

The Clock Is Not Enough: The Clock Drawing Test versus the Kimberley Indigenous Cognitive Assessment for Detecting Dementia in Older Aboriginal and Torres Strait Islander Adults

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Keywords

Cognitive screening test · Aboriginal and torres strait islander · Indigenous populations · Cognitive assessment · Dementia · Culturally appropriate cognitive assessment

Abstract

Introduction: We aimed to explore the performance of the Kimberley Indigenous Cognitive Assessment – Cognitive component (KICA-Cog) and the Clock Drawing Test (CDT) in older Aboriginal and Torres Strait Islander adults with dementia and without dementia in the Let's CHAT Dementia study. **Methods:** In this cross-sectional diagnostic test accuracy study, participants completed Comprehensive Geriatric Assessments. Demographic, health, cognitive, and functional histories, and cognitive assessments (KICA-Cog and CDT) were recorded. The reference standard was consensus diagnosis by two

geriatricians blinded to KICA-Cog and CDT performance. Binary logistic regression and receiver operating characteristic curve analyses explored accuracy against a diagnosis of dementia. **Results:** Seventy-five adults with a median age of 74 years (interquartile range 65, 78) were assessed, of whom 39 (52.0%) were women. Forty-seven (62.7%) had normal cognition, 15 (20.0%) had cognitive impairment no dementia, and 13 (17.3%) had dementia. Sixty-one (81.3%) participants had completed primary school, and 13 (17.3%) had completed secondary school. People with dementia were older ($p = 0.046$), but no differences were found for gender, comorbidities, or education. KICA-Cog and CDT scores were inversely associated with dementia in unadjusted and fully adjusted models (adjusted odds ratio [OR] = 0.43, 95% CI [0.26–0.71] and OR = 0.18 [0.07–0.51], respectively). The KICA-Cog was superior to the CDT for classifying dementia in participants, with area under the curve (95% CI) = 0.98

(0.95–1.00); versus 0.79 (0.64–0.93), respectively, $p < 0.001$. The optimal KICA-Cog cutpoint for classifying dementia was ≤ 34 , with 92.3% sensitivity and 90.3% specificity. **Conclusions:** KICA-Cog is superior to CDT at classifying dementia when used with older Aboriginal and Torres Strait Islander adults and should, therefore, be prioritised over the CDT for cognitive screening in older Aboriginal and Torres Strait Islander peoples.

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Plain Language Summary

Memory and thinking problems, such as dementia, can be found using different tests. Depending on culture, language, and education, different tests are better than others at finding memory and thinking problems. We compared two tests, the Kimberley Indigenous Cognitive Assessment – Cognitive component (KICA-Cog) and the Clock Drawing Test (CDT), in older Aboriginal and Torres Strait Islander people across Australia. Our results show that the KICA-Cog was better than the CDT at finding dementia.

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Introduction

The population of Aboriginal and Torres Strait Islander peoples aged over 45 years is approximately 170,000 and is expected to grow to over 500,000 by 2050 [1]. Owing to the enduring impacts of colonisation on social determinants of health [2], Aboriginal and Torres Strait Islander peoples experience dementia at younger ages and up to five times the rate observed in the non-Indigenous population [3–5]. The number of Aboriginal and Torres Strait Islander people living with dementia is projected to increase in coming decades [6]. Despite structural inequalities, many Aboriginal and Torres Strait Islander are ageing well, central to which are connections of the inner spirit to people, country, and culture [7–9].

There are few validated cognitive screening tools for use with Aboriginal and Torres Strait Islander peoples [10]. Using culturally appropriate cognitive screening tools enhances accurate detection of cognitive impairment in different cultural groups [11, 12]. Culturally safe and timely diagnosis and management of dementia may improve the experience of people living with dementia and their carers [13].

