

New Complementary Approaches for the Treatment of Anxiety - A Narrative Review.

Catarina Santos^{1,2,*} 

¹ ABS – Health Level Atlântico Business School, Vila Nova de Gaia, Porto, Portugal;

² IPTC – Research Department in Complementary Medicine, Portuguese Institute of Taiji and Qigong, Maia, Porto, Portugal.

* Correspondence: catarina.santos.10323@abs.pt

Abstract: Anxiety disorders are prevalent mental health conditions with increasing numbers due to various factors such as the COVID-19 pandemic, armed conflicts, and climate changes. Besides, individual, provider, and systemic barriers can limit access to effective mental health services. To address these challenges and expand treatment options, traditional and modern complementary therapies have gained attention. This review focuses on acupuncture, mindfulness and mindfulness-based practices, virtual reality, music therapy, aromachology and aromatherapy, and the use of cannabidiol (CBD) and classical psychedelics. The findings suggest that acupuncture and electroacupuncture may have benefits in reducing anxiety symptoms, but more research with improved methodology is required. Mindfulness and mindfulness-based practices (yoga, Taijiquan, and Qigong), show promising results in reducing anxiety levels, although further high-quality studies are needed. Virtual reality-based therapy offers customizable experiences to confront anxiety-inducing situations. Music therapy demonstrates potential in alleviating anxiety symptoms. Certain fragrances show potential in reducing stress and anxiety through mechanisms that involve olfactory pathways. Additionally, emerging evidence suggests that CBD, ayahuasca, psilocybin, and LSD may have anxiolytic properties, but further extensive studies are necessary to understand their efficacy, safety, and practicality for anxiety treatment. These complementary approaches provide additional options for managing anxiety, complementing conventional treatments and addressing the growing prevalence of anxiety disorders.

Keywords: Anxiety, Acupuncture, Mindfulness, Taijiquan, Qigong, Virtual reality, Music therapy, Aromachology, Aromatherapy, Cannabidiol, Classical psychedelics.

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1. Introduction

Anxiety is an emotional state that is characterized by feelings of tension, worried thoughts, and physical changes such as increased blood pressure. Those with anxiety disorders often experience recurring intrusive thoughts and may avoid certain situations due to worry, as well as experiencing physical symptoms such as sweating, trembling, dizziness, or a rapid heartbeat. While anxiety and fear are sometimes used interchangeably, anxiety is a future-oriented and long-lasting response to a general threat, while fear is a short-lived response to a specific and identifiable threat¹⁻³.

Anxiety disorders such as generalized anxiety, obsessive-compulsive disorder and panic disorder are some of the most commonly diagnosed mental health conditions, affecting 42.5 million adults in the USA alone⁴. However, recent data suggest that the numbers have been increasing in the last years due to the COVID-19 pandemic^{5,6}, the Russian-Ukrainian war⁷⁻⁹, and even climate changes^{10,11}.

Obtaining effective mental health services may be hindered by various barriers, including individual factors such as reluctance to seek help, provider factors such as failure

to detect mental health issues, and systemic factors such as the lack of access to suitable treatment options ¹².

Considering the increasing prevalence and the several barriers that may obstruct effective treatment for anxiety, new approaches should be taken into consideration to provide more options and access. In this fashion, traditional and modern complementary therapies may prove to be valuable.

This narrative review aims to explore some of these options and provide insight about complementary therapies for the management of anxiety.

2. Methodology

For this review, we considered the results of systematic reviews that were published in the last five years – from 2018 to August 8th of 2023. Informal search was conducted on various databases such as PubMed, Google Scholar, Science Direct, and Scielo, using different combinations of keywords. Titles were screened for relevance, and the selected studies were subject to abstract assessment. Studies meeting all criteria (systematic review, published within the last 5 years, and using a complementary approach for anxiety treatment) were included, and their full texts were retrieved and analysed.

3. Results and Discussion

3.1. Acupuncture

Acupuncture can be described as the act of inserting tiny needles into particular points on the body, known as meridians or channels, through which the life energy called qi is believed to flow ^{13, 14}. Its purpose is to adjust the functioning of the nervous, circulatory, endocrine, and exocrine systems, ultimately enhancing overall well-being ¹⁵. Electroacupuncture, on the other hand, involves the use of electrical stimulation alongside the insertion of needles ¹⁶.

According to the findings of Li, Xing ¹⁷, evidence indicates that the effectiveness of acupuncture surpassed that of conventional medicine and sham acupuncture in treating anxiety. However, the methodological quality of most of the included reviews and the quality of evidence were considered low.

Regarding the study by Amorim, Amado ¹⁸, it concludes that diverse approaches involving variations in acupoints, study design, duration, and types of acupuncture all yield comparable outcomes, namely reduced levels of anxiety. As well, the authors highlight the need for more research in order to assess and confirm the positive effects of acupuncture and electroacupuncture for anxiety.

