Evaluation of Meditation as a Treatment for GAD

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Abstract

Recently, Generalized Anxiety Disorder (GAD) has become a more prevalent mental health issue across the population. It is on the rise globally and is particularly affecting higher-income countries, such as the United States. Furthermore, evidence suggests there is a significant number of people suffering from undiagnosed GAD, in addition to the diagnosed count. Most of the widely used methods like medication and professional therapy, while decently effective, can be expensive and inaccessible to many people. This literature review explores the effectiveness of Buddhist Vipassana meditation in managing GAD compared to conventional treatments. While meditation shows promise in enhancing emotional regulation and stress resilience as a free, accessible, and versatile practice, current evidence suggests it is most effective as a complementary therapy. Further research is needed to validate its efficacy as a standalone treatment.

Introduction

In today's society, the rising burden of anxiety on the population cannot be ignored. From 2008 to 2018, the prevalence of anxiety disorders has risen among adult Americans, especially among young adults, with 15% of young adults reporting anxiety in 2018.[1] The situation has only worsened after the Covid-19 pandemic, for infected patients have shown a higher anxiety rate, and the dramatic changes in daily life as well as economic uncertainty caused by the pandemic have induced further fear and anxiety.[2] One of the most prominent anxiety disorders is GAD, which has been associated with considerable role impairment (difficulty in fulfilling life responsibilities), especially in high-income countries like the U.S., underlining its significance as a public health issue.[3] Furthermore, evidence suggests many cases of GAD go undiagnosed, highlighting its larger impact.[4]

As a group, anxiety disorders are the most widespread class of mental health disorders and are the sixth leading cause of disability and impairment in high and low-income countries, with the highest burden being between ages 15 through 34.[5] One of these anxiety disorders is General Anxiety Disorder (GAD) and is defined by the DSM-V as persistent and excessive anxiety and worry about a number of domains in the person's life, present for at least 6 months.[6] Some of the symptoms of GAD include restlessness, being easily fatigued, difficulty concentrating, irritability, muscle tension, and disturbed sleep; at least three of them need to be present for at least 6 months to meet the DSM-V criteria for GAD.[6] Compared with other anxiety disorders, GAD specifically is also present all over the globe but especially impacts higher-income countries such as the U.S.[3] In addition, the disorder affects twice as many women as men; studies suggest further risk factors include low income and widowed, separated, or divorced marital status.[7] Evidence shows a hereditary basis and genetic factors associated with GAD, as well.[8] Like other anxiety disorders, GAD has a high rate of comorbidity with other anxiety disorders and depression, but GAD has a particularly strong association with major depression.[5] While many anxiety disorders have an age of onset ranging from late adolescence to early adulthood, GAD has the latest age of onset, with a median age of 31 years old.[5,7]

While the pathophysiology and exact mechanism through which GAD occurs and affects victims is not understood, there is still some evidence suggesting specific regions of the brain are impacted by GAD. Brain imaging studies, with the use of functional MRI (fMRI), have long suggested various abnormalities, like overactivity, in the limbic regions, such as the amygdala

