Comparison of the Montreal Cognitive Assessment and the Mini-Mental State Examination in detecting multi-domain mild cognitive impairment in a Chinese sub-sample drawn from a population-based study

YanHong Dong*,1,2,3 Wah Yean Lee*,1,2 Saima Hilal,1,2 Monica Saini,2 Tien Yin Wong,4,5 Christopher Li-Hsian Chen,1,2 Narayanaswamy Venketasubramanian2,6,7 and Mohammad Kamran Ikram2,4,5

1Department of Pharmacology, National University of Singapore, Singapore
2Memory Aging and Cognition Centre, National University Health System, Singapore
3School of Psychiatry, University of New South Wales, Australia
4Department of Ophthalmology, Yong Loo Lin School of Medicine, National University of Singapore, Singapore
5Singapore Eye Research Institute, Singapore National Eye Centre, Singapore
6Department of Medicine, National University Health System, Singapore
7Neuroscience Clinic, Raffles Hospital, Singapore

ABSTRACT

Background: We examined the discriminant validity of the Montreal Cognitive Assessment (MoCA) and the Mini-Mental State Examination (MMSE) in detecting multiple-domain mild cognitive impairment (md-MCI) in a Chinese sub-sample drawn from an elderly population-based study.

Methods: This study included Chinese participants from the Epidemiology of Dementia in Singapore (EDIS) study aged ≥ 60 years who underwent cognitive screening with the Abbreviated Mental Test and Progressive Forgetfulness Questionnaire. Screen-positive participants subsequently underwent MoCA, MMSE, and a comprehensive formal neuropsychological battery. MCI was defined by Petersen’s criteria and further classified into single-domain MCI (sd-MCI) and md-MCI. Area under the receiver operating characteristic curve (AUC) with 95% confidence intervals (CIs) was computed for the MoCA and the MMSE in detecting md-MCI.

Results: A total of 300 participants were recruited: 128 (42.7%) were diagnosed with no cognitive impairment (NCI), 47 (15.7%) with sd-MCI, and 83 (28.0%) with md-MCI. Forty-one participants were excluded, 7 (2.3%) had dementia, and 34 (11.3%) had only objective cognitive impairment without subjective complaints. Although the MoCA had a significantly larger AUC than the MMSE (0.94 (95% CI = 0.91–0.97) vs. 0.91 (95% CI = 0.86–0.95), p = 0.04), at optimal cut-off points, the MoCA (19/20) was equivalent to the MMSE (25/26) in detecting md-MCI (sensitivity: 0.80 vs. 0.87, specificity: 0.92 vs. 0.80).

Conclusion: Both screening tests had good discriminant validity and can be used in detecting md-MCI in a sub-sample of Chinese drawn from a population-based study.

Key words: mild cognitive impairment, screening, community

Introduction

Mild cognitive impairment (MCI) is considered a pre-clinical stage in which an individual is at an increased risk of developing dementia (Petersen et al., 1999). MCI is further classified into subtypes based on whether the impairment includes amnestic/non-amnestic and single/multiple domains (Petersen, 2004). Among these subtypes, the prevalence of multiple-domain mild cognitive impairment (md-MCI), which includes both amnestic and non-amnestic md-MCI, is high with a range of 9%–21% (Lopez et al., 2003; Manly et al., 2005; Das et al., 2007; Brodaty et al., 2013). Moreover, md-MCI has a higher conversion rate (8%–12%) to dementia, in comparison to single-domain MCI (sd-MCI), for which a range of 2.1%