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Mindfulness Meditation in Young People with Anxiety Symptoms to Improve Cognitive Functions: A Clinical Trial

Vivianne Amanda Do Nascimento[1], Marlei Lanfredi[1], Elvis Wisniewski[1], Marcio Silveira Correa[2]

[1]Faculty of Medicine, Integrated Regional University of Upper Uruguay and Missions, Erechim, Brazil
[2]Department of Biosciences and One Health, Federal University of Santa Catarina, Curitibanos, Brazil
Email: marcio.s.correa@ufsc.br

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Abstract

Introduction: Meditation is an ancient practice that cultivates a calm and focused mind. However, little is known about how short-term meditation practices affect cognitive functioning in groups that did not practice meditation and had signs and symptoms of anxiety. **Methods:** We selected individuals between 18 and 28 years old with signs and symptoms of anxiety for two groups (meditation and control). The meditation group practiced meditation for 4 weeks, with 2 weekly meetings lasting approximately 1 hour and a half. Afterwards, we applied neuropsychological tests to both groups in order to assess whether there was an improvement in cognitive functions. **Results:** Compared to our control group, we observed that 4 weeks of meditation are able to reduce anxiety levels, increase the degree of attention, and improve immediate and delayed contextual memory. In addition, we also obtained small results in improving processing speed and decision making. **Conclusions:** This study suggests that short-term meditation is capable of offering beneficial effects on cognitive functions and reducing anxiety levels.

Keywords

Meditation, Mindfulness, Anxiety, Cognitive Functions

1. Introduction

Anxiety disorders include features of excessive fear and anxiety. Fear is the emotional response to the presence of a perceived or real imminent threat, and is associated with periods of increased autonomic excitability, while anxiety is the anticipation of a future threat and is associated with vigilance and muscle tension. Elevated levels of anxiety differ from adaptive fear and anxiety in that they become excessive or persist beyond appropriate periods (APA, 2014).

Meditation can be defined as a mind-body integrative practice based on experiencing the present moment, with full and non-judgmental awareness of every moment (Wallace, 1970; Fortney & Bonus, 2007; Hayes et al., 1999; Roca et al., 2019). It is a form of mental training that improves the psychological core of an individual and involves attentional and emotional states. There are several different practices, and the main ones include mindfulness meditation, mantra, yoga, tai chi, and chi gong (Ospina et al., 2007; Burke, 2012). The mindfulness-based technique has received more neuroscientific attention and research, and is the practice of nonjudgmentally focused mindfulness of present-moment experiences, resulting in mindfulness and self-acceptance (Hölzel et al., 2007; Hwang et al., 2017; Tang et al., 2015).

The practice of mindfulness meditation is an excellent adjunctive therapy for many ailments and an essential and primary means of maintaining overall health and well-being. Rather than being a fringe concept, meditation is now widely known and accepted as a mind-body practice that is seen as beneficial by the general public and the scientific community (Fortney & Taylor, 2010; Marciniak et al., 2020; Salmon et al., 2004). Studies show solid results from the practice of meditation associated with reduced anxiety, increased affection, reduced recurrence of depression, improvement in chronic pain, positive effects in the treatment of tension headaches, smoking, psoriasis, hypertension, alcohol abuse, benefits in longevity and cognitive functions in the elderly, among others (Fortney & Taylor, 2010; Chambers et al., 2008; Jain et al., 2007; Tang et al., 2007).

Physiologically, meditation and its state of relaxation are defined by a hypometabolic state of parasympathetic activation (Fortney & Taylor, 2010). A study using an electroencephalogram monitored the meditative state, pointing to the appearance of theta waves, a decrease in frequency, and an increase in the amplitude of alpha waves (Wallace, 1970). In addition, mindfulness-induced neuronal changes are likely to involve dendritic branching, synaptogenesis, myelogenesis, or even adult neurogenesis (Tang et al., 2015). It is also possible that there is autonomic regulation and improvement of immune activity, resulting in neuronal preservation, restoration, or inhibition of apoptosis, decreased inflammation, reduced autonomic nervous system reactivity, increased telomerase activity, and increased levels of melatonin and plasma serotonin (Ngô, 2013).

