



An Australian Government Initiative

Dementia Screening for Urban Aboriginal Australians: The modified Kimberly Indigenous Cognitive Assessment (mKICA)

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Pilot Study Report

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Translating dementia research into practice

FINAL PROJECT REPORT

Modified Kimberly Indigenous Cognitive Assessment (mKICA) Pilot

Objectives:

- The primary objective is to pilot a modified version of the KICA and test its suitability for use in urban dwelling Aboriginal communities.
- A second objective is to implement that tool in our NHMRC project.
- A third objective is to make the piloted tool publicly available for use by other clinicians and researchers.

Overview:

This project aims to trial a modified (KICA) cognitive assessment tool in an urban Aboriginal community. The reason for this is that a literature search and review indicates a lack of suitable tools for working with urban dwelling populations. This pilot will have two stages: (a) redesign of a KICA for an urban sample and; (b) assessment of 25 adults at La Perouse & Kempsey with data analysis and reporting.

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Centre: Primary Dementia Collaborative Research Centre

Node: Special Groups of People with Dementia

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Acknowledgement of Country

In the spirit of respect, we acknowledge the traditional owners of Country, this gesture acknowledging Aboriginal and Torres Strait Islander custodianship for millennia. As our mark of respect, we acknowledge the Elders and the peoples who are talked about in this publication. We acknowledge the Land on which this work was done. Australia is the only place in the world where Aboriginal and Torres Strait Islander Australians belong, and there is no place in Australia where this is not true.

Acknowledgements

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Disclaimer

The views expressed in this work are the views of its authors and not necessarily those of the Australian Government.

Full Report

Dementia screening for urban Aboriginal Australians: a pilot study

Dementia is a growing concern for Aboriginal Australians (1-2), but remains poorly understood in urban and regional (i.e., non-remote) Aboriginal peoples, who comprise the vast majority of Australia's Indigenous population (3). There is a need for better understanding of dementia and appropriate services in these communities, but one of the major obstacles for research and clinical practice is that there are no validated cognitive screening tools for use in urban/regional populations. How to effectively and appropriately assess dementia and cognitive impairment is a key issue in working with (older) Aboriginal people.

Pollitt (1997) (4) has described the complex issues surrounding the assessment of dementia in Australia's diverse Indigenous communities due not only to the small percentage who reach old age but also cultural and conceptual issues surrounding 'dementia' as a distinct condition and diagnosis in those communities. We reviewed the literature on the design and modification of cognitive assessment tools for use with specific cultural and language populations, including those with reduced literacy and/or poor formal education (5-9). We rejected as unsuitable for our urban English speaking Aboriginal population (i) instruments developed by the 10/66 group aimed at dementia diagnosis and prevalence measurement across developing, non-English speaking countries where literacy is very limited (8) and (ii) the Kimberley Indigenous Cognitive Assessment (KICA) which was developed for remote non-literate Indigenous people with English as a second language (5).

Nevertheless, the KICA is the only dementia screening tool validated with Indigenous Australians (10), and it has been invaluable in investigating dementia and cognitive impairment in remote Aboriginal communities (2). We decided to trial an urban modification of the KICA, described below. The Rowland Universal Dementia Rating Scale (RUDAS) (6) is another well-validated cognitive screening tool developed in Australia, which was designed to be culturally fair and does not appear to disadvantage those from culturally and linguistically diverse backgrounds (i.e., non-western and/or non-English speaking). In contrast, scores on the Mini-Mental Status Examination (MMSE) have been found to be influenced by ethnicity and education (11-12). Despite its limitations, the MMSE (13) is probably the most common cognitive screening tool used in clinical practice and dementia research, and thus it was included for comparison in the current study.

This pilot study investigated the use of three dementia screening tools, namely a modified version of the KICA (mKICA), RUDAS and MMSE. We aimed to determine their cultural acceptability and preliminary validity as screening tools for cognitive impairment and dementia in a group of Aboriginal people from urban and regional communities in NSW.

Methods

This research was approved by the Aboriginal Health and Medical Research Council and University of New South Wales human research ethics committees. Formal community consent for the study was provided by local Aboriginal community partner organizations.

Participants

Participants were contacted through Aboriginal research assistants who were also local community members. Eight Aboriginal men and 22 Aboriginal women from communities in Sydney (La Perouse) and the mid-north coast of NSW (Kempsey) volunteered for this study. On average, participants were aged 58 years and had 10 years of formal education. Notably, all participants spoke English as their preferred language and had a minimum of primary schooling. All participants gave informed consent.