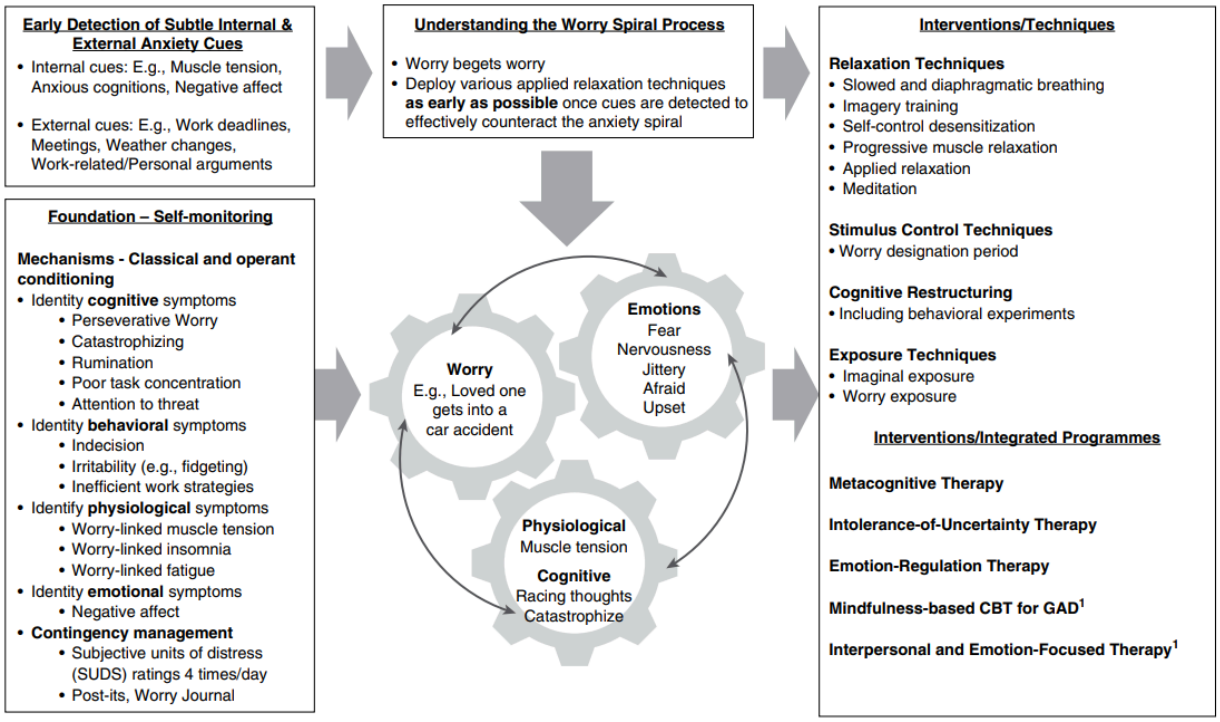
and insula.[5] In addition, multiple implicated neurotransmitter systems have been identified to have a role in disrupting the central nervous system. Commonly for anxiety disorder patients, the serotonergic neurotransmitter system tends to be characterized by underactivation while the noradrenergic system is characterized by overactivation.[9] These systems regulate and are regulated by other pathways and neuronal circuits in various regions of the brain, so disruptions in them provide an explanation for anxiety disorders. Another disrupted system associated with anxiety disorders is the gamma-aminobutyric acid (GABA) system, with evidence for the role of this system pointing to clinical experience with drugs called benzodiazepines.[9,10]

There are two ways that GAD is typically treated today – pharmacotherapy and psychotherapy. One of the most well-established forms is pharmacotherapy. Three of the most prominent pharmacotherapy treatments for GAD are SSRIs, SNRIs, and benzodiazepines. SSRIS and SNRIS are often used as first-line treatments due to their high efficacy rates and relatively few side effects.[11,13] Selective serotonin reuptake inhibitors (SSRIs) are antidepressants that block the neurotransmitter serotonin from reabsorption (reuptake) into neurons. As a result, serotonin availability is increased, improving serotonin transmission between neurons.[11,12,13] Six SSRIs are widely available: citalopram, fluoxetine, fluvoxamine, paroxetine, sertraline and escitalopram.[13] Serotonin-norepinephrine reuptake inhibitors (SNRIs) are another class of antidepressants that work similarly to SSRIs but improve availability of norepinephrine in addition to serotonin.[11,12,13] Although these antidepressants work effectively and have relatively good safety profiles, it nevertheless typically takes around four weeks for the onset of anxiolytic effects, and until then, patients may experience adverse effects.[12] On the contrary, one of the main advantages of benzodiazepines, which are not antidepressants, is that start providing anxiolytic effects almost immediately.[12] All known actions of benzodiazepines are mediated by the GABA-A receptor complex. Benzodiazepines act to increase chloride conductance of the GABA-A receptor, causing increased inhibitory neurotransmission.[11,13] However, they have their own complications, as benzodiazepine treatment may be associated with central nervous system (CNS) depression, impaired cognitive functions mainly in elderly patients, and dependency. Although 55 - 94% of anxiety patients are treated with this medication, current guidelines do not recommend it as a first-line treatment.[12]