It is known that pathological anxiety states have part of their genesis in amygdala hyperexcitability, related to fear. Mindfulness meditation leads to decreased amygdala activity, with results found mostly in beginners (Desbordes et al., 2012). An analysis of the functional connectivity of the frontal regions and the amygdala points out that a negative correlation occurs in individuals with anxiety, in which there is suppression of emotional responses. On the other hand, after practicing meditation, a positive correlation of the structures is observed, which involves the monitoring of emotions, understood as the conscious regulation of emotion

(Hwang et al., 2017; Kocovski et al., 2009; Tang et al., 2015). Still, the hippocampus is an organ related to memory and spatial navigation that also undergoes changes. In people with meditative routines, this area shows denser internal cell connections and increased gray matter (Luders et al., 2015). Concomitantly, prefrontal activity improves in beginner meditators and is related to greater active cognitive regulation. On the other hand, experienced meditators may no longer use this prefrontal control since their acceptance posture in relation to the experience is already automated, demonstrating improved ascending processing, and the same occurs with the parietal cortex (Hwang et al., 2017; Tang et al., 2015).

Thus, various brain structures can undergo changes after practicing mindfulness meditation: anterior cingulate cortex, concerned with self-regulation of attention and emotion; prefrontal cortex, related to the attentional state and emotion; posterior cingulate cortex, related to self-awareness; insula, related to consciousness and emotional processing; amygdala, related to emotional processing; and hippocampus, related to memory (Desbordes et al., 2012; Luders et al., 2015; Tang et al., 2012; Tang et al., 2015).

Training to improve attention has the potential to be beneficial in multiple fields, as attention networks are essential for higher-order cognitive operations (Fortney & Taylor, 2010; Hwang et al., 2017; Tang et al., 2015). In addition to the benefits already known about anxiety, meditation can be practiced by individuals with no meditative experience, helping not only with quality of life, but also with a greater ability to retain new information and learn more effectively (Luders et al., 2015; Tang et al., 2007; Kabat-Zinn et al., 2017; Kwak et al., 2020).

Therefore, the aim of the present study is to evaluate the relationship of mindfulness meditation with cognition, considering contextual memory, attention, and executive functions in young adult individuals.

2. Methods

2.1. Participants

This study consists of a clinical trial. The study population consists of young adults aged 18 to 28, female and male, who have signs and symptoms of anxiety identified by the Beck Anxiety Inventory (BAI) (Cunha, 2001). The Beck Depression Inventory (BDI) (Gorenstein & Andrade, 1996) was used to assess signs and symptoms of depression. It was employed solely for the characterization of participants and was not used as an exclusion criterion. The Mini Mental State Examination (MMSE) was used to screen for dementia (Folstein, Folstein, & McHugh, 1975), as well as the Lipp Stress Symptom Inventory (ISSL) (Lipp & Guevara, 1994; Lipp, 2000), to check for the presence of chronic stress. Individuals with Attention Deficit Hyperactivity Disorder, cerebral palsy, dementia syndromes, mental retardation, and who are using medication that interferes with the pituitary-pituitary-adrenal axis or in the attentional functions were excluded from the study.

The research consisted of two study groups that totaled 36 participants with anxiety symptoms. The Test Group (T) consisted of 16 individuals who performed mindfulness meditation with Preethaji's soul-sync method, and the Control Group (C) consisted of 20 individuals who did not perform mindfulness meditation.

2.2. Neuropsychological Measures

Frontal lobe functions were assessed with neuropsychological tests that measured different components of executive function. The Digit-span tests were employed to assess working memory. Trail Making A and B tests and the word (I) and color (II) versions of the Stroop test were used to evaluate attention and processing speed (Castro et al., 2000). The word/color (III) version of the Stroop test was used to evaluate the inhibitory response capacity (Castro et al., 2000).

Temporal lobe functions were assessed by the Logical Memory Test (Wechsler, 1987). This task evaluates immediate and delayed recall of declarative memory and is heavily dependent on the hippocampal formation. All procedures related to the neuropsychological assessments followed the recommended guidelines for each specific task and have been briefly described elsewhere.