Overall results for this topic are insufficient. However, acupuncture and electroacupuncture seems to produce some benefits for anxiety symptoms and is worth to consider it as a complementary therapy to conventional medicine treatments.

3.2. Mindfulness and mindfulness-based practices

Mindfulness involves intentionally directing one's awareness to the current moment's encounter without making judgments ^{19, 20}.

The effects of mindfulness exercises as a stand-alone intervention on symptoms of anxiety and depression were analysed by Blanck, Perleth ²¹ in a systematic review and meta-analysis.

The study results suggest that the mere regular practice of mindfulness exercises proves to be advantageous, even when not incorporated into broader therapeutic frameworks. Despite the promising results, more studies should be conducted in the future to further confirm these results.

Research suggests that mindfulness meditation, leads to decreased rumination, and can potentially modify the biological clinical pathways related to psychological and physical stress ²²⁻²⁴.

It is suggested that mindfulness interrupts the continuous activation of the sympathetic nervous system and the hypothalamus-pituitary-adrenal axis²²⁻²⁴.

Yoga therapy involves utilizing yoga as a form of exercise, primarily centred on postures known as asanas. It serves as a gentle approach to both physical activity and relaxation, with a specific focus on enhancing well-being. This variant of yoga finds extensive practice within instructional sessions, encompassing not only postural yoga but also potential elements like meditation, visualization, controlled breathing (pranayama), and soothing music²⁵.

Exploring the practice of Yoga for anxiety, Cramer, Lauche²⁶ carried out a systematic review and meta-analysis of randomized controlled trials. The study suggests that Yoga has the potential to be a beneficial and safe intervention for individuals experiencing heightened levels of anxiety. However, the evidence regarding the effects of Yoga on anxiety disorders is inconclusive. To draw more definitive conclusions and explore the underlying mechanisms, further high-quality studies are necessary and justified, considering the initial findings and plausible mechanisms of action.

Another meta-analysis²⁷ suggested that, when compared to non-mindful exercise, yoga has greater effectiveness in relieving symptoms of anxiety. Therefore, the authors suggest that yoga could serve as a primary healthcare intervention to aid the public in reducing anxiety.

As well, mindfulness-based techniques such as Taijiquan and Qigong²⁸ have also been recently studied for their effects on anxiety.

These techniques are often considered Traditional Vegetative Biofeedback Therapies²⁹⁻³¹ that are capable of producing benefits on the treatment of anxiety through the activation of the parasympathetic nervous system and the reduction of cortisol levels³²⁻³⁴, as well as the decrease in noradrenaline excretion and sympathetic nervous system activity³⁵. These techniques may influence health by primarily modulating the two divisions of the autonomic nervous system, as suggested by Rodrigues, Lopes³⁶.

The systematic review and meta-analysis by Zhang, Zou³⁷ suggests that Taijiquan produces moderate-to-large significant positive effects on negative emotions in both young and older adults. Conclusions point out that these findings suggest that Taijiquan is a worthy complementary non-pharmacological resource towards anxiety and with relevant implications for the public health domain.

Regarding Qigong, the study by Chang, Knobf³⁸ suggest that the practice may have some benefits for older adults. As well, the findings of Liu, Li³⁹ suggest that Qigong and Taijiquan can improve psychological well-being (anxiety included) in adolescents. However, there is a consensus on these studies, namely the need to improve future research's quality in order to confirm the results.

Recent studies suggest that Taijiquan and Qigong may be beneficial for mental well-being when allied to new technologies⁴⁰⁻⁴², strengthening the idea that these techniques are a feasible complement to conventional treatment for anxiety.

3.3. Virtual reality

Virtual reality is a recent technology and has become increasingly studied. Virtual Reality is a tool proposed to be capable of enhancing psychological well-being by facilitating new learning opportunities, as stated by Cieřlik, Mazurek⁴³. Regarding the systematic review of the same authors⁴³, Virtual reality can be used as a supportive therapy to the conventional approaches for anxiety.

Virtual reality provides therapeutic scenarios that are difficult or impossible to recreate in real life, allowing for repeated and readily available treatment experiences, leading to more consistent delivery⁴⁴. Individuals can engage in simulations of challenging situations and receive coaching on appropriate responses based on theoretical understanding⁴⁴. These simulations can be adjusted in difficulty and repeated until effective learning takes place and consequently, patients can confront challenging situations more

easily in a VR environment and explore new therapeutic strategies ⁴⁴. Some studies indicate that patients express satisfaction with VR-based therapy and may find it more acceptable compared to traditional approaches ^{45,46}. Nevertheless, due to the ongoing advancements in technology, both in terms of access and quality, there remains a limited number of studies on anxiety.

