

# Validation of Malay Mini Mental State Examination

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**Abstract:** Cognitive impairment cases referred to psychiatric clinic are very few especially those who have mild disease. Formal evaluation of cognitive impairment is time consuming and it involves consultation with an expert in psychological training.

One clinically useful test for practitioners is the Mini Mental State Examination (MMSE). Although MMSE has shown good reliability and validity, using this instrument in a language and culture other than English may create problems. However the test has never been validated in Bahasa Malaysia even though it is a widely used screening test during patient's clinical examination. This study was done to translate and validate MMSE into Bahasa Malaysia.

**Key words:** Validation, Malay, dementia, MMSE

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## Introduction

Dementia is a syndrome with a large number of underlying causes. It is a common syndrome, experienced by the aged, but is not a part of the normal ageing process. The syndrome is a progressive though occasionally reversible disorder and is characterized by not only multiple cognitive deficits, including memory impairment, but also other problems, such as difficulties in executive functioning, aphasia, apraxia and agnosia. It is also characterized by one or more of the following clinical manifestations, a decrease in level of cognition especially memory, behavioural disturbance and interference with daily function and independence.

MMSE is the most widely used cognitive test for dementia in United State clinical Practice. The examination takes approximately seven minutes to complete (1). It tests a broad range of cognitive functions, including orientation, recall, attention, calculation, language manipulation and constructional apraxia. It is also practical to track the changes in a patient's cognitive state (2).

Mini Mental State Examination has been shown to have good reliability and validity in a sample of patients in the United States, but using this instrument in a language and culture other than that in which they were developed can create problems. The validity may be doubtful in a different cultural setting, especially where literacy is low (3). It also fails to identify executive dysfunction if it is quite severe (4). People with executive cognitive dysfunction can have a normal mini mental state examination score but still have severe functional limitations.

In Malaysia, the examiner is still using the English version of mini mental state examination as their bedside screening test. However there are a few questions that are not suitable for the country and have some language barriers, for example the questions about season. It only reflects to the country that have specific season changes but not in Malaysia. Another example is in language manipulation. Patient has to repeat a sentence which has no meaning if it is directly translates to local language.

The English version of MMSE was found not suitable for local environment due to language barriers and cultural differences. In most cases, the interviewer will either directly translate the questionnaire or skip the question. Skipping the question will reduce the total score lower than the normal score and hence may

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impact the outcome. To overcome this, the Malay version of MMSE needs to be validated before it can be used locally as a proper measure. These are the main reasons why this study was conducted.

## Material and Methods

The Mini Mental State Examination was translated into Malay language using forward and backward translation method. Two teachers who are bilingual (English and Malay) translated the MMSE from English into Malay. Once completed, two medical doctors who are also bilingual translated the Malay version back into English. Later, the original version and the backward translated version were compared to determine the accuracy of the translation. This was done with an expert advice from the Center for Languages and Translation, Universiti Sains Malaysia. The meaning and the contents were remained unchanged throughout the translation process.

Although most of the questions are easily translated from English to Malay, there are few questions that require special care. Firstly, the question that inquires about seasons, which is found not suitable to be used since Malaysia only has hot and wet weather all year long. Secondly, the repetition of sentences that has no meaning if directly translated and requires special attention. Professor Michael Woodward from Queensland Hospital was consulted in finding the suitable replacement for the questions. Besides that, the MMSE version that was already translated to Thai was also referred (5). This is to ensure that the questions are suitable, adequate and appropriate to be used in local environment.

### Validity

The clinical diagnosis was the gold standard in diagnosing dementia. The MMSE Individual item validity was tested against the gold standard clinical diagnosis using Chi square test. To test the hypothesis that the total score of the scales as valid indices of dementia, Kruskal-Wallis test was used.

### Face validity

Expert opinion was consulted to provide their assessment of the entire test as a whole instead of each individual item to reduce reviewer burden. High face validity is expected to gain better cooperation from responders.

### Content validity

An expert review provides a very critical review not

only to the individual test item but also to the test as a whole

### *The study area and population*

Participants were selected from an old folks home (4 government supported, 4 private) located in Kelantan, Kuala Lumpur, Perak and Penang. Sample size based on statistical calculation was 150 subjects aged 60 years and above.

### *The screening instrument*

This study utilized Malay version of Mini Mental State Examination (MMSE) and Clock Drawing test.

### *Data entry and analysis*

Results validity was tested by first examining item level descriptive statistics. Reliability of the identified items components was evaluated using Cronbach's coefficient alpha.

## Results

A total number of 185 patients were selected for the study from eight old folks home across Malaysia. Table 1 shows the socio-demographic characteristics of the respondents. 51.9% are male with mean age of 72.11 years. Another 48.1% are female respondents with mean age of 69.42 years. More than half of the respondents are Malays (58.9%). Majorities are of non-skilled workers with low educational level.

