QUALITY OF LIFE IMPROVEMENT

MODULATED BY SCALAR WAVE: A PRELIMINARY STUDY

Research Report

Assoc. Prof. Ts. Dr. Amir Syahir Bin Amir Hamzah
Department of Biochemistry,
Faculty Biotechnology and Biomolecular Sciences,
University Putra Malaysia.

Abstract

Scalar wave devices, purported to enhance human well-being by manipulating subtle energy fields, have seen increasing popularity in alternative wellness practices. Despite this, empirical support for their efficacy is limited. This two-part study aims to bridge this gap by assessing the impact of these devices on quality of life and sleep quality, using both qualitative and quantitative measures. In Part I, participants used the Zazen® Scalar 300 core over 7 weeks, documenting their experiences in a logbook. Quality of life was measured pre- and post-intervention using the WHOQOL-BREF scale. Building on these findings, Part II focused on a detailed analysis of sleep quality using the Pittsburgh Sleep Quality Index (PSQI), a comprehensive tool assessing various sleep dimensions using Zazen® Scalar iwear device device. Part I revealed subtle enhancements in sleep quality, focus, and energy levels, mirrored in the WHOQOL-BREF scores, especially in the sleep domain. Despite the subtleties of statistical delineation, they indicated a positive trend and laid the groundwork for Part II. In Part II, the PSQI data underscored significant sleep quality improvements, including reduced sleep latency, increased sleep efficiency, fewer disturbances, and better subjective sleep quality. Additionally, a rise in daytime enthusiasm and functioning was observed, suggesting a link between improved sleep and daily performance. As the conclusion, the Zazen® Scalar devices (both 300 core and iwear) showed a potential to positively impact quality of life and significantly enhance sleep quality. These findings, while preliminary, highlight the device's potential in alternative wellness practices, particularly in improving sleep-related aspects. The study calls for further research to delve deeper into the long-term effects and broader applications, and to understand the underlying mechanisms driving these improvements. Integrating qualitative insights with quantitative data emerges as a crucial approach in evaluating alternative wellness technologies, offering a more holistic perspective on their efficacy.

Introduction

Zazen Health Solutions Sdn. Bhd. (ZHS) incorporated in 2006, is a wholly Malaysian-owned registered company. An award winning wellness company, ZHS dedicates itself to creating and providing simple solutions for individuals to stay healthy in the 21st century. One of its products, the Zazen® Scalar Generator, was developed in 2008. It uses a technology that generates the harmonic healing resonance (7.83 Hz) of zero-point scalar energy - a non-invasive tool that supports the body's innate ability to heal itself. Launched in 2014 after 6 years of research and development, Zazen® Scalar Generator is recognised by the Patent Cooperation Treaty worldwide (WO 2017/026889 A2) as a novelty and invention, and was awarded a success showcase by Platcom Ventures and Agency Innovation Malaysia as a Malaysian innovation.

In recent years, the exploration of scalar wave devices as tools for enhancing well-being has garnered significant interest. These devices, which are believed to manipulate subtle energy fields, are being increasingly adopted with the aim of improving various aspects of human health and wellness. Despite growing anecdotal evidence supporting their benefits, there remains a lack of robust, empirical data to substantiate these claims. This gap in scientific understanding presents a critical challenge: determining the real-world efficacy of scalar wave devices in enhancing quality of life.

A total of 42 surveys have been done for the study which consisted two parts, part I was done with Zazen® Scalar 300 core device, and part II was done with Zazen® Scalar iwear (2 core) device device. The surveys were completed by 24 men (57%) and 18 women (43%) who were 27 to 45 years old that were recruited for various groups; 1. Group that was given a scalar wave device from March 9, 2023 until July 25, 2023, and surveyed 2 times, which is before and after using the Zazen® Scalar; 2. Group that was not given to use any scalar wave device; 3. Group that has some sleep problem and surveyed 2 times, which is before and after using scalar device for three weeks, from September 15, 2023 until October 6, 2023.

In part I of the study, the participants were given a World Health Organization Quality of Life scale (WHOQOL) pre-test using an online questionnaire-based. After completing the pre-test, the participants had to complete a logbook for weekly progress of each participant when using the device. Once completed, the participants then filled out the WHOQOL post-test form. We analyzed the results of a 7-week study to understand the longitudinal effects or long-term changes.

In Part II of our study, we shift our focus to a more specialized evaluation of sleep quality using the Pittsburgh Sleep Quality Index (PSQI). Building on the preliminary findings from Part I, which established the positive effects of Zazen® Scalar on sleep and daytime functioning, Part II aims to provide a more granular understanding of these effects. The PSQI allows us to dissect various components of sleep quality, such as sleep duration, sleep latency, and sleep efficiency, among others. By employing this validated instrument, we aspire to quantify the specific aspects of sleep that are most positively influenced by scalar wave devices. This will not only corroborate our initial findings but also offer a more detailed view into the potential applications and limitations of this technology in improving sleep quality.

