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Brief Cognitive Screening Instruments and the Clinical Utility of Three Screens in a New Zealand Clinical Geriatric Setting

A thesis presented in partial fulfilment of the requirements for the degree of
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New Zealand.

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Abstract

Cognitive impairment (CI) is a serious concern for an aging global population, and its impact is not only felt within the family unit but also society at large. The current thesis involved two studies – an online survey about the use and role of screening instruments in New Zealand, and an evaluation of the clinical utility of three screens used in a clinical geriatric setting.

The survey found that the Mini Mental Status Examination (MMSE) was the most frequently used screen, followed by the Clock Drawing Test (CDT), Addenbrooke’s Cognitive Examination-Revised (ACE-R), Verbal Fluency (FAS), Three Word Recall (3WR), and Trail-making Test (TMT). The opinions of the survey respondents confirmed international publications suggesting that the MMSE does not fulfil the requirements of current assessment and/or screening practices. The survey further suggested that the ACE-R showed promise as an appropriate alternative to the MMSE due to its continuity from the MMSE, and because it appears to meet clinician requirements for brief screening instruments.

The second study evaluated the clinical utility of the ACE-R, MMSE and the Modified Mini Mental State (3MS) within a larger assessment approach. It found that all three screens successfully differentiated between milder forms of CI and dementia; however, predictive ability for milder CI could not be determined. The ACE-R outperformed both the 3MS and MMSE in terms of predictive ability for dementia, with the 3MS showing marginally higher predictive ability than the MMSE. The study suggested that the 3MS’s incremental validity did not justify its inclusion in a routine assessment process.

Optimal sensitivity and specificity ratios – providing the best balance between sensitivity and specificity – were obtained with different cut-off scores than those recommended by the screens’ original publications. This may have been due to the screens’ authors seeking ratios that favoured sensitivity at the cost of specificity. However, in the data set from a clinical geriatric setting, used for this current study, the focus was on limiting both false-negatives and false-positives. While the MMSE
showed adequate sensitivity and specificity, its known cultural and socio-economic bias makes it inappropriate for widespread use.

The predictive ability (and incremental validity) of the ACE-R, coupled with the fact that it is cost-effective, relatively brief and covers all the recommended cognitive domains suggest that it is a suitable substitute for the MMSE in clinical geriatric service settings. Further research is however required to assess any potential biases inherent in the ACE-R. It is recommended that all initial assessments with CI patients include a mood screen due to their high comorbidity and the increased scope of treatment options available when a mood component underlies cognitive complaints.
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I dedicate this to my parents, Dawie and Annette Strauss.
The Massey University Human Ethics Committee (MUHEC) granted approval to conduct the survey nationwide, and the Health and Disability Ethics Committees (HDEC), and Central Regional Ethics Committee granted ethical approval for the second (ACE-R) study.
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