The validation of brief cognitive screening instruments and determination of the prevalence of dementia in Geriatric medical outpatients

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Introduction

By 2021 it is estimated that around 1 million people will be living with a dementia in the UK; having a tremendous impact on health and social care.

Therefore, there is a strong demand for early identification and disease-modifying therapies.

In addition to this, data suggests that memory complaints are often overlooked as only 50% of people with dementia are known to specialist mental health services. Thus, it is unknown how many patients with dementia are referred to geriatric medical services.

A number of different tests have been developed to help detect dementia however, their validation in non-primary care settings is sparse.

Aims

1. **Determine the prevalence of dementia**
2. **Determine proportion of participants with dementia known to specialist dementia services**
3. **Validate screening methods**

Methods

- Cross-Sectional study
- Participants recruited in Geriatric medical outpatient clinics from three hospitals in Newcastle Upon Tyne over one year and three months
- Eligible participants were those aged sixty-five years and older and registered with a Newcastle Primary Care Trust general practice
- Ninety-eight participants in total were included in the study after meeting inclusion criteria.

Total screened = 513 → **Total accepted information leaflet = 341** → **Total replied = 122** → **Total joined study = 109** → **Total participants after withdrawals = 98**

Figure 1. The screening demographics starting from the total screened to the final total of participants from which data was collected from

Results

Demographics

The prevalence of dementia was 15% and none were known to specialist services. Demographic variables were compared between the participants with dementia and the controls. Residence was a variable which differed between the groups as well as being dependent on others, which was higher for the dementia group. CAMCOG scores were found to be significantly different between the two groups too with the dementia group scoring lower.

	Control	Dementia	P Value
N (%)	83 (85%)	15 (15%)	
Age (mean)	78.0	79.5	0.475
Gender (% females)	51.8%	73.3%	0.123
Education			0.685
Minimum	46.3%	80%	
Additional	39%	13.3%	
University	14.6%	6.7%	
Residence			**0.039***
24hrs	1.2%	0	
Community	98.8%	93.3%	
Other	0	6.7%	
Stroke (present)	15.9%	40%	0.194
Heart attack (present)	23.4%	46.7%	0.248
Hypertension (present)	69.5%	73.3%	0.766
Diabetes (present)	17.1%	26.7%	0.380
Obesity (present)	29.3%	40%	0.408
Smoking (present)	43.9%	46.7%	0.843
CIRS G (median)	14	14	0.611
Frailty Index (median)	3	5	**0.000***
Bristol (median)	1	6	**0.002***
Barthel (median)	20	19	**0.006***
GDS (median)	3	5	**0.029***
Cornell (median)	22	22	0.367
CAMCOG (mean)	92.47	74.67	**0.00***
(TOTAL CAMSCORE)			

Figure 2. The demographic variable values for the dementia and control groups along with their statistical p values

Sensitivity and specificity

The test with the highest sensitivity was the IQCODE16 whereas the test with highest specificity was the MiniCog. Positive predictive value was also highest for the MiniCog and for the negative predictive value, the IQCODE26.

	Sensitivity	Specificity	PPV	NPV
MMSE	81.93%	73.33%	42.31%	94.44%
IQCODE16	**86.67%***	75.90%	39.39%	96.92%
IQCODE26	84.67%	79.52%	42.33%	**97.06%***
MiniCog	53.33%	**90.36%***	**50.00%***	90.36%
MiniCog5	66.67%	77.71%	34.48%	92.75%

Figure 3. Sensitivity, specificity, positive predictive and negative predictive values for each of the different screening tests

ROC Curves

The area under the ROC curves are shown in Figure 5. The MMSE had the largest AUC whereas the MiniCog had the lowest.

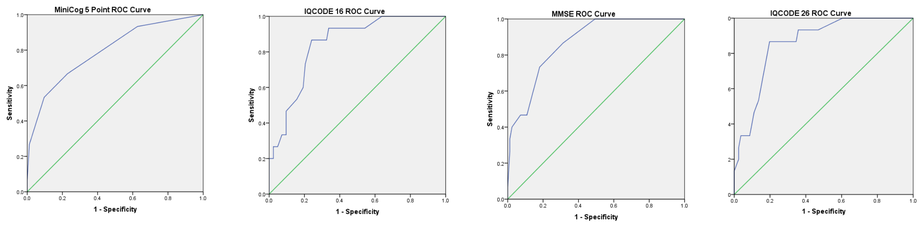

Figure 4. Roc Curves for MMSE, IQCODE (16 and 26) and MiniCog (5 points)

	AUC
MMSE	**0.868**
IQCODE16	0.844
IQCODE26	0.859
MiniCog5	0.794

Figure 5. Area under the curve values for MMSE, IQCODE (16 and 26) and MiniCog (5 points)

Definitions

Specificity = how well a test correctly identifies positives amongst the positive population
Sensitivity = how well a test correctly identifies negatives amongst the negative population
Positive predictive value (PPV) = proportion of positives amongst the results
Negative predicative value (NPV) = proportion of negatives amongst the results

Discussion

The Alzheimer's society report that as many as 28 million people worldwide with dementia are living without a diagnosis. From our results, it was found that even though the prevalence of dementia was 15%, none of these participants were known to specialist services, supporting the idea that there are many living with dementia without the diagnosis.

Despite being the most studied and used, this study has shown that there are other cognitive screening tests for dementia which are just as good, if not better, than the MMSE.

The IQCODE16 is a shorter and more sensitive screening tool which could be incorporated into Geriatric clinics. Furthermore, the MiniCog presented a dramatically higher specificity and positive predictive value and the IQCODE26 had a higher negative predictive value when compared to the other screening tools studied.

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