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OP 15 - Effects of long-term meditation on cognition and electroencephalography derived brain dynamics: a cross-sectional comparative study

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Introduction: The effects of meditation on cognition and electroencephalography (EEG) remains inconclusive. This study compares the dynamics of EEG wave patterns and measures of cognitive domains of long-term meditators with non-meditators.

Method: Ten experienced meditators (practice of over 3 years) were selected using a validated intake-interview. Nine age, gender, ethnicity and educational-level matched non-meditators were recruited. Montreal cognitive assessment (MoCA) score of >26 was one eligibility criterion. Validated Sinhala version of repeatable battery for the assessment of cognition (RBANS) was used to assess immediate memory, visuospatial/constructional, language, attention and delayed memory. EEG was recorded according to the 10-20 system. In long-term meditators, EEG was recorded with one-minute eyes-closed followed by 19 minutes of meditation while in controls, the total 20 minutes of EEG recording was in an eyes-closed relaxed state of mind. EEG wave frequencies of meditation/relaxed state were analysed from 4 areas: F7-T3, T5-O1, F8-T4, T6-O2.

Results: The mean score of RBANS in meditators (M) (mean age 39.78; SD=9.2 years) was 440.8; SD=109.4 while in non-meditators (NM) (mean age 40.4; SD=8.3 years) it was 331.2; SD=101.9 (p=0.13). Cognitive scores were higher among the M compared to the NM: immediate memory, M=45.4±SD; NM=36.1±SD (p=0.09); visuospatial, M=37.7±SD; NM=28±SD (p=0.013); language, M=39.6±SD; NM=35.1±SD (p=0.08); attention, M=67.2±SD; NM=60.6±SD (p=0.39); delayed memory, M=54.7±SD; NM=47.1±SD (p=0.019). In EEG, a higher percentage of alpha activity was observed among M (25.31%) compared to NM (7.7%) (p=0.001) in all the EEG regions. Delta activity predominated in the fronto-parietal region of NM (NM=61.3%; M=30.5%; p= 0.003) while alpha activity predominated among M (M=24.2%; NM=9.6%; p=0.011).

Conclusion: Long-term meditation enhances selected cognitive domains and produces changes in EEG frequencies suggestive of long- and short-term effects of meditation on CNS functions.

Key words: EEG, cognition, meditation

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