

Depression and Anxiety Disorders: Benefits of Exercise, Yoga, and Meditation

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Many people with depression or anxiety turn to nonpharmacologic and nonconventional interventions, including exercise, yoga, meditation, tai chi, or qi gong. Meta-analyses and systematic reviews have shown that these interventions can improve symptoms of depression and anxiety disorders. As an adjunctive treatment, exercise seems most helpful for treatment-resistant depression, unipolar depression, and posttraumatic stress disorder. Yoga as monotherapy or adjunctive therapy shows positive effects, particularly for depression. As an adjunctive therapy, it facilitates treatment of anxiety disorders, particularly panic disorder. Tai chi and qi gong may be helpful as adjunctive therapies for depression, but effects are inconsistent. As monotherapy or an adjunctive therapy, mindfulness-based meditation has positive effects on depression, and its effects can last for six months or more. Although positive findings are less common in people with anxiety disorders, the evidence supports adjunctive use. There are no apparent negative effects of mindfulness-based interventions, and their general health benefits justify their use as adjunctive therapy for patients with depression and anxiety disorders. (*Am Fam Physician*. 2019;99(10):620-627. Copyright © 2019 American Academy of Family Physicians.)

Depression and anxiety disorders are among the most common psychiatric conditions, with an estimated 19.1% of U.S. adults experiencing anxiety and 10% experiencing depression in the past year.¹ Nearly one-half of people diagnosed with depression will also experience comorbid anxiety. In addition, many will have symptoms that are distressing, but that do not meet duration or intensity criteria to enable a clinical diagnosis. Complementary and integrative therapies (e.g., exercise, meditation, tai chi, qi gong, yoga) are often sought by patients experiencing these conditions. This article provides a concise overview of the evidence on the effectiveness of complementary therapies in treating these conditions.

Exercise

A review of meta-analyses on the effectiveness of exercise for depression and anxiety disorders noted that aerobic and resistance exercises may

be effective for mild to moderate depression, but less so for anxiety.² However, the study designs had methodologic limitations, including lack of consistent definitions for exercise type (e.g., aerobic, resistance), controls (e.g., other complementary treatments, waitlist controls), outcome measures (e.g., remission, treatment discontinuation), defined clinical populations (e.g., symptoms vs. diagnosed condition), and sample recruitment techniques.³ These study differences increase heterogeneity and undermine the ability of meta-analyses to demonstrate clear and consistent effects.

A Cochrane review on exercise for major depressive disorder concluded that exercise had a modest positive effect.⁴ However, when lower-quality studies were excluded, there was no effect. Similarly, recent meta-analyses and systematic reviews found moderate positive effects of exercise for depression and anxiety, particularly

CME This clinical content conforms to AAFP criteria for continuing medical education (CME). See CME Quiz on page 607.

Author disclosure: No relevant financial affiliations.

Patient information: A handout on this topic is available at <https://www.aafp.org/afp/2010/0415/p987.html>.

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	Evidence rating	Comments
Exercise can be a modestly beneficial adjunctive treatment option for depressive and anxiety disorders, especially treatment-resistant depression, unipolar depression, and posttraumatic stress disorder.	B	Several systematic reviews and meta-analyses show positive effects of exercise on depressive ⁵⁻¹⁰ and anxiety disorders, ¹¹⁻¹³ but the strength of these effects varies. General health benefits justify its use as an adjunctive intervention for depression and anxiety disorders.
Yoga is a therapeutic option for depression and has positive effects in people with anxiety disorders, particularly panic disorder.	B	Yoga can be suggested as a monotherapy for depression, but it is preferred as an adjunctive treatment for depression and anxiety. ^{22,26,27,31} The optimal frequency and duration are not clear, but studies have shown symptom reduction with one 60-minute session per week. ^{16,29}
Tai chi and qi gong have inconsistent effectiveness as complementary treatments for depression and anxiety.	B	Tai chi and qi gong have shown inconsistent effects on anxiety and depression in several small studies. In studies that demonstrate benefits, their effect on depressive and anxiety symptoms is small. ³⁴⁻³⁶
Mindfulness-based interventions are effective as adjunctive treatment for depression, with positive effects persisting through follow-up. Their effects on anxiety disorders also seem to be positive.	B	There is limited support for mindfulness-based interventions as a monotherapy for depression or anxiety disorders, although they may be effective for preventing relapse or as an adjunctive treatment. ^{28,38,44} Until further adequately powered trials are conducted, physicians should use caution in recommending these interventions as a first-line treatment for anxiety or depressive disorders.