Measures

Modified Kimberley Indigenous Cognitive Assessment (mKICA). In consultation with the KICA developers (5), several items in the cognitive section (KICA-Cog) were altered to improve face validity for non-remote populations (see Table 1). This urban modification, the mKICA, is scored out of 39 and has 17 items covering orientation, object recognition and naming, memory, fluency, language, praxis and copying/drawing. For the KICA-Cog, the dementia screening cut-off is a score <34 (14).

Table 1 Summary of Kimberley Indigenous Cognitive Assessment (KICA) modifications

Item(s)	New item (mKICA)	Original item (KICA-Cog)
1	<i>What month is it?</i>	<i>Is this week pension week?</i>
2	<i>What season is it?</i>	<i>What time of year is it now?</i>
4 – 6	<i>cup</i>	<i>Pannikin</i>
8	<i>First point to the ceiling and then point to the floor</i>	<i>...sky...ground</i>
9	Prompts not given during verbal fluency task	<i>Can prompt with: Any more? What about in the air? In the water?</i>

Rowland Universal Dementia Assessment Scale (RUDAS). The RUDAS is a six item screening test scored out of a total of 30 points and assessing language, praxis, memory, judgment, construction and fluency. Performance has been shown to be affected by age, but not by education, gender or preferred language. The RUDAS dementia screening cut-off is a score <23 (6).

Mini- Mental State Examination (MMSE). The MMSE is also scored out of 30, with 11 items assessing orientation, attention, memory, language, and visuospatial skills. The MMSE dementia screening cut-off is a score <24 (13).

Procedure

All three cognitive tests were administered in a consistent order (MMSE, RUDAS, mKICA) as part of an extensive survey of personal history, health, and well-being across the lifespan. Tests were administered by interviewers trained in both cultural issues and cognitive screening. In many cases, a local Aboriginal research assistant accompanied a non-Indigenous interviewer. For one participant, the interview was terminated before completion of the mKICA (due to fatigue), and education was not recorded for five participants (who were not asked this question). No one refused cognitive testing.

Secondly, 19 participants also completed a 'gold standard' diagnostic medical assessment with a geriatrician who was blind to the initial screening results. The average time lag between initial screening and medical assessment was 4.87 months (range: 3.27 – 7.23). The medical assessment included clinical history, physical examination, cognitive testing, and involved speaking to a close relative or friend (i.e., a 'contact person'). Based on this assessment, a consensus panel of two geriatricians and a clinical neuropsychologist determined a diagnosis of dementia (DSM-III-R criteria (15)), 'cognitive finding no dementia' (CFND) or 'normal', for each participant. CFND included participants meeting formal criteria for mild cognitive impairment (MCI) (16) and those for whom there was an abnormal cognitive finding (determined by clinical consensus) but no cognitive or functional decline was reported. 'Normal' was defined as no diagnosis of CFND or Dementia.

Analyses

Where cognitive test items were not administered due to sensory or motor impairment, prorated total scores were used. All data were analysed using SPSS (version 17.0) with alpha levels set at 0.05; 2-tail significance tests were used, unless otherwise specified. Firstly, Spearman correlations were used to explore associations between cognitive measures and with demographics. Secondly, participants were divided into groups based on diagnostic category. Independent samples t-tests (for non-equal variances, where appropriate) were used to compare cognitive screening test scores (1-tail significance test), as well as age and education, between diagnostic groups. Two sets of analyses were run: (i) CFND or Dementia ($n = 9$) vs. Normal ($n = 10$), and (ii) CFND ($n = 7$) vs. Normal ($n = 10$). The Dementia group was not analysed separately given the very small sample and large variation within this group. Finally, we considered the false positive/false negative rate for each test, based on available dementia screening cut-off scores.

Results

Correlation analysis revealed that higher scores on the RUDAS were moderately correlated with higher scores on both the mKICA ($r_s(29)=.55, p<.01$) and MMSE ($r_s(30)=.56, n=30, p<.01$), but

mKICA and MMSE scores were not significantly correlated ($r_s(29)=-.21, p=.26$). Younger age was associated with more years of formal education ($r_s(25)=-.68, p<.01$) as well as with higher scores on the RUDAS ($r_s(30)=-.48, p<.01$). Age and education were not significantly correlated with scores on either the mKICA or MMSE in this sample.

Of 19 participants who underwent medical assessment, 2 were diagnosed with dementia, 7 with CFND (including 4 who met criteria for MCI) and 10 were 'normal'. Dementia cases included one of mild severity (vascular dementia) and the other, moderate (mixed dementia: Alzheimer's dementia, traumatic encephalopathy, dementia with Lewy bodies). Results for the total sample and diagnostic groups are presented in Table 2.