3.4. Music Therapy

Music therapy is characterized as the utilization of evidence-based music interventions, guided by a trained professional who has completed an approved music therapy program, to achieve personalized goals within a therapeutic relationship ^{47,48}. It incorporates various musical elements, such as melody, timbre, rhythm, harmony, and pitch, to bolster physical, psychological, and social well-being by establishing a therapeutic connection between the participant and therapist ⁴⁹. Music therapy can also be categorized into active, receptive, or a combination of both formats, and can be administered individually or in group settings ⁵⁰. Due to its non-invasive nature, which includes safety, high compliance, minimal side effects, and ease of tolerance, this therapy has gained recognition as a viable adjunctive treatment for a wide range of psychiatric disorders ⁵¹.

The effects of music therapy on anxiety were assessed in the systematic review of Lu, Jia ⁴⁸. This study indicates that Music therapy can improve anxiety. However, despite this recent positive overview of Music Therapy, further research is needed on the lasting effects after the intervention is discontinued.

The same was found by Witusik and Pietras ⁵² also finding good outcomes, and suggesting Music therapy as a promising complementary therapy for mental disorders.

3.5. Cannabidiol and classical psychedelics

Cannabidiol (CBD) is one of the major compounds present in the plant *Cannabis sativa* ⁵³.

Studies have shown that CBD displays several effects, amongst them anxiolytic ⁵⁴⁻⁵⁶.

According to the study by García-Gutiérrez, Navarrete ⁵⁶ evidence consistently demonstrate the substantial impact of CBD on regulating behaviours associated with anxiety. Nevertheless, further extensive studies are required to fully understand the efficacy, safety, and practicality of CBD for treating psychiatric disorders such as anxiety.

Ayahuasca, a botanical hallucinogen traditionally utilized by indigenous populations for ceremonial and medicinal purposes, contains the psychedelic compound N-methyltryptamine ⁵⁷⁻⁶⁰. Research has revealed its antidepressant and anxiolytic properties, including mood improvement and reduction of panic-related symptoms ^{59,61-66}. Furthermore, longitudinal observational studies involving ritual users have indicated that ayahuasca is not detrimental to psychological well-being and may even be associated with a decreased risk of mental health issues ⁶⁷⁻⁶⁹.

Similar to ayahuasca, psilocybin is a natural plant alkaloid found in certain mushroom species, and acts as a prodrug of psilocin (4-hydroxydimethyltryptamine) ⁷⁰. Some studies have linked psilocybin administration to cognitive flexibility, cortical neural plasticity, and antidepressant responses ⁷¹⁻⁷⁵. The compound has a well-established safety profile and experts consider it one of the least harmful drugs when used appropriately with a very interesting potential ^{76,77}.

In contrast, LSD is a semi-synthetic psychedelic compound ⁷⁸. Compared to psilocybin, LSD is believed to induce more intense emotional experiences and carries a higher risk of triggering paranoia. However, when administered in a medical setting with proper support, the likelihood of severe anxiety and panic attacks is normally mitigated ⁷⁹.

According to the systematic review of Muttoni, Ardissino ⁸⁰, ayahuasca, psilocybin, and LSD have consistently demonstrated significant and enduring anxiolytic effects when administered in safe settings. These psychedelic treatments have generally been well-tolerated, with no long-lasting adverse effects. Their therapeutic effects primarily occur

through biochemical interactions with serotonin receptors and the generation of profound psycho-spiritual experiences that enhance mental flexibility. However, before considering wider implementation of psychedelics, the authors state that it is crucial to replicate the findings present in the literature in larger studies with longer follow-up periods to confirm their efficacy and safety. These results and recommendations were shared with the study of Aday, Mitzkovitz ⁸¹.

3.6. Aromachology and aromatherapy

Since the dawn of civilization, individuals have recognized that pleasant aromas can wield a positive impact on their emotions, well-being, and how they perceive their societal status ⁸². In the present day, fragrances are a captivating realm of investigation into the elements that shape behavior and overall wellbeing ⁸³⁻⁸⁶. This trend largely stems from the escalating curiosity in environmental psychology – an area exploring the connections between people and their surroundings, and how environmental elements influence personal actions and feelings ^{87,88}.

A systematic review by Thangaleela, Sivamaruthi ⁸⁹ concludes that certain aromas can be relaxing and capable of reducing mental stress, known to be the cause or the result of many mental and physical health conditions. Some of the oils and their effects are presented in Table 1, as reported by the authors of the above-mentioned study. The process through which aromas act on the human brain has already been studied.

