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Evaluation of Antidepressant and Anxiolytic Activity on Medical Representative by Using Insight Meditation

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Abstract: The pharmaceutical industry in India is undergoing significant expansion, with Medical Sales Representatives (MR) playing an integral role in promoting pharmaceutical products and facilitating communication between healthcare providers and the industry. However, the demanding nature of this profession often results in elevated levels of psychological strain, including stress, anxiety, and depression. The present study aims to assess the effectiveness of Vipassana (Insight) meditation an ancient Indian practice centered on cultivating mindfulness and emotional balance as a strategy for reducing occupational stress. This investigation focuses on physiological indicators of stress, notably serum cortisol concentrations and brainwave activity measured by Electroencephalography (EEG). By exploring these biomarkers, the study evaluates the potential of Insight meditation as a non-pharmacological intervention in high-stress work environments. Previous findings suggest that Vipassana meditation contributes to a decrease in various psychological disturbances, including aggressive tendencies, anxiety, and depressive symptoms. As stress becomes increasingly prevalent in modern life, meditation practices have gained attention for their broad benefits physiological, psychological, and spiritual. EEG-based studies have provided empirical support for the influence of meditation on brain Insights. This research seeks to deepen the understanding of neural activity during meditation by analyzing EEG data through wavelet transform methods and conducting statistical evaluations to determine significant changes in brainwave patterns.

➢ ***Aim and Objective***

Evaluation of antidepressant and anxiolytic activity on medical representative by using Insight meditation.

Material and Method

To evaluate the effectiveness of the meditation intervention, a paired samples t-test was employed to determine whether the mean cortisol levels differed significantly between the baseline and post-intervention measurements. Furthermore, electroencephalography (EEG) was used to monitor and assess participants mental states on both the first and twenty-first days of the meditation program.

➢ ***Result***

A statistically substantial association ($p < 0.001$) was observed amongst pre-Insight Meditation also post-Insight Meditation, as measured by cortisol levels and EEG activity.

➢ ***Conclusion***

Insight Meditation influences brainwave activity (alpha, beta, theta), improving memory, insight, and reducing anxiety. EEG studies show lower frequency waves are more common in meditating individuals, indicating reduced stress levels. Real-time EEG monitoring can track meditation progress and help train individuals. The study found significant drops in cortisol after meditation, highlighting its anti-stress effects.

Keywords: *MR, Insight Meditation, Cortisol, EEG, Stress.*

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I. INTRODUCTION

➢ *Factors Affecting Medical Representative Mental Health*

The Indian pharmaceutical industry has undergone substantial growth in recent years, driven by increased engagement from both multinational corporations and domestic enterprises. This rapid expansion has intensified market competition, subsequently elevating the demand for pharmaceutical sales personnel and broadening the scope of their professional responsibilities. Within this highly