Two commonly used cognitive screening tools include the Kimberley Indigenous Cognitive Assessment – Cognitive component (KICA-Cog) [14] and the Clock Drawing Test (CDT) [15]. The KICA-Cog [16] was originally validated to screen for cognitive impairment in older Aboriginal peoples in the Kimberley, the remote northernmost region of Western Australia [14]. The KICA-Cog is the cognitive component of the KICA comprehensive package that collects clinical, cognitive, and functional information and a collateral history from someone who knows the person well (KICA-Carer) [17]. The KICA-Cog includes 16 questions examining orientation, memory, language, praxis, and executive function domains [14]. The KICA-Cog has been adapted and validated in three First Nations populations internationally [18–21], in other urban and remote Aboriginal and Torres Strait Islander populations in Australia [10, 22–25], and for telehealth [26]. One study found the urban/regional modification of the KICA-Cog had similar accuracy for dementia diagnosis to the Mini Mental State Examination (MMSE) [10].

The CDT, first described in 1915 [27], is a rapid tool assessing a range of cognitive domains and is one of the most used cognitive screening tools globally [27]. Despite its widespread use, there is no single standardised administration and scoring approach to the CDT with 46 published CDT scoring methodologies [28]. Three CDT scoring methodologies were examined in one study with Aboriginal Australians, all of which showed comparable adequate performance for the classification of dementia [29].

The Let's CHAT (Community Health Approaches To) Dementia study was a stepped-wedge randomised controlled trial which implemented and evaluated a culturally responsive best-practice model of dementia care for older Aboriginal and Torres Strait Islander adults across four Australian states [30, 31]. Within Let's CHAT Dementia, a nested cross-sectional diagnostic test accuracy study was undertaken where older (≥ 50 years) Aboriginal and Torres Strait Islander adults completed Comprehensive Geriatric Assessments (CGAs). The CGA included the KICA-Cog (urban/regional, remote and Torres Strait Island versions) and CDT screening tools. This study was undertaken to determine relative accuracy of short cognitive tools in this population.

Given the need for culturally safe cognitive screening tools in the growing and ageing population of Aboriginal and Torres Strait Islander peoples, we examined CGA data with the aim of determining the accuracy of the KICA-Cog and CDT in classifying dementia in this population. We hypothesised that the KICA-Cog would

show superior accuracy for classifying dementia in older Aboriginal and Torres Strait Islander peoples than the CDT in the Let's CHAT Dementia study.

Methods

Let's CHAT Dementia was conducted in partnership with 12 Aboriginal Community Controlled Health Services (ACCHSs) across four Australian states. For the nested diagnostic test accuracy study, participants completed CGAs [30]. The study applied reporting standards according to the STAndards for the Reporting of Diagnostic accuracy studies in dementia (STARDem), which ensures that reporting of diagnostic tools for dementia is interpretable, reproducible, and clinically useful [32].

Indigenous Reference Group

An Indigenous Reference Group (IRG) guided the study and ensured a culturally safe research process was followed. The IRG was formed at the outset of the Let's CHAT Dementia study, with members approached and recruited via social networks of the research team and co-researching ACCHS research partners. Candidates for membership were Aboriginal and/or Torres Strait Islander people with experience and/or interest in dementia, and advocating for Elders, with many members being Elders themselves. Representation from each state where the study was conducted was required. The IRG met on average every 3 months to discuss and advise on research design, processes, and outputs from our research group. In relation to the CDT and KICA-Cog data analysis presented here, the IRG reviewed the proposal and approved the research process as culturally safe, and the current chairs of the group (H.D. and R.M.) co-authored this article.

Ethics

See Statement of Ethics below. The study is registered with the Australian New Zealand Clinical Trials Registry on September 4, 2018 (ACTRN12618001485224) [30].

Participants

The Let's CHAT Dementia study included audit data of medical records of all attending clients of the ACCHSs aged ≥ 50 years. If there were ≥ 150 people eligible at a single ACCHS, every n th person was selected where n was the total group size divided by the desired sample (150). A total of 1,655 records were audited. A sample of 86 Aboriginal and Torres Strait Islander women and

men were recruited from 12 urban, regional, and remote ACCHSs across Queensland, New South Wales (NSW), Victoria, and Western Australia. Aboriginal and Torres Strait Islander participants were included if they were active clients of the ACCHS (three visits in last 2 years), aged ≥ 50 years at enrolment (in line with Australian Government age criteria to assess for aged care services) and provided informed consent for the CGA. Participants were excluded if they were severely unwell in last 12 months, had not resided in the catchment area for the last 12 months, resided in residential care at study onset, or were not active participants of the clinic [30].

