Prevalence and predictors of domain-specific cognitive impairment 6 months after stroke: *the value of early cognitive screening*

UNIVERSITY OF OXFORD

Elise Milosevich, Margaret Moore, Sarah Pendlebury, & Nele Demeyere

BACKGROUND

Several demographic, stroke-related, vascular, and brain-related risk factors for post-stroke cognitive impairment have been identified.[1-3] However, there is a lack of established domain-specific cognitive markers of long-term cognitive outcome. Post-stroke cognitive screening is widely recommended, yet few studies have investigated the predictive value of acute domain-specific cognitive function for longer-term cognitive outcome.

This study aimed to (i) determine the prevalence of domain-specific cognitive impairment acutely and at 6 months, (ii) assessed the proportion of change in cognitive performance, and (iii) examine the predictive value of acute domain-specific cognitive screening.

METHODS

A prospective cohort of 430 consecutive stroke survivors completed the Oxford Cognitive Screen acutely (<2 weeks) and 6 months post-stroke (mean age 73.9 years (12.5 SD), 46.5% female, median NIHSS 5; range 0-30).

Cognitive impairment was defined as impairment in ≥1 domain, characterized by a deficit in ≥1 domain subtask relative to normative data; 12 subtask scores were categorized into 6 domains: language, spatial attention, executive function, memory, praxis, and number processing. Demographics and clinical candidate predictor variables were collected acutely (age, sex, education years, atrial fibrillation, hypertension, diabetes, smoking, NIHSS, recurrent stroke, and days to cognitive assessment). Hierarchical regression analyses were used to predict overall and domain-specific cognitive impairment at 6 months.

RESULTS

PREVALENCE OF COGNITIVE IMPAIRMENT

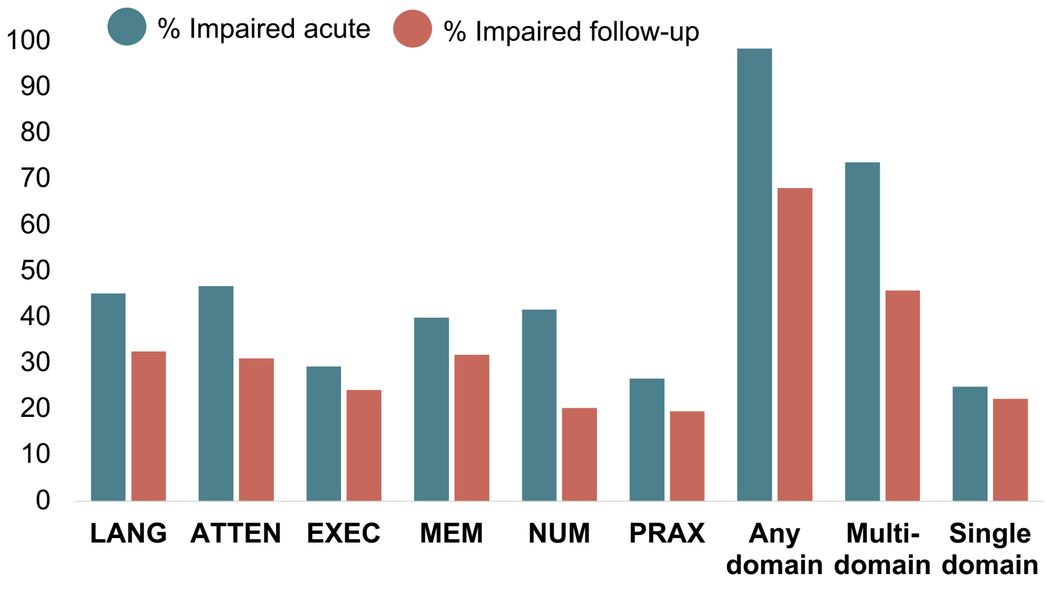

Fig 1. Prevalence of domain-specific impairment acutely and at 6 months.

