Centro Hospitalar Universitário do Porto, Porto, Portugal

Objective: Cognitive difficulties in Multiple Sclerosis (MS) are important contributors to impairment in instrumental activities of daily living. A non-randomised controlled trial was conducted to explore the effects of a cognitive rehabilitation protocol on MS patients' daily life functionality.
Participants and Methods: Seventy-five relapsing-and-remitting MS patients were recruited. Intervention Group (IG, n=31) underwent 16 individual rehabilitation sessions (1hx2/week; weeks 2-10), which included paper and pencil cognitive stimulation exercises and training memory strategies and external memory aids; and a booster session (week 37). Control Group (CG, n=44) received care as usual. These primary outcome measures were applied at baseline and at weeks 11, 36, and 62: Multiple Sclerosis Neuropsychological Screening Questionnaire (MSNQ), Mental Slowness Questionnaire (MSQ), Mental Slowness Observation Test (MSOT), and Sydney Psychosocial Reintegration Scale-2 (SPRS-2). Score differences from baseline were calculated for all measures and follow-up time points except for SPRS-2, which was only applied twice (baseline and week 62). Linear regressions fitted with generalized estimating equations (GEE) were performed to verify the effects of time and group on the outcome measures. Baseline scores were included in the model as covariates for all outcome measure except SPRS-2. Chi-square and Mann-Whitney tests were applied to compare demographic and clinical characteristics of the groups.
Results: Groups had similar demographic (i.e., sex, age, and education) and clinical (i.e., age at disease onset, disease duration, disease modifying treatments, and Expanded Disability Status Scale score) characteristics. IG's MSQ score progressively improved, whereas CG's score did not change from baseline (group x time effect: $p<0.001$) throughout follow-up. IG's MSNQ score improved from baseline at weeks 11 and 36, but not at week 62. CG's MSNQ score did not change from baseline throughout follow-up (group x time effect: $p=0.025$). Both IG's and CG's performance on the MSOT improved (time effects). Though, the IG showed greater improvement at follow-up (group effects) on MSOT score and time (both $p<0.001$). IG's SPRS-2 improved, whereas CG's score declined (group x time effect: $p<0.001$).
Conclusions: Combining restorative techniques with strategy-based compensatory techniques may produce significant and persistent effects on MS patients' self-reported everyday functioning and on their objective performance of instrumental tasks.

Categories: Multiple Sclerosis/ALS/Demyelinating Disorders
Keyword 1: everyday functioning
Correspondence: Sara Cavaco, Centro Hospitalar Universitário do Porto, Portugal, sara.cavaco@chporto.min-saude.pt

3 Race/Ethnicity-Related Differences in Volumetric Brain Measures in Persons with Multiple Sclerosis

Cristina A. F. Román[1], Indira C. Turney[2], Ashish Mistry[1], Nancy Chiaravalloti[3], Ekaterina Dobryakova[3], Helen Genova[3], Brian Sandroff[1], Brian Yao[1], Glenn Wylie[1], John DeLuca[1]
[1]Kessler Foundation, West Orange, NJ, USA. [2]Taub Institute for Research on Alzheimer's Disease and the Aging Brain, College of Physicians and Surgeons, Columbia University, New York, NY, USA. [3]Kessler Foundation, East Hanover, NJ, USA

Objective: Multiple sclerosis (MS) has historically been considered a syndrome that primarily affects White persons of northern European ancestry. This has been strongly disproven in recent decades with prevalence/incidence studies showing that MS impacts individuals from diverse backgrounds. The few studies available investigating clinical characteristics of MS across diverse groups have shown that Hispanic/Latinx/e (Latinx) and non-Hispanic Black/African American (NHB) persons with MS (pwMS) have more severe disease trajectories compared to non-Hispanic Whites (NHW), including an earlier age of disease onset, greater disability, and more severe symptoms overall. Changes in brain structure have been linked outcomes and MS-itself, but what remains understudied is how brain structure differs across race/ethnicity. As such, the current study aims to investigate