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competitive environment, medical representatives are frequently subjected to substantial performance pressures, particularly in relation to achieving sales targets. Such pressures contribute to a high-stress occupational setting. Numerous factors—including excessive workloads, stringent deadlines, the mobile and target-driven nature of the role, extended working hours, and interpersonal workplace demands serve as significant stressors for sales representatives. The cumulative impact of these factors often results in elevated levels of job-related stress, which can lead to reduced job satisfaction and negatively affect overall employee well-being [1]. Previous research has indicated that pharmaceutical sales representatives (PSRs) often face demanding working conditions, including extended work hours, extensive travel, and the physical burden of managing promotional materials. These occupational demands are recognized as significant contributors to job-related stress among PSRs. Empirical studies have identified key stressors such as insufficient peer support, excessive workloads, and persistent performance pressure as primary factors leading to elevated stress levels within this professional group. Furthermore, several investigations have suggested that chronic workplace stress may have adverse health effects comparable to those associated with sedentary lifestyles or tobacco use—risks that are particularly relevant for individuals employed in pharmaceutical sales roles [2]. Previous research has indicated that pharmaceutical sales representatives (PSRs) often face demanding working conditions, including extended work hours, extensive travel, and the physical burden of managing promotional materials. These occupational demands are recognized as significant contributors to job-related stress among PSRs. Empirical studies have identified key stressors such as insufficient peer support, excessive workloads, and persistent performance pressure as primary factors leading to elevated stress levels within this professional group. Furthermore, several investigations have suggested that chronic workplace stress may have adverse health effects comparable to those associated with sedentary lifestyles or tobacco use—risks that are particularly relevant for individuals employed in pharmaceutical sales roles [3]. Due to the inherent demands of their profession, medical representatives are frequently exposed to a range of occupational stressors, including excessive workloads, strict deadlines, complex job responsibilities, prolonged working hours, insufficient rest periods, suboptimal working conditions, and role ambiguity or conflict. Opportunities for career advancement can function as a crucial buffer against the psychological strain associated with factors such as perceived underperformance, job insecurity, and inadequate professional development. Moreover, unexpected changes in socioeconomic status may contribute to a perceived loss of autonomy or control, which can further exacerbate stress levels among individuals in this occupational group [4].

II. MATERIAL AND METHODS

This study employed a 21-day experimental design to examine the effects of Vipassana meditation on physiological and psychological stress markers among medical representatives. Participants engaged in guided Vipassana meditation sessions daily from 6:00 to 7:00 a.m. on an empty stomach. The sample comprised 20 healthy adults, aged between 25 and 45 years. Serum cortisol levels were assessed through morning blood samples collected one day prior to the commencement of the meditation practice (baseline) and on the 21st day, following the final session. A paired samples t-test was conducted to determine whether the observed changes in mean cortisol levels were statistically significant. In parallel, electroencephalographic (EEG) assessments were performed under controlled conditions on both the first and the twenty-first day to evaluate changes in neural activity and mental state. By integrating biochemical and neurophysiological data, the study aimed to evaluate the efficacy of Vipassana meditation in reducing stress and modulating hormonal responses. All participants provided written informed consent prior to their inclusion in the study [5,6].

➢ *The Participants have Explained the Method of Meditation:*

Participants in the study described the structured methodology of Vipassana meditation, which necessitates attending a ten-day residential course at an official Vipassana Meditation Center. This retreat is conducted under the supervision of an experienced teacher (Acharya) and is characterized by the practice of noble silence, which involves complete abstention from verbal and non-verbal communication with others and disconnection from the external world. The retreat formally begins on "Day Zero," when participants arrive at the center and complete registration procedures. The instructional process is divided into three progressive stages:

- Step I: Observance of Sīla (Moral Conduct): This foundational stage emphasizes ethical discipline. Participants commit to five precepts: abstaining from killing, stealing, sexual misconduct, lying, and the use of intoxicants. These ethical guidelines are designed to create a stable and harmonious environment conducive to meditation practice.

- Step II: Anapana (Awareness of Respiration): In this stage, practitioners develop concentrated awareness by observing the natural breath, particularly the sensation of air passing in and out of the nostrils and the area above the upper lip. In cases of mental agitation, a brief period of rapid breathing may be employed to stabilize attention. Anapana meditation fosters tranquility, mindfulness, and sharpened concentration, thereby preparing the mind for the more profound practice of Vipassana. This stage occupies the first three and a half days of the retreat.

- Step III: Vipassana (Insight Meditation); Vipassana involves the systematic observation of bodily sensations with equanimity, without reacting with craving or aversion. Practitioners learn to perceive sensations objectively, recognizing them as impermanent and devoid of inherent essence. This insight fosters mental purification and a deeper understanding of the nature of reality. The final six and a half days are dedicated to this

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stage, during which instructions are reinforced through daily video discourses by S.N. Goenka, who elucidates the philosophical and practical aspects of the meditation practice. Throughout the initial nine days, participants maintain noble silence to support internal focus and self-reflection.