2.3. Protocols

Group T was composed of participants with signs and/or symptoms of mild to severe anxiety, detected by the Beck Anxiety Inventory (BAI) anxiety test (Cunha, 2001), following the practice of mindfulness meditation. After reading about the results obtained in the programs: Meditation Based on Stress Reduction (Kabat-Zinn et al., 2017; Nehra et al., 2013; Roca et al., 2019), Mind Body Integrative Therapy (Tang et al., 2007; Kwak et al., 2020), and Soul Sync Meditation (Preethaji & Krishnaji, 2019), the Soul-Sync meditation program created by Preethaji and made available by the O&O Academy was selected to be applied. This is because Soul-Sync mindfulness meditation also uses proprioceptive mechanisms to anchor the practice. In summary, Soul Sync Meditation is a practice that comprises six core components: (i) Conscious Breathing—focusing attention on slow and controlled inhalation and exhalation; (ii) Exhalation Humming—producing a gentle vibratory sound during exhalation; (iii) Attention to the Pause—observing the momentary pause between breaths; (iv) Mantra Chanting—silently or vocally repeating a mantra; (v) Contact and Expansion—cultivating a sense of connection and expanding awareness; and (vi) Desire Manifestation—setting a conscious intention or wish at the end of the practice (Soul Sync®, 2025). Thus, the 4-week mindfulness meditation program consisted of a total of nine 60-minute sessions. The first session focused on teaching the concept of meditation, as well as introducing Soul Sync and Serene Mind techniques to practice mindfulness meditation. Subsequently, eight sessions were conducted, two per week, each lasting 60 minutes. In addition, participants were instructed to perform daily home meditations using audio recordings, such as the Serene Mind meditation (3-minute duration) (Preethaji & Krishnaji, 2019), incorporating techniques taught during the face-to-face meetings. Accordingly, the intervention spanned four weeks, with participants attending three sessions during the first week (one instructional and two practical), followed by two sessions per week in the remaining three weeks. All sessions were guided by an experienced instructor and included structured practice of each of the six components. Finally, at the end of the sessions, all the cognitive tests were performed on Group T: 1) Mini Mental State Examination (MMSE) (Folstein et al., 1975), 2) Digit Span, 3) Logical Memory Test I and II (Wechsler, 1987), 4) Trail Test (Wechsler, 1987), and 5) Stroop Test (Castro et al., 2000). At the end of the experiment, Group T was submitted again to the Beck Anxiety Inventory (BAI) (Cunha, 2001) for comparison with previous results to the intervention, mainly to identify whether there was a reduction in anxiety levels.

Group C was composed of participants with signs and/or symptoms of a moderate to severe anxiety score, as measured by the BAI (Cunha, 2001). The control group did not participate in the meditation practice for four weeks. Individuals in this group only completed the same cognitive tests [1) Mini Mental State Examination (MMSE) (Folstein et al., 1975), 2) Digit Span, 3) Logical Memory Test I and II (Wechsler, 1987), 4) Trail Test (Wechsler, 1987), and 5) Stroop Test (Castro et al., 2000)], allowing their results to be compared with those of the intervention group.

2.4. Statistical Analysis

The data were analyzed using GraphPad Prism version 9.0 (GraphPad Software, San Diego, CA). Results were expressed as mean and standard deviation. The results on socio-demographic and psychiatric, as well as cognitive performance, were tested for normality using the Shapiro-Wilk Test. The results were non-parametric and were compared using the Mann-Whitney Test, as shown in the following topic. The statistical significance was set at $P < 0.05$.

3. Results

3.1. Demographic and Clinical Characteristics

For demographic and clinical analysis, there were no significant differences between the test and control groups. As can be seen in **Table 1**, the mean and standard deviation for age ($p = 0.134$), gender ($p = 0.149$), Mini Mental State Examination ($p = 0.554$), and BDI ($p = 0.923$) were assessed. For the analysis of emotional stress, most participants in the control group were in the exhaustion phase. For the test group, it is noted that a part of the group was in the resistance phase, while some did not present stress. The predominance of symptoms in both groups was psychological.

Table 1. Demographic and psychiatric measures (mean ± standard error) of the different groups.

	Control Group	Test Group
Sex (nº)	M(3) F(17)	M(4) F(12)
Age (Years)	21.85 ± 1.84	22.81 ± 2.97
MMSE (Mean ± SD)	29.15 ± 0.87	29.37 ± 1.50

Continued

BDI (Mean ± SD)	24.55 ± 9.98	20.87 ± 9.97
Lipp stress test (phase) (No. of the individuals)	(1) No stress	(4) No stress
	(0) Alert	(0) Alert
	(6) Resistance	(7) Resistance
	(0) Almost exhaustion	(0) Almost exhaustion
	(13) Exhaustion	(5) Exhaustion
Predominance of symptoms (No. of the individuals)	(2) Physical symptoms	(3) Physical symptoms
	(17) Psychological symptoms	(9) Psychological symptoms

Abbreviations: MMSE, Mini Mental Status Examination and BDI, Beck Depression Inventory.

