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Research Article

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Efficacy of Enviroglobe and Geomat in Combating the Deleterious Effect of Electromagnetic Fields and Geopathic Stress on Sleep

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Abstract

Introduction

The aim of this research is to determine the efficacy of Enviroglobe and Geomat in enhancing sleep and other related parameters of a person sleeping in an environment surrounded with natural and manmade sources of EMF.

Materials and Methods

Sixty-six healthy subjects (44 subjects for Enviroglobe and 22 subjects for Geomat), between 18-60 years were enrolled for this interventional study. The study was conducted at the Apollo Hospital, New Delhi, India.

Result

The comparison of sleep data with and without Enviroglobe in terms of Deep Sleep (78.8 ±53.9) vs (85.3 ±30.5), ($p<0.030$) was found to be statistically significant. There was a trend towards significance in sleep efficiency score and REM sleep as well. We did not find any statistically significant difference between light sleep and awake time.

There was a statistically significant difference between the sleep data with Geomat in terms of Sleep efficiency score (67.4 ±9.7) vs (73.8 ±7.6), $p< 0.028$ and awake time (61.3 ±15.4) vs (51.0 ±11.5), $p<0.021$. We did not find any statistically significant difference between REM, deep sleep, and light sleep.

Discussion

The World Health Organization (WHO) / International Agency for Research on Cancer (IARC) has classified radiofrequency electromagnetic fields as possibly carcinogenic to humans (Group 2B), based on an increased risk for glioma, a malignant type of brain cancer associated with wireless phone use.

Keywords: Enviroglobe, Geomat, Environics, Geopathic Stress, Electromagnetic Field, EMR

1. Introduction

We are surrounded by Electromagnetic fields (EMFs) round the clock. These EMFs are an invisible threat to us and are referred to as emissions and are associated with exposure from both natural and man-made sources like high-tension power lines, mobile towers, wi-fi routers, computers, televisions, microwaves, refrigerators, and other electrical appliances at homes and offices [1].

Depending on their source, the fields can range from extremely high-frequency radio waves to extremely low-frequency (ELF) ley lines. Although these fields form the low energy non-ionizing part of the electromagnetic spectrum that can't damage DNA or cells directly but constant exposure to these fields can cause a variety of health problems, including high Resting Heart Rate, fluctuations in heart rate (HRV), high blood pressure, headache, sleep disturbance, fatigue, reproductive problems, neurological issues, and cancer in extreme cases [2-10].

The thermal effect has been largely studied and refers to the heat that is generated due to the absorption of EMFs. Being exposed to the thermal effect could cause fatigue, cataracts, and reduced mental concentration. The Specific Absorption Rate (SAR value) has been defined by ICNIRP (International Commission on Non-Ionizing Radiation Protection) to limit thermal damage.

Non-Thermal effects, on the other hand, are associated with more serious problems like effects on the cell membrane permeability, bad sleep quality, altered permeability of the blood–brain barrier, altered EEG, reproductive problems, oxidative stress, impaired cognitive functions, poor concentration, depression, and many other problems. Research is going on to study these effects [11-20].

Geopathic stress zones, on the other hand, are areas of disruption of the earth's electromagnetic field which are harmful to all living beings [21-23]. Causes for this are the underground water streams, the concentration of mineral deposits, and underground fissures [24-26].

Enviroglobe and Geomat invented by Syenergy Environics Ltd, India are known to mitigate the effects of man-made EMF and natural Geopathic emissions respectively. These devices use patented technology to harmonize the effects of both digital smog and geopathic stress, which compensate for the ill effects of geopathic Stress, and the superimposed stressors of manmade EMFs. Enviroglobe claims to correct an area of 300 sq. ft around it while Geomat corrects an area of 6x3 feet. The current study aims at analysing the efficacy of Enviroglobe and Geomat in improving the sleep and related parameters of a person sleeping in an area surrounded by natural and man-made emissions from nearby sources.

2. Materials and Methods

Sixty-six healthy subjects (44 subjects for Enviroglobe and 22 subjects for Geomat), between 18-60 years were enrolled for this interventional study. The study was conducted at the Apollo Hospital, New Delhi, India, after approval by its institutional ethics committee- Biomedical Research, vide letter no IAH-BMR-001/01-22, RP-32/2021). The study has been registered with the clinical trial registry of India CTRI/2022/05/042367 [Registered on: 04/05/2022].

A full, free, and voluntary informed consent was obtained from all the participants. The participants were assured of the confidentiality of their personal information, and they were also counselled to explain the study rationale, procedure, and terminologies used in the questionnaire. Flow chart of the study has been given in Figure 1.