Mean total score for Mini Mental State Examination is  $17.78 \pm 4.51$  (ranges from 7 to 27) while the mean total score for Clock Drawing Test is  $1.23 \pm 1.258$  (0 - 4). (Table 2)

Question 5b and 5c are poorly correlated with corrected item total score (Table 3). Both are the questions on language where Question 5b is an instruction to repeat the sentence "dahulu, kini dan selamanya" and Question 5d is reading instruction and doing it. In general, all other questions in MMSE have a satisfactory correlation with corrected item total score. The Cronbach's alpha coefficient is 0.76.

Various cut-off score for MMSE are selected in order to identify the most suitable cut-off score to be applied. These numbers are then compared to the numbers of diagnosed using The Chi-Square Goodness of Fit Test. In Goodness of Fit Test, using cut-off score 15, 20 and 23 for MMSE are rejected ( $p = 0.00$ ) (Table 4). The most suitable cut-off score to be applied in this study will be 17 for MMSE and 1 for CDT.

Across all subjects, sensitivity and specificity of all instruments were adequate. In this study, we found that the sensitivity was 97.5 % for MMSE and specificity was 60.6 % whereas, sensitivity for CDT was 80.2 % and specificity was 89.4 %. It was within the acceptable value. In one previous study by Borson *et al.*, the sensitivity and specificity of MMSE was 92% (Table 5).

## Discussion

The study was done at some old folks home, a few in the west coast and one in east coast. Almost all were government sponsored old folks home. The sample size and the subjects participating in the study were adequate and acceptable when compared with previous studies. In this study, it needs quite a large number of populations with limited time to be completed. Even though it could give some biases towards the results but it still has a lot of implications in the study and most probably for better study in the future. One hundred and eighty five responders were taken, which was more than expected samples required based on calculation using Epi Info software program by unmatched case control.

This is the first study that translates the English version of MMSE into Malay language. The process of translation was almost straightforward. The most difficult question was repetition of “no, ifs ands or buts”, season and attention and calculation. In one of the Thai study (5), for repetition questions, they used a native Thai sentence than had similar tone and meaning. In this study, after consultation with an expert, Professor Michael Woodward, he suggested the use of sentences that have meaning but seldom being used without thinking of the sound of the sentence. Therefore we made a conclusion to change it to ‘dahulu, kini dan selamanya’ (before, now and always). This sentence was quite acceptable in comparison with the original MMSE. In MMSE translated in Thai language, the repetition was changed to ‘krai kai kai khai’ which mean ‘who sells egg’. In general, all questions in MMSE have a satisfactory correlation with corrected item total score except question about repetition and following a written command.

Other question that created problem with translation was a question of season. In Thailand study, they still asked about the season. After discussion with the professor again, he suggested to

use time such as morning, afternoon, night or real time. So time was more suitable to use in Malaysia.

In our study, the cut off score of 17 was chosen because there was significance between MMSE and CDT. In the study done by Folstein *et al* (6) the cut of point of the score was 23 with the sensitivity of 100% and specificity 44%. The Thailand National Survey concluded that the cut of point of the MMSE depended on education level (5). For those who were illiterate, the cut off score was 14 with sensitivity and specificity of 35.4% and 76.8% respectively. Those who completed primary education, the cut off point was 17. The sensitivity was 56.6% and the specificity was 93.8%. The cut off score was 22 for subjects with secondary education. The sensitivity and specificity was 92% and 92.2% respectively.

The conventional approach to improve the performance of MMSE in subjects with low educational background was to lower the cut off score for classification of cognitive impairment. For clinical screening purposes, high sensitivity is preferred to high specificity to maximize detection. In a study by Borson *et al.* (7), their responders were mostly less educated and they readjusted the cut off scores by using exploratory analyses. Their cut off scores was 20 for MMSE.

In conclusion, the validated Malay Mental State Examination is a useful screening test in clinical examination. It should be used as a cognitive test for dementia among our patients.

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## References

1. Royall DR, Cordes JA, Polk M. CLOX: An Executive Clock Task. *Journal of Neurology and Neurosurgery Psychiatry* 1998; 64:588-594.
2. Harold IK, Benjamin JS. *Synopsis of Psychiatry*. 8<sup>th</sup> Edition. New York: Lippincott Williams & Wilkins. 1998:328-345.
3. Kua EH, Ko SM. A Questionnaire to Screen for

- Cognitive Impairment among Elderly People in Developing Countries. *Acta Psychiatrica Scandinavica* 1992; 85(2): 119-122.
4. Angela J, Shirley T, Victoria B. The Value of Clock Drawing in Identifying Executive Cognitive Dysfunction in People with Normal Mini Mental State Examination Score. *Journal of Canadian Medical Association* 2002;167(8): 859-867.
5. Jitapunkul S, Kunanusont C, Phoolcaroent W. Prevalence Estimation of Dementia Among Thai Elderly: A National Survey. *Journal of the Medical Association of Thailand* 2001;84(4): 461-467.
6. Folstein M, Folstein S, McHugh P. A Practical Method for Grading The Cognitive State of Patients for The Clinicians. *J Psychiatr Res* 1975;12: 189-198.
7. Borson S, Scanland JM, Chen P *et al.* The Mini-Cog as a Screen for Dementia: Validation in a Population-Based Sample. *Journal of American Geriatrics Society* 2003; 51(10):1451-1454.