Measures

Participants identified with possible dementia or cognitive impairment no dementia (CIND) by audit ($n = 36$) and age/gender-matched controls ($n = 50$) were invited to participate in the CGA. Demographic factors, medical history, medications, substance use, head trauma history, cognition (KICA-Cog [14] and CDT [15]), quality of life [8], chronic pain, continence, function, mental health, psychosocial history, nutrition, physical activity, frailty, sensory impairments, and physical assessments (including gait) were assessed [30].

The CDT was scored using the method by Tuokko et al. [15] which assesses the clock from 0 to 3. A score of 0 is "uninterpretable," 1 is "minimal resemblance to a clock," 2 is "clock recognisable but with errors," and 3 is "correctly drawn clock." Those who did not complete or attempt the KICA-Cog or CDT were excluded from the main analysis. The CGA was performed by technically and culturally trained research assistants, and data were entered and stored in REDCap. Carers or family were invited to complete a section of the CGA, including the KICA-Carer [17]. Clinical care recommendations were fed back to ACCHSs and all participants received a study report.

Cognitive Classification Procedure

Deidentified data collected from the CGAs and audits were reviewed by two specialist geriatricians (H.N. and D.L.) to determine consensus diagnoses based on DSM-IV criteria [33]. Participants were classified as having normal cognition ("intact"), dementia, or CIND by the geriatricians who were blinded to each other and KICA-Cog and CDT assessments but had access to medical history including prior diagnoses, carer reports and function. Ten questions on function, defined as independence or need for assistance with personal, community, and domestic activities of daily living (ADLs), were considered by the geriatricians performing

cognitive classification of participants. CIND encompasses those with neurocognitive disorders in which cognition is affected, but the criteria for dementia are not met, including those with MCI, acquired or traumatic brain injury, developmental disability, or psychiatric illness [34]. A third specialist geriatrician (J.Z.) re-scored all CDTs, with disagreements resolved by D.L. Refer to online supplementary file (for all online suppl. material, see <https://doi.org/10.1159/000548440>) for the CON-SORT flow diagram, diagnostic protocol, and checklist.

Statistical Analysis

In total, 86 participants completed CGAs. Ten participants had missing data for the CDT (which included two participants who had missing data for the KICA-Cog) and were excluded from the analysis (online suppl. File 1). Of these, five had dementia and two had CIND. One participant who completed the cognitive assessments was missing risk factor data and was excluded from analysis. This left 75 participants for the main analysis (online suppl. File 1).

A sensitivity analysis was performed in which participants who did not attempt the CDT were assigned a score of “0” and included if there was complete risk factor data ($n = 79$) (online suppl. File 2). The most common reason ($n = 4$, 40%) for non-completion of the CDT was the assessor determining it to be culturally inappropriate (online suppl. File 3).

Participant demographics and test performances were not normally distributed. We, therefore, explored differences between groups using Mann-Whitney U tests and Kruskal-Wallis tests (for continuous data) and Pearson’s chi-squared tests (for categorical data). Continuous data are presented as median (interquartile range [IQR]). Correlations between variables were examined using Spearman correlation coefficients. Interrater reliability for the CDT was assessed using percent agreement and Cohen’s kappa with quadratic weighting.

Multivariable binary logistic regression was performed with dementia (versus no dementia, which included “intact” and “CIND”) as the dependent variable. Two regression models were examined (Model 1, KICA-Cog as independent variable; Model 2, CDT as independent variable). First, unadjusted analyses were performed for the entire sample, and then stratified by median split of age. Second, minimally adjusted analyses including plausible univariate independent variables (age, gender, and Charlson Comorbidity Index [CCI]) were performed. Third, fully adjusted analyses including plausible univariate independent variables (age, gender, CCI, completed

primary school, and completed secondary school) were performed.

