Global and Domain-Specific Cognitive Impairment in Multiple Sclerosis Patients Based on Cambridge Neuropsychological Test Automated Battery

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ABSTRACT

Introduction: Multiple sclerosis (MS) is a chronic inflammatory disease of the central nervous system. Findings have shown that cognitive impairment in the early stages of the disease may appear as the first symptom of MS. Cognitive disorders can affect up to 70% of patients and are present in 40-20% of patients in the early stages of the disease. Memory, processing speed, attention, episodic memory, and executive functions are the cognitive domains that are primarily impaired in MS patients. In this study, we aimed to evaluate the global and domain-specific cognitive impairment in MS patients based on the Cambridge Neuropsychological Test Automated Battery (CANTAB).

Methods and Materials: In this cross-sectional study, 124 MS patients who visited the outpatient neurology clinics of Tabriz University of Medical Sciences between 2022 and 2023 were included. CANTAB was used to evaluate the patients cognitively. In addition to the Motor Screening Task, four nonverbal cognitive subtests from the CANTAB were utilized: paired-associate learning, rapid visual information processing to assess sustained attention and reaction time, and the Spatial Working Memory test, which measures participants' ability to retain and manipulate visuospatial information. Impaired functions in at least three domains were defined as cognitive impairment. The statistical analysis was carried out through the 23rd version of SPSS. The normality of distributions was assessed using the Kolmogorov–Smirnov test, and based on the normality, numeric values were reported in mean ± SD or median (quartiles) and compared using the independent sample t-test or Mann-Whitney U test. Categorical variables were reported in number (percentage) and compared using the chi-square test.

Results: Among 124 MS patients with a median age of 31 (26.25-37.75) years, 93 (75%) were female, and 49 (39.5%) were cognitively impaired. The disease phenotype was relapsing-remitting phenotype in 112 (90.3%) patients. Regarding sex, there was not any significant difference between the two groups of cognitively impaired (females: 40 [81.6%]) and cognitively intact patients (females: 53 [70.7%]), with a p value of 0.16. There was a significant difference in age of patients between the two groups (cognitively impaired: 37 [24-44]; cognitively not impaired: 28 [24-34.5]; p = 0.01). Also, the progressive form of the disease was more frequent in the cognitively impaired group (16.3% vs. 5.3%; p = 0.04). We could not find a statistically significant difference regarding disease duration between the two study groups (cognitively impaired: 120 [36-165] months; cognitively not impaired: 48 [21-108]), with a p value of 0.08.

Conclusion and Discussion: MS who are older and have a progressive form of the disease exhibit a higher prevalence of neuropsychiatric dysfunctions. However, gender does not affect these dysfunctions. We could not find a relationship between disease duration and cognitive impairment in this study, which could be due to the small sample size.