Class	Example medications	Typical class adverse effects[b]	Select safety and use considerations[b]
First-line therapy			
Selective serotonin reuptake inhibitors (SSRIs)	Citalopram Escitalopram Fluoxetine Fluvoxamine Paroxetine Sertraline	Initial anxiety and jitteriness, nausea, dyspepsia, diarrhea, drowsiness or insomnia, palpitations, headache, sweating, increased or decreased appetite Weight gain and sexual dysfunction SSRI discontinuation symptoms with abrupt withdrawal	Class warning suicidality (<24 y) Caution in epilepsy, cardiac arrhythmia/QTc prolongation (citalopram dose limitations), angle closure glaucoma, bleeding, hepatic impairment, hyponatremia, syndrome of inappropriate antidiuretic hormone secretion, risk hypomania/mania with monotherapy bipolar Varying effects by drug on drug metabolism and interactions including risk serotonin syndrome
Serotonin-norepinephrine reuptake inhibitors (SNRIs)	Duloxetine Venlafaxine extended release	Overlaps SSRI adverse effects, eg, nausea, dizziness, drowsiness, sedation, insomnia, headache, constipation, dry mouth SNRI discontinuation symptom risk	Overlaps SSRI class warnings as above Potential hypertensive effects, hepatic enzyme elevations
Second- or third-line therapy[c]			
Benzodiazepines	Alprazolam Clonazepam Diazepam Lorazepam	Drowsiness, sedation, dizziness, ataxia. Cognitive impairment, falls in elderly individuals Physiological dependence, withdrawal, interdose rebound (benefits longer acting more lipophilic agents)	Risk for misuse and dependence Consider substance use disorder history and age May interfere with cognitive behavioral therapy

Overview of Pharmacologic Therapy for Anxiety Disorders [14]

In terms of psychotherapies, Cognitive Behavioral Therapy (CBT) is the most prominent and empirically supported psychological treatment for youth and adult anxiety disorders. A full course of CBT typically consists of 8 to 20 weekly sessions.[14] The primary components of CBT include psychoeducation, cognitive restructuring, and exposure.[14] Psychoeducation helps patients understand their symptoms and the harmful patterns that worsen them. Cognitive restructuring involves recognizing anxiety-provoking thoughts, like catastrophizing, and learning to reframe them, personalized to the patient's condition (e.g., fear of uncertainty in GAD).[14] Exposure therapy encourages patients to face sensations they tend to avoid due to anxiety. Combination of CBT and medication may be beneficial for severe anxiety or for patients who don't respond to either treatment alone.[14]



Integration of core principles, mechanisms, and techniques of CBT for GAD [17]

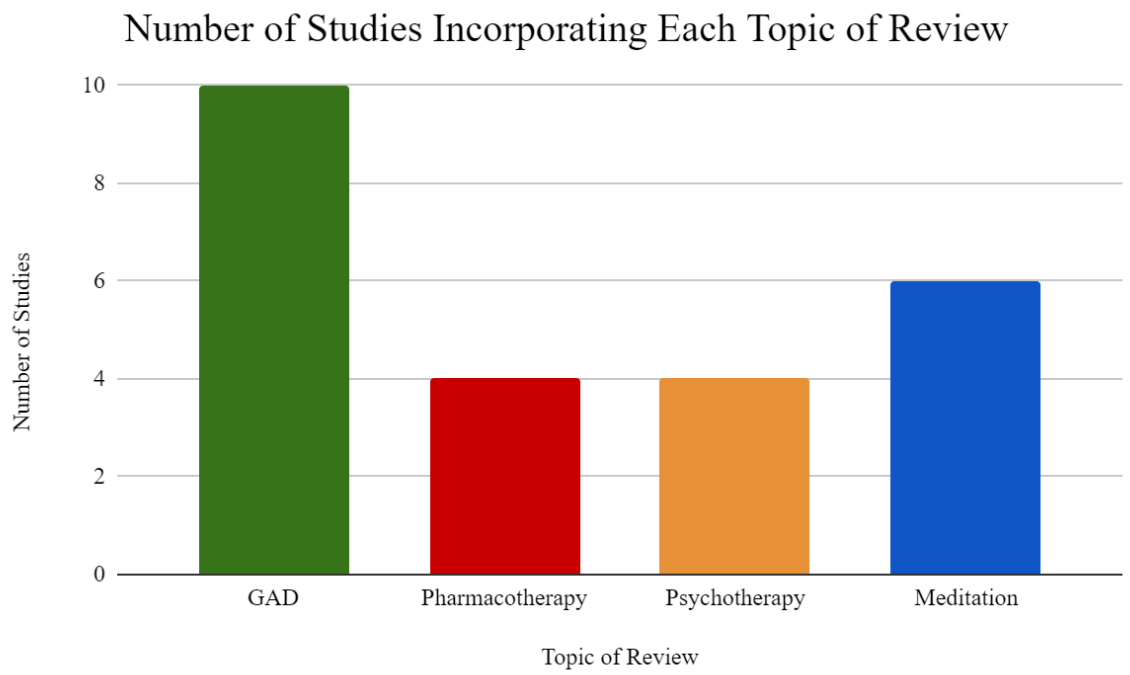
Practically speaking, both pharmacotherapy and psychotherapy present accessibility problems for a vast number of patients suffering from GAD. They can both be extremely costly; of the two, psychotherapy tends to be the more expensive due to the need for professionals and highly tailored therapy sessions. Hence, psychotherapy can also be inconvenient, given that patients regularly need to carve out space in their schedules to meet with professionals and travel to those sessions. On the other hand, pharmacotherapy treatments like SSRIS, SNRIS, and benzodiazepines all have shown various significant adverse effects, potentially worsening their patients' overall wellbeing. Medication also tends to provide short-term relief, as it treats only the symptoms of disorders rather than their underlying causes. A form of treatment that is truly effective in the long-term, is accessible to everyone, and can be done in a flexible manner is greatly needed. Thus, the purpose of this review is to evaluate meditation for its effectiveness in dealing with anxiety and to compare it with first line treatment options for anxiety disorders. This review compares meditation with other treatments because meditation has the potential to be a treatment method that is also free, accessible, versatile, and easily integrable into daily life. It is hypothesized that meditation could prove to be an effective alternative treatment to

