

Executive Functions Directly Associated with Severity of Perceived Pain above and beyond Depression in the Context of Medical Rehabilitation

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Abstract : Objective: To investigate whether a direct link exists between perceived pain (PP) and executive functions (EF), above and beyond the influence of depression symptoms, in the context of medical rehabilitation. Design: Cross-sectional study. Setting: Rehabilitation Hospital. Participants: 125 medical records of hospitalized patients were screened for matching to our inclusion criteria. Only 60 patients were found fit and were asked to participate. 19 decline to participate on personal basis. The 41 neurologically intact patients (mean age 46, SD 14.96) that participated in this study were in their sub-acute stage of recovery, with fluent Hebrew, with intact upper limb (to neutralize influence on psychomotor performances) and without an organic brain damage. Main Outcome Measures: EF were assessed using the Wisconsin Card Sorting Test (WCST) and the Stop-Signal Test (SST). PP was measured using 3 well-known pain questionnaires: Pain Disability Index (PDI), The Short-Form McGill Questionnaire (SF-MPQ) and the Pain Catastrophizing Scale (PCS). Perceived pain index (PPI) was calculated by the mean score composite from the 3 pain questionnaires. Depression symptoms were assessed using the Patient Health Questionnaire (PHQ-9). Results: The results indicate that irrespective of the presence of depression symptoms, PP is directly correlated with response inhibition (SST partial correlation: $r=0.5$; $p=0.001$) and mental flexibility (WCST partial correlation: $r=-0.37$; $p=0.021$), suggesting decreased performance in EF as PP severity increases. High correlations were found between the 3 pain measurements: SF-MPQ with PDI ($r=0.62$, $p<0.001$), SF-MPQ with PCS ($r=0.58$, $p<0.001$) and PDI with PCS ($r=0.38$, $p=0.016$) and each questionnaire alone was also significantly associated with EF; thus, no specific questionnaires 'pulled' the results obtained by the general index (PPI). Conclusion: Examining the direct association between PP and EF, beyond the contribution of depression symptoms, provides further clinical evidence suggesting that EF and PP share underlying mediating neuronal mechanisms. Clinically, the importance of assessing patients' EF abilities as well as PP severity during rehabilitation is underscored.

Keywords : depression, executive functions, mental-flexibility, neuropsychology, pain perception, perceived pain, response inhibition

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