The relationship between cognitive reserve and change in cognition during the first 3 months post-stroke

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Background

Impaired **memory** and **executive function (EF)** are commonly seen post-stroke. **Cognitive reserve (CR),** the brain's ability to adapt from damage and degeneration, has been suggested as a protective factor for cognitive impairment in stroke research. However, the association between CR and post-stroke cognition has not been sufficiently studied.

We aimed to study:

- The association between CR and cognitive function (memory and EF) at 1 week and 3 months post-stroke
- The association between CR and change in cognitive function during the first 3 months post-stroke

Method

Patients with ischemic stroke were assessed with a battery of neuropsychological tests within 1 week and followed up at 3 months post-stroke**. Multiple linear regression** was used to estimate the relationship of CR proxies with cognition, controlling for age and sex.

CR variables:

Years of education
Career (ISCO-88; 4: intellectuals, 3: mixed, 2: elementary occupations, 1: none)
IQ (composite variable: National Adult Reading Test, Matrix Reasoning (WASI) & Vocabulary (WASI))

Measures of cognition (Using composite variables):

Memory: RAVLT (immediate and delayed recall), Digit Span (WAIS-III) & Spatial Span (WMS-III)
EF: Trail Making Test A&B (Halstead-Reitan), Digit Symbol Coding (WAIS-III), Colour-Word Interference Test 3&4 (D-KEFS)
Change in cognitive function: Memory/EF scores at 1 week subtracted from Memory/EF scores at 3 months

Results

Patient characteristics (N=79)

Sex: 34.0% female
Age: (M±SD) 64.4 ± 9.0 years
Education: 11.0 ± 2.9 years
NIHSS score first day in hospital (M±SD): 3.6 ± 3.3
NIHSS score at 3 months post-stroke (M±SD): 0.66 ±1.59

Career:

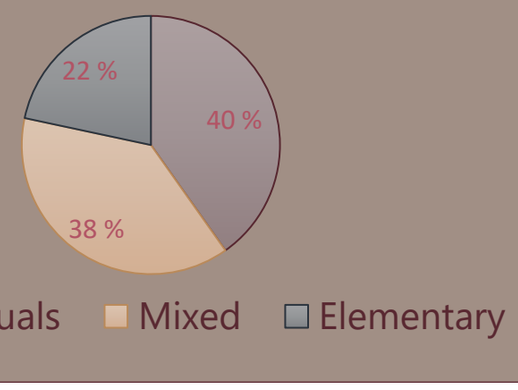

Table 1:
Relationship of CR proxies with cognitive function at 1 week and 3 months

	Memory 1 week	Memory 3 months	EF 1 week	EF 3 months
Education	β=.13	β=-.15	β=-.18	β=-.26*
IQ	β=.48**	β=.67**	β=.63**	β=.68**
Career	β=.-10	β=.03	β=-.10	β=.05

Note: **p<.00833 (Bonferroni correction), *p<.05; Controlled for age and sex.

Table 2:
Relationship of CR proxies with change in cognitive function during the first 3 months post-stroke

	Change in memory	Change in EF
Education	β=-.42*	β=-.15
IQ	β=.26	β=.13
Career	β=.20	β=.24

Note: **p<.00833 (Bonferroni correction), *p<.05; Controlled for age and sex.

Conclusion

Of the studied CR proxies, only IQ was significantly associated with cognitive function at 1 week and 3 months post-stroke. The association between CR and change in cognitive function was not significant, indicating that CR may not promote improvement of cognitive function during the first 3 months post-stroke. More research exploring how different factors (e.g. stroke severity or time since stroke) may affect the association between CR and cognitive change is needed.

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