Once inhaled through the nose, aromas pass the blood–brain barrier and affect the central nervous system ^{110,111}, the autonomic nervous system, and the endocrine system ¹¹². These scents have the capacity to swiftly induce emotional shifts in human beings ¹¹³. Upon inhaling the essential oils, the volatile molecules adhere to olfactory receptors nestled within cilia cells. This initiates the transmission of an electrochemical signal along the olfactory tract and bulb, ultimately reaching the brain's olfactory regions. Consequently, this process triggers autonomic responses and evokes potent emotional reactions linked to the received aroma stimuli ¹¹⁴. While there is growing evidence, more research is needed on the topic, particularly large randomized controlled trials to confirm effects and mechanisms of action.

4. Conclusion

In conclusion, anxiety poses a significant challenge in mental health, with its prevalence exacerbated by recent global events. This review explored diverse complementary therapies as potential adjuncts to conventional treatments. Acupuncture, mindfulness practices, yoga therapy, virtual reality, music therapy, cannabidiol, classical psychedelics, and aromachology/aromatherapy all exhibited promise in addressing anxiety.

Acupuncture's subtle effects, mindfulness's thought pattern rewiring, Taijiquan, Qigong and yoga therapy's holistic benefits showed potential. Virtual reality offered innovative exposure-based options, while music therapy and aromachology engaged the senses. And cannabidiol and classical psychedelics introduced new therapeutic directions. However, overall, these therapies require further research for validation, as integrating these therapies into mainstream care mandates rigorous investigation into their effectiveness, mechanisms, and safety. Anyway, balancing conventional and complementary approaches could offer a more comprehensive strategy for tackling anxiety and enhancing well-being in this increasingly complex world.

Table 1. Oils and effects of the relevant studies reported by Thangaleela, Sivamaruthi ⁸⁹.

Oils	Effects	Studies
Lavender (<i>Lavandula angustifolia</i>) + ylang-ylang (<i>Cananga odorata</i>) + marjoram (<i>Origanum majorana</i>) + Neroli (<i>Citrus aurantium</i>)	Decrease systolic and diastolic blood pressure and reduce salivary cortisol in prehypertensive and hypertensive patients.	Kim, Kim ⁹⁰
Lavender (<i>Lavandula angustifolia</i>) and bergamot	Act as an antidepressant and a relaxant.	Diego, Jones ⁹¹
Lavender (<i>Lavandula angustifolia</i>) and bergamot	Alleviate negative emotions.	Price ⁹²
Lavender (<i>Lavandula angustifolia</i>)	Reduces mental stress and increases arousal.	Motomura, Sakurai ⁹³
Lavender (<i>Lavandula angustifolia</i>)	Reduces agitation in dementia patients.	Lin, Chan ⁹⁴
Lavender (<i>Lavandula angustifolia</i>)	Lessen depression and increase the sleep quality of postpartum mothers.	Afshar, Moghadam ⁹⁵ , Kianpour, Mansouri ⁹⁶
Lavender (<i>Lavandula angustifolia</i>)	Promoted post-stress cognitive performance; Protective effects on working memory - protect cognitive function after stress.	Chamine and Oken ⁹⁷
Bergamot (<i>Citrus bergamia</i>)	Possesses anti-nociceptive and anti-allodynic properties and modulates the sensitive perception of pain.	Rombolà, Amantea ⁹⁸
Neroli	Soothes emotions, gives comfort, and reduces shakes resulting from shock or fear .	Anwar, Ahmed ⁹⁹
Neroli, lavender, and bitter orange	Reduces anxiety and blood pressure in postmenopausal women.	Choi, Kang ¹⁰⁰ , Farshbaf-Khalili, Kamalifard ¹⁰¹
Bitter orange (<i>C. aurantium</i>)	Reduces first-stage labor pain and anxiety in primiparous women.	Namazi, Akbari ¹⁰²
Yuzu (<i>Citrus junos Sieb. ex Tanaka</i>)	Reduces negative emotional stress.	Matsumoto, Kimura ¹⁰³ , Matsumoto, Kimura ¹⁰⁴
Ylang-ylang	Promotes relaxation.	Anwar, Ahmed ⁹⁹
Marjoram	Lowers the activity of the sympathetic nervous system and kindles the parasympathetic nervous system.	Anwar, Ahmed ⁹⁹
Linalool, santalol, cedrol, piperonal, true lavender, and sweet orange oil	Improves sleep in the elderly with dementia.	Takeda, Watanuki ¹⁰⁵
Sandalwood, sweet marjoram, lavender	Used in sedation, relaxation, treating anxiety, and relieving irritability, loneliness, insomnia, and depression.	Diego, Jones ⁹¹ , Carvalho-Freitas and Costa ¹⁰⁶ , Toda and Morimoto ¹⁰⁷
<i>Litsea cubeba</i>	Treating cognitive discomfort. Found to improve mood and reduce stress and confusion by reducing the salivary cortisol levels in healthy individuals.	Chaiyasut, Sivamaruthi ¹⁰⁸
Agave (<i>Polianthes tuberosa</i>)	Reduced test anxiety.	Ghorat, Shahrestani ¹⁰⁹

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