conventional medication and therapy that anxiety patients could independently implement themselves. Additionally, meditation could be a fantastic supplement to medication and therapy if combining them significantly increases their effectiveness.

This dual potential of meditation—as both a standalone and complementary treatment—aligns with the principles of Buddhist Vipassana meditation, a practice rooted in deep mindfulness and insight.[15] It involves extraordinary attentiveness to the six senses (seeing, hearing, smelling, tasting, touch, and thought) while cultivating equanimity, or an attitude of non-interference toward whatever arises.[15] Through this Vipassana meditation, a practitioner learns to observe both positive and negative experiences without reacting. By not engaging with negativity, it loses its power and eventually dissolves, leading to purification. Vipassana operates on the principle that ordinary experiences, when met with mindfulness and equanimity, yield profound insights and purification. Mindfulness entails precise, rich, and continuous awareness of each moment, while equanimity means allowing the senses to function without interference, even at the subconscious level. Suffering, often caused by resistance to pain, is reduced by learning to experience pain without attaching to it, thereby separating it from resistance. Likewise, craving is a form of grasping around pleasure. When awareness is complete and interference is absent, one senses the pure state of “I am” and simultaneously realizes that the self is a process rather than a fixed entity. This realization leads to profound freedom and happiness that are independent of external circumstances. In Vipassana, this path to insight is complemented by the cultivation of loving-kindness and compassion, which form the other half of the practice.

Methods

This literature review acquired sources from Google Scholar and PubMed using search words that include the following: anxiety, GAD, pharmacotherapy, SSRIs, SNRIs, benzodiazepines, psychotherapy, CBT, mindfulness meditation, Vipassana meditation, and MBSR. Some sources that had data on efficacy rates or insight into how the treatment methods work were included in the review.



Efficacy

Many forms of conventional treatment to GAD have been shown to be efficacious. One meta-analysis focusing on CBT compares efficacy rates of the treatment on anxiety across various studies has results of the effect size from 0.33 to 0.57 to 0.82.[16]

		Random effects		Fixed effects				
Comparison	Symptom category	Average effect size	95% CI	Average effect size	95% CI	τ^2	Q	n
(C)BT with no-treatment control	Anxiety	0.82	0.62, 1.01	0.82	0.63, 1.00	0	10.91	19
	Depression	0.76	0.55, 0.98	0.76	0.57, 0.96	0	8.69	15
	Quality of life	0.89	0.57, 1.21	0.89	0.47, 1.31	0	4.04	6
(C)BT with placebo control	Anxiety	0.57	0.30, 0.85	0.57	0.34, 0.80	0	7.28	9
	Depression	0.52	0.15, 0.89	0.52	0.24, 0.80	0	1.06	6
	Clinical significance	0.98	0.38, 1.57	0.98	0.61, 1.35	0	2.80	4
(C)BT with pharmacotherapy	Anxiety	0.33	−0.02, 0.67	0.33	0.04, 0.61	0	6.80	8

Note. CI = confidence interval; τ^2 = random-effects variance; Q = result of the Q test for homogeneity of effect sizes; n = number of effect sizes; (C)BT = (cognitive) behavioral therapy.