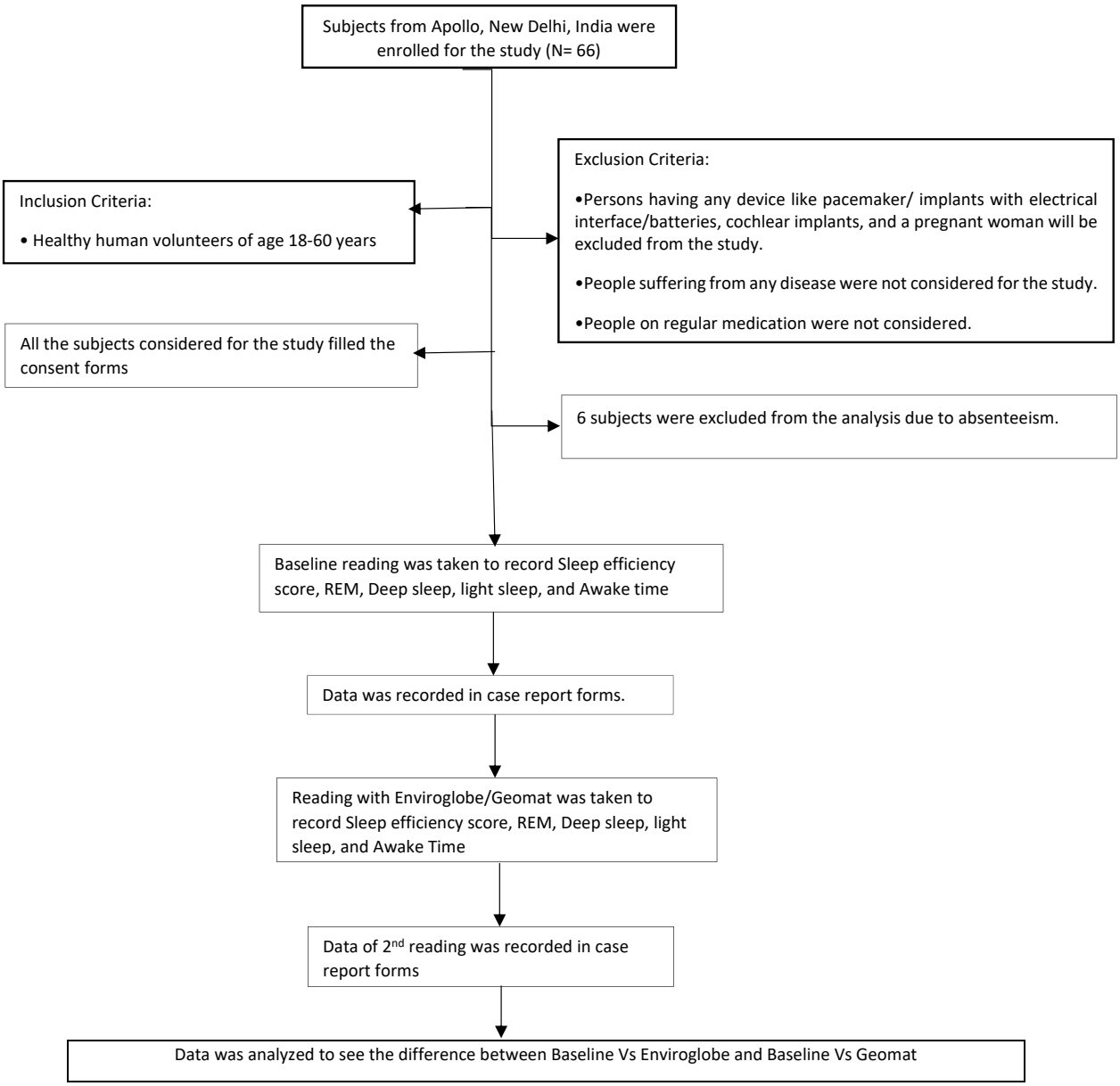

Figure 1: Flowchart of the study

3. Inclusion Criteria

- Healthy participants between 18-60 years who were willing to participate in the study and were physically fit and had no comorbidities.
- The participants who were not suffering from any chronic disease.

4. Exclusion Criteria

- People suffering from any sleep disorder or any chronic physical or mental illness, affecting their sleep.
- People with any chronic respiratory problem (including nasal congestion, chest infections, asthma, adenoids, allergic rhinitis, etc), having any device like pacemaker/ implants with electrical interface/batteries, cochlear implants, and pregnant women.
- People on regular medication for metabolic, neurological issues or any other severe condition.