Finally, the diagnostic performance of the KICA-Cog and CDT were compared using receiver operating characteristic (ROC) curve analyses. We calculated Youden’s Index (sensitivity + specificity – 1) to estimate an optimal cutpoint for classifying dementia in participants. Analyses were performed using Stata/BE v18.0. We considered p values < 0.05 to be statistically significant.

Results

Seventy-five Aboriginal and Torres Strait Islander adults with median [interquartile range] age of 74 [65, 78] years, of whom 39 (52.0%) were women, were included in the main analysis (Table 1). Forty-seven (62.7%) participants had no cognitive impairment (intact), 15 (20.0%) had CIND and 13 (17.3%) had dementia. Compared to those with intact cognition, those with CIND or dementia were significantly older ($p = 0.046$), and had lower KICA-Cog ($p < 0.001$) and CDT ($p = 0.002$) scores. Sixty-one (81.3%) participants had completed primary school only, and 13 (17.3%) had completed secondary school. No differences were observed between persons with intact cognition, CIND or dementia regarding gender, location, education or comorbidities (CCI) ($p > 0.05$).

In an analysis including those who did not complete the CDT, no demographic differences were observed between those who completed ($n = 76$) and those who did not complete the CDT ($n = 10$); however, those not completing the CDT were more likely to have dementia ($p = 0.047$) (online suppl. File 3). The CDT assessment showed an interrater reliability by percent agreement of 0.99 (0.98, 1.00), $p < 0.001$; and by Cohen’s kappa with quadratic weighting, 0.93 (0.89, 0.97), $p < 0.001$ (online suppl. File 3).

A consensus diagnosis of cognitive impairment was strongly inversely correlated with KICA-Cog score, weakly inversely correlated with CDT score and weakly correlated with age (Table 2). KICA-Cog and CDT scores were weakly correlated. Level of education was not correlated with the KICA-Cog score, but primary school completion was weakly correlated with CDT score.

Multivariate binary logistic regression analyses examined the impact of age, gender, education, and comorbidities (CCI) on the association between the KICA-Cog or CDT and the presence of dementia (Table 3; Fig. 1). In Model 1 (KICA-Cog), unadjusted analysis showed an association of the KICA-Cog with dementia,

Table 1. Participant characteristics and cognitive screening scores

Characteristic	Total (n = 75)	Intact (n = 47)	CIND (n = 15)	Dementia (n = 13)	p value
Age, years, median [IQR]	74.0 [65.0, 78.0]	72.0 [64.0, 77.0]	74.0 [63.0, 80.0]	78.0 [74.0, 79.0]	0.046
Gender (female), n (%)	39 (52.0)	23 (49.0)	7 (46.7)	9 (69.2)	0.388
Location ^a , n (%)					0.624
Metropolitan	22 (29.3)	13 (27.7)	5 (33.3)	4 (30.8)	
Regional	20 (26.7)	14 (29.8)	3 (23.1)	3 (23.1)	
Rural	16 (21.3)	8 (17.0)	3 (23.1)	5 (38.5)	
Remote	17 (22.7)	12 (25.5)	4 (26.7)	1 (7.7)	
Completed primary school, n (%)	61 (81.3)	38 (80.9)	13 (86.7)	10 (76.9)	0.797
Completed secondary school, n (%)	13 (17.3)	7 (14.9)	3 (20.0)	3 (23.1)	0.752
Charlson comorbidities score, median [IQR]	5.0 [3.0, 8.0]	5.0 [2.0, 8.0]	6.0 [3.0, 10.0]	4.0 [3.0, 7.0]	0.742
KICA-Cog, median [IQR]	36 [35, 38]	38 [36, 38]	36 [34, 37]	27 [25, 31]	<0.001
CDT, median [IQR]	2 [2, 3]	3 [2, 3]	3 [2, 3]	1 [1, 2]	0.002

CIND, cognitive impairment no dementia; IQR, interquartile range; SD, standard deviation; KICA-Cog, Kimberley Indigenous Cognitive Assessment – Cognitive component; CDT, Clock Drawing Test. ^aLocation by Modified Monash Model (MM): metropolitan = MM1; regional = MM2; rural = MM3, MM4, and MM5; remote = MM6 and MM7. *p* value indicates significance of differences between groups of people with intact cognition, CIND, and dementia.