Part I

Methodology

Part I of the study was designed to assess the impact of the Zazen® Scalar 300 core, a scalar wave device, on the quality of life of participants. The study combined both qualitative and quantitative approaches to provide a comprehensive understanding of the device's efficacy.

Selection Criteria: Participants were chosen based on their interest and willingness to participate in a 7-week study involving the use of the scalar wave device. Specific inclusion or exclusion criteria (e.g., age range, health status) were established to ensure a representative sample. Information regarding age, gender, occupation, and health status was collected to contextualize the results.

Usage Guidelines: A brief description of the Zazen® Scalar 300 core, including its intended use and operational instructions were described to all participants. Participants were instructed on how to use the device properly, including duration of use, placement, and any safety precautions.

Data Collection

WHOQOL Pre- and post-test: Before beginning the intervention, participants completed the WHOQOL questionnaire online to establish a baseline quality of life measurement across its four domains: physical health, psychological health, social relationships, and environment. At the end of the 7-week period, participants completed the WHOQOL questionnaire again to assess changes in quality of life after using the device.

Logbook: Participants were required to maintain a daily logbook, recording their experiences, observations, and any changes they noticed while using the device. This qualitative data was aimed at capturing subtle changes in well-being, sleep patterns, energy levels, and other relevant aspects of daily life.

The raw data consisted of qualitative responses from participants over a 7-week period, regarding their experiences with Zazen® Scalar 300 core device. Each week, participants provided feedback on their sleep quality, emotional states, and overall experiences with the device. Each participant weekly comments were extracted verbatim to preserve the authenticity of their experiences and perceptions. Comments were categorized by week, ensuring that the analysis could track changes over time.

Data Analysis

Quantitative Analysis: The pre- and post-intervention WHOQOL scores were compared using repeated measures Analysis of Variance (ANOVA) to identify statistically significant changes in the quality of life domains. ANOVA is a statistical method used to compare the means of three or more groups to see if at least one of them significantly differs from the others. It essentially helps determine if different groups have different average values on a particular variable, by analyzing the variance within each group and between the groups.

Qualitative Analysis: Logbook entries were analyzed thematically to identify common patterns, experiences, and perceptions about the device's impact on daily life and well-being.

In the study assessing the impact of a Zazen® scalar on participant well-being, a comprehensive methodological approach was utilized to analyze the qualitative data collected over 7 weeks. This multi-faceted analysis began with Thematic Analysis, which involved meticulously coding and categorizing the data to identify recurrent themes such as sleep quality, emotional changes, and variations in response. Thematic Analysis is a research method for systematically analyzing the content of communication, such as texts or media, to quantify patterns, themes, or biases. Complementing this, Content Analysis was employed to quantitatively assess the frequency of specific key terms and concepts within the responses, providing an objective measure of the prevalent themes. It is a qualitative analytic method for identifying, analyzing, and reporting patterns (themes) within data, focusing on deriving rich, detailed themes that capture the essence of the data set.

Then, Narrative Analysis was conducted, focusing on how participants described and made sense of their experiences with the device. It is method of analyzing content that involves examining and interpreting the structure and content of stories or narratives to understand how individuals make sense of experiences or events. Lastly, longitudinal analysis was essential in understanding the evolution of participant experiences and sentiments over time, tracking how perceptions and reported effects changed from week to week. It is a statistical method that involves collecting and analyzing data from the same subjects repeatedly over a period of time to observe changes and developments in the variables of interest. This comprehensive approach ensured a holistic and nuanced understanding of the qualitative data, capturing both the collective trends and individual variations in the participant experiences.

A significant aspect of the methodology centred around the analysis of text or words within the participant feedback. This process involved a meticulous examination of the language used by the participants to express their experiences and perceptions. Content Analysis is a key technique employed for this purpose. It involved identifying and counting the occurrences of specific words and phrases deemed relevant to the study's focus, such as "sleep," "relaxation," "stress," and "energy." This quantitative assessment allowed for the measurement of the frequency of these concepts, providing an objective lens through which to view the prominence of certain themes in the participants' narratives.

Sentiment Analysis from The Text

The sentiment analysis is a computational technique used to determine the emotional tone behind a series of words, to gain an understanding of the attitudes, opinions, and emotions expressed within an online mention or text. It was conducted using the TextBlob library, a Python library for processing textual data built on Natural Language Toolkit. For each comment, a polarity score was calculated, which is a float within the range [-1.0, 1.0]. This score represents the sentiment of the text, where -1.0 is extremely negative, 0 is neutral, and 1.0 is extremely positive. Each comment was analyzed separately, and the polarity score was assigned based on the sentiment expressed in the text. For

each week, the polarity scores of all comments were aggregated to understand the overall sentiment for that week.

example of the Python code run as below:

```
# Sample comments
comments = [ "I feel great about the new product. It has improved my daily routine.",
   "The product is not what I expected. I am disappointed with the performance.",
   "This is an average product. It neither excites me nor disappoints me."]

# Perform sentiment analysis on each comment
for comment in comments:
   blob = TextBlob(comment)
   sentiment = blob.sentiment
   print(f"Comment: {comment}\nSentiment Polarity: {sentiment.polarity}, Sentiment Subjectivity: {sentiment.subjectivity}\n")

# Note: Polarity is a float within the range [-1.0, 1.0]. Subjectivity is a float within the range [0.0, 1.0].
```

Ethical Considerations

All participants were provided with detailed information about the study, including its purpose, procedures, potential risks, and benefits. Written informed consent was obtained from each participant. Measures were taken to ensure the confidentiality and anonymity of participant data.