➢ *Real Time Recording*

Demographic data, including participants' age and gender, were collected as part of the study. Electroencephalography (EEG) was utilized to monitor and analyze brainwave activity. A neuroheadset was employed to capture, display, and record EEG signals. The analysis was conducted in accordance with the International 10–20 system, a standardized method for electrode placement in EEG studies. This research evaluated the utility of the Mindrove EEG Bright headband, a commercially available, lightweight EEG device. The device functions using a four-channel electrode configuration integrated within a headband, operating across a frequency range of 1–250 Hz. Although the Mindrove EEG Bright provides a less detailed representation of brain activity compared to multi-electrode or clinical-grade EEG systems, its primary advantage lies in its non-intrusive design, which facilitates ease of use and enhances participant comfort during extended data collection sessions.

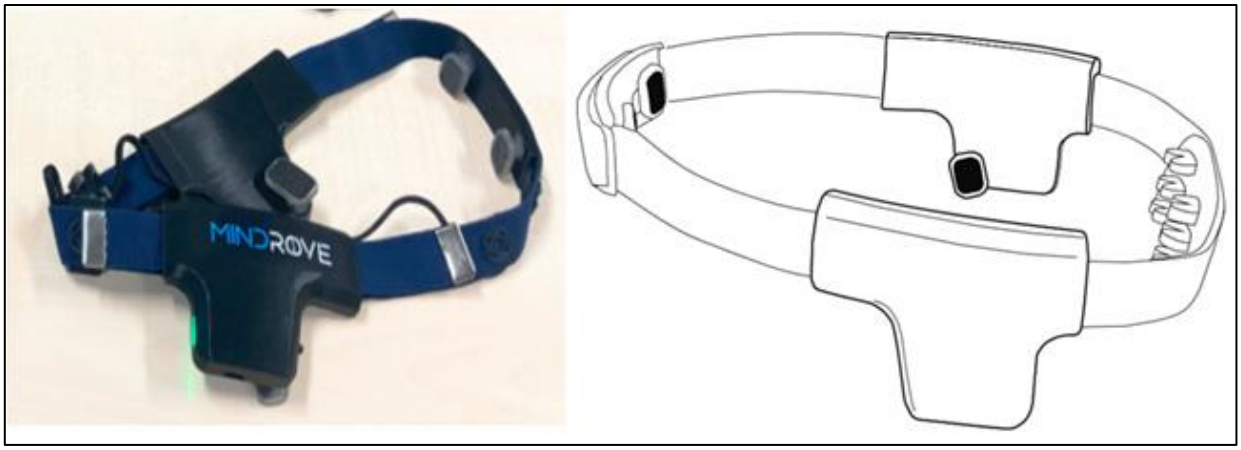

Fig 1 Mindrove EEG Bright Headband.

Table 1 Brain wave samples for different waveforms [7]

Frequency Band	Frequency	Brain States
Gamma (γ)	35-80 Hz	Concentration
Beta (β)	12–35 Hz	Anxiety-dominant, active, external attention, relaxed
Alpha (α)	8–12 Hz	Very relaxed, passive attention
Theta (θ)	4–8 Hz	Deeply relaxed, inward focused
Delta (δ)	0.5-4 Hz	Sleep

III. RESULT

A statistically significant decrease in serum cortisol levels was observed among all 20 participants following a 21-day period of Insight meditation, when compared to baseline measurements obtained one day prior to the initiation of the practice (Table no. 02). At baseline, the mean serum cortisol concentration was 14.09 µg/dL, with a standard deviation of 2.476 and a standard error of 0.554. After 21 days of sustained meditation, the mean cortisol level declined to 9.29 µg/dL, with a standard deviation of 1.753 and a standard error of 0.392 (Table no. 01). The difference in mean cortisol levels between the pre- and post-intervention groups was analyzed using a paired t-test, yielding a highly significant result ($p < 0.001$), thereby suggesting a strong association between regular Insight meditation and reduced physiological stress markers.