Average Effect Sizes for Posttest of the Symptom Categories Comparing Therapy Approaches[16]

When comparing the effect on symptoms between these treatments, CBT is demonstrated to be a highly effective treatment for GAD, alleviating core anxiety symptoms, reducing related depressive symptoms, and enhancing quality of life.[16] Additionally, CBT is recognized as the only empirically supported treatment for GAD (Chambless & Ollendick, 2001), showing significant reductions in acute symptoms and sustaining treatment benefits for up to two years.[17] According to another study's results, CBT has displayed a larger effect size on treating GAD than pharmacotherapy does (g = 0.76 vs. g = 0.38).[18] However, the study also notes that the two treatment methodologies are often tested using different controls and that there is some publication bias towards psychotherapies.

Nevertheless, in the realm of pharmacotherapy, all SSRIs, SNRIs, and benzodiazepines have all shown significant efficacy (g = 0.36, 0.42, and 0.38 respectively).[19] Initially, BZs can rapidly alleviate symptoms due to their quick onset of action, often reaching peak efficacy within just days of starting treatment. However, this efficacy tends to diminish after approximately four weeks of continuous use, after which their effectiveness can plateau.[19] Antidepressants (ADs) like SSRIs and SNRIs, on the other hand, generally require a longer period to reach their full therapeutic effect, typically taking between four to eight weeks.[19] This extended onset can be challenging for patients to tolerate, especially due to the side effects that may accompany early stages of AD use. Meanwhile, BZs present a range of adverse effects of their own, particularly with long-term use, which is associated with cognitive impairments and an elevated risk of dementia.[19]

As for meditation, a paper by Koszycki et al. studied the effectiveness of mindfulness-based stress reduction (MBSR) versus cognitive behavioral group therapy (CBGT) for social anxiety disorder (SAD).[20] MBSR is a secularized form of Vipassana meditation that applies similar principles. SAD, like GAD, is another type of anxiety disorder. The study found that although MBSR didn't reduce SAD symptoms as effectively as CBGT did, MBSR "was equally efficacious in improving functioning, mood and subjective well-being." Furthermore, a different study by Hoge et al that evaluated efficacy of MBSR specifically on GAD concluded that MBSR does indeed beneficially affect GAD symptoms, with an effect size of 1.06 and a significant reduction in most clinical outcome measures (questionnaires like CGI-S, CGI-I, BAI, and PSQI to report various psychological symptoms) but not all (HAM-A).[21]

It was also observed that patients who learned mindfulness meditation had improved coping during a laboratory stress paradigm, raising the possibility that mindfulness may imbue some resilience to stressful psychological challenges. Additionally, one study observed that mindfulness meditation training helped reduce the stress response in individuals with GAD, as evidenced by changes in HPA axis hormones and inflammatory markers, suggesting it may enhance resilience to psychological stress.[22] Another study indicated that even brief mindfulness meditation training supports self-regulation and improves heart rate, benefits commonly seen in long-term practitioners.[23]

Furthermore, one more study confirmed that mindfulness meditation reduces state anxiety by activating a network of brain regions, notably the anterior cingulate cortex (ACC), anterior insula, and ventromedial prefrontal cortex (vmPFC).[24] Additionally, in contrast to experienced Zen meditators, participants with brief meditation training were able to effectively reduce amygdala activation when exposed to negative emotional stimuli (Taylor et al., 2011). The observed link between vmPFC activation and anxiety relief offers valuable insight into how mindfulness meditation may regulate self-referential processes. Moreover, increased activation in the ACC and anterior insula correlated with more substantial reductions in state anxiety.

Conclusions

In conclusion, the efficacy of mindfulness meditation as a treatment for GAD demonstrates promising, albeit varied, results when compared with established treatments such as cognitive-behavioral therapy (CBT) and pharmacotherapy. CBT consistently achieves strong effect sizes in reducing both anxiety and comorbid depressive symptoms, with effects that are often maintained long after treatment. Pharmacotherapy, particularly with SSRIs and SNRIs, also provides significant relief, although the delayed onset of therapeutic benefits and risk of side effects can complicate its long-term use. Benzodiazepines offer rapid symptom relief but

are typically unsuitable for prolonged treatment due to diminishing efficacy and potential adverse effects with extended use.

Mindfulness meditation, particularly in the form of mindfulness-based stress reduction (MBSR), adds a valuable alternative by directly targeting stress responses and enhancing emotional regulation. Although there just isn't much literature available that directly compares the efficacy rates of meditation to pharmacotherapy and psychotherapy in treating GAD, meditation's capacity to reduce symptoms and to improve functioning, mood, and subjective well-being provides an appealing complement to more traditional interventions and merits further research to investigate its full potential as a treatment. Furthermore, the neurophysiological changes associated with mindfulness, including enhanced activation in brain regions linked to self-regulation and anxiety reduction, suggest a unique mechanism by which mindfulness may support resilience and emotional stability in patients with GAD.

