The Validation of the Korean-Version of the Memory Impairment Scale

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Key words: memory impairment scale, validity, ROC curve

A variety of brief screening tests for dementia are being developed as timely and accurate diagnosis of dementia is becoming increasingly important. The memory impairment screen (MIS; Buschke et al., 1999) is a 4-minute card-based screening test used to differentiate between patients with normal forgetfulness and those with memory defects typical of early Alzheimer’s disease and other memory disorders. We developed the Korean version of MIS (K-MIS) which is a translated and adapted version of MIS and then carried out a validation study within a dementia clinic using the K-MIS. Our study aimed to assess its usefulness as a screening tool for memory problems related to dementia, especially Alzheimer’s Disease (AD).

METHOD

Participants. All of the subjects were community-dwelling elderly Koreans aged 65 and older. There were 126 subjects, 91 normal and 35 dementia patients. A psychiatrist with expertise in dementia research made the diagnosis of dementia by doing clinical interviews and reviewing neuropsychological testing data of the subjects. The diagnosis of dementia was also made according to the Diagnostic and Statistical Manual of Mental Disorders, forth edition (DSM-IV, 1994)). Severity of dementia was rated using the extended version of Korean Clinical Dementia Rating (CDR) scale. All of the normal elderly were CDR 0, while all of dementia patients were rated at CDR 1 or 2 with the exception of one (CDR=3).

Procedures and Statistical Methods. A translated geriatric depression inventory (GDS-K) was administered to rule out pseudodementia due to depression. To determine the construct validity of the K-MIS, the participants received not only the K-MIS but also the standardized Korean-version of Neuropsychological Assessment Battery CERAD (CERAD-K-N). To compare performances on the K-MIS between two groups, Multivariate Analysis of Covariance (MANCOVA) using age and education as the covariates was calculated. To measure the diagnostic accuracy of the K-MIS for dementia, the receiver operator characteristic (ROC) analysis was used. Since the K-MIS scores were influenced by age and education (r=.334, p<.001 and r=.288, p<.001, respectively), not sex according to correlation analysis, statistical analyses were conducted while controlling possible effects of age and education on the K-MIS performances.

RESULTS

Two groups did not show significant differences in demographic variables and GDS-K. The K-MIS scores were significantly correlated with memory measures of the CERAD-K-N (r adjusted by age and education=.282~.535, p<.001). On top of that, the scores of the K-MIS showed significant correlations, but low correlations, with other objective cognitive measures of CERAD-K-N. According to MANCOVA results, the performances on the K-MIS were significantly differentiated between two groups (Walks Lamda=.584, F=17.358, p<.001). As shown in table 1, the optimal cut off score for dementia on the K-MIS was 11/12. The area under the ROC curve (AUC) of the K-MIS was .877, indicating the overall diagnostic accuracy of the K-MIS is fairly high.

Table 1. Roc analyses of the K-MIS

<table>
<thead>
<tr>
<th>Cut off</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>AUC</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/11</td>
<td>.771</td>
<td>.143</td>
<td></td>
</tr>
<tr>
<td>11/12</td>
<td>.800</td>
<td>.791</td>
<td>.877</td>
</tr>
<tr>
<td>12/13</td>
<td>.886</td>
<td>.352</td>
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DISCUSSION

Our results indicate that the K-MIS is a very brief and valid memory screening instrument for evaluating memory deficits of dementia patients while showing high sensitivity and specificity. In this study, the original subjects were divided into three groups, the previously mentioned 91 normal, 35 dementia patients, and a third mild cognitive impairment (MCI) group. We did not report the result of the third group in this paper, since the K-MIS diagnostic accuracy for MCI was relatively low compared to dementia in the ROC analysis. However, we found that the performance scores of the K-MIS among dementia, MCI, and normal groups were significantly different through MANCOVA analysis. Therefore, further research is needed to assess clinical availability of the K-MIS for the MCI group. Lastly, we also found that the K-MIS scores were influenced by age and education, not sex as other neuropsychological tests often were. Hence, it is necessary to consider effects of age and education on the K-MIS performances when we interpret the test results.

REFERENCES