5. Data Collection

Data of the participants was recorded for a total of two nights from 10pm to 6am. Sleep data was recorded for each subject to establish the baseline and then same recording was done in similar controlled conditions with Geomat and Enviroglobe, in the second session. Geomat was placed under the mattress of the bed where the participants slept. Each recording was preceded by a readiness session designed to help participants familiarize to the testing conditions and to rule out the presence of any sleep or neurological disorders.

The subjects were also monitored for other factors which could affect results. These included intake of coffee/ tea, last night's sleep quality and any kind of work/home related stress.

Sleep data was recorded using the Fitbit Versa 2 band which complies with Part 15 of the FCC Rules and with Industry Canada license exempt RSS standard(s).

Data was recorded for the sleep efficiency score, REM, deep sleep, light sleep, awake time, and total sleep time.

6. Statistical Analysis

Descriptive statistics were used in this study to summarize data from the sample, including mean, median, and SD.

The Shapiro-Wilk test was used to check the normal distribution. To check the mean or median difference between the groups we have used the t-test and Mann-Whitney U-test as appropriate. The alpha level for statistical significance was set at $p<0.05$.

7. Result

Data from 60 subjects (40 subjects with Enviroglobe, 20 subjects with Geomat) was used for statistical analysis, as 6 subjects dropped out of the study.

8. Enviroglobe

All the 40 subjects were females, with age ranging from 18 years to 60 years. The comparison of sleep data with and without Enviroglobe is depicted in Table 1. The difference in Deep Sleep (78.8 ±53.9) vs (85.3 ±30.5), was found to be statistically significant ($p<0.030$, Table 1). There was a trend towards significance in sleep efficiency score and REM sleep as well. We did not find any statistically significant difference between light sleep and awake time.

Parameters	Normal		Enviroglobe		p-value
	Mean ± SD	Median, IQR	Mean ± SD	Median, IQR	
Number	40		40		
Sleep efficiency score	70.4 (11.8)	74.0 (62.5, 78.5)	75.4 (8.9)	75.5 (69.5, 81.0)	0.072
REM	69.7 (22.0)	67.5 (57.5, 81.0)	77.0 (22.0)	80.0 (62.0, 94.0)	0.074
Deep sleep	78.8 (53.9)	63.5 (53.0, 86.5)	85.3 (30.5)	82.5 (63.0, 102.0)	0.030
Awake time	36.5 (26.8)	43.5 (3.0, 55.5)	40.2 (30.7)	48.5 (2.0, 59.0)	0.46
Light sleep	232.4 (80.4)	205.0 (172.0, 278.5)	244.9 (75.7)	245.0 (201.0, 274.5)	0.26
Total Sleep	355.0 (113.2)	353.0 (280.0, 418.5)	367.5 (87.1)	372.0 (323.5, 434.0)	0.30

Table 1: Comparison of parameters with and without Enviroglobe, subjects (n=40)

Geomat: Out of 20 subjects, 10 subjects were males, and 10 subjects were females, with age ranging from 18 years to 60 years.

There was a statistically significant difference between the sleep data with Geomat in terms of Sleep efficiency score (67.4 ±9.7) vs (73.8 ±7.6), $p< 0.028$ and awake time (61.3 ±15.4) vs (51.0 ±11.5), $p<0.021$. We did not find any statistically significant difference between REM, deep sleep, and light sleep. (Table 2).

Parameter	Normal	Geomat	p-value
Number	20	20	
Sleep efficiency score, mean (SD)	67.4 (9.7)	73.8 (7.6)	0.028
REM, mean (SD)	69.2 (37.6)	78.7 (28.7)	0.37
Deep sleep, mean (SD)	61.8 (21.5)	63.8 (21.3)	0.77
Awake time, mean (SD)	61.3 (15.4)	51.0 (11.5)	0.021
Light sleep, mean (SD)	208.6 (60.8)	215.4 (42.8)	0.69
Total sleep, mean (SD)	337.6 (92.3)	357.8 (64.0)	0.43

Table 2: Comparison of parameters with and without Geomat, subjects (n=20)

9. Discussion

Excessive exposure to EMF generated from both man-made sources and natural sources (geopathic stress) is known to have negative effects on human health[8] and many experts, recommend taking steps to reduce exposure to both of these EMF sources to reduce potential health risks [27].

The World Health Organization (WHO) / International Agency for Research on Cancer (IARC) has classified radiofrequency electromagnetic fields as possibly carcinogenic to humans (Group 2B), based on an increased risk for glioma, a malignant type of brain cancer associated with wireless phone use [28,29]. This was studied by a Working Group of 31 scientists from 14 countries, who were assigned the task to assess the potential carcinogenic hazards from exposure to radiofrequency electromagnetic fields.