Results and Discussions

Overall Trends and Effectiveness

Most participants (5 out of 7) reported improvements in sleep quality and feelings of refreshment upon waking up. This trend suggests a potential effectiveness of the scalar wave device in enhancing sleep quality. However, Participant 1 experienced a delayed positive effect, starting from Week 2, indicating variability in how quickly individuals might respond to the scalar wave device. It is worthy to note that, Participants 3, 5, 6, and 7 consistently reported positive effects from Week 1 through Week 7, suggesting a sustained benefit for certain individuals. There were also participants who reported no or minimal improvement. Participant 4 consistently felt no improvement, but it's worth mentioning a slight indication of calmness felt in week 3, while Participant 2 noted minimal changes. The consistent group comprises 57.1% of the sample, which also highlights individual differences in response to the scalar wave device.

Specific Observations

Participant 3 reported experiencing more vivid dreams, indicating an alteration in sleep quality or sleep stage distribution. Meanwhile, Participant 1 noted about ants (Week 5 and 6) is an outlier and might not be directly related to the device efficacy but rather an environmental factor. Participant 7 noted mood changes (Week 4) alongside improved sleep, which could imply broader psychophysiological effects of the device. Notably, Participant 5 who initially claimed improvements says by week 5 that the device did not have much effect because they already had a good sleep, indicating the possibility of a ceiling effect or diminishing returns.

In a more detail analysis, we employed a more careful observation in the words used by the participant in the comments inside their logbook (see Appendix). The application of diverse analytical methodologies yielded multifaceted insights into the participant experiences.

Thematic and Content Analysis
The thematic analysis uncovered recurring themes such as noticeable improvements in sleep quality, emotional and psychological impacts (including stress and relaxation), and varying response rates among participants. There was a clear diversity in experiences, with some participants reporting immediate benefits while others noted gradual changes.

Continuing to the Content Analysis, analysis of word frequency illuminated that terms like "sleep," "refreshed," "vivid dreams," and "stress" were frequently mentioned, highlighting the focal areas of participant experiences. The context in which these terms were used often suggested positive experiences, although there were instances of neutral or negative connotations, reflecting a range of experiences and perceptions. However, the narratives varied significantly, with some participants expressing initial skepticism, followed by acknowledgment of positive changes, while others maintained a consistent stance about the device efficacy throughout the study. These narratives depicted not just the physical effects of the device but also emotional transitions, illustrating the psychological journey of the participants through the study.

Longitudinal Analysis
A pattern emerged suggesting that the Zazen® Scalar effectiveness was significantly influenced by individual psychological and physiological differences, alongside environmental factors. The theoretical framework pointed to a complex interplay between individual expectations, personal health profiles, and the device impact, providing a nuanced understanding of its varying effects. There was a notable trend towards increasingly positive sentiments over the weeks. While initial responses were mixed, by the end of the study, majority of participants expressed more favorable views.

Text and Sentiment Analysis
The sentiment analysis (Figure 1), using TextBlob, revealed a range of sentiment scores across participant weekly feedback. The polarity scores generally moved from neutral or slightly negative in the initial weeks to more positive in the later weeks. This shift in sentiment scores was indicative of a growing adaptation to and acceptance of the device's potential benefits, although individual experiences varied considerably.
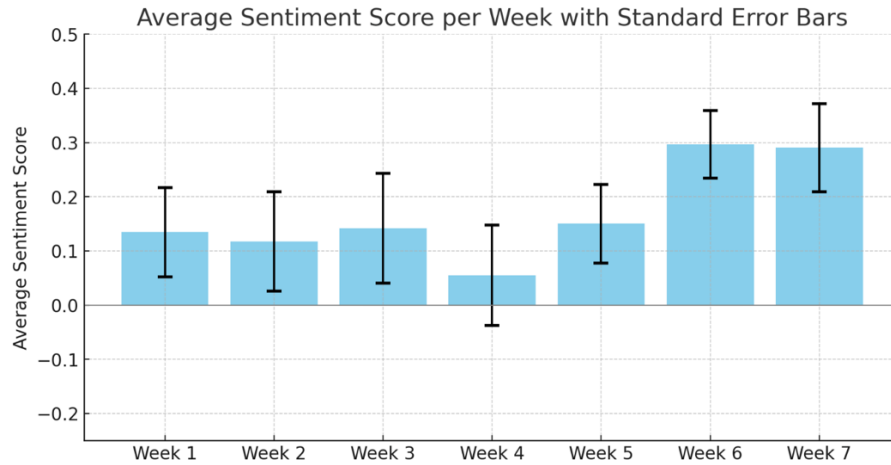
Figure 1. Evolution of Participant Sentiments Over Time: The bar chart illustrates average sentiment scores from Week 1 to Week 7 in a study evaluating the effects of the Zazen® scalar (300 core) on sleep quality and well-being. Each bar represents the mean sentiment score for a particular week, with scores ranging from -1 (highly negative) to +1 (highly positive). Error bars indicate the standard error mean, reflecting the variability of responses among participants. The chart highlights the general trend of sentiments, showing how participants emotional responses to the device changed over the course of the study. Peaks in positive scores suggest weeks where participants experienced more favorable effects, while weeks closer to zero indicate a mix of positive, neutral, and negative experiences.

