENECA), and the Thai Mental State Examination (TMSE) were completed in the face-to-face interview.*
Results: *There were 4,459 participants with no specific reported conditions that could potentially influence cognitive performance. The mean (SD) age was 64.2 (7.9) years and most participants were women (71.7%). The median (interquartile range) of the TMSE was 27 (25-29) and 23 (19-26) in literate and illiterate participants, respectively. The distribution of TMSE scores were reported here determined by age, gender, and educational level. Percentage of correct response in each TMSE item was low in recall and calculation performance. TMSE score declined with age in both genders and had greater variation with increasing age. TMSE score also increased with increasing levels of education and better financial status. Gender was not associated with the TMSE score adjusting for age, educational level, and economic status.*
Conclusion: *Age, education, and economic status have an influence on the TMSE performance. Controlling for these three factors, genders does not contribute to significant differences in TMSE performance. Norms adjusted for these factors should be considered before employing single cutpoints to identify impairment.*

Keywords: *Mental status, Cognitive function, Community, Elderly, Norm*

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Previously reported prevalence of dementia in Thailand varied widely from 1.8 to 9.9%[1-4]. Dementia is frequently under-diagnosed[5]. The variation in reported prevalence have been related to different population characteristics (e.g., age, gender, and educational level) as well as study methodology including diagnostic criteria used. The most widely used tool for assessing cognitive status both in epidemiological studies, community surveys and clinical settings is the Mini-Mental Status Examination (MMSE). The MMSE has been criticized with regard to the effect of education, language, and culture on the MMSE performance and the inability to detect the subcortical cognitive dysfunction as well as mild cognitive impairment (MCI). However, it has been translated into many languages and validated in many settings. The Thai version of the Mini-Mental State Examination (TMSE) was developed in 1993 and has been extensively used in Thailand to screen cognitive impairment and dementia. The suggested cut-off point to determine cognitive impairment is 23 out of 30[6]. Age, gender, education, ethnicity, and social class have all been reported to have an influence on MMSE scores[7-11]. However, there are no age, gender, and education-stratified information for the TMSE score, which is used widely in research and clinical setting in Thailand. Several items of the TMSE are inappropriate in screening those with lower education such as the serial 7s. The fixed cut-off point of 23/24 may not be

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valid for certain demographic characteristics. This could lead to misclassification of patients in clinical and research settings. Over- or under-diagnosis of dementia and cognitive impairment might be reported. Exploring the distribution of TMSE scores in the older Thai population stratified by these factors will lead to more precise studies in the future.

The objectives of the present study were two-fold. First, we aimed to study the distribution of TMSE scores in the non-demented older Thai population for both genders, different age groups, educational levels and economic status. We aimed to investigate the different cutpoints in literate and illiterate participants. In addition, the proportion of correct response in each TMSE item was studied. Second, we investigated the relationship between TMSE score and demographic factors (age, gender, educational level, and economic status).

Material and Method

Study design

The data set was obtained from the Bangkok Longitudinal Study by Siriraj Hospital for Older Men and Women (BLOSSOM), which was a community cohort study of the Department of Preventive and Social Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Thailand. The study aimed to include 5,000 participants aged 50 years and over sampling from community settings from six suburban areas in Bangkok, Thailand. The objectives of the project were to gain an understanding of the magnitude of health problems of the older population in urban areas, obtain the health determinants and predictors of the common diseases in the older population and developed strategies to promote health and prevent common diseases.

The community leaders were requested to ask eligible people in their community to attend a mobile unit at a community hub. This varied from a temple, or a school, or a conference hall, or a leisure area. All individuals aged 50 years and over in the sampling areas were invited to participate in the study via the community leaders and nurses of the Primary Care Unit. The participation rate was difficult to obtain as the number of family members recorded in the census and by the community leaders was frequently incorrect because of unregistered migration. The true denominator from which this population came was therefore unknown, but response was generally high using these methods. However, we randomly checked the participation rate in the population of 3,000 participants by comparing the total number of the participants with the total population checked by the local community leaders. By this method, the participation rate in the present study was 80%.

