Effect of Brainwave Entrainment and frequency-therapy technology for EMF effect mitigation on the quality of sleep, mood, and heart rate variability: pilot study with healthy individuals.

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2. Objectives

2.1. General Objective

Evaluate the Effect of Audio Brainwave Entrainment (ABE) and EMF effects mitigation technology (EEMT), either alone or combined on quality of sleep and mood.

2.2. Specific Objectives

• Evaluate the effect of ABE and EEMT on:

• Quality of Sleep - through the Pittsburgh Quality of Sleep Index (PQSI).

• Mood - through the Profile of Mood States (POMS) questionnaire.

• Depression, Anxiety and Stress Levels - through the Depression, Anxiety and Stress Scale (DASS-21).

3. Methods

3.1. Sample Size

Sample size consisted of 20 volunteers who were not making use of analgesics, anti-inflammatories or sleep aids at least seven (7) days prior to, as well as during the study, and who had no hearing disabilities.

3.2. Study Duration

Study was conducted over the course of six (6) weeks.

3.3. Intervention

Participants were asked to undergo two (2) Braintap sessions a day (Braintap Headset, New Bern - NC - USA) and be in close proximity to a Somavedic™ EMF effects mitigation technology during the day and particularly DURING SLEEP for the duration of the study (6 weeks).

3.4. Evaluations

The assessments consisted of the following online questionnaires:

• Pittsburgh Quality of Sleep Index,
• The Profile of Mood States (POMS) questionnaire, and
• The Depression, Anxiety and Stress Scale (DASS-21).

4. Results

Results indicate that:

• Statistically significant decrease in stress and depression scores ($p < 0.05$), and decrease in anxiety, but not statistically significant ($p = 0.0003$) (Figure 1),
• Statistically significant increase in Mood ($p < 0.05$) (Figure 2).
• Statistically significant increase in Quality of Sleep (PQSI total score, $p < 0.05$), as well as on sub scales II (sleep latency), III (sleep duration), V (sleep disturbance), and VII (daytime dysfunction); positive results in sub scales I (subjective sleep quality) and IV (sleep efficiency), although not statistically significant ($p = 0.1981$ and $p = 0.3122$, respectively); finally, on Subscale VI (use of sleep medication), one participant started making use of sleep aids, negatively affecting results ($p = 0.6811$) (Figure 3).

5. Conclusion

Overall results indicate positive effects of Audio Brainwave Entrainment and EMF effects mitigation technology on quality of sleep, stress, depression and mood.

Limitations of this trial are the small sample size, and the fact that the study was not placebo-controlled. A randomized blinded placebo controlled trial with a lager sample size study is awarded.

Figure 1. Depression, Anxiety and Stress Scale (DASS-21). Lower scores indicate improvement. NS: Not statistically significant. *p<0.05* when compared to baseline evaluation. Paired t-test analysis (prism graphpad 9, La Jola USA).

Figure 2. Profile of Mood States (POMS). Lower scores indicate less disturbances to mood, hence, better overall mood. NS: Not statistically significant. *p<0.05* when compared to baseline evaluation. Paired t-test analysis (prism graphpad 9, La Jola USA).

Figure 3. Pittsburgh Quality of Sleep Index (PQSI). Lower scores indicate less disturbances to sleep, hence better quality of sleep. Global PSQI Score (PQSI); Component 1 (PQSI I): Subjective sleep quality; Component 2 (PQSI II): Sleep latency; Component 3 (PQSI III): Sleep duration; Component 4 (PQSI IV): Sleep efficiency; Component 5 (PQSI V): Sleep disturbance; Component 6 (PQSI VI): Use of sleep medication; Component 7 (PQSI VII): Daytime dysfunction. NS: Not statistically significant. *$p<0.05$ when compared to baseline evaluation. Paired t-test analysis (prism graphpad 9, La Jola USA).