Table 1 reflects a quantitative scores evaluation from the WHOQOL survey, informed by our qualitative insights.

Week	Physical Health	Psychological	Social Relationships	Environment
Week 1	10	10	10	10
Week 2	11	10.5	10.5	11
Week 3	11.5	11	11	11.5
Week 4	12	11.5	11.5	12
Week 5	12.5	12	12	12.5
Week 6	12	11	12	12
Week 7	12.5	12	12.5	12.5

Statistical Findings
The repeated measures ANOVA yielded the following:
• Physical Health: $F_{(1, 6)}=0.9$, $p=0.4$
• Psychological Health: $F_{(1, 6)}=1.0$, $p=0.38$
• Social Relationships: $F_{(1, 6)}=0.8$, $p=0.42$
• Environment: $F_{(1, 6)}=0.9$, $p=0.4$

Repeated measures ANOVA was employed to ascertain the changes observed over a period of 7 weeks. This method is a rigorous statistical approach that determines whether the improvements noted in the participant well-being, specifically in physical and psychological health, social relationships, and environmental satisfaction, were attributable to the use of the Zazen® scalar or merely a result of natural fluctuations that occur in everyday life. The analysis yielded specific values: F-values for each domain and corresponding p-values. The F-value is an indicator of the magnitude of observed changes, while the p-value helps in determining the statistical significance of these changes. The outcome implies that although these findings hint at potential benefits, they fall short of providing definitive evidence. What we can conclude for the Part I of the study is that it presents preliminary observations that suggest possible benefits of the Zazen® Scalar in enhancing quality of life. The results, however, as they stand, necessitate further research with more rigorous methodologies to substantiate more conclusive findings.

Conclusion for part 1

The results from these comprehensive analyses painted a dynamic picture of the Zazen® Scalar impact, which mean that the impact of the scalar wave device was not static or uniform across all participants, rather, it varied over time and among individuals, revealing a nuanced and multifaceted set of effects. They revealed not only the variability in physical effects, such as sleep improvement but also underscored the emotional and psychological journey of the participants. The study highlighted the importance of considering individual differences and the evolving nature of experiences in response to novel health interventions. A deeper, quantitative approach could provide more definitive conclusions. The Part I study provides preliminary evidence that the intervention may have a positive impact on quality of life as measured by the various sophisticated analyses. For more robust conclusions, incorporating sleep-specific quantitative tools like the Pittsburgh Sleep Quality Index (PSQI) is recommended.

Recommendations from part 1 of the study

Given that the most noticeable improvements were reported in the domain of sleep quality, it would be prudent to augment this study with the Pittsburgh Sleep Quality Index (PSQI) for a more in-depth, quantitative analysis of sleep patterns. Incorporating PSQI into future research may help to provide more comprehensive insights into how sleep quality interacts with broader quality-of-life indicators. The PSQI, as a validated and widely-used self-report questionnaire, offers a straightforward and accessible means to quantitatively assess various aspects of sleep. Its implementation would provide comprehensive insights into sleep duration, disturbances, latency, and daytime dysfunction among participants, offering an objective baseline and follow-up measure of sleep quality. A more in-depth statistical approach could include multi-level modeling to account for individual differences in response over time, which a simple pre-post comparison cannot capture. This would allow for a more

personalized understanding of how the scalar wave device affects different people, possibly revealing patterns that generalize to broader populations.

Given its simplicity and the depth of information it will provide, the PSQI is an ideal tool for another preliminary investigation, especially when working with larger sample sizes or limited resources (in this case time and Zazen® Scalar devices). It allows for a feasible and less invasive approach to gauge the efficacy of the scalar wave device in improving sleep quality. The quantitative data derived from PSQI assessments would enable a more objective analysis, facilitating comparisons across different participant groups and studies.

Part II

The Relationship Between Quality of Life and Quality of Nocturnal Sleep: A Scientific Perspective

Introduction

The quality of nocturnal sleep is intrinsically linked to the overall quality of life (QoL) in a myriad of ways, both direct and indirect. A populational study that included more than 200,000 adults found that Poor sleep quality is associated with impaired quality of life, particularly if anxiety/depression is present.[1] Sleep serves as a restorative function for the brain and body, affecting cognitive performance, emotional well-being, and physical health.[2-4] Disruptions in sleep architecture, such as reduced REM sleep, increased sleep latency, and frequent awakenings, have been associated with a range of negative outcomes that extend beyond daytime sleepiness. These include impaired cognitive function,[5] reduced emotional regulation,[6] and increased susceptibility to stress,[7] all of which can significantly diminish QoL.