Data collection

The structured face-to-face interview was conducted by trained personnel to collect the personal information, general health history, and specific illness questionnaires that included the translated version of the activities of daily living designed by the Survey in Europe on Nutrition and the Elderly, a Concerted Action (SENECA), and the Thai Mental State Examination (TMSE)[6,12,13]. Data from participants who were independent in activities of daily living, had no history of cognitive impairment (self and informant report) and did not report a previous disease affecting the central nervous system, a psychiatric illness, or a history of psychotropic drug use were used to calculate normative data. As each subgroup of the population should contain at least 200 people to make the data representative of the true population[14]. We categorized age into only three groups (50 to 59, 60 to 69, and 70+ years) and education into two groups, lower (1 to 4 years of education and literate) and higher (greater than four years of education). In addition, the TMSE score in three age groups (50 to 59, 60 to 69, and 70+ years) of participants who had no previous study or illiterate was determined (here we called illiterate group). Ethical approval of the present study was obtained from the Siriraj Institutional Review Board of Faculty of Medicine Siriraj Hospital, Mahidol University. Informed consent was obtained from all study participants.

Statistical analysis

As we were interested in testing for any differences across gender, an independent-samples t-test was used to compare the mean age between men and women. A Chi-square test was used to compare the categorical variables of age group, gender, educational level, marital status, living status, and income. The TMSE scores were compared separately across age groups, gender, educational level, and income via independent-samples t-test or one-way analysis of variance (ANOVA). Multiple linear regression analysis was conducted to find the best predictor of the TMSE score among these variables. All analyses were performed using SPSS version 14.0. A p-value (two-sided) of <0.05 was considered statistically significant.

Results

Baseline demographics

The baseline demographics of respondents with complete data were summarized in Table 1. There were 1264 men (28.3%) and 3195 women (71.7%). Overall, the mean age (standard deviation (SD)) was 64.2 (7.9) years. Men were significantly older than women (mean age (SD): 66.1 (8.0) versus 63.5 (7.7) years, $p<0.001$). The majority of participants studied less than four years (66.5%). Three hundred forty nine participants (7.8%) were illiterate or had no previous education. Men had higher education than women. Women were more likely to be single, widowed or divorced, living alone and having inadequate income (see Table 1).

Cognitive function

Cognitive function measured by the TMSE had a slight left skewed distribution due to the maximal score of 30 (Fig. 1). The median (interquartile range (IQR)) of the TMSE was 27 (25 to 29) and 23 (19 to 26) in literate and illiterate participants, respectively. Table 2 summarized percentage of correct responses to each TMSE item and mean score of each cognitive domain in the TMSE. Three-word recall and calculation were the tasks with low rate of correct responses in non-demented elderly. There were significant difference in proportion of correct responses between literate and illiterate groups in several items such as attentional task of day backwards, serial 7s subtraction, closing eyes following the reading of command, copying design and similarity (Table 2). The mean score of each cognitive domain in the TMSE were significantly different between literate and illiterate/no previous education groups, except for the registration of three words ($p = 0.125$). Table 3 showed the distribution of

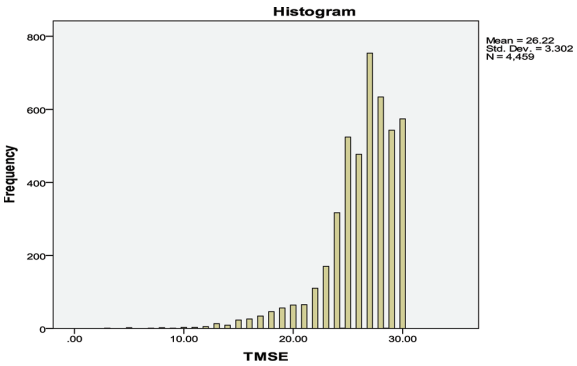

Fig. 1 Distribution of the TMSE scores.

