Original Article

A Moment to Remember: Performance of the Three-word Recall, Name and Address Recall and Famous Person Tasks on Thai Elderly with Mild Cognitive Impairment and Dementia

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Objective: The present study aimed to evaluate the diagnostic accuracy of the 3-word recall, name and address recall and famous person tasks on cognitively healthy elderly, elderly people with mild cognitive impairment (MCI) and patients with early dementia.

Materials and Methods: The participants comprised 65 normal controls (NC), 45 people with MCI, and 52 people with early dementia. All participants completed 3-word recall, name and address recall and famous person tasks.

Results: The three-word recall, name and address recall and famous person tasks demonstrated good diagnostic accuracy in the detection of dementia. However, the 3-word recall and famous person tasks were not able to discriminate between NC and MCI groups. The optical cut-off score for 3-word recall differentiating NC from dementia was <2 words, giving a sensitivity of 86.5% and specificity of 92.3%. For famous person task, the cut-off was <3 points, giving a sensitivity and specificity of 78.8% and 80.0%, respectively. Using the cut-off of <3 points, name and address recall had the highest accuracy with a sensitivity of 94.2% and specificity of 93.8%.

Conclusion: All three memory tests are sensitive bedside assessments for the screening of dementia. The present study suggests the optimal cut-off score and provides diagnostic accuracy concerning each task.

Keywords: Alzheimer's disease, Dementia, Memory, Mental status tests, Mild cognitive impairment, Neuropsychologic tests

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The assessment of memory function is an important aspect of mental state examinations as well as cognitive function testing. Commonly, such an assessment is performed through the use of word lists, names and addresses, or asking about famous person[1]. The use of these brief tests is useful in clinical settings, such as outpatient departments and emergency rooms, because they require little time for completion and are easily administered.

Though studies concerning the diagnostic accuracy of these memory assessments have been published[2,3], the Thai versions of these tests have never been examined. Moreover, when translating an assessment into a different language and culture, many measures take on different properties and cut-off scores. For example, it is impossible to use Western names and addresses to test Thai patients on name and address recall; it is likewise inappropriate to assume that the same properties exist in the English version when changing into Thai names and addresses. Therefore, the objective of the present study was to determine the diagnostic accuracy of the three-word recall, name and address recall and famous person tasks in cognitively normal elderly, elderly people with mild cognitive impairment and patients with dementia.

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Materials and Methods

The present study used secondary data from the study of the Thai version of the Addenbrooke's Cognitive Examination (ACE-T)[4]. Participants completed the original ACE-T. The three memory tasks were obtained from the items within the ACE-T. These tests consisted of three items: (1) three-word recall, (2) name and address recall and (3) famous person tasks.

The participants were at least 55 years old and had at least four years of formal education. There were 65 normal controls (NC), 45 patients with mild cognitive impairment (MCI), and 52 patients with early dementia. Patients with MCI and dementia were examined by an experienced geriatric

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psychiatrist or neurologist and their diagnoses made using the Diagnostic and Statistical Manual of Mental Disorders, 5th edition criteria (DSM-5). The diagnostic assessments included history, physical and neurological examinations, cognitive assessment, laboratory data and neuroimaging. To ensure that participants with dementia had only mild dementia, those with a Thai Mental State Examination of <15 were excluded from the study[5,6]. The normal controls were recruited from the relatives of patients. They did not meet the diagnosis criteria for MCI or dementia. The original study was approved by the Human Ethics Committee of Thammasat University (protocol number: MTU-EC-PS-6-019/57).

Three-word recall task

Three words, 'lemon, key and boat', were read to the participants and then repetition of the words was requested (registration phase). Three to five minutes later, following administration of 100-7 tasks, free recall for the three words was assessed. The scores ranged from 0 to 3.

Name and address recall task

A Thai name and address were read to the participants as follows: 'Somchai/Tongdee/73/Watdang/Street/Om-Mueang/Pathumthani'. This registration was repeated three times, but only responses in the third trial contributed to the registration score (0 to 7 points). After five to ten minutes, following administration of non-memory tests, free recall was assessed.

Famous person task

Participants were asked for the names of (1) the current Prime Minister of Thailand, (2) the woman who was Prime Minister, (3) the current US president and (4) the current King of Thailand. The scores ranged from 0 to 4.