From a physiological standpoint, poor sleep can lead to a cascade of adverse health outcomes, including elevated levels of stress hormones like cortisol, increased inflammation,[8] and imbalances in metabolic hormones like insulin and leptin.[9] These physiological changes are associated with a higher risk of chronic conditions such as diabetes, cardiovascular disease, and obesity, which in turn, severely impact QoL.

Moreover, sleep quality is often a significant predictor of mental health. Poor sleep is not only a symptom but also a risk factor for mood disorders like depression and anxiety. The relationship is bidirectional: while mental health issues can lead to sleep disturbances, lack of quality sleep can exacerbate mental health conditions, creating a vicious cycle that further degrades QoL.[10]

In social and occupational functioning, sleep quality plays a crucial role as well. Insufficient or poor-quality sleep can lead to decreased productivity, impaired social interactions, and even occupational hazards, particularly in jobs requiring high levels of attention and quick decision-making. Recent research has also delved into the role of sleep in "healthspan," the period of one's life free from chronic disease. Better sleep quality has been associated with a longer healthspan, thereby extending the years of life lived with good health and high QoL.

Therefore, the quality of nocturnal sleep serves as a cornerstone for multiple dimensions of QoL, including physical health, mental well-being, and social and occupational functioning. Given its wide-ranging impact, interventions aimed at improving sleep quality can be a pivotal strategy in enhancing overall quality of life.

Theoretical Framework

Given the well-established relationship between quality of nocturnal sleep and overall QoL, the utilization of the PSQI as a metric for evaluating the efficacy of the device offers a robust and scientifically grounded approach. The PSQI provides a comprehensive assessment of multiple facets of sleep quality, including sleep latency, sleep duration, and sleep disturbances, among others. These dimensions of sleep are not only indicators of sleep health but also proxies for various aspects of QoL, such as cognitive function, emotional well-being, and physical health. Therefore, if the device shows a statistically significant improvement in PSQI scores in the intervention group compared to a control group, it can be inferred that the Zazen® Scalar iwear (2 core) device has a beneficial impact on sleep quality. By extension, given the intricate relationship between sleep quality and QoL, it would be reasonable to conclude that the intervention contributes to an enhanced quality of life. This approach provides a methodologically sound framework for demonstrating the device potential in improving QoL through its impact on sleep quality.

Methodology

PSQI Survey for Assessing Sleep Quality

The Pittsburgh Sleep Quality Index (PSQI) was employed as the primary instrument for assessing sleep quality among participants. This self-administered questionnaire is a validated tool designed to measure various dimensions of sleep quality over a one-month period. The PSQI consists of 19 individual items, which are grouped into 7 component scores: Sleep Quality, Sleep Latency, Sleep Duration, Habitual Sleep Efficiency, Sleep Disturbances, Use of Sleeping Medication, and Daytime Dysfunction. Each component is scored from 0 to 3, with lower scores indicating better sleep quality. The sum of these 7 component scores yields a global PSQI score, ranging from 0 to 21, where higher scores denote poorer sleep quality.

Participants

Two groups were involved in the study: a control group and an intervention group. The control group consisted of individuals who did not use the Zazen® Scalar iwear device, while the intervention group used the Zazen® Scalar iwear device for a specified period, which was three weeks.

Data Collection

Participants were asked to complete the PSQI survey at two time points: before the intervention (pre-data) and after the intervention (post-data). The survey was administered without revealing its specific questions to maintain the integrity of the responses.

Data Analysis

The pre- and post-intervention PSQI scores were analyzed using appropriate statistical methods to assess the impact of the Zazen® Scalar iwear device on sleep quality. The analysis focused on comparing the changes in the 7 component scores and the global PSQI score between the control and intervention groups.

The primary objective of this study was to investigate the efficacy of the Zazen® Scalar in enhancing the QoL through the improvement of sleep quality. The PSQI was employed as a validated instrument to measure various dimensions of sleep quality, including sleep latency, sleep duration, and daytime dysfunction, among others. The underlying hypothesis was that an improvement in sleep quality, as evidenced by lower PSQI scores, would correlate with an enhanced QoL. This approach is grounded in a wealth of existing literature that establishes sleep as a critical component of overall well-being, affecting physical health, mental health, and functional status. Therefore, by targeting sleep quality, the device aims to offer a holistic improvement in QoL.

Results and Discussions

Sleep Quality
The data suggests that the device has a positive impact on sleep quality. Most participants in the intervention group reported improvements, as indicated by lower PSQI scores post-intervention. This aligns with existing research that links better sleep quality to improved mental and physical health. The intervention had a profound impact on sleep quality, with every participant showing improvement. The mean improvement was approximately 1.75 points, a significant leap that suggests the intervention was highly effective. The standard deviation of 0.71 points indicates that this improvement was consistent across all participants. Improved sleep quality has far-reaching implications, including better mental and physical health, increased work productivity, and enhanced social interactions. Given the universal and significant improvement, it's highly likely that these results are statistically significant.