3.2. Effects of Meditation on Neuropsychological Measurements

Results for BAI in the test group, before and after meditation, [before mean = 25.31, SD = 10.47; after mean = 14.81, SD = 9.579; p = 0.0002], as well as comparing the BAI between groups, indicated an important difference between significant [test group mean = 14.81, SD = 9.579; control group mean = 25.71, SD = 9.540; p = 0.0021], indicating an important effect of meditation on anxiety. The Mann-Whitney Test indicated that the performance in Test the Trail A and B, as well as in the version the Stroop Tests of the group, remained without significant alterations [all p > 0.05], despite the test group having better results when compared to the controls. On the other hand, performances in other neuropsychological tasks showed significant results for Span forward [test group mean = 7.563, SD = 1.504; control group mean = 6.524, SD = 0.9284; p = 0.0064], Span reverse [test group mean = 6.000, SD = 1.633; control group mean = 4.619, SD = 1.071; p = 0.0088], Logical Memory I [test group mean = 27.75, SD = 4.946; control group mean = 23.29, SD = 4.417; p = 0.0023], and Logical Memory II [test group mean = 25.06, SD = 6.148; control group mean = 22.14, SD = 5.379; p = 0.0414], as shown in **Figure 1**. The last results indicate that meditation has a modulating role in the performance of working memory, attention, and incidental contextual memory.

Principal component analysis was used to investigate the correlation among all the parameters assessed and their role in participants clustering. The 10 initial variables obtained from cognitive instruments were reduced to PC1 and PC2, which were able to explain 51.41% of the data variability. The participants who were submitted to the meditation were placed mainly at the left of the plot, with PC1 negative values (green points), as depicted in **Figure 2(a)**. This clustering pattern is linked with higher values of LM-1, LM-2, SPAN-r, and SPAN-f. As may be observed in the vector plot depicted in **Figure 2(b)**, PC1 was affected to a large extent mainly by TRIAL-B and SPAN-f, while LM-1 was important for producing the dispersion of points along the y-axis. The vector plot described in **Figure 2(b)** also shows the separation of variables whose higher values are linked with improvement of cognitive abilities (left) from those whose lower values are linked with this effect (right). Furthermore, it may be noticed the positive correlations between LM-1 and SPAN-r and among BAI, TRIAL-A, and STROOP-I.

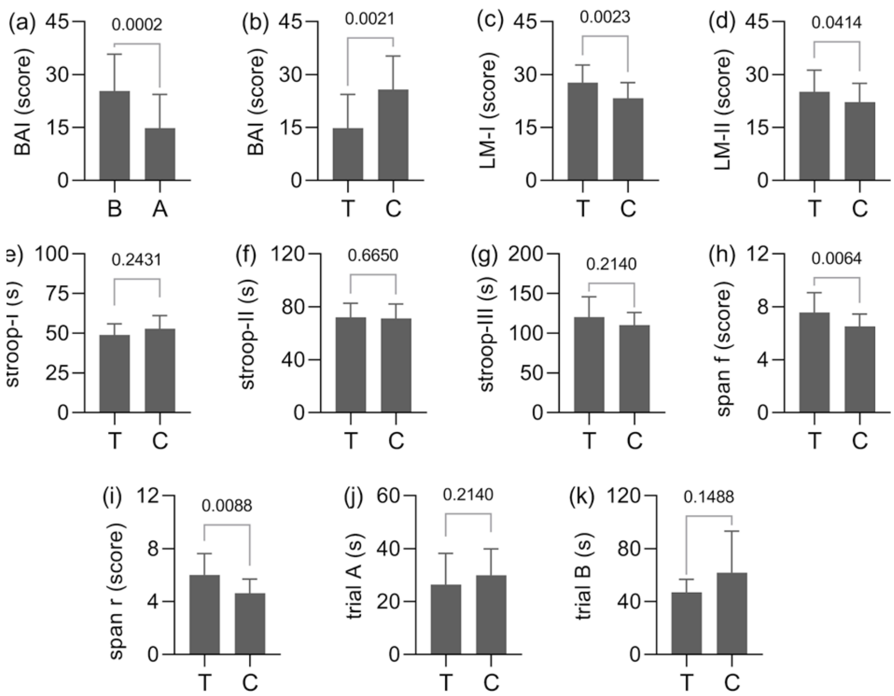

Figure 1. Effect of meditation on cognitive parameters. In (a), the BAI score before (b) and after (a) meditation is compared, while in (b)-(k), the BAI, LM, STROOP, SPAN, and TRIAL values are compared between the test (T) and control (C) groups.

