

**Introduction:** Long term meditation is known to produce changes in nervous system which may be beneficial for overall health. A comprehensive study on central and peripheral neurophysiological parameters in long term meditators (LTM) hasn't been reported before in one cohort. We compared electroencephalography (EEG), visual evoked potentials (VEP), measures of cognitive functions and peripheral nerve conduction (NCS) of LTM with meditation naïve controls (MNC).

**Methods:** Fifteen experienced healthy LTM (n=15; regular practice of >3 years) were selected using a validated intake-interview. Fifteen matched MNC (n=15) were recruited from community. All had Montreal cognitive assessment score of >26/30. Validated Sinhala-version of repeatable battery for assessment of neuropsychological status (RBANS) was used to assess cognition. Using 10-20 system, EEG was recorded with one-minute eyes-closed state followed by 19 minutes of meditation among LTM. In MNC, total of 20 minutes EEG recording was in an eyes-closed relaxed state. EEG wave frequencies in both groups were analyzed from six regions. Latencies for N75, P100, N145 were measured on VEP (Nicolet system). Median and tibial nerve conduction velocities and amplitude were recorded for peripheral NCS.

**Results:** Mean scores of every cognitive domain was higher among LTM (mean age 39.78; SD=9.27 years) than MNC (mean age 40.44; SD=8.39 years): immediate memory, LTM=46.87±SD, MNC=36.2±SD (p=0.004); visuospatial, LTM=37.6±SD, MNC=24.93±SD (p=0.000); language, LTM=39.2±SD, MNC=35.93±SD (p=0.440); attention, LTM=69.33±SD, MNC=61.93±SD (p=0.185); delayed memory, LTM=55.33±SD, MNC=44.73±SD (p=0.000). In EEG, LTM had higher alpha activity (47.27%) at rest in right temporal region compared to MNC (39.2%) (p=0.028). During meditation LTM had higher alpha activity in all regions (p<0.05). N75 latencies were reduced among LTM compared to MNC (p=0.02) with no difference in P100 and N145 latencies. NCS showed higher tibial nerve conduction velocity among LTM than MNC (p=0.016).

**Conclusion:** Long-term meditation enhances cognitive functions and produces measurable changes in EEG frequencies, VEP and NCS. Further studies to assess therapeutic benefits of meditation are recommended.