Table 1. Baseline characteristics of the participants with complete data, n (%) unless otherwise indicated

Baseline characteristics	Men (1,264)	Women (3,195)	Total (4,459)	*p*-value
Age				
50-59 years	307 (24.3%)	1,208 (37.8%)	1,515 (34.0%)	
60-69 years	503 (39.8%)	1,287 (40.3%)	1,790 (40.1%)	
≥70 years	454 (35.9%)	700 (21.9%)	1,154 (25.9%)	
Mean age (SD), in years	66.1 (8.0)	63.5 (7.7)	64.2 (7.9)	<0.001[a]
Education				<0.001[b]
Did not study	37 (2.9%)	312 (9.8%)	349 (7.8%)	
Learn as a monk	6 (0.5%)	3 (0.1%)	9 (0.2%)	
1-4 years	639 (50.6%)	1,980 (62.0%)	2,619 (58.7%)	
Primary school	104 (8.2%)	215 (6.7%)	319 (7.2%)	
Secondary school	365 (28.7%)	529 (16.6%)	892 (20.0%)	
Bachelor degree or higher	115 (9.1%)	156 (4.9%)	271 (6.1%)	
Marital status				<0.001[b]
Single	57 (4.6%)	378 (11.9%)	437 (9.8%)	
Married	1,039 (83.1%)	1,606 (50.3%)	2,657 (59.6%)	
Widowed	94 (7.5%)	842 (26.4%)	936 (21.0%)	
Divorced or separated	60 (4.8%)	369 (11.5%)	429 (9.6%)	
Income				0.004[b]
Inadequate	207 (16.4%)	636 (19.9%)	843 (18.9%)	
Adequate	851 (67.3%)	2,125 (66.5%)	2,976 (66.7%)	
Saving	206 (16.3%)	434 (13.6%)	630 (14.4%)	

[a] Tested via independent-samples t-test

[b] Tested via Chi-square test

Table 2. Proportion of subject giving a correct answer to each item and mean score of each domain in a TMSE

Items	a (%)	b (%)	*p*-value
Orientation (mean ± SD)	5.75±0.61	5.07±1.13	<0.000
Day of the week	97.0	93.6	<0.103
Date	89.6	78.7	<0.000
Month	92.9	50.6	<0.000
Time (morning, noon, afternoon, evening)	98.4	94.4	<0.000
Place (examine area)	99.1	96.4	<0.032
Occupation of a given picture (nurse)	97.8	90.4	<0.000
Registration: three words (tree, car, hand) (mean ± SD)	2.91±0.46	2.86±0.55	0.125
Correct 1 word	1.2	2.0	<0.000
Correct 2 words	1.6	3.2	<0.000
Correct 3 words	95.6	92.0	<0.000
Attention: days of the week backward (mean ± SD)	4.75±0.97	3.59±2.04	<0.000
Correct 1 day	0.8	3.6	<0.000
Correct 2 days	0.9	3.2	<0.000
Correct 3 days	1.2	5.6	<0.000
Correct 4 days	2.0	4.8	<0.000
Correct 5 days	92.2	65.1	<0.000
Calculation: serial 7s subtraction (mean ± SD)	2.00±1.04	1.24±1.18	<0.000
Correct 1 word	32.0	35.3	<0.000
Correct 2 words	13.9	8.8	<0.000
Correct 3 words	46.8	25.3	<0.000
Language (mean ± SD)	9.70±0.72	8.36±1.57	<0.000
Naming wristwatch	99.9	99.2	<0.287
Name clothes	99.8	99.2	<0.649
Repeat a sentence	98.6	91.6	<0.000
Three step commands			
First step	98.8	92.4	<0.000
Fold a paper	99.1	96.0	<0.206
Return a paper to a doctor	99.4	98.0	<0.206
Close eyes	97.3	39.4	<0.000
Copying design	91.3	67.5	<0.000
Similarity (cat and dog)	90.5	67.5	<0.000
Recalling 3 words (mean ± SD)	1.46±1.23	1.05±1.23	<0.000
Correct 1 word	14.4	9.6	<0.000
Correct 2 words	22.5	17.3	<0.000
Correct 3 words	29.0	21.3	<0.000

TMSE = Thai Mental State Examination
a: Able to read and write
b: Illiterate/no previous education

TMSE categorized by age groups, and educational level in literate and illiterate participants.

Association between TMSE and demographic variables

Association between TMSE and gender

The median (IQR) and mean (SD) TMSE in men were 27 (25 to 29) and 26.5 (3.0) and in women were 27 (25 to 28) and 26.1 (3.4). Men had significantly higher TMSE scores than women ($p = 0.005$).

