

Introduction: Meditation is known to reduce stress and anxiety. The balance between inhibitory gamma-Aminobutyric acid (GABA) and excitatory glutamate is the key in controlling the overall level of excitation that leads to stress and anxiety. Dopamine contributes to executive function and motivation. The effect of Buddhist meditation on these three neurotransmitters have not been collectively studied in one cohort. The objective of this study was to assess the dopamine, GABA, and glutamate concentrations in experienced meditators and to compare them in an age, gender and education level matched non-meditating group.

Methods: This is a cross sectional, case-controlled study and ethical clearance was obtained from the ERC, Faculty of Medicine, Colombo. Dopamine, GABA and glutamate concentrations in the blood of long-term, healthy, experienced meditators (n=18), recruited from Buddhist meditation centers using a validated interview, and age, gender, BMI and educational level matched healthy control subjects (n=18) who had never practiced meditation, were determined using commercially available ELISA kits. Dopamine, GABA and glutamate concentrations of the meditators and controls were compared using Mann-Whitney U test and Independent Samples t-test.

Results: The mean age of the meditator group was 42.77 ± 9.51 and the control group was 42.54 ± 10.43 years and 67% were males. The mean duration of the meditation practice was 6.46 ± 2.89 years. In the meditator group, the dopamine (136.1 ± 22.13 pg/ml) (Mean $\pm$ SEM), and GABA concentrations (71.4 ± 3.18 ng/ml) were significantly higher and glutamate concentration (6.3 ± 0.64 μ g/ml) was significantly lower compared to the control group who had a dopamine level of 86.2 ± 17.15 pg/ml ($p=0.022$), GABA level of 61.9 ± 1.90 ng/ml ($p=0.015$) and glutamate level of 7.6 ± 0.56 μ g/ml ($p=0.031$).

Conclusion: The effects of Buddhist meditation on these neurotransmitters may have potential benefits in decreasing anxiety and improving executive functions in individuals. Further studies on meditation and neurotransmitters responsible for anxiety are recommended.