Based on the Source of Emission, EMFs can be Categorized as follows

1. Geopathic Stress caused by natural sources.
2. Radiofrequency or microwave emissions caused by man-made sources.

10. Geopathic Stress

Geopathic stress is a distorted or disrupted electromagnetic field of the Earth which is harmful to humans, animals, and plants [21-23]. Causes for this are the underground water streams the concentration of mineral deposits, and underground fissures [24-26]. Geopathic lines are repeated at every 5- 20 meter in N-S and E-W directions and affect 20% of the built spaces.

Prolonged exposure to Geopathic stresses is known to cause diseases like increased Blood Pressure, drowsiness, fatigue, migraine, lowered immune response, disturbed sleep, and cancer as well as other stress-induced ailments [30]. Other negative effects of Geopathic stress are a high attrition rate, the poor performance of people working in a Geopathic zone, bad interpersonal relationships among people spending long hours or sleeping in such zones, and frequent breakdown of the machinery kept in Geopathic zones [31]. Augner et.al., 2010, reported that well-being can be location dependent, which may be because of geopathic stress zones. They, however, reported no impact on the test work performance parameters [32,33].

Geopathic stress is detrimental to human health and can cause alterations in blood pressure and can trigger many other health conditions [1]. In fact, there is evidence to suggest that geopathic stress can adversely impact the body's subtle energy systems (these include the etheric body, its chakras, and meridians) as well as its electrical and neural well-being (brain, heart, and muscles), thus delaying healing and recovery [34]. According to Aghav et.al., 2015, Geopathic stress can weaken the body's natural Défense and people spending a long time or sleeping in the Geopathic zones may experience frequent waking with a feeling of tiredness, tingling, and lack of sensation of feet, fatigue in the morning, restlessness, insomnia, migraine, rheumatism, nervousness, cardiovascular circulation problem, asthma, and arthritis [34,35].

11. Electromagnetic Field from Man Made Sources

The man-made electromagnetic fields are emanated from various electrical and wi-fi devices around us. These fields are structurally different from the electromagnetic fields found in nature – including the subtle low electromagnetic fields that our body's cells use to communicate with each other and our cells respond to these fields negatively. Effects of these EMS can be classified into thermal and non-thermal effects [36-38].

Beale et. al., 1997, found that residents exposed to chronic 50 Hz MF exposure as a result of living near high-voltage substations and power transmission lines experienced psychological symptoms such as suicide, depression, and disturbed emotional state [39].

Many other studies have found that people exposed to EMF have experienced headaches, changes in blood-brain-barrier permeability (BBB), tremors, memory loss, sleep disturbance, anxiety, depression, exhaustion, and stress [40-45].

According to our previous study people who were spending time in Geopathic zones had increased Resting Heart Rate, poor interpersonal relationships, and lower performance, and a significant improvement in all these parameters was seen when these zones were corrected [46].

A study done to analyse the impact of EMF exposure on HD EEG signals demonstrated that the activity level of the EEG increases with the exposure of EMF and alteration in Herat Rate variability (HRV) was observed by Chandra et.al., 2022, during one of the studies done by them to check the impact of EMF exposure on HRV [3,10].

This study was aimed at analysing the efficacy of Geomat and Enviroglobe in improving sleep when a person is surrounded by natural and manmade sources of EMF which are detrimental to the health of the people. Sleep is essential for good health

and well-being. Sleep is essential because it allows the body to repair itself and prepare for the next day. Several studies have demonstrated that sleep can affect our memory, cognition, the healing process, blood pressure, brain functioning, emotional and social intelligence, and immunity [47,48].Cooper et.al., 2018, People who sleep less than seven hours per night on a regular basis are more likely to have a higher BMI and develop obesity than those who sleep more [49,50].

The sample's average sleep time was 5.78 hours, which is less than the 7-9 hours recommended by the National Sleep Foundation for the age group of the sample [51]. However, subjects showed significant improvement in sleep efficiency and awake time with Geomat, while Enviroglobe improved deep sleep.

12. Limitations of the Study

The small sample size and a racially homogenous population are the obvious limitations of the study that are less representative of the population as a whole. Also, the participants were monitored clinically in a controlled environment, which does not simulate a real-world environment. Moreover, none of the subjects had any concurrent illnesses or reported stress/disorder, which is not representative of the general population.

13. Conclusion

To conclude, the study has shown that, despite the small sample size, there is enough data to suggest that using Enviroglobe and Geomat may considerably contribute to reducing the negative impacts of both natural and artificial EMF by enhancing specific bodily parameters.

Considering the outcome of the study, a combination of these two products can have a great impact on the overall sleep of a person, therefore, additional research on a wider population would be of great advantage to mankind.

In fact, since the study was carried out in a controlled group, actual data from a wider population with sleep related comorbidities due to emf may aid in a better application of this technology.

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