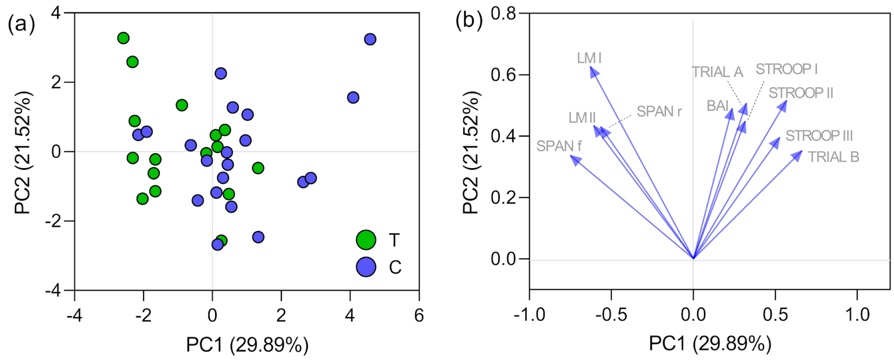

Figure 2. Principal component analysis for the 11 assessment tools applied to the meditation group (T) and to the control group (C). In (a), hyperspace map for the first two principal components, and in (b), vector plot showing the correlations among the 11 variables and their role in participants' clustering.

Correlation networks of cognitive instruments were constructed to investigate the profile of interactions in the control group (**Figure 3(a)**) and in the meditation group (**Figure 3(b)**). In the control group, the BAI score presented a higher degree of independence with the other parameters compared to the group submitted to meditation (2 edges against 7 edges). The intervention modified the correlation profile of the investigated variables so that in the control group the lowest r value was −0.3909 (between SPAN-f and STROOP-II) and in the meditation group the lowest r value was −0.7275 (between STROOP-III and SPAN-f, $p = 0.0014$). Tests that assessed the same cognitive domains were strongly correlated in both experimental groups. ML-I and ML-II (blue circles) were strongly correlated in the control group ($r = 0.8150$, $p < 0.0001$) and in the meditation group ($r = 0.5800$; $p = 0.0185$). SPAN-r and SPAN-f (red circles) were also correlated in the control and meditation groups, with r values of 0.31318 and 0.5945 ($p = 0.0151$), respectively. Finally, strong correlations may be observed among the green circles (STROOP and TRIAL parameters), as may be verified in the control group (correlation between STROOP-II and STROOP-III: $r = 0.7881$, $p < 0.0001$; correlation between STROOP-III and TRIAL-B: 0.8278, $p < 0.0001$; correlation between TRIAL-A and TRIAL-B: $r = 0.7692$, $p < 0.0001$; correlation between TRIAL-A and STROOP-III: $r = 0.6025$, $p = 0.0049$) and in the meditation group (correlation between STROOP-II and STROOP-III: $r = 0.71923$, $p = 0.00169$; correlation between TRIAL-A and TRIAL-B: $r = 0.61607$, $p = 0.01105$). In the group that performed meditation, other correlations that may be highlighted were among the blue circles (ML-I and ML-II) with SPAN-f, having r values of 0.5507 ($p = 0.0271$) and 0.5265 ($p = 0.0362$), respectively. In the control group, ML-II was correlated with SPAN-r, with $r = 0.5700$ ($p = 0.0070$).