Statistical analysis

Demographic data and scores for the memory tasks were compared between the participants using exact test and one-way ANOVA with Bonferroni post-hoc adjustment. The authors determined how well the three memory tasks distinguished cognitively normal elderly from MCI, and further distinguished normal elderly from dementia using area under area under receiver operating characteristic (AuROC), sensitivity, specificity and likelihood ratio if test positive (LR+). All analyses were performed using STATA version 14. A p-value <0.05 was considered statistically significant.

Results

Participants consisted of 65 normal controls, 45 patients with MCI and 52 patients with early dementia. Table 1 demonstrates the characteristics of the participants in each group. The normal controls (NC) did not differ from MCI or dementia group in terms of gender or level of education. Only age was significantly different between NC vs. MCI and NC vs. dementia (Table 1).

Table 2 summarises the percentage of correct responses and the mean scores for each memory task. There were statistically significant differences in the proportion of correct responses and the mean scores between NC vs. dementia in all tasks. However, there was no significant difference between NC vs. MCI for 3-word registration. For 3-word recall, 92.3% of NC could correctly recall at least two of the words, whereas only 13.5% of those in the dementia group could recall two words and none could recall all three words. For the name and address task, none of the dementia patients could recall more than three elements, while the majority (69.3%) of NC correctly recalled more than three elements. Regarding famous person task, the highest percentage of correct responses was for the name of the King of Thailand, while the lowest number of correct responses was for the name of the US president; only 67.7% of the NC knew the answer.

The diagnostic accuracy results for the 3-word recall, name and address recall and famous person tasks are shown in Table 3. The results illustrated that the 3-word recall and famous person tasks were not able to be discriminated between the NC and MCI groups since the area under receiver operating characteristics (AuROC) were only 0.61 to 0.72. Only name and address recall had AuROC of 0.81. All tasks demonstrate good accuracy to distinguish NC from dementia with AuROC of at least 0.79. Comparing the three tasks together, name and address recall had the highest AuROC and likelihood ratio if test positive (LR+), whereas the famous person task had the lowest AuROC and LR+.

Discussion

To the best of our knowledge, this is the first study

Table 1. Characteristic

	Non-dementia		Dementia (n = 52) n (%)	Differences between NC vs. MCI	Differences between NC vs. dementia
	NC (n=65) n (%)	MCI (n=45) n (%)			
Gender (male)	15 (23.1)	17 (37.8)	17 (32.7)	0.135	0.298
Age (years): mean (SD)	64.1 (7.2)	69.4 (7.7)	75.7 (8.0)	0.001	<0.001
Years of education: mean (SD)	10.3 (5.0)	9.1 (5.5)	8.1 (4.3)	0.69	0.058

NC = normal controls, MCI = mild cognitive impairment

Table 2. Percentage of correct response and the mean score of each memory tasks

	Non-dementia		Dementia (n = 52) n (%)	The *p*-value: NC vs. MCI	The *p*-value: NC vs. dementia
	NC (n = 65) n (%)	MCI (n = 45) n (%)			
3-word registration					
0	0 (0)	0 (0)	1 (1.9)	0.409	0.007
1	0 (0)	0 (0)	0 (0)		
2	0 (0)	1 (2.2)	5 (9.6)		
3	65 (100)	44 (97.8)	46 (88.5)		
Mean (SD)	3 (0)	2.98 (0.15)	2.85 (0.5)	1.0	0.017
3-word recall					
0	0 (0)	7 (15.6)	32 (61.5)	<0.001	<0.001
1	5 (7.7)	16 (35.6)	13 (25)		
2	21 (32.3)	12 (26.7)	7 (13.5)		
3	39 (60)	10 (22.2)	0 (0)		
Mean (SD)	2.52 (0.64)	1.55 (1.01)	0.52 (0.73)	<0.001	<0.001
Name and address registration					
0 to 1	0 (0)	1 (2.2)	3 (5.8)	<0.001	<0.001
2 to 3	2 (3.1)	13 (28.9)	35 (67.3)		
4 to 5	27 (41.5)	25 (55.6)	13 (25.0)		
6 to 7	36 (55.4)	6 (13.3)	1 (1.9)		
Mean (SD)	5.6 (1.07)	4.16 (1.35)	2.96 (1.24)	<0.001	<0.001
Name-address recall					
0 to 1	1 (1.5)	24 (53.3)	49 (94.2)	<0.001	<0.001
2 to 3	19 (29.2)	12 (26.7)	3 (5.8)		
4 to 5	30 (46.2)	9 (20.0)	0 (0)		
6 to 7	15 (23.1)	0 (0)	0 (0)		
Mean (SD)	4.37 (1.41)	1.78 (1.61)	0.25 (0.74)	<0.001	<0.001
Famous person					
Current PM (correct)	56 (86.2)	31 (68.9)	12 (23.1)	0.034	<0.001
Woman who was PM (correct)	54 (83.1)	35 (77.8)	20 (38.5)	0.622	<0.001
The USA president (correct)	44 (67.7)	16 (35.6)	8 (15.4)	0.001	<0.001
The King of Thailand (correct)	62 (95.4)	39 (86.7)	33 (63.5)	0.156	<0.001
Total score: Mean (SD)	3.34 (0.78)	2.69 (1.06)	1.44 (1.19)	0.003	<0.001