ASSOCIATIONS BETWEEN DOMAIN-SPECIFIC IMPAIRMENTS

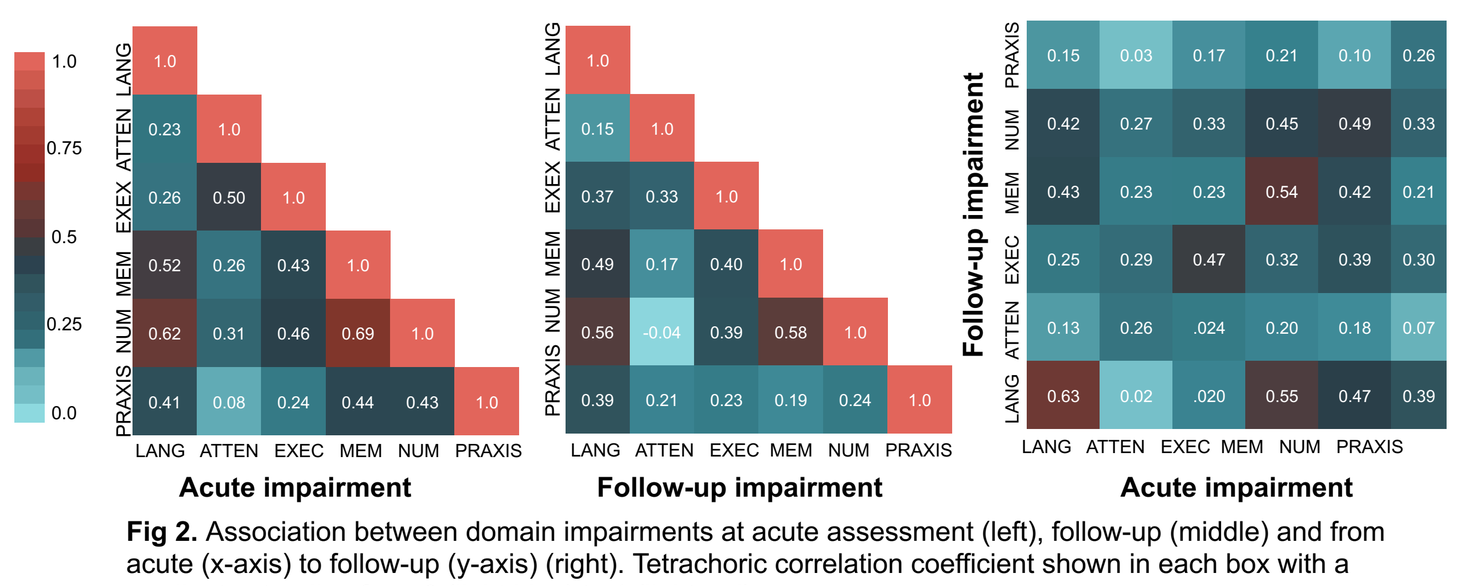

Fig 2. Association between domain impairments at acute assessment (left), follow-up (middle) and from acute (x-axis) to follow-up (y-axis) (right). Tetrachoric correlation coefficient shown in each box with a gradient extending from 0 (light blue) to 1 (light red).

COGNITIVE FUNCTION: ACUTE TO 6 MONTHS

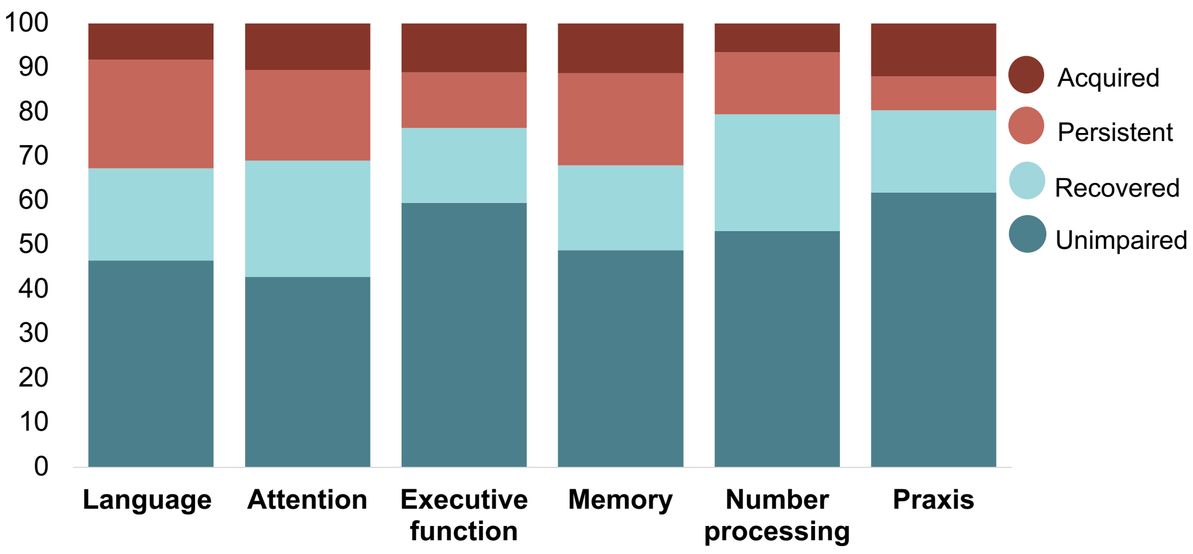

Fig 3. Proportion of change in impairment from acute to follow-up assessment in each domain.