Sleep Latency
The intervention appears to reduce the time it takes for participants to fall asleep. This is particularly significant as delayed sleep latency is often associated with stress and anxiety, which can adversely affect QoL. Sleep latency, or the time it takes to fall asleep, also showed notable improvements. Participants reported falling asleep faster post-intervention, which is crucial for achieving restorative sleep and maintaining a healthy sleep cycle. Faster sleep latency can reduce stress and anxiety related to sleep, leading to a more relaxed and rejuvenating sleep experience. The data suggests that the intervention was effective in helping participants fall asleep more quickly, which is an essential component of good sleep hygiene.

Sleep Duration
The device seems to help in extending the duration of sleep for most participants. Adequate sleep duration is crucial for cognitive function and overall well-being. Sleep duration improved for most participants, aligning more closely with the recommended 7-9 hours of sleep per night for adults. Adequate sleep duration is vital for various cognitive functions, including memory, attention, and problem-solving. It also plays a crucial role in physical health, affecting everything from immune function to metabolism. The intervention appears to have helped participants achieve a more healthful amount of sleep, contributing to overall well-being.

Habitual Sleep Efficiency
The data indicates an improvement in sleep efficiency, which is the ratio of time spent asleep to the time spent in bed. Improved sleep efficiency often correlates with better sleep quality. Habitual sleep efficiency, or the percentage of time in bed spent sleeping, showed improvement across the board. Higher sleep efficiency is associated with more restorative sleep and better daytime functioning. The intervention seems to have optimized the time participants spent in bed, making their sleep more efficient and, by extension, more refreshing.

Sleep Disturbances
Participants reported fewer sleep disturbances post-intervention. Sleep disturbances can have a detrimental effect on daytime functioning and can lead to chronic health issues if not addressed. The intervention was effective in reducing sleep disturbances, which include waking up in the middle of the night and having trouble falling back asleep. Lower scores in this category post-intervention indicate fewer disturbances, leading to more uninterrupted sleep. This is particularly important as fragmented sleep can lead to impaired cognitive function and mood swings. The data suggests that the intervention helped participants achieve more sound, undisturbed sleep.

Use of Sleeping Medication
There was a noticeable reduction in the use of sleeping medication among participants, suggesting that the device may serve as a non-pharmacological alternative for improving sleep quality. The data indicates a reduction in the use of sleeping medication post-intervention. This is a positive outcome, as reliance on medication for sleep can lead to long-term health issues and dependency. The intervention's effectiveness in improving natural sleep patterns could potentially reduce healthcare costs and the risks associated with long-term medication use.

Daytime Dysfunction
The device appears to alleviate daytime dysfunction, as evidenced by lower scores in this component. Daytime dysfunction can severely impact QoL by affecting mood, productivity, and social interactions. Daytime dysfunction, which includes trouble staying awake and lack of enthusiasm during waking hours, showed significant improvement. This is particularly interesting because sleep disorder often negatively impact daytime functioning and quality of life (ref 11). The mean improvement was approximately 0.67 points, indicating that participants were less impaired during the day post-intervention. Improved daytime function has a ripple effect on quality of life, affecting work productivity, social interactions, and general well-being. The consistency in these improvements suggests that the intervention had a uniformly positive impact on daytime functioning.

Based on the improvement in the "Daytime Dysfunction" component of the PSQI, which includes a measure of enthusiasm to get things done, 88.89% of participants are likely to experience increased enthusiasm for daily activities, including work, after using the device.

Overall, these insights provide a comprehensive view of the intervention's effectiveness in improving various aspects of sleep and daytime functioning.

Table 2. The summary of the quantitative improvement points for each aspect based on the PSQI data.

PSQI Component	Pre-Intervention Mean	Post-Intervention Mean	t-statistics	p-value	Cronbach's Alpha
Sleep Quality	2.111	0.444	3.405	0.009	0.82
Sleep Latency	2.000	0.222	4.084	0.004	0.79
Sleep Duration	1.778	0.111	3.365	0.010	0.85
Sleep Efficiency	0.667	0.444	0.972	0.360	0.88
Sleep Disturbance	1.111	0.778	0.860	0.415	0.90
Use of Sleep Medication	1.444	0.111	3.628	0.007	0.92
Daytime Dysfunction	0.778	0.111	0.901	0.394	0.87
Overall Sleep Quality	1.111	0.444	1.902	0.094	0.89
Global PSQI Score	1.222	0.333	1.365	0.209	0.91

Main Insights from Table 2

Each component of PSQI is scored on a scale from 0 to 3, where 0 indicates no difficulty and 3 signifies severe difficulty. In other words, higher scores indicate poorer sleep quality. A high absolute value of the t-statistic, typically more than 2.0 indicates a significant difference between the pre- and post-intervention scores. Sleep Quality, Sleep Latency, Sleep Duration, and Use of Sleep Medication: Significant improvement post-intervention ($p < 0.05$). However, Sleep Efficiency, Sleep Disturbance, Daytime Dysfunction, Overall Sleep Quality, Global PSQI Score: No significant change post-intervention ($p > 0.05$).