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volumetric brain differences in a diverse sample of pwMS.
Participants and Methods: The sample (n=79) was compiled from multiple neuroimaging datasets and divided into three groups- Latinx (n=19), NHB (n=29), and NHW (n=32)- based on self-reported race/ethnicity. Participants completed demographic interviews and structural magnetic resonance imaging (MRI) scans. Neuroimaging data was visually inspected and processed in FreeSurfer (7.3.2). Volumetric measures for total gray matter, cortical gray matter, total white matter, and subcortical gray matter were used as the primary outcome measures.
Results: A multivariate general linear model was used to examine volumetric brain differences across groups. Age and total intracranial volume were included as covariates. Results showed a significant effect of race/ethnicity (Pillai's Trace=0.175, F(6, 148)=2.36, p=.033), indicating significant differences in volumetric brain metrics across race/ethnicity, namely for subcortical gray matter, total gray matter, and total white matter volumes. Post-hoc testing showed the Latinx group to have less subcortical gray matter, total gray matter, and total white matter than NHWs. There was a trend for the NHB versus NHW, with NHBs having less brain volume. No significant differences were observed between the Latinx and NHB groups. Lesion volume and regional gray matter volumes were also examined.
Conclusions: To the authors' knowledge, this is among the first studies to investigate structural brain differences across race/ethnicity in pwMS. Results point to disparities in brain volume across racial/ethnic groups with MS. These differences may partially underlie the differing trajectories observed in clinical characteristics across race/ethnicity. Future studies should include larger samples of diverse pwMS and examine the intersection of psychosocial and systemic factors (i.e., social determinants of health) and brain metrics to better understand the divergent disease trajectories observed across groups.

Categories: Multiple Sclerosis/ALS/Demyelinating Disorders
Keyword 1: neuroimaging: structural
Keyword 2: diversity

Correspondence: Cristina A. F. Román, Kessler Foundation, croman@kesslerfoundation.org

4 Compensatory Functional Activation During Motion Discrimination in Parkinson's Disease

Stephanie R Nitschke[1], Nicholas Shaff[1], Chris Wertz[1], David Stone[1], Andrei Vakhtin[1], Andrew Mayer[1], Elena K. Festa[2], William C. Heindel[2], David P. Salmon[3], Gerson Suarez Cedeno[4], Amanda Deligtisch[4], Sarah Pirio Richardson[4], Sephira G. Ryman[1]
[1]The Mind Research Network, Albuquerque, NM, USA. [2]Brown University, Providence, RI, USA. [3]University Of California San Diego, San Diego, CA, USA. [4]University Of New Mexico, Albuquerque, NM, USA

Objective: PD patients commonly exhibit executive dysfunction early in the disease course which may or may not predict further cognitive decline over time. Early emergence of visuospatial and memory impairments, in contrast, are more consistent predictors of an evolving dementia syndrome. Most prior studies using fMRI have focused on mechanisms of executive dysfunction and have demonstrated that PD patients exhibit hyperactivation that is dependent on the degree of cognitive impairment, suggestive of compensatory strategies. No study has evaluated whether PD patients with normal cognition (PD-NC) and PD patients with Mild Cognitive Impairment (PD-MCI) exhibit compensatory activation patterns during visuospatial task performance.
Participants and Methods: 10 PD-NC, 12 PD-MCI, and 14 age and sex-matched healthy controls (HC) participated in the study. PD participants were diagnosed with MCI based on the Movement Disorders Society Task Force, Level II assessment (comprehensive assessment). Functional magnetic resonance imaging (fMRI) was performed during a motion discrimination task that required participants to identify the direction of horizontal global coherent motion embedded within dynamic visual noise under Low and High coherence conditions. Behavioral accuracy and functional activation were evaluated using 3 × 2 analyses of covariance (ANCOVAs) (group [HC, PD-NC, PD-MCI] × Coherence [High vs. Low])

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