Discussion

This literature review examines the effectiveness of mindfulness meditation, particularly Buddhist Vipassana, compared to conventional treatments like pharmacotherapy and psychotherapy for managing GAD. Ultimately, there is limited knowledge regarding direct comparisons between the efficacy of meditation, pharmacotherapy, and psychotherapy efficacy rates. Additionally, the precise underlying mechanisms of neither mindfulness meditation nor GAD are fully understood, as many complex factors influence them.

Many insights into optimizing treatments for GAD can be drawn from the available research and data. Firstly, it would still be worthwhile to keep pharmacotherapy as a first-line treatment for anxiety disorders like GAD. SSRIs, SNRIs, and benzodiazepines have all concretely demonstrated significant efficacy in reducing GAD symptoms relatively quickly, targeting specific chemical pathways. While antidepressants like SSRIs and SNRIs can have adverse effects, taking an initial combined approach of antidepressants and benzodiazepines can mitigate those side effects while boosting anxiolytic effects earlier and for a longer range of time. However, medication tends to only deal with symptoms, rather than addressing underlying causes of disorders.

CBT as a psychotherapy is empirically supported to provide lasting anxiolytic effects for GAD for multiple years, meaning a longer-term solution. CBT also promotes healthy lifestyle changes that help patients learn how to independently tackle some of the root causes of anxiety. However, CBT may not be for everyone, as it is known to have problems with retention; for instance, some patients start CBT but do not complete the treatment. Furthermore, its need for professionals to give regular, highly tailored therapy sessions means that it is often less affordable and much more time-intensive, so certain patients may not have the time or resources for it.

Unlike CBT, mindfulness meditation like Vipassana is a journey that patients undertake by themselves, as opposed to having a structured format, so it provides more flexibility for practitioners, who can use it as often as they find helpful. Mindfulness meditation fosters resilience by encouraging self-reflection, helping individuals cultivate stability regardless of external circumstances, unlike CBT's focus on external behaviors. Although meditation requires immense focus as well as a genuine effort to shift one's lifestyle and has not been empirically supported as an effective standalone treatment method for GAD, it may still provide help for those who can't afford other conventional treatments.

In addition to being a potential independent solution for individuals with limited access to therapy or medications, meditation's value as a complementary treatment warrants attention.

Evidence suggests that mindfulness meditation can counteract some of the adverse effects of pharmacotherapy, such as restlessness or irritability, by increasing self-awareness and reducing agitation. Combining mindfulness meditation with CBT may also help patients improve retention rates, as meditation's focus on emotional regulation could enhance their commitment to structured therapies.

Integrating meditation into existing treatments can be achieved through tools like mobile apps or online guided courses. These resources could bridge the gap for individuals unable to attend in-person therapy or purchase costly medications. Additionally, meditation's broader applications for overall well-being, beyond addressing anxiety symptoms, make it a holistic tool that could supplement conventional treatments.

However, challenges remain in promoting meditation as a treatment. For one, the lack of standardization in meditation practices makes it difficult to compare efficacy rates across studies. Furthermore, practitioners may face barriers such as difficulty maintaining focus, initial skepticism, or a lack of guidance on how to begin. Addressing these challenges through education and accessible resources could help demystify meditation and encourage its adoption.

In summary, mindfulness meditation, while not yet rivaling the established efficacy of pharmacotherapy and psychotherapy as standalone treatments for GAD, presents significant potential as a complementary or alternative approach. Its emphasis on resilience and emotional stability, coupled with its accessibility and flexibility, underscores the importance of continued research. Exploring ways to integrate meditation into conventional care while addressing its barriers will be crucial for realizing its full therapeutic potential. Future studies should investigate methods to standardize meditation practices for clinical trials and assess the long-term benefits of combining meditation with conventional treatments like CBT and pharmacotherapy. Future studies should investigate methods to standardize meditation practices for clinical trials [20,21] and assess the long-term benefits of combining meditation with conventional treatments like CBT and pharmacotherapy. [22,20] Future studies should investigate methods to standardize meditation practices for clinical trials and assess the long-term benefits of combining meditation with conventional treatments like CBT and pharmacotherapy.

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