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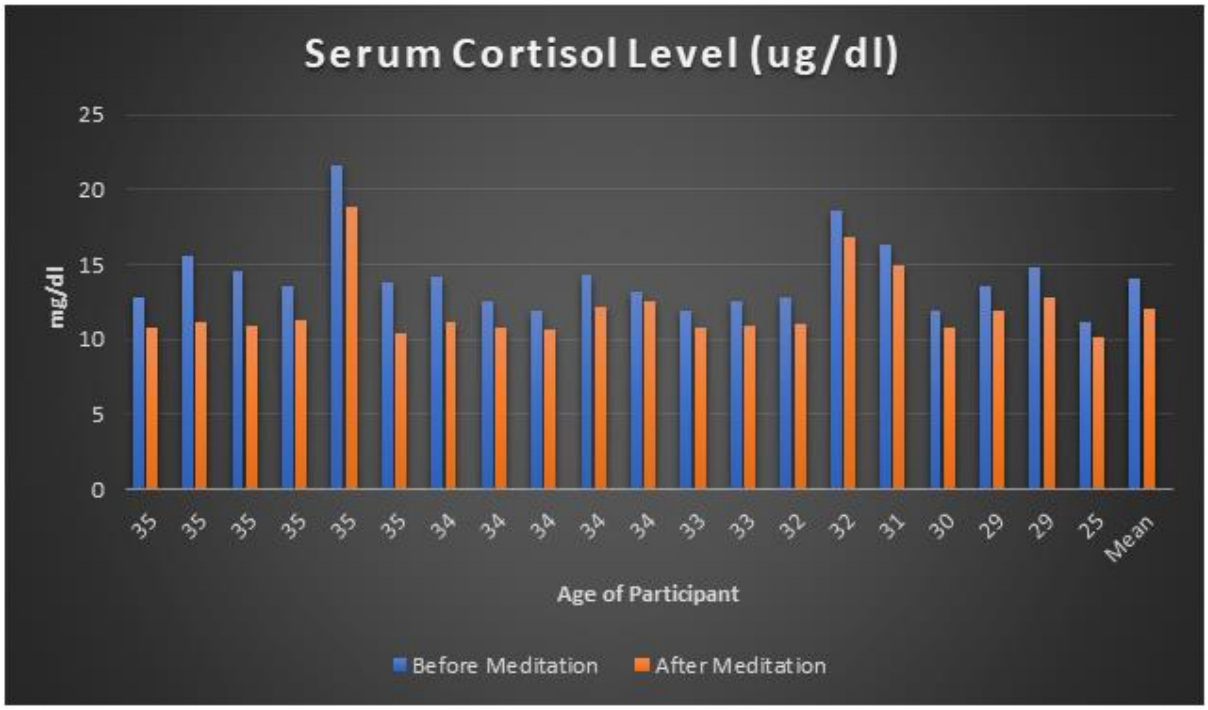

Fig 2 Describe the serum cortisol level (ug/dl) before and after the practice of Insight meditation.

Table 2: Describe the serum cortisol level before and after 21 days of Insight meditation.

Sr. no	Age	Serum Cortisol Level (ug/dl) Before starting the Insight meditation.	Serum Cortisol Level (ug/dl) After 21 days of the Insight meditation.
1	35	12.8	10.8
2	35	15.6	11.2
3	35	14.5	10.9
4	35	13.6	11.3
5	35	21.6	18.9
6	35	13.8	10.4
7	34	14.2	11.2
8	34	12.6	10.8
9	34	11.9	10.6
10	34	14.3	12.1
11	34	13.2	12.5
12	33	11.9	10.8
13	33	12.6	10.9
14	32	12.8	10.98
15	32	18.6	16.8
16	31	16.3	14.99
17	30	11.9	10.8
18	29	13.6	11.9
19	29	14.8	12.8
20	25	11.2	10.1
MEAN	32.7	14.0900	12.0385
SD	2.6969	2.4762	2.2895
SEM	0.5008	0.5537	0.5119
N	20	20	20

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Table 3: Describe Electroencephalogram Activity before and after Insight Meditation.