Table 2. Correlations between cognitive and demographic variables

	Consensus diagnosis (<i>r</i> , <i>p</i> value)	KICA (<i>r</i> , <i>p</i> value)	CDT (<i>r</i> , <i>p</i> value)
Age	0.271, 0.019	−0.154, 0.187	−0.085, 0.467
Gender (female)	0.109, 0.351	0.074, 0.528	−0.053, 0.648
Completed primary school	−0.018, 0.970	0.082, 0.486	0.274, 0.019
Completed secondary school	0.087, 0.454	0.099, 0.934	0.070, 0.553
CCI	−0.002, 0.986	0.072, 0.538	0.105, 0.368
Consensus diagnosis ^a		−0.671, <0.001	−0.282, 0.015
KICA-Cog			0.282, 0.015

KICA-Cog, Kimberley Indigenous Cognitive Assessment – Cognitive component; CDT, Clock Drawing Test. ^aConsensus diagnosis = ordinal categories: intact, CIND, or dementia. *r* = correlation coefficient.

odds ratio [OR] = 0.46, 95% CI (0.30–0.70). This association slightly improved in a model fully adjusted for age, gender, CCI, and education, OR (95% CI) = 0.43 (0.26–0.71). In Model 2 using the CDT, unadjusted analysis showed an association of the CDT with dementia, OR (95% CI) = 0.21 (0.08–0.53). The association was slightly improved after adjustment.

The accuracy of the KICA-Cog and CDT for classifying dementia was examined by ROC analysis (Fig. 2). The KICA-Cog showed high diagnostic accuracy for the

classification of participants with dementia, with area under the curve (AUC) (95% CI) = 0.98 (0.95–1.00). The CDT showed acceptable diagnostic accuracy for the classification of dementia, with AUC (95% CI) = 0.79 (0.64–0.93). The KICA-Cog was superior to the CDT for dementia classification, *p* < 0.001. In a full risk factor model including age, gender, CCI, and education level, the KICA-Cog model remained unchanged (AUC = 0.98) and the CDT improved (AUC = 0.87), but the difference remained significant (*p* = 0.036) (online suppl. File 4).

Table 3. Logistic regression for dementia vs. no dementia ($n = 75$)

Variable	OR (95% CI)	<i>p</i> value
<i>Model 1: KICA-Cog</i>		
Unadjusted	0.46 (0.30–0.70)	<0.001
Age by median split		
<74 years	0.58 (0.35–0.97)	0.039
≥74 years	0.38 (0.19–0.77)	0.007
Minimally adjusted ^a	0.44 (0.27–0.70)	0.001
Fully adjusted ^b	0.43 (0.26–0.71)	0.001
<i>Model 2: CDT</i>		
Unadjusted	0.21 (0.08–0.53)	0.001
Age by median split		
<74 years	0.46 (0.07–3.21)	0.432
≥74 years	0.18 (0.06–0.57)	0.003
Minimally adjusted ^a	0.19 (0.07–0.52)	0.001
Fully adjusted ^b	0.18 (0.07–0.51)	0.001

KICA-Cog, Kimberley Indigenous Cognitive Assessment – Cognitive component; CDT, Clock Drawing Test.
^aMinimally adjusted models include age, gender, and Charlson Comorbidity Index (CCI). ^bFully adjusted models include age, gender, CCI, completed primary school, and completed secondary school.

The sensitivity, specificity, and Youden’s Index for the KICA-Cog in classifying participants with dementia is presented in Table 4. The optimal KICA-Cog cutpoint for classifying dementia in this sample was KICA-Cog ≤34, with sensitivity of 92.3%, specificity of 90.3%, and Youden’s Index of 0.83.

Discussion

This study found that the KICA-Cog outperformed the CDT in classifying dementia in Aboriginal and Torres Strait Islander adults aged ≥50 years both before and after adjusting for demographic and education factors. As expected, both test scores were lower in participants with dementia compared to those with CIND or intact cognition. The KICA-Cog also had higher completion rates than the CDT, highlighting its greater accessibility and acceptability in this population [35].