NC = normal controls, MCI = mild cognitive impairment

that has extensively examined the diagnostic accuracy of the 3-word recall, name and address recall, and famous person tasks in Thailand. The cut-off score for each task was provided. We recommend that elderly with normal cognitive ability should be able to recall ≥2 words for 3-word recall, ≥3 elements for name and address recall, and ≥3 names for famous person task. A score lower than this suggests that patients might have a cognitive impairment. In such as case, a more comprehensive cognitive assessment should be used.

Highly discrepant scores for the 3-word recall, name and address recall and famous person tasks were obtained by the normal controls and dementia samples, demonstrating that these tests are effective in differentiating groups of cognitively healthy and people with dementia. However, the 3-word recall and famous person tasks seemed less sensitive in screening for MCI. This is probably because the cognitive decline in MCI is more modest than dementia. Consequently, these brief tasks are not sensitive enough to distinguish MCI from healthy elderly. Therefore, standardised neuropsychological tests or more comprehensive short cognitive tests for detecting MCI, such as Montreal Cognitive Assessment[7] or Addenbrooke's Cognitive Examination[4,8], should be used if MCI is suspected.

Comparing between the three tasks, name and address recall demonstrated the highest AuROC, sensitivity and specificity. Although 3-word recall might be the most common memory screening task, the results herein suggest that name and recall could also be used for routine screening of memory function in a mental state examination. However, it is slightly more complicated than 3-word recall. In keeping with the findings, famous person test is least recommended to use compared to the other two tasks because it had the lowest AuROC (0.79) with a sensitivity of only 78.8% for the detection of dementia.

Approximately 92% of the healthy, aging participants in the present study could recall two or three words, comparable with the study by Chandler et al in which 83% of the older group recalling 2 or 3 words[2]. The present

Table 3. Cut-off score, area under receiver operating characteristic (AuROC) curve and diagnostic accuracy of three drawing tests for detection of mild cognitive impairment

	Cut-off score	AuROC (95% CI)	Sensitivity (95% CI)	Specificity (95% CI)	LR+ (95% CI)
For detection of MCI					
3-word recall (0 to 3)	<2	0.72 (0.64 to 0.8)	51.1% (35.8 to 66.3)	96.7% (88.5 to 99.6)	6.6 (2.7 to 16.2)
Name and address recall (0 to 7)	<3	0.81 (0.74 to 0.89)	68.9% (53.4 to 81.8)	93.8% (85.0 to 98.3)	11.2 (4.3 to 29.5)
Famous person (0 to 4)	<3	0.61 (0.52 to 0.7)	42.2% (27.7 to 57.8)	80.0% (68.2 to 88.9)	2.1 (1.2 to 3.8)
For detection of dementia					
3-word recall (0 to 3)	<2	0.89 (0.84 to 0.95)	86.5% (74.2 to 94.4)	92.3% (83.0 to 97.5)	11.3 (4.8 to 26.3)
Name and address recall (0 to 7)	<3	0.94 (0.9 to 0.98)	94.2% (84.1 to 98.8)	93.8% (85.0 to 98.3)	15.3 (5.9 to 39.7)
Famous person (0 to 4)	<3	0.79 (0.72 to 0.87)	78.8% (65.3 to 88.9)	80.0% (68.2 to 88.9)	3.9 (2.4 to 6.5)