EEG Activities	Before Insight Meditation		After Insight Meditation		P-value
	Mean	SD	Mean	SD	
Delta wave	4.4505	±1.2356	13.2035	±2.5199	p<0.001
Theta wave	2.0220	±0.8332	3.5205	±0.7740	p<0.001
Alpha wave	1.1050	±0.5261	1.5885	±0.5176	p<0.001
Beta wave	0.9680	±0.3834	0.9870	±0.3544	0.7060
Gamma wave	0.5005	±0.1856	0.5060	±0.1872	0.7176

Based on Table no.03, it was found that delta, theta, and alpha brainwaves gradually increased after Insight meditation with statistically significant at the 0.05 level compared to before Insight meditation. On the other hand, beta and gamma bands were not changed after Insight meditation.

Based on Table no.03, it was found that delta brainwave increased after Insight Meditation with statistically significant at the 0.05 level compared to before Insight Meditation (before: 4.45 ± 1.23 µV after: 13.20 ± 2.51 µV p<0.001).

Based on Table no.03, it was found that theta brainwave increased after Insight Meditation with statistically significant at the 0.05 level compared to before Insight Meditation (before: 2.02 ± 0.83 µV after: 3.52 ± 0.77 µV p <0.001).

Based on Table no.03, it was found that alpha brainwave increased after Insight Meditation with statistically significant at the 0.05 level compared to before Insight Meditation (before: 1.10 ± 0.52 µV after: 1.58 ± 0.51 µV p<0.001).

Based on Table no.03, it was found that beta brainwave not change after Insight Meditation compared to before Insight Meditation (before: 0.96±0.38 µV after: 0.98±0.35 µV p = 0.7060).

Finally, Based on Table no.03, it was found that gamma brainwave was not changed after Insight Meditation compared to before Insight Meditation (before: 0.50±0.18 µV after 0.50±0.18 µV p =0.7176).