Higher education levels are cognitively protective and linked to better cognitive test performance [36]. In our study, KICA-Cog performance was not associated with

education, while CDT performance was weakly correlated with primary school completion. This aligns with a meta-analysis of 100 studies showing CDT performance is strongly influenced by education, culture, and ethnicity [11]. In our ROC analysis, CDT showed acceptable discrimination for dementia (AUC = 0.79), similar to a study examining three CDT scoring methods in Aboriginal Australians (AUC range 0.74–0.76) [29]. Adding age and demographic factors to the KICA-Cog risk factor model did not improve its discriminating capacity for dementia (AUC = 0.98). These findings mirror other studies where KICA-Cog performance was generally unaffected by education level [10, 22].

A cognitive screening test should be quick, affordable, culturally appropriate, and have strong psychometric properties [37]. The outcomes of this study suggest the KICA-Cog meets these criteria [37]. Conversely, it is possible the CDT may not be appropriate for older Aboriginal and Torres Strait Islander peoples [15], considering lower completion rates. Of the 46 published CDT scoring methods, only two have proven effective in multicultural settings [11]. Despite the subjectivity of CDT scoring [38], excellent interrater reliability (Cohen’s kappa 0.98) was shown in this study, consistent with the literature [39].

The differences in diagnostic performance between the KICA-Cog and CDT may partly reflect the broader range of cognitive domains assessed by the KICA-Cog, including memory, language, visuospatial, attention, and executive function – spanning medial, temporal, and frontal lobes [25]. In contrast, the CDT focuses mainly on visuospatial and executive functions, which are more limited to the parietal and frontal lobes [27].

The KICA-Cog validation study with 363 unselected older Aboriginal adults in the Kimberley region of Western Australia and in the Northern Territory identified a cutpoint of ≤33 with sensitivity 93.3% and specificity 94.8% for classifying dementia [25]. In contrast, our study with a smaller sample size found an optimal cutpoint of ≤34 for classifying dementia, with equivalent AUC = 0.98 but slightly lower sensitivity and specificity (92.3% and 90.3%, respectively). Our study indicates similar diagnostic accuracy compared to recent studies: an adapted KICA-Cog in older Torres Strait Islander adults showed 81.0% sensitivity and 92.0% specificity for dementia with a cutpoint of ≤33 [22], while in NSW the mKICA showed 85.7% sensitivity and 89.9% specificity at ≤36 [10]. Our study included Aboriginal and Torres Strait Islander populations from four Australian states with similar representation across metropolitan to remote settings, whereas the referenced studies included populations from single