A = consistent, good-quality patient-oriented evidence; **B** = inconsistent or limited-quality patient-oriented evidence; **C** = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to <https://www.aafp.org/afpsort>.

treatment-resistant and unipolar depression and posttraumatic stress disorder (PTSD).⁵⁻¹⁵ However, these effects were not sufficiently reliable to assure short-term results or stable long-term benefits. Adequate trials on the role of interval training are lacking, although there are indications that the physiologic changes produced by this type of exercise are greater and longer lasting compared with changes from aerobic or resistance training.

In summary, despite efforts to demonstrate clear replicable positive therapeutic effects of exercise on depression and anxiety disorders, evidence is lacking (*Table 1*).⁵⁻¹⁵ Although there seems to be more support for exercise in depression vs. anxiety disorders, there are physical benefits for both. One analysis specifically recommends exercise as an adjunct to medication in people with treatment-resistant depression.⁵ No trials have shown that exercise worsens either condition, so it is safe to recommend to patients with the understanding that additional medication or psychotherapy may be needed.

Yoga

Yoga is an ancient Eastern practice that combines physical postures, breath control, and meditation. There are several styles that differ in intensity, duration, and emphasis on each component. Two

systematic reviews and multiple individual studies conclude that yoga is an effective treatment for depression.¹⁶⁻²³ A systematic review compared yoga with other treatments for major depressive disorder and found similar benefits for yoga vs. exercise and yoga vs. medication. This review showed that yoga was less effective than electroconvulsive therapy for the treatment of major depressive disorder, suggesting that yoga would not be appropriate for treatment of resistant-depression for which electroconvulsive therapy is a treatment option.²³ However, one study has shown long-term effectiveness of yoga as an adjunctive treatment for women with persistent depression.²⁴ Yoga also demonstrated effectiveness in relieving depression in the perinatal period, but results varied based on the style of yoga.^{22,25} Exercise-based yoga was not effective in reducing depressive symptoms in the perinatal period, but integrative styles with stronger emphasis on meditation and breath control were effective.²⁶

Indications for yoga in the treatment of anxiety disorders are less clear. A meta-analysis of hatha yoga (the most common style in the United States) found that people with more severe symptoms benefitted most.²⁷ However, the overall effect was relatively small, which suggests that it is best used as an adjunctive treatment with cognitive behavior therapy, selective serotonin