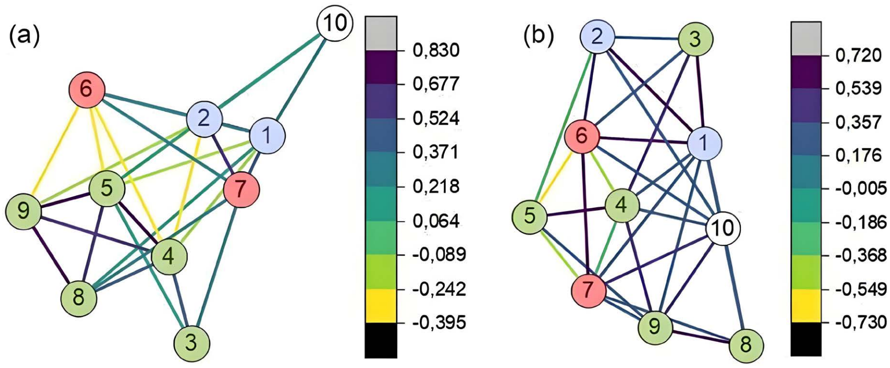

Figure 3. Correlation network constructed based on the Spearman r values among all the variables investigated for the groups control (a) and meditation (b). Correlations with low Spearman r values between −0.15 and +0.15 were omitted in the plots. The blue circles represent instruments used for the assessment of contextual memory (1: LM-II; 2: LM-II); the green circles represent instruments used for the assessment of executive functions (3: STROOP-I; 4: STROOP-II; 5: STROOP-III; 8: TRIAL-A; 9: TRIAL-B); the red circles represent the instruments used for the assessment of memory work (6: SPAN-f; 7: SPAN-r), and the white circle represents the BAI score.

4. Discussion

Regarding the demographic data, it can be observed that both in the control group and in the test group, there was no significant difference between the number of male and female participants, which exerts little influence on the result between groups, only with a predominance of female participants. With regard to age, both groups were close in their averages. The average age before 24 years is important because the prefrontal cortex, especially the middle frontal lobe, responsible for decision-making and processing speed, continues its maturation until 24 years of age, and the evaluated participants obtained values not exactly significant in tests that assess the middle frontal lobe (Stroop and Trial tests) (Arain et al., 2013; Kandel et al., 2014).

Continuing with the screening tests, the mini mental state examination also did not reveal a significant difference between the means of the groups, with only 0.22 between the averages. The test for signs and symptoms of depression (BDI) showed that patients in the control group had slightly higher level scores. This test was not used to exclude participants, only to observe the coexistence of signs and symptoms of depression and anxiety. The averages of both groups show a predominance of signs and symptoms of moderate depression. Although anxiety was associated with the presence of moderate symptoms of depression, meditation practices were still able to reduce anxiety levels and improve cognitive aspects.

With regard to the stress test (LIPP), it can be noted that patients in the control group had 1 participant without signs of stress, 6 participants in the resistance phase, and 13 in the exhaustion phase. The participants in the test group, on the other hand, had 4 participants without signs of stress, 7 in the resistance phase, and 5 in the exhaustion phase. For the comparison between the groups to be acceptable, it is pointed out that the control group, with a greater number of participants, would naturally have more participants in stress. Proportionally, the control group obtained 95% with signs of stress and the test group 75%.

The LIPP was applied in order to understand how much stress influences the participants' anxious state, and to try to identify the ability of meditation to change anxiety and improve cognitive functions even in the midst of a state of stress. It is also important to highlight that, due to the fact that the test group has more individuals without signs of stress, we can infer a pure action of meditation on the improvement of signs and symptoms of anxiety. Within the LIPP, one can also infer the predominance of symptoms, whether physical or psychological. The Control Group had 2 participants with a predominance of physical symptoms, and 17 with psychological symptoms, just as the Test Group had 3 participants with a predominance of physical symptoms, and 9 with psychological symptoms. These data indicate that, although the control group included more individuals in the exhaustion phase, which could influence the results, both groups exhibited the same predominance of psychological stress, allowing for a more accurate analysis of the outcomes.

Participants in this study had anxiety levels (initial BAI) calculated at an average score of 22.8125. After applying the one-month meditation program, with two 1-hour weekly meetings, with the integrated technique of mindfulness with proprioceptive activity (Soul-Sync Meditation), the individuals reached an average score of signs and symptoms of anxiety of 14.8125. It is demonstrated, in addition to the main objective of this study, that mindfulness meditation remains an effective complementary method for reducing anxiety levels. Even among a group of young participants, who ranged from 18 to 28 years of age, a period of life in which they are subjected to high loads of stress, pressure, and activities, these levels could be reduced in the search for emotional balance.

