IMPULSIVITY AND FRONTAL EEG ACTIVITY IN MEDITATORS

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Abstract (300 word limit)

Background: Impulsivity is a multifaceted personality characteristic associated with maladaptive behavior including action without foresight, lack of self-control, and premature actions. However, a growing body of meditation studies reported benefits on emotion regulation, stress reactivity, and mind wandering, it remains unclear whether there is an association between impulsivity and resting-state frontal electroencephalogram (EEG) activity in meditators.

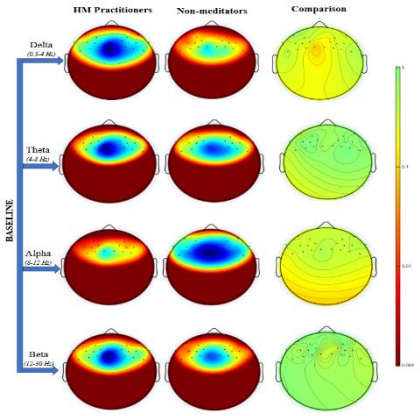
Aims Methods: The present study evaluated the association between frontal EEG oscillation and impulsivity in heartfulness meditators and non-meditators. A total of eighty participants with an age range from 30 to 45 years were recruited from Heartfulness Institute and South Bengaluru. A cross-sectional study assessed impulsivity by using the Barret impulsive scale, version 11 (BIS-11), and resting-state frontal EEG activity on heartfulness meditators (HM) and non-meditators. Prior to EEG acquisition, self-reported BIS-11 was administered to each participant. Data were acquired in the sound-attenuated chamber of the cognitive neuroscience Laboratory at Swami Vivekananda Yoga Anusandhana Samasthana (S-VYASA), Bengaluru, India.

Results: The Mann-Whitney U-test showed significantly lower impulsive scores in HM meditators. The resting-state EEG was significantly higher alpha power, and lower beta power in HM meditators compared to non-meditators. Spearman's rank correlation coefficient showed impulsiveness was negatively correlated with frontal alpha power and positively correlated with beta power.

Conclusions: The shreds of evidence suggest that the meditation practice may have a potential role in promoting frontal-lobe activities that may facilitate inhibitory control over characteristics of impulsive behavior.

Keywords: electroencephalogram; heartfulness meditation; impulsiveness; resting-state brain activity;

Image



Topographical comparison between HM practitioners and non-meditators during resting state.

Recent Publications (minimum 5)

1. Vidyashree, M., Deepeshwar, S., Kaligal, C., Kanthi, **Krishna, D.,** A., Bathala, L., & Sharma, V. K. (2024). Cerebral haemodynamic changes in Type 2 Diabetes mellitus following a 3-month yoga intervention: A randomized control trial. *Cureus*.16(1): e51548. doi:10.7759/cureus.51548
2. Anurag, S., Singh, B. K., **Krishna, D.,** Prasanna, K., & Deepeshwar, S. (2023). Heart–brain Rhythmic Synchronization during Meditation: A Nonlinear Signal Analysis. *International Journal of Yoga*, 16(2), 132-139.
3. Kaligal, C., Kanthi, A., Vidyashree, M., **Krishna, D.,** Raghuram, N., Hongasandra Ramarao, N., & Deepeshwar, S. (2023). Prefrontal oxygenation and working memory in patients with type 2 diabetes mellitus following integrated yoga: a randomized controlled trial. *Acta diabetologica*, *60*(7), 951–961. https://doi.org/10.1007/s00592-023-02085-0
4. Kaligal C, Kanthi A, Vidyashree M, **Krishna D.** Raghuram N, Hongasandra Ramarao N, Deepeshwar S. (2023). Prefrontal oxygenation and working memory in patients with type 2 diabetes mellitus following integrated yoga: a randomized controlled trial. *Acta Diabetol*. doi: 10.1007/s00592-023-02085-0. PMID: 37014456.l
5. Putchavayala, K. C., Sasidharan, K. R., **Krishna D.** & Deepeshwar, S. (2023). Correlation between Excessive Smartphone usage, Basic Psychological Needs, and Mental Health of University Students. *Journal of Mental Health and Human Behaviour*, 28(1), 65-71.
6. Shrivastava A, Singh BK, **Krishna D,** Krishna P, Singh D. Effect of Heartfulness Meditation Among Long-Term, Short-Term and Non-meditators on Prefrontal Cortex Activity of Brain Using Machine Learning Classification: A Cross-Sectional Study. *Cureus*. 2023, 14;15(2): e34977. doi: 10.7759/cureus.34977. PMID: 36938168; PMCID: PMC10019753.
7. **Krishna, D.,** Prasanna, K., Angadi, B., Singh, B. K., Anurag, S., & Deepeshwar, S. (2022). Heartfulness Meditation Alters Electroencephalogram Oscillations: An Electroencephalogram Study. *International journal of yoga*, *15*(3), 205–214. https://doi.org/10.4103/ijoy.ijoy_138_22
8. **Krishna, D.,** Prasanna, K., & Deepeshwar, S. (2022). Association between impulsiveness and quality of life among heartfulness meditators: A cross-sectional study. *IJMH. In Press*.
9. **Krishna, D.,** Prasanna, K., & Deepeshwar, S. (2022). A cross-sectional study on impulsiveness, mindfulness, and World Health Organization quality of life in heartfulness meditators. *Yoga Mimamsa*, *54*(1), 24-30.

Photograph

Biography (150 word limit)



Dr. Krishna Dwivedi has completed his B.Sc. M.Sc., and Ph.D. in Yoga from Swami Vivekananda Yoga Anusandhana Samasthana (S-VYASA) Yoga University, Bangalore. His Ph.D. thesis title is "Changes in Cortical and Autonomic Activities During Heartfulness Meditation: A Cross-Sectional With Immediate Effect Study". He has also carried out an individual research project during his postgraduation program titled "Yoga-Based Relaxation Technique Facilitates Sustained Attention in Patients with Low Back Pain: A Pilot Study". He explored the beneficial effects of yoga and meditation practices on mental health and brain functions using electrophysiological and neuroimaging techniques including fNIRS EEG, TCD, and so on. He has guided several postgraduate students in their research work. Currently, He is working at S-VYASA University, Bengaluru, India, as an Assistant Professor and his research work involves exploring the neurophysiology and psychophysiology of various yoga practices.

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Notes/Comments: