

Association between Cognitive Reserve, Fatigue and Quality of Life in Multiple Sclerosis: A Single centre Exploratory Cross-Sectional Study

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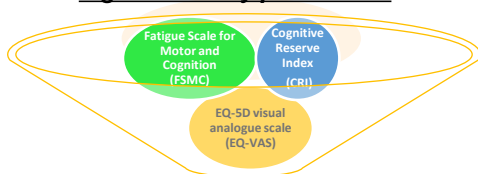
OBJECTIVES: Cognitive Reserve has been increasingly recognized as a potential modulator of clinical outcomes in MS. With our exploratory analysis *we aimed to investigate the relationship between the Cognitive Reserve Index (CRI), fatigue levels, and health-related quality of life in a cohort of MS patients.*

MATERIALS AND METHODS: The study included 39 MS patients (baseline characteristics in **Table 1**) diagnosed with MS, followed at a single neurology centre, regardless of MS subtype and clinically stable, who underwent the protocol exposed in **Figure 1**. Patients were grouped by FSMC total score into two categories: mild and moderate-to-severe fatigue. Comparisons were performed using univariate analysis (Mann-Whitney U test), and correlations were assessed via Spearman's rank correlation coefficient.

Table 1: Baseline characteristics

VARIABLES	N = 39
Age (mean ± SD), years	48.62 ± 12.84
Education (mean ± SD), years	11.28 ± 3.39
Sex (%)	
• M	15 (31%)
• F	24 (61%)

Figure 1: Study procedures



Patients grouped by FSMC total score into mild and moderate-to-severe fatigue

Figure 2: Cognitive Reserve Index (CRI total) by Fatigue Severity

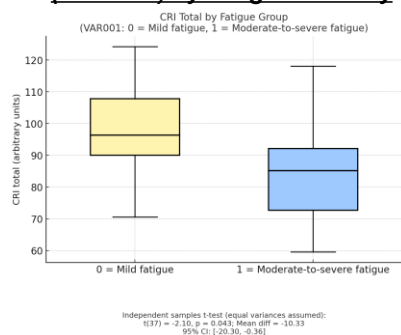
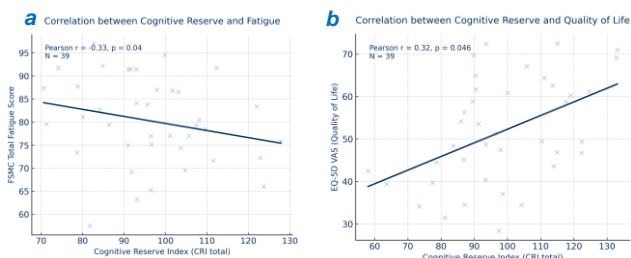


Figure 3 Correlation between Cognitive Reserve with Fatigue (a) and Quality of Life (b)



RESULTS: Patients with moderate-to-severe fatigue had significantly lower CRI total scores than those with mild fatigue (**Figure 2**). This finding remained significant when fatigue was analysed in its physical domains (mean CRI: 92,42 ± 10,42 vs 102,75 ± 18,68 respectively, $p = 0.043$) and showed a trend of significance considering psychological scores of FSMC (91,77 ± 10,11 vs 100,08 ± 16,39 respectively, $p = 0.05$). A statistically significant inverse correlation was found between CRI-Education and FSMC total score ($r = -0.38, p = 0.003$, **Figure 3-a**), as well as with both physical ($r = -0.36, p = 0.042$) and cognitive ($r = -0.32, p = 0.03$) subscores. Additionally, CRI-Total showed a direct correlation with EQ-VAS scores ($r = 0.32, p = 0.04$, **Figure 3-b**).

DISCUSSIONS AND CONCLUSIONS

Cognitive reserve has been linked to MS presentation and progression. Our findings suggest that lower cognitive reserve, particularly considering Educational domains, is associated with more fatigue and poorer quality of life in MS patients. This supports the hypothesis that cognitive reserve may exert a protective effect on functional and subjective outcomes in MS, also highlighting the importance of integrating cognitive reserve assessment in clinical practice.



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