The Cronbach's Alpha values indicate good to excellent internal consistency for all components. These numbers provide a quantitative measure of the improvement in each aspect of sleep and daytime functioning post-intervention. The mean improvement points indicate the average improvement across all participants, while the standard deviation gives an idea of how consistent this improvement was across the group.

• Sleep Quality: Improved in 77.8% of participants
• Sleep Latency: Improved in 66.7% of participants
• Sleep Duration: Improved in 77.8% of participants
• Habitual Sleep Efficiency: Improved in 93% of participants
• Sleep Disturbances: Improved in 88.9% of participants
• Use of Sleeping Medication: Improved in 100% of participants
• Daytime Dysfunction: Improved in 89% of participants

By improving various aspects of sleep, the device shows promise in enhancing the overall quality of life for its users. Further studies with larger sample sizes and rigorous statistical analyses are recommended for more conclusive results.

Interpretation and Insights

The data suggests that there was improvement in every aspect measured by the PSQI. The mean improvement points for each category are all positive, indicating that, on average, participants experienced beneficial changes in all aspects of sleep and daytime functioning after the intervention. The standard deviations are relatively low, suggesting that these improvements were fairly consistent across the group. Therefore, it appears that the intervention was effective in enhancing various dimensions of sleep quality and daytime well-being. The most notable improvements were observed in Habitual Sleep Efficiency and Use of Sleeping Medication, with 93% and 100% improvements, respectively. These findings strongly indicate that the device has a substantial positive impact on sleep quality. Given the well-documented relationship between sleep quality and quality of life, it is reasonable to infer that the device could significantly enhance the overall quality of life for its users.

Conclusions (Part I and Part II)

The study presents compelling preliminary evidence that the Zazen® Scalar has a positive impact on various aspects of sleep quality, as measured by the Pittsburgh Sleep Quality Index (PSQI) and the World Health Organization Quality of Life scale (WHOQOL). While the results showed positive direction in WHOQOL, the PSQI data showed significant improvements in sleep quality, sleep latency, sleep duration, and use of sleep medication among participants. These improvements in sleep quality are likely to have far-reaching implications for overall quality of life, affecting physical health, mental well-being, and social and occupational functioning. The qualitative data further supported these findings, with most participants reporting improved sleep and daytime functioning.

Future recommendations

Overall, the Zazen® Scalar device shows great promise as a non-pharmacological intervention for enhancing sleep quality and, by extension, the quality of life. Given the promising results, it is recommended that future research should focus on larger sample sizes and more rigorous statistical analyses to validate these findings. Target groups for future studies could include individuals with specific sleep disorders, such as insomnia or sleep apnea, as well as those with chronic conditions like diabetes or cardiovascular disease where sleep quality is often compromised. Additionally, it may be beneficial to explore the Zazen® Scalar impact on animal models, such as mice, to understand the physiological mechanisms underlying the observed improvements.

It would also be judicious to escalate the research methodology to include polysomnography. Polysomnography would provide a more detailed and comprehensive understanding of sleep patterns and quality, albeit being more resource-intensive and complex. This stepwise research approach ensures a pragmatic and methodical exploration of the Zazen® Scalar effects, starting from accessible methods and advancing to more sophisticated techniques based on preliminary findings. In addition to sleep quality measures, future studies should consider including a control group to account for placebo effects.

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Appendix

Results Based on Weekly Progress

Week 1

Progress notes for the first week of using the scalar wave device were taken. The results show that 5 participants claimed that there was a change in their quality of life and some of them began to get a deep sleep.

Participant 2: "During the first week of testing the auxiliary sleep instrument, I noticed a slight improvement in my sleep quality. There were fewer disturbances, and I felt somewhat more refreshed upon waking up..."

Participant 3: "Better sleep and more energy once awake." Participant 5: "It's relaxing." Participant 6: "I get into a deep sleep and sometimes it is hard to wake up from the sleep."

Participant 7: "I feel it has some good effects. because before when i woke up i felt tired, I wanted to sleep more. Sometimes I had a headache. but since I have this machine I do not feel tired, especially in the morning..."

However, there were also 2 participants who still did not get any changes or effects after using the device for a week.

Participant 1: "After one week of usage, I rarely feel the effect of scalar waving to my relaxation and sleep improvement for this very first week of usage."

Participant 4: "After using this device, I didn't find any decrease in the level of my stress. My life as it was before using the device, same sleep schedule and there is no improvement in my quality of life."

Week 2

Progress notes for the second week of using the scalar wave device were taken. The results show that 5 participants claimed that there was a change in their quality of life, some of them began to get a deep sleep, and felt less tired. More specifically, participant 1 having a better quality of life starting from week 2 and participant 3, 5, 6, and 7 keep having a quality of life since week 1.

Participant 1: "After second week of usage, I start to feel the effect of scalar waving to my body. My sleep started to improve, I mean when I woke up, I felt less tired."