TABLE 1

Effectiveness of Exercise for Treatment of Depression and Anxiety

Evidence source	Findings
Systematic review of studies of exercise for unipolar or bipolar depression ⁵	Exercise plus SSRI therapy was more effective than other treatments, especially for treatment-resistant depression
Meta-analysis of 23 RCTs of exercise for unipolar depression or depressive symptoms ⁶	Exercise was generally helpful, particularly in studies of unipolar depression; positive effects were reduced in studies with validity steps and no longer present at follow-up
Summary of meta-analyses and systematic reviews of complementary and alternative medicine therapies for MDD ⁷	Recommended 30 minutes of supervised aerobic or resistance exercise three times per week for mild to moderate MDD, and as adjunctive therapy for moderate to severe MDD
Meta-analysis of 41 studies with participants experiencing MDD or subclinical depressive symptoms ⁸	Significantly large control group response in exercise trials made evaluating the actual effects of exercise challenging
Meta-analysis of 25 RCTs with participants experiencing MDD; investigated the effect of publication bias ⁹	Removing publication bias, which underestimated effects, increased positive effects of exercise
Meta-analysis of 35 RCTs with participants experiencing clinically diagnosed MDD; included trials from China and South America ¹⁰	Inclusive analysis showed moderate positive effect for exercise, which was eliminated when trials were limited to low risk of bias
Meta-analysis of eight RCTs of exercise for clinically diagnosed anxiety ¹¹	Exercise had moderate positive effects on anxiety but was less effective than SSRIs; aerobic and nonaerobic exercises were effective
Qualitative review of 12 RCTs and five meta-analyses of exercise for clinically diagnosed anxiety or subclinical anxiety symptoms ¹²	Exercise had mild positive effects, but methodologic problems led authors to withhold recommendation for use in anxiety disorders
Meta-analysis of six RCTs with participants experiencing clinically diagnosed anxiety disorder and/or stress-related disorder ¹³	Exercise significantly reduced anxiety with moderate effect size; exclusion of trials for posttraumatic stress disorder eliminated effect
Meta-analysis of seven RCTs with participants experiencing clinically diagnosed anxiety ¹⁴	No overall effect for aerobic exercise; cognitive behavior therapy or medication was significantly more effective than aerobic exercise; exercise was more effective than waitlist controls but not other controls; did not recommend aerobic exercise for anxiety disorders
Meta-analysis and network analysis of MDD ¹⁵	No differences between exercise and antidepressants or other complementary and alternative therapies

MDD = major depressive disorder; SSRI = selective serotonin reuptake inhibitor; RCT = randomized controlled trial.

Information from references 5 through 15.

reuptake inhibitors, or other antianxiety medications. Some studies suggest that yoga may be more effective at reducing anxiety symptoms compared with no treatment^{17,19,28-30}; however, other studies do not show symptom improvement.^{16,25} One study showed that yoga as monotherapy or adjunctive therapy is effective in the treatment of panic disorder.²⁹

There is not enough evidence to determine the optimal duration or frequency of yoga. Initial studies found no difference in reductions of depression symptoms when yoga was practiced once vs. twice per week.^{21,28} However, more frequent sessions are associated with reductions in anxiety symptoms. The duration in most reports

was three to 24 weeks, with frequencies varying from once per week to daily for 40 to 100 minutes per session.

In summary, yoga can be suggested as a monotherapy for depression, but it is preferred as an adjunctive treatment for depression and anxiety disorders (*Table 2*).¹⁶⁻³¹ The optimal frequency and duration are unclear, but studies have shown symptom reduction with one 60-minute session per week.

Tai Chi and Qi Gong

Tai chi and qi gong are mind and body practices that combine postures and gentle movements with mental focus, breathing, and relaxation.

TABLE 2

Effectiveness of Yoga for Treatment of Depression and Anxiety

Evidence source	Findings
RCT of 60 minutes of yoga per week for six weeks vs. usual treatment (medication with or without therapy) in people with symptoms of depression and anxiety ¹⁶	Depression scores significantly improved in yoga group compared with waitlist control; no significant reduction in anxiety scores
Three-arm RCT (yoga vs. meditation vs. control) in college students with depression and/or anxiety ¹⁷	Depression and anxiety significantly improved in yoga and meditation groups compared with control, but did not significantly differ from each other
RCT of yoga in treatment-naïve people with mild to moderate major depressive disorder ¹⁸	Yoga participants had greater reduction in symptoms compared with control and were more likely to achieve remission; effect size suggested significant reduction in symptoms
RCT of yoga in older women with symptoms of depression and/or anxiety ¹⁹	Yoga reduced symptoms of depression and anxiety compared with controls
RCT of yoga vs. waitlist control in male military veterans with posttraumatic stress disorder ²⁰	Yoga had largest effect on symptoms of hyperarousal and reexperiencing symptoms, and had significant effect on general distress and anxious arousal
Dosing trial assessing differences in symptom reduction between low-dose yoga (two 90-minute sessions