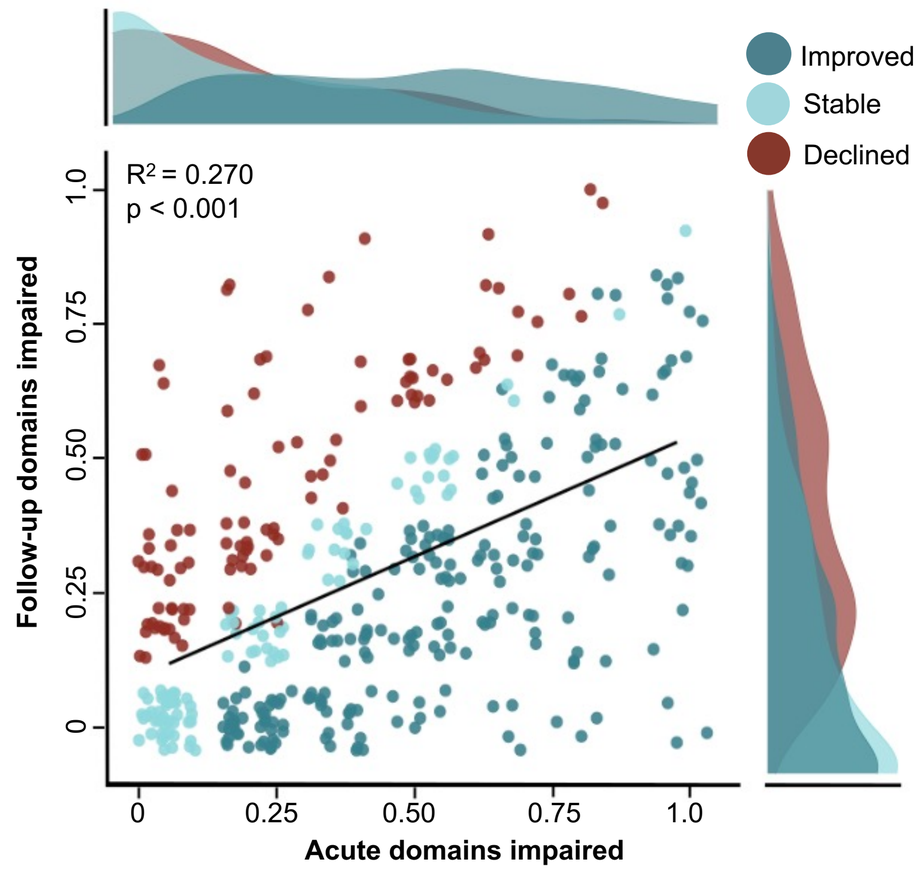

Fig 4. Proportion of individuals who improved, remained stable, or declined in cognitive function (proportion of domains impaired) after 6 months. Solid trend line represents reported regression analysis with the considered clinical/demographic covariates accounting for 27% of variance.

PREDICTING COGNITIVE IMPAIRMENT AT 6 MONTHS

Clinical/demographic predictors (n = 10)
Adjusted R^2 = 0.085, F = 4.212, 10 and 334 df, p <0.0001

	β (SE)	*t* value	*p* value
Age	0.005 (0.106)	4.338	0.000*[a]
Education years	-0.010 (0.026)	-2.549	0.011*
Smoking	0.072 (0.033)	2.205	0.028*
NIHSS	0.005 (0.003)	2.205	0.045*

Clinical/demographic predictors and acute cognitive impairment (*N* domains impaired)
Adjusted R^2 = 0.298, F = 14.260, 11 and 33 df, p <0.0001

	β (SE)	*t* value	*p* value
Age	0.004 (0.010)	4.542	0.000*[a]
Smoking	0.059 (0.029)	2.049	0.041*
Acute cognitive impairment	0.414 (0.041)	10.099	0.000*[a]

Clinical/demographic and acute domain-specific impairments
Adjusted R^2 = 0.310, F = 10.20, 16 and 331 df, p <0.0001

	β (SE)	*t* value	*p* value
Age	0.004 (0.001)	4.211	0.000*[a]
Smoking	0.076 (0.029)	2.620	0.009*
Acute Language	0.096 (0.027)	3.844	0.000*[a]
Acute Executive	0.068 (0.027)	2.520	0.012*
Acute Memory	0.115 (0.027)	4.280	0.000*[a]
Acute Praxis	0.086 (0.028)	3.111	0.002*[a]

* Significance p <0.05; [a] Significant after Bonferroni correction for multiple comparisons

Table 1. Results of regression analyses for clinical/demographic factors and acute cognitive impairment predictive of cognitive impairment at 6 months (proportion of domains impaired).

Predictors of domain-specific cognition at 6 months

Each domain-specific impairment at 6 months was best predicted by the same acute domain impairment *except:*

Attention impairments – better predicted by **acute executive dysfunction** (β=0.137, *p*=0.032) and **age** (β=0.010, *p*<0.0001), though only age survived correction.

Number impairments – better predicted by **acute praxis** (β=0.114, *p*=0.025) and **language** deficits (β=0.098, *p*=0.031), (however neither remained significant after correction.)

CONCLUSIONS

- Cognitive impairment is highly prevalent initially after stroke across all domains, though prevalence of impairment decreased in each domain from acute to 6 months. Impairments in language, memory and attention predominate at 6 months.
- Acute cognitive impairment was the strongest predictor of cognitive function at 6 months compared to common post-stroke cognitive risk factors. Acute impairments in memory, language, and praxis were particularly important in predicting proportion of domains impaired at follow-up.

References
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3. Tu Q, Ding B, Yang X, et al. The current situation on vascular cognitive impairment after ischemic stroke in Changsha. Arch Gerontol Geriatr. 2014; 58(2):236-247.

Experimental Psychology, Medical Sciences Division

TRANSLATIONAL NEUROPSYCHOLOGY GROUP

Stroke Association