Association between TMSE and age

The total TMSE score declined with age in both genders ($p<0.001$ for men and $p<0.001$ for women) and had greater variation with increasing age.

Association between TMSE and education

The TMSE scores also varied with educational level in both genders. The TMSE score increased with the increasing level of education ($p<0.001$). There was not much difference in the TMSE performance between

Table 3. Distribution of the TMSE score by age, sex, educational level in 4,111 literate and 348 illiterate/no previous study participants

Education	Illiterate/no previous study	Lower education[a]	Higher education[b]
50-59 years			
n	98	848	569
Mean	22.8	26.7	27.9
SD	4.9	2.7	2.0
Median	24.0	27.0	28.0
IQR	19-26	25-29	27-30
5^{th}, 10^{th}, 25^{th}, 75^{th} percentile	14, 16, 19, 26	22, 24, 25, 29	24, 25, 27, 30
60-69 years			
n	122	1,039	629
Mean	23.0	26.1	27.7
SD	5.1	2.8	1.9
Median	24.0	27.0	28.0
IQR	20.8-26.3	25-28	27-29
5^{th}, 10^{th}, 25^{th}, 75^{th} percentile	13.2, 17, 20.8, 26.3	21, 23, 25, 28	24, 25, 27, 29
70+ years			
n	128	747	279
Mean	20.9	25.0	26.9
SD	5.0	3.5	2.5
Median	20.5	25.0	27.0
IQR	17-24	24-27	26-29
5^{th}, 10^{th}, 25^{th}, 75^{th} percentile	13, 15, 17, 24	18, 20, 24, 27	23, 24, 26, 29
Total			
n	348	2,634	1,477
Mean	22.2	26.0	27.6
SD	5.1	3.0	2.1
Median	23.0	26.0	28.0
IQR	19-26	25-28	27-29
5^{th}, 10^{th}, 25^{th}, 75^{th} percentile	13, 15, 19, 25	20, 22, 25, 28	24, 25, 27, 29

[a] Education level for 1-4 years and able to read and write
[b] Education level more than 4 years

men and women at each educational level, except from those with a bachelor's degree women had higher TMSE than men ($p<0.001$) (Fig. 2).

Association between TMSE and income

The TMSE score increased with higher economic status in both men and women in a linear pattern ($p<0.001$ for men and $p<0.001$ for women) (Fig. 3).

Association between TMSE and age, gender, education and income

These general pattern of TMSE score distributions persisted when age, gender, economic status, and education were combined. The multiple regression analysis was conducted to find the best predictor of the TMSE score among these variables. We found that age, educational level, and economic status, but not gender, contributed to the prediction of the TMSE score (Table 4). Age and education were the strongest predictors of the TMSE performance. Although, economic status still contributes to the TMSE score to some extent after controlling for these variables.

Discussion

We found that age, educational level and economic status, but not gender, influenced TMSE performance. TMSE scores decrease with age, lower education, and poorer financial status. Education and age seem to be the most influential factor on the TMSE performance. This implies the public health intervention to improve the modifiable acquired factors affecting cognitive function.

There are some variations in the TMSE tool to the original MMSE version. For example, the

Table 4. Multiple linear regression for TMSE adjusted for age, gender, educational level and economic status

Factors	Unstandardized coefficients		Standardized coefficients	95% confidence interval		*p*-value
	B	Std. error	β	Lower bound	Upper bound	
Intercept	28.459	0.505	28.459			
Age (per year)	-0.087	0.006	-0.208	-0.099	-0.076	<0.001
Gender	-0.147	0.103	-0.020	-0.349	0.055	0.155
Educational level	0.856	0.040	0.316	0.779	0.934	<0.001
Economic status	0.322	0.077	0.059	0.171	0.474	<0.001

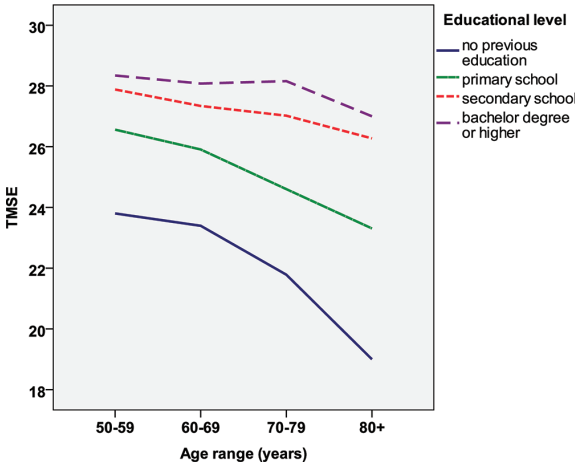

Fig. 2 The TMSE score by age and educational level.