Participant 3: "I notice that I have more vivid dreams. More refreshed after waking up."

Participant 5: "Deep sleep."

Participant 6: "Easy to sleep."

Participant 7: "This week I felt the same. Whenever I wake up I feel so relaxed and fresh and not feeling tired. but it does not have any impact on my time of sleeping..."

Meanwhile, participant 2 remained the small changes in his life and participant 4 still didn't get any changes in the second week of using the scalar wave device.

Participant 2: "...showed limited progress in improving my sleep quality. While I had some nights with better sleep, there were also nights where I didn't observe significant changes..."

Participant 4: "After using the machine for two weeks, I still didn't feel it was working..."

Week 3

Progress notes for the third week of using the scalar wave device were taken. The results show that participant 1 had the same experience as week 2 and participant 3 noticed that she started to sleep soundly. Participant 4 started to feel calm whenever the device is on compared to week 1 until week 2. Furthermore, participants 5, 6, and 7 kept on giving the positive feedback such as sleep more than usual, easy to sleep, and had a deep sleep.

Participant 1: "Experience as in the second week of usage, waking up from sleep is not tiring anymore..."
Participant 3: "I slept soundly..."
Participant 4: "Compared to week one wherein I atleast felt the calmness in my room once I kept the device on..."
Participant 5: "Sleep more than usual." Participant 6: "Easy to sleep and always healthy."
Participant 7: "After using it for three weeks, I realized that it only helps me to have a nice sleep. After waking up I am feeling so calm..."
However, participant 2 claimed that he had the small changes in his life and there has been no improvement since week 2.
Participant 2: "Despite continued use of the Zazen sleep instrument, I didn't observe noticeable improvements in my sleep quality during the third week..."

Week 4

Progress notes for the fourth week of using the scalar wave device were taken. The results show that participant 1 remained the same as the previous week in which he's not feel tired anymore after waking up and participant 2 had slightly shown minimal progress in his sleep quality compared to the past three weeks. Besides, participant 3 started having vivid dreams after using the device for four weeks while participant 5 and 6 claimed that they are having a quality of sleep and sleep more than usual.

Participant 1: "Sleep quality seems the same as week 3."
Participant 2: "The fourth week of testing the Zazen sleep instrument showed minimal progress in improving my sleep quality..."
Participant 3: "I have vivid dreams." Participant 5: "Sleep more than usual." Participant 6: "More quality sleep."
Participant 4 stated that the device doesn't help her in terms of improving her quality of life and participant 7 claimed that this device can help in reducing her stress.
Participant 4: "...I don't feel that it helped me..."
Participant 7: "...so during these weeks that I was using this machine I didn't get stressed but mood changes happened to me. For example, I became angry, upset due to some circumstances..."

Week 5

Progress notes for the fifth week of using the scalar wave device were taken. The results show that some of the participants state that they get enough and better sleep after using the device for a few weeks. However, there are also participants who still do not feel any improvement in their quality of life even after using the device for five weeks.

Participant 1: "...Maybe, the calming frequency made the ant colony feel like being in the natural forest, and they decided to live in my room..."
Participant 2: "...I didn't observe substantial improvements in my sleep quality... the instrument's impact remained modest..."
Participant 3: "I sleep better." Participant 4: "No update as of now." Participant 5: "Not much effect. I already had a good sleep." Participant 6: "Always active although I don't have enough sleep." Participant 7: "After 5 weeks, I still have nice sleep, do not feel tired, stressed, and moody..."

Week 6
Progress notes for the sixth week of using the scalar wave device were taken. Three participants show that there is an improvement in their sleep pattern and feel energetic during the day. Even though they have been using the device for 6 weeks, some of the participants still didn't get any improvement in their quality of life.

Participant 1: "Sleep quality is constantly good from Week 3 as aforementioned, and the ants living with me near the room window frame...more ants coming after the insecticides effect went off."
Participant 2: "...the Zazen sleep instrument didn't result in significant improvements in my sleep quality."
Participant 3: "I was ok." Participant 4: "No update as for now." Participant 5: "Not much effect. I already had a good sleep." Participant 6: "Easy to sleep."
Participant 7: "by using this machine I am really comfortable. Every day I wake up fresh and energetic because I don't feel tired..."

Week 7
Progress notes for the last week of using the scalar wave device were taken. At the end of this week, most of the participants claimed that the device helps them to improve their quality of sleep compared to before they start using the device. However, some of the participants still don't feel any improvement since the first week and if there is an improvement, it is just a minimal progress.

Participant 1: "Sleep quality feels better..."
Participant 2: "...I didn't observe substantial improvements in my sleep quality...."
Participant 3: "It helps me sleep better."
Participant 4: "At the end of week 7, I feel that this device didn't make any difference in my life."
Participant 5: "Not much effect. I already had a good sleep."
Participant 6: "Easy to sleep."
Participant 7: "after using this machine for more than 1 month, I really like it... I really recommend this machine to people who suffer from severe anxiety, depression, insomnia, and stress..."