AuROC = Area under receiver operating characteristic; LR+ = Likelihood ratio if test positive

study supports the suggestion of Feher et al for a cut-off score of less than two words in screening for dementia[9]. Concerning the name and address recall, an original study of Addenbrooke's Cognitive Examination by Mathuranath et al showed that the mean score of name and address recall was 6.2 (SD 1) for controls and 1.6 (2.1) for people with dementia[10], which is slightly higher than the present study. However, Hodges suggests a recall of 0 to 2 elements is abnormal[1], which is the same cut-off score proposed by the present study.

Limitation

The cut-off scores proposed by the present study should not be implemented on these tasks in isolation for diagnostic purposes. It should be used as a screening measure because they cannot replace the comprehensive medical and cognitive assessment that is required for the differential diagnosis of cognitive impairments. Education is usually an important factor of the cognitive function[4,11]. Consequently, future research should focus on education-adjusted cut-off scores and the diagnostic accuracy of each task.

What is already known on this topic?

Three-word recall, name and address recall and famous person tasks are widely used in making brief assessments of memory function. However, studies concerning the diagnostic accuracy of these measures in the Thai version has never been examined.

What this study adds?

All three measures are sensitive and valid for the screening of dementia. Name and address recall had the highest diagnostic accuracy, followed by 3-word recall and famous person task.

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Potential conflicts of interests

The author declare no conflicts of interest.

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ชั่วขณะที่ต้องจำ: ความสามารถในการทดสอบจำคำสามคำ ชื่อและที่อยู่ และบุคคลมีชื่อเสียงในผู้สูงอายุไทยที่มีภาวะ mild cognitive impairment และสมองเสื่อม

ธรรมนาถ เจริญบุญ

วัตถุประสงค์: เพื่อทดสอบความแม่นยำในการวินิจฉัยของการทดสอบจำคำสามคำ ชื่อและที่อยู่ และบุคคลมีชื่อเสียง ในผู้สูงอายุที่มีการรู้คิดปกติ ผู้สูงอายุที่มีภาวะ mild cognitive impairment (MCI) และผู้ป่วยภาวะสมองเสื่อม

วัสดุและวิธีการ: กลุ่มตัวอย่างประกอบไปด้วยผู้สูงอายุปกติ 65 คน ผู้มีภาวะ MCI 45 คน และผู้ป่วยภาวะสมองเสื่อม 54 คน ผู้ป่วยทุกคนได้รับการทดสอบจำคำสามคำ ชื่อและที่อยู่ และบุคคลมีชื่อเสียง

ผลการศึกษา: การทดสอบจำคำสามคำ ชื่อและที่อยู่ และบุคคลมีชื่อเสียงมีความแม่นยำในการตรวจพบภาวะสมองเสื่อม อย่างไรก็ตามการทดสอบจำคำสามคำและบุคคลมีชื่อเสียงไม่สามารถจำแนกผู้มีภาวะ MCI จากกลุ่มควบคุมได้ จุดตัดที่แนะนำสำหรับการทดสอบจำคำสามคำในการตรวจพบภาวะสมองเสื่อมได้แก่การจำได้น้อยกว่า 2 คำ ซึ่งมีความไวเท่ากับร้อยละ 86.5 ความจำเพาะเท่ากับ 92.3 สำหรับการทดสอบบุคคลมีชื่อเสียงมีจุดตัดที่น้อยกว่า 3 คะแนน มีความไวร้อยละ 78.8 และความจำเพาะเท่ากับ 80.0 ส่วนการทดสอบจำชื่อและที่อยู่มีจุดตัดที่น้อยกว่า 3 คะแนน มีความแม่นยำในการวินิจฉัยมากที่สุด โดยมีความไวร้อยละร้อยละ 94.2 ความจำเพาะ 93.8

สรุป: การทดสอบความจำทั้งสามแบบเป็นการทดสอบข้างเตียงที่มีความไวพอสำหรับการคัดกรองภาวะสมองเสื่อม การศึกษานี้ได้แนะนำจุดตัดที่เหมาะสม และแสดงค่าความแม่นยำในการวินิจฉัยของแต่ละแบบทดสอบ