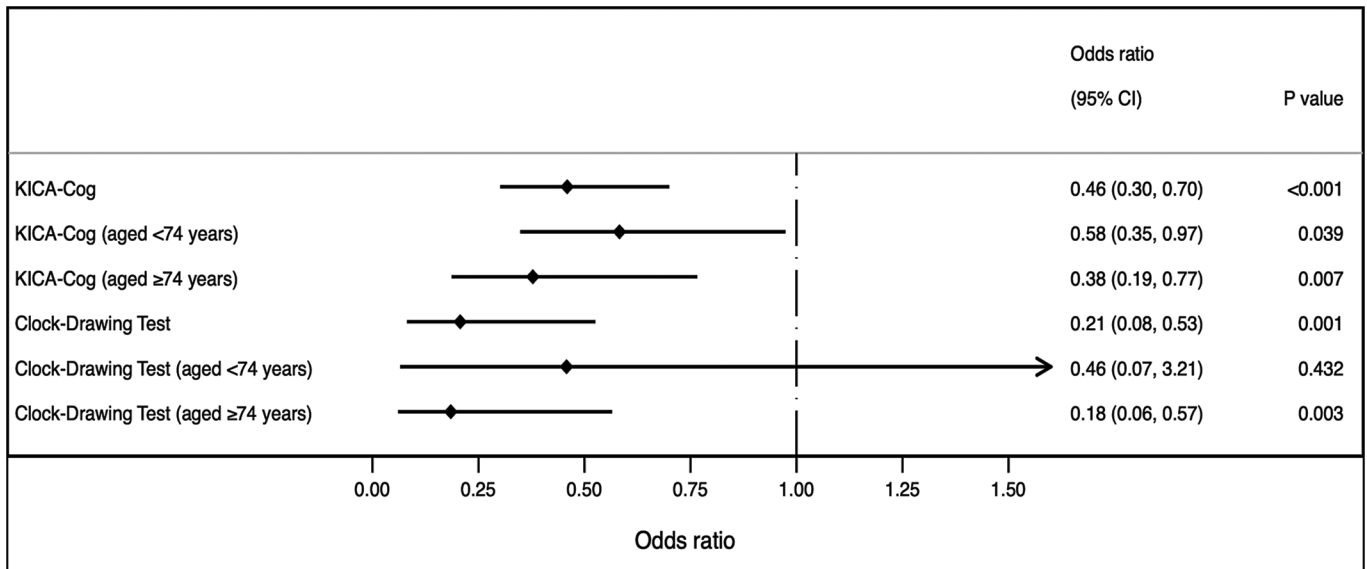


Fig. 1. Logistic regression forest plot for dementia versus no dementia ($n = 75$). Unadjusted logistic regression models depicted. KICA-Cog, Kimberley Indigenous Cognitive Assessment – Cognitive component.

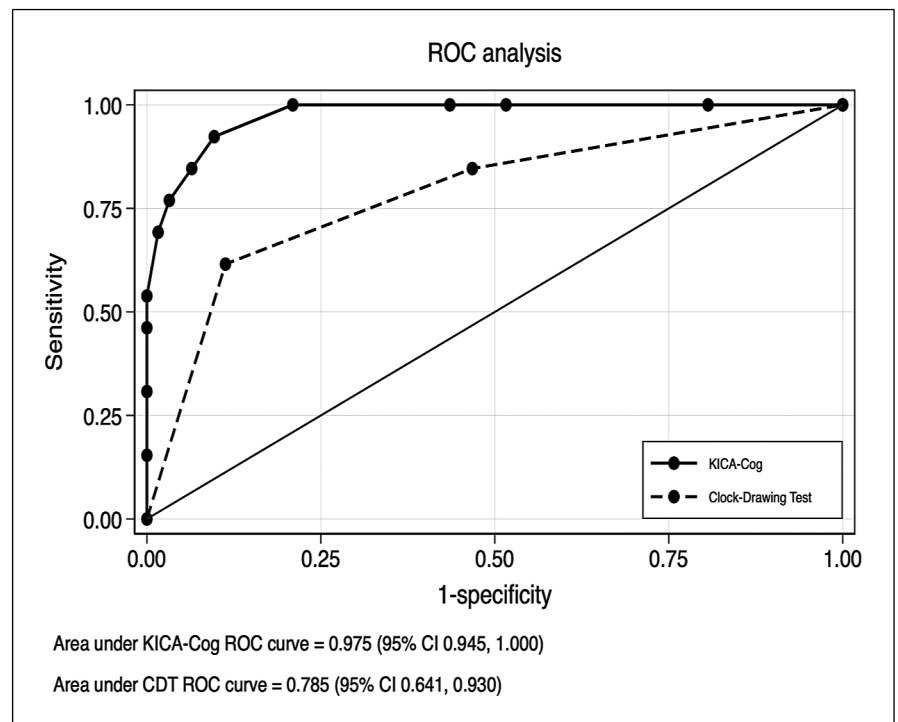


Fig. 2. Receiver operator characteristic curves of KICA and CDT for dementia ($N = 75$). KICA-Cog, Kimberley Indigenous Cognitive Assessment – Cognitive component. AUC, area under the curve. KICA-Cog AUC (95% CI) = 0.98 (0.95–1.00). CDT AUC (95% CI) = 0.79 (0.64–0.93). p value <0.001.

states and specific regions, which may account for these differences. Cutpoint variations highlight the importance of regionally specific, culturally appropriate cognitive screening tools [10, 22, 26].