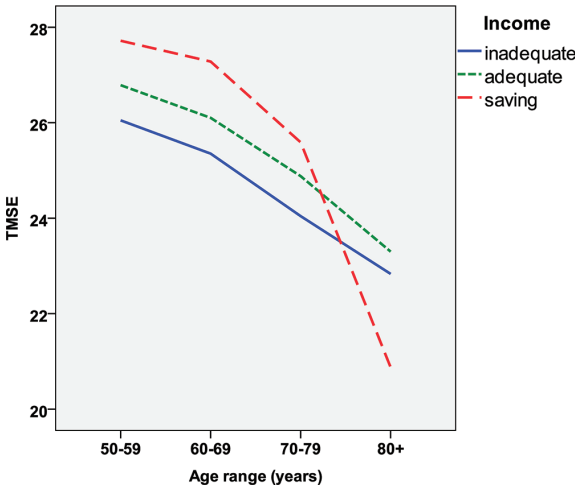

Fig. 3 The TMSE score by age and income.

original MMSE was developed to test hospital patients so the orientation questions require the patient to tell the name and floor of their hospital[15,16]. However, the questions and responses are modified when the MMSE is used in epidemiological studies and community settings[2]. Moreover, in the original MMSE, patients were permitted to spell the word "WOLRD" backward if they could not perform the serial 7s task[15]. In the TMSE and many versions of the MMSE only the serial 7s are used, while some others use only "WORLD"[17,18]. Moreover, the scoring methods for each task are also different[16,18,19]. These could lead to variation in test performance. Another Thai version of MMSE called the MMSE-Thai 2002 was developed to match with the original MMSE by cultural and linguistic translation. There were cut-off points for subjects with or without previous education. However, its sensitivity of the cut-off points in subjects with no previous education and low education is still limited.

The performance in giving correct response in several items was different between literate and illiterate groups such as attentional task of day backwards, serial 7s subtraction, closing eyes following the reading of command, copying design and similarity. This implies the less useful of these items in distinguish normal and impaired cognitive function in illiterate elderly.

Future studies in Thailand which use the TMSE in defining dementia or cognitive impairment should take into account the influence of age and educational on the score. Studies using the TMSE with a cut-off point of 23 as a screening tool could provide different prevalence rates of cognitive impairment and dementia depending on the population studied[2,4]. The finding that older adults tend to have lower TMSE scores than younger adults raises the issue that a fixed cut-off score of 23 may lead to over-estimations of the prevalence of cognitive impairment in older adults and under-estimations in younger adults.

The present study supported the previous findings with MMSE that age, education, and social class affect the MMSE performance[8,16,18,20]. The lack of difference between men and women once other factors are accounted for has been reported previously[7,17]. The study by Grigoletto et al showed

that women had lower performance in taking the MMSE, and that lower performance occurred only substantially in older women with lower educational levels[20]. The interaction of age and education might explain the finding.

Although we categorized the education into two levels and age strata into three groups to allow a sufficient number of subjects in each cell, the numbers of subjects aged 70 years and over in the higher education levels were still small. Thus, the normative data in this age group may be less accurate. While we excluded those with functional impairment, history of central nervous system disorder, psychiatric disorders and psychotropic drug use, there might be participants with mild cognitive impairment and depression mixed in with the studied population that might make the TMSE score slightly deviated from the norm.

This was the first report from a community-based sample in Thailand to report age, gender, and education-stratified TMSE score in literate and illiterate participants. It can be used as a reference for clinical practice and research in the future. Choosing the cut-off point of the score below the fifth percentile or less than two SDs below the mean in the age and education matched norms should lead to less misclassification than using cutpoints based on Western populations.