The Logical Memory test (Wechsler, 1987) part 1 (ML-1) works with immediate memory, a test which was applied without asking the participant to intend to remember what would be read to him. This phase of the test works more specifically on attention, for which the prefrontal cortex is primarily responsible. Thus, in **Figure 1**, in (c) one can notice the capacity of meditation to increase the participant's attentional capacity, with significance ($p = 0.0023$), comparing the test group with the control group. In Phase 2 of Logical Memory (ML-2), applied thirty minutes after the first part, one works with late and incidental memory, in which the main pathways involved are the hippocampus and the temporal lobe. With that in mind, it can be noted that the applied meditation program, even though it was short-term (1 month), showed significant results. It is known that the neural networks of the prefrontal cortex are more recruited in beginning or short-term meditators, as they are the first pathways activated. In this study, we show that the cognitive tests that most focused on the prefrontal cortex (ML-1, ML-2, SPAN-f and SPAN-r) obtained the best results. And, again, in **Figure 1**, in (d) there is a significant ($p = 0.0414$) difference between the test group's ability to retain previously heard content compared to the control group.

It is known that long-term meditators experience great effects from meditative practice; however, results can also be achieved in the short term (Tang et al., 2007; Hwang et al., 2017; Kwak et al., 2020). A longitudinal study demonstrated that just 5 days (20 minutes a day) of mind-body integrative training (IBMT) led to an improvement in conflict management. The images indicated greater activation of the anterior cingulate cortex during the resting state after 5 days of IBMT. Magnetic resonance data suggest that the practice leads to greater cortical thickness and increased white matter of the anterior cingulate cortex (Tang et al., 2007).

Another study applied a 4-day intensive meditation program accompanied by magnetic resonance imaging before and after the intervention, in which an increase in the prefrontal cortex, anterior cingulate cortex, and dorsolateral prefrontal cortex was identified, demonstrating an improvement of induced attentional networks by short-term meditation (Kwak et al., 2020).

With that in mind, it can be noted that the applied meditation program, even though it was short-term (1 month), showed significant results. It is known that the neural networks of the prefrontal cortex are more recruited in beginning or short-term meditators, as they are the first pathways activated. In this study, we show that the cognitive tests that most focused on the prefrontal cortex (ML-1, ML-2, SPAN-f, and SPAN-r) obtained the best results.

Both tests mentioned above also showed that the structures of the hippocampus and temporal lobe are used by the participant, especially ML-2. The hippocampus is an essential structure for consolidating new information and creating memories. Within a short period of meditation, our participants were able to recruit this structure. In the ML-2 test, the control group obtained an average score of 22.14, while the meditation group obtained an average of 25.06, demonstrating that meditation enables greater recruitment of hippocampal neurons together with the sharp attention associated with auditory temporal lobe activity.

Meditation is an ancient technique that is increasingly popular today. The study suggests that it mitigates the manifestations of a number of disorders, including anxiety, depression, substance abuse, eating disorders, and chronic pain, among others. It is an increasingly applied tool in psychotherapeutic programs (Fortney & Taylor, 2010; Chambers et al., 2008; Jain et al., 2007; Tang et al., 2007; Wallace, 1970; Tang et al., 2015; Ngô, 2013).

5. Conclusion

The mindfulness meditation practice applied in this study suggests that short-term meditation is able to reduce the signs and symptoms of anxiety as well as improve cognitive aspects. The application of a 4-week program, with 2 weekly meetings of 1 hour, using the soul-sync technique, was able to reduce the anxiety levels of 93.75% of the participants, which involves structures such as the amygdala. In addition, LM-1, LM-2, Span-f, and Span-r showed significant results, demonstrating that mindfulness meditation can improve the performance of immediate and delayed attention, incidental contextual memory, as well as working memory, which involves structures of the prefrontal cortex frontalis, hippocampus, and temporal lobe.

The activation and modification of various brain areas contribute to the understanding that mindfulness meditation is capable of stimulating brain plasticity, leading to behavioral changes and a greater ability to deal with conflicts. Mindfulness is a technique that results in individuals having a greater state of peace, calm, and relaxation, greater personal acceptance, reflective capacity, self-control, and self-regulation.

It is observed that to achieve the functions of processing speed and decision making, which surround the middle frontal lobe, longer mindfulness meditation programs could provide better results. Therefore, future studies could examine other mindfulness techniques and varying durations to evaluate their effects on cognitive aspects, further reinforcing the importance of mindfulness practice for the population.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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