Our study had several strengths, including cultural safety and engagement, Aboriginal and Torres Strait Islander governance, comprehensive assessments, and participation across four Australian states. Limitations

Table 4. Sensitivity, specificity, and Youden's Index for KICA-Cog for classifying dementia

KICA-Cog score	Sensitivity, %	Specificity, %	Youden's index	Correctly classified, %
≤31	76.8	96.8	0.73	93.3
≤32	–	–	–	–
≤33	84.6	93.6	0.78	92.0
≤34	92.3	90.3	0.83	90.7
≤35	100.0	79.0	0.79	82.7
≤36	100.0	56.5	0.57	64.0
≤37	100.0	48.4	0.48	57.3

N = 75. KICA-Cog, Kimberley Indigenous Cognitive Assessment – Cognitive component; KICA-Cog score of a maximum of 39.

included a relatively small sample size, affecting the precision of estimates. This study did not use a community-drawn sample but instead a sample with suspected cognitive impairment or dementia and age and sex-matched controls selected for the absence of documented cognitive impairment. This may have resulted in spectrum bias [32]. Additionally, our consensus diagnoses were not subtyped nor based on clinical diagnoses but relied on CGA and audit data with clinicians blinded to performance on cognitive testing. Only 19 (22.6%) participants had accompanying KICA-carer histories to corroborate cognitive and functional status, which may have impacted case classification. Functional dependence was considered in diagnosis, but tools like the Clinical Dementia Rating (CDR) were not used as the Clinical Dementia Rating is not yet validated in Aboriginal and Torres Strait Islander adults – a focus for future research. Additionally, due to limited access across study locations, biomarker and neuroimaging techniques were not included to support cognitive classification. Finally, alternative CDT scoring methods may have greater accuracy in detecting cognitive impairment in this population, warranting further research.

In conclusion, this study reinforces the importance of culturally appropriate cognitive assessments for Aboriginal and Torres Strait Islander peoples, demonstrating the KICA-Cog's superiority over the CDT for detecting dementia in this population. Future research should focus on validating the KICA-Cog in different settings and refining it for better detection of CIND, including MCI [40]. While the KICA-Cog is a useful screening tool for dementia, it is not diagnostic, and low scores should prompt further comprehensive evaluation.

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Prof. Dawn Bessarab was not available to confirm co-authorship, but the corresponding author, Dr. Jesse Zanker, affirms that Prof. Dawn Bessarab contributed to the manuscript and had the opportunity to review the final version to be published and guarantees Prof. Dawn Bessarab's co-authorship status and the accuracy of the author contribution and conflict of interest statements.

Statement of Ethics

The study was approved by the Aboriginal Health and Medical Research Council Ethics Committee (1,362/18 and 1,855/21), the University of Melbourne Human Research Ethics Committee (HREC) (181,943), the Western Australian Aboriginal Health Ethics Committee (858), and James Cook University HREC (H7371). The study is registered with the Australian New Zealand Clinical Trials Registry ACTRN12618001485224 [30]. Written informed consent was obtained from the participants prior to the study. If, as determined by a trained clinician, a participant did not have the capacity to consent to the detailed assessment and record linkage (due to dementia or other forms of cognitive impairment), proxy consent was sought from the carer, next of kin, or a statutory health attorney/guardian (*n* = 1). Interpreters were available; however, they were not required.

Conflict of Interest Statement

There are no conflicts of interest to report.

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A.H., H.N., R.M., R.Q., K.R., and S.R. co-conceived the broader study, acquired data, revised, and finalised manuscript. E.S., L.F., and R.A.S. co-conceived the broader study, revised, and finalised manuscript. D.L. co-conceived the study, interpreted results, revised, and finalised manuscript.

Author Contributions

J.Z. co-conceived and executed the analysis, interpreted results, drafted/revised manuscript, and finalised manuscript. Z.H. and F.W. co-conceived and executed the analysis, interpreted results, revised, and finalised manuscript. K.S., D.B., K.B., H.D., J.-

Data Availability Statement

Owing to restrictions related to data sovereignty, data for this study are not publicly available and remains protected by the custodians. Further enquiries can be directed to the corresponding author.

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