Conclusion and Recommendation

The score declined with increasing age, decreasing educational level and decreasing income. Age, education, and economic status have influence on performance of the TMSE test. Cut-off scores to determine cognitive impairment should be stratified by these factors. Choosing the cut-off point of less than the fifth percentile or less than two SDs below the mean in the age and education matched norms will be more accurate.

What is already known on this topic?

The Thai version of the TMSE has been used extensively in Thailand to screen cognitive impairment and dementia. The suggested cut-off point to determine cognitive impairment is 23 out of 30.

What this study adds?

Age, education, and economic status have an influence on performance of the TMSE test.

There were significant difference in proportion of correct responses between literate and illiterate groups in several items such as attentional task of day backwards, serial 7s subtraction, closing eyes following the reading of command, copying design, and similarity.

Acknowledgement

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Potential conflicts of interests

None.

References

1. Phantumchinda K, Jitapunkul S, Sitthi-amorn C, Bunnag S, Ebrahim S. Prevalence of dementia in an urban slum population in Thailand. Validity of screening methods. Int J Geriatr Psychiatry 1991; 6: 639-46.
2. Senanarong V, Poungvarin N, Sukhatunga K, Prayoonwiwat N, Chaisewikul R, Petchurai R, et al. Cognitive status in the community dwelling Thai elderly. J Med Assoc Thai 2001; 84: 408-16.
3. Jitapunkul S, Kunanusont C, Phoolcharoen W, Suriyawongpaisal P. Prevalence estimation of dementia among Thai elderly: a national survey. J Med Assoc Thai 2001; 84: 461-7.
4. Wangtongkum S, Sucharitkul P, Silprasert N, Inthrachak R. Prevalence of dementia among population age over 45 years in Chiang Mai, Thailand. J Med Assoc Thai 2008; 91: 1685-90.
5. Jitapunkul S, Chansirikanjana S, Thamarpirat J. Undiagnosed dementia and value of serial cognitive impairment screening in developing countries: a population-based study. Geriatr Gerontol Int 2009; 9: 47-53.
6. Train the Brain Forum Committee. Thai mental state examination (TMSE). Siriraj Hosp Gaz 1993; 45: 661-674.
7. O'Connor DW, Pollitt PA, Treasure FP, Brook CP, Reiss BB. The influence of education, social class and sex on Mini-Mental State scores. Psychol Med 1989; 19: 771-6.
8. Brayne C, Calloway P. The association of education and socioeconomic status with the Mini Mental State Examination and the clinical diagnosis of dementia in elderly people. Age Ageing 1990; 19: 91-6.
9. Mendes de Leon CF, Beckett LA, Fillenbaum GG, Brock DB, Branch LG, Evans DA, et al. Black-white differences in risk of becoming disabled and recovering from disability in old age: a longitudinal analysis of two EPESE populations. Am J Epidemiol 1997; 145: 488-97.

10. Ylikoski R, Erkinjuntti T, Sulkava R, Juva K, Tilvis R, Valvanne J. Correction for age, education and other demographic variables in the use of the Mini Mental State Examination in Finland. Acta Neurol Scand 1992; 85: 391-6.
11. Scazufca M, Almeida OP, Vallada HP, Tasse WA, Menezes PR. Limitations of the Mini-Mental State Examination for screening dementia in a community with low socioeconomic status: results from the Sao Paulo Ageing & Health Study. Eur Arch Psychiatry Clin Neurosci 2009; 259: 8-15.
12. Osler M, de Groot LC, Enzi G. Life-style: physical activities and activities of daily living. Euronut SENECA investigators. Eur J Clin Nutr 1991; 45 (Suppl 3): 139-51.
13. Assantachai P, Maranetra N. Factors determining hospital admission of Thai elderly by a mailed survey. J Med Assoc Thai 2005; 88: 1051-6.
14. Nunnally J, Bernstein I. Psychometric theory. 3rd ed. New York: McGraw-Hill, 1994.
15. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res 1975; 12: 189-98.
16. Tombaugh TN, McIntyre NJ. The mini-mental state examination: a comprehensive review. J Am Geriatr Soc 1992; 40: 922-35.
17. Bleecker ML, Bolla-Wilson K, Kawas C, Agnew J. Age-specific norms for the Mini-Mental State Exam. Neurology 1988; 38: 1565-8.
18. Morris JC, Mohs RC, Rogers H, Fillenbaum G, Heyman A. Consortium to establish a registry for Alzheimer's disease (CERAD) clinical and neuropsychological assessment of Alzheimer's disease. Psychopharmacol Bull 1988; 24: 641-52.
19. Teng EL, Chui HC. The Modified Mini-Mental State (3MS) examination. J Clin Psychiatry 1987; 48: 314-8.
20. Grigoletto F, Zappala G, Anderson DW, Lebowitz BD. Norms for the Mini-Mental State Examination in a healthy population. Neurology 1999; 53: 315-20.