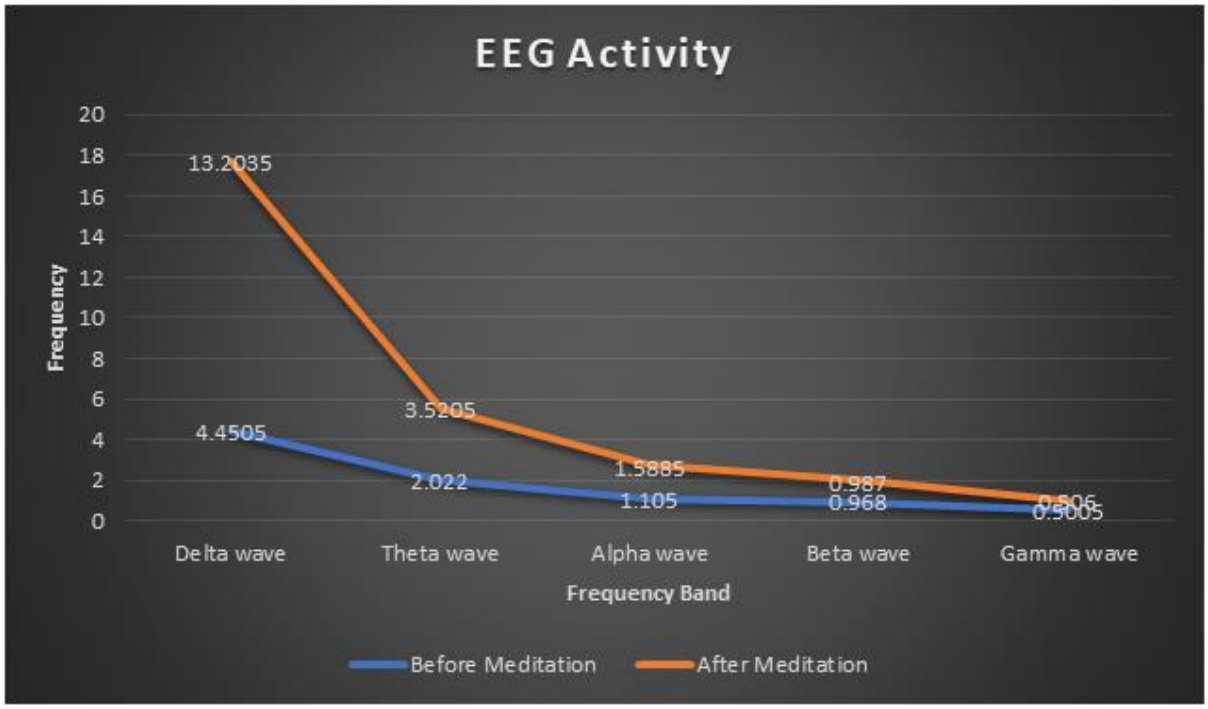

Fig 3 Describe Electroencephalogram Activity before and after Insight Meditation.

The findings indicated that Insight Meditation may contribute to stress reduction and cellular restoration by enhancing subjective well-being and increasing EEG activity associated with relaxation and potential growth hormone stimulation. Specifically, statistically significant increases ($p < 0.05$) were observed in the alpha, theta, and delta brainwave frequencies, which are commonly associated with states of deep relaxation and meditative awareness. In contrast, no significant changes were detected in the beta and gamma frequency bands following the meditation intervention. These results align with previous studies, which have demonstrated similar outcomes even

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among individuals with no prior experience in Insight Meditation or related contemplative practices such as yoga for mental health, neiyang qi gong, Zen meditation, walking meditation, or inner wisdom meditation. Such practices have been consistently associated with reduced psychological and physiological stress, enhanced workplace well-being, decreased symptoms of depression, improved emotional intelligence, and positive health behavior changes, particularly in individuals managing chronic conditions such as diabetes. Moreover, Insight Meditation is believed to facilitate emotional cleansing, promote relaxation, and support processes related to cellular regeneration.

IV. DISCUSSION

A study found that participants who completed a 21-day Insight meditation program reported reduced stress and improvements in various clinical and workplace-related factors, such as lower aggression, anxiety, emotional exhaustion, and role overload. The practice also boosted cognitive coping skills and self-enhancement. Stress, often triggered by daily life challenges, is linked to both psychological and physical illnesses. Many companies to offer meditation as a stress-reduction tool. Meditation is increasingly used in psychotherapy and has been shown to lower stress, anxiety, depression, heart rate, and blood pressure, while improving conditions like IBS and aiding cancer recovery. Brainwave studies reveal that meditation enhances alpha, theta, and delta activity waves associated with relaxation, unconscious processing, and intuition. EEG coherence, a marker of brain connectivity and pure consciousness, has been linked to higher creativity, IQ, and social awareness.

V. CONCLUSION

Medical representatives often face high stress due to heavy workloads, tight deadlines, and job pressures. While stress is a natural part of life, practices like yoga, meditation, counseling, and spending time with loved ones can help manage it. If stress persists, professional help is recommended. Meditation influences brainwave activity (alpha, beta, theta), improving memory, insight, and reducing anxiety. EEG studies show lower frequency waves are more common in meditating individuals, indicating reduced stress levels. Real-time EEG monitoring can track meditation progress and help train individuals. The study found significant drops in cortisol after meditation, highlighting its anti-stress effects. Insight meditation, in particular, may be effective for reducing stress-related mental and physical issues. A stress audit can help improve workplace conditions, boosting job satisfaction and performance. Managing stress among medical representatives benefits both employees and organizations. More clinical research is needed to validate meditation as a standard treatment in healthcare.

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