Table 2 Demographics and cognitive screening results by diagnostic category

	All (n = 30)	Normal (n = 10)	CFND (n = 7)	Dementia (n = 2)
Age (M ± SD, range)	58.4 ± 9.9, 41 – 79	56.4 ± 9.3, 41 – 66	65.1 ± 8.3, 55 – 79	59.0 ± 15.6, 43 – 76
Education (M ± SD)	10.1 ± 2.6 [†]	10.4 ± 2.7	8.1 ± 1.8	8.5 ± 2.1
Sex (Male/Female)	8 / 22	2 / 8	1 / 6	2 / 0
mKICA (M ± SD, range)	36.8 ± 3.6, 24 – 39 [‡]	38.2 ± 1.0, 36 – 39	36.4 ± 3.1, 30 – 39	28.9 ± 7.0, 24 – 33.9
RUDAS (M ± SD, range)	26.6 ± 4.2, 13 – 30	28.2 ± 1.4, 26 – 30	26.9 ± 2.5, 24 – 30	17.7 ± 3.8, 15 – 20
MMSE (M ± SD, range)	26.4 ± 4.6, 9 – 30	28.4 ± 1.5, 25 – 30	27.7 ± 2.3, 23 – 30	13.3 ± 6.0, 9 – 18

[†] n = 25; [‡] n = 29; CFND = Cognitive Finding No Dementia; mKICA = Modified Kimberley Indigenous Cognitive Assessment; RUDAS = Rowland Universal Dementia Assessment Scale; MMSE = Mini-mental State Examination

Firstly, in comparing those with cognitive impairment (i.e., CFND or Dementia) to those without, significantly lower scores were seen on the mKICA ($t_{8.6}=-2.1, p<.05$) and RUDAS ($t_{9.3}=-2.0, p<.05$), as well as marginally significant lower scores on the MMSE ($t_{8.7}=-1.6, p=.07$). We also explored demographic differences and found no significant difference in age ($t_{17}=1.7, p=.1$), but education was marginally higher for the 'normal' group ($t_{15}=-2.0, p=.06$).

Secondly, in comparing the CFND and normal groups, there were no significant differences on RUDAS ($t_{8.7}=-1.2, p>.1$) or MMSE ($t_{15}=-.7, p>.1$), but marginally significant results were found for mKICA ($t_{15}=-1.7, p=.05$). Marginally significant differences were also found in age ($t_{15}=2.0, p=.07$) and education ($t_{13}=-1.9, p=.08$), with the CFND group tending to be older and have less formal education than those classified as 'normal'.

Based on established cut-points for dementia screening (best available estimates; not in urban Indigenous populations), there were no false negative classifications. There was one false positive case each for the mKICA and MMSE (i.e., 1 participant was misclassified on both

screening tests), and no false positive cases identified for the RUDAS. Thus, in this small sample, sensitivity was 100% across all measures and specificity was 94% for mKICA and MMSE, and 100% for RUDAS. These results are encouraging but preliminary and clearly need to be treated with caution.

Discussion

There is preliminary evidence to support the validity of these screening tools in urban Indigenous populations, but the work is far from done in terms of recommending their widespread use. We are currently following this up in a large epidemiological study (NHMRC Project Grant #510347). In the current sample, all three screening tools successfully identified dementia cases and discriminated between normal functioning and cognitive impairment (including dementia) at the group level. Differences between CFND and normal groups were more subtle, with the mKICA showing evidence of greater sensitivity to mild cognitive decline in our sample. We found age and education were moderately correlated, older age was related to poorer RUDAS performance, and there was a trend for fewer years of education in those classified with cognitive impairment. It will be important to address the influence of age and education on test performance in our larger study.

Additionally, in terms of ‘face value’ cultural acceptability of cognitive measures, all participants completed testing and no significant issues were identified. A greater concern was the length of the overall survey in which these measures were couched. Feedback from participants was that this survey was too long, sometimes not structured in an appropriate way (i.e., not user friendly or pursued too many personally irrelevant questions) and some of the “off the shelf” (standardized) measures used did not ‘speak to’ or adequately capture participants’ experiences. As a result, participant fatigue and incomplete surveys (missing data) hindered data collection.

Based on these pilot results, a number of improvements were identified which have been implemented in our larger study. These include the need for comprehensive training in cognitive screening to ensure standardization and minimize missing values, revised order of presentation to account for overlap of test items and avoid repetition whilst not interfering with standardized procedures (particularly memory delay), overall survey length reduced and cognitive measures administered relatively early to minimize effects of fatigue.

In this pilot study, there were a small number of dementia cases. Both cases were male, in contrast to the majority female sample, but otherwise varied considerably in terms of age, education and cognitive performance. We have provided preliminary estimates of sensitivity and specificity but our sample size was not adequate to provide a thorough analysis of this. The

larger study is required to accurately and reliably determine the sensitivity, specificity and appropriate cut-off scores for each test. This research will be critical for making recommendations regarding the appropriate use of these tools in this population.

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