การกระจายและปัจจัยที่สัมพันธ์ของคะแนน Thai Mental State Examination (TMSE) ในผู้สูงอายุที่ไม่มีภาวะสมองเสื่อมในบริเวณชานเมืองกรุงเทพมหานคร

วีรศักดิ์ เมืองไพศาล, ประเสริฐ อัสสันตชัย, กอบกุล สิทธิชัย, แคทรีน ริชาร์ดสัน, คารอล เบรน

วัตถุประสงค์: เพื่อให้ได้การกระจายของคะแนน Thai Mental State Examination (TMSE) ในประชากรไทยตามระดับอายุและการศึกษาในผู้ชายและผู้หญิงที่อายุ 50 ปีขึ้นไป และศึกษาความสัมพันธ์กับปัจจัยทางประชากร นอกจากนั้นยังศึกษาจุดตัดของคะแนนและคะแนนในแต่ละข้อของผู้เข้าร่วมการศึกษาที่อ่านออกเขียนได้ และอ่านไม่ออกเขียนไม่ได้

วัสดุและวิธีการ: ผู้เข้าร่วมการศึกษาในชุมชนที่อายุตั้งแต่ 50 ปีขึ้นไป ได้รับการเชิญเข้าร่วมในการศึกษานี้ และได้รับการสัมภาษณ์ถึงประวัติส่วนตัว ประวัติสุขภาพทั่วไป และแบบคำถามประเมินสภาวะโรคจำเพาะรวมถึงการประเมินความสามารถในการประกอบกิจวัตรประจำวันที่ได้รับการออกแบบโดย the Survey in Europe on Nutrition and the Elderly (SENECA) และการประเมิน Thai Mental State Examination (TMSE)

ผลการศึกษา: มีผู้เข้าร่วมการศึกษาที่ไม่มีรายงานโรคประจำตัวที่อาจมีผลกระทบต่อความสามารถในการรู้คิด 4,459 คน อายุเฉลี่ย 64.2±7.9 ปี และส่วนใหญ่เป็นผู้หญิง (ร้อยละ 71.7) ค่ามัธยฐาน (ค่าพิสัยระหว่างควอร์ไทล์) ของคะแนน TMSE ในผู้เข้าร่วมการศึกษาที่อ่านออกเขียนได้ และอ่านไม่ออกเขียนไม่ได้ มีค่าเท่ากับ 27 (25-29) และ 23 (19-26) ตามลำดับ ผู้นิพนธ์ได้รายงานการกระจายของคะแนน TMSE โดยจำแนกตามอายุ เพศและระดับการศึกษา ร้อยละของความถูกต้องในแต่ละข้อของ TMSE มีน้อยในด้านการระลึกและการคำนวณ คะแนน TMSE ลดลงตามอายุในทั้งสองเพศและมีความแปรปรวนมากขึ้นเมื่ออายุมากขึ้น คะแนน TMSE สูงขึ้นตามระดับการศึกษาและเศรษฐฐานะ เพศไม่ได้มีความสัมพันธ์กับคะแนน TMSE เมื่อปรับตามระดับอายุ การศึกษา และเศรษฐฐานะแล้ว

สรุป: อายุ ระดับการศึกษา และเศรษฐฐานะ มีผลต่อคะแนน TMSE เมื่อควบคุมปัจจัยทั้งสามอย่างนี้แล้ว เพศไม่มีผลต่อคะแนน TMSE อย่างมีนัยสำคัญ ค่าปกติที่ปรับตามปัจจัยทั้งสามนี้ ควรนำไปใช้มากกว่าการใช้คะแนนจุดตัดเพียงระดับเดียว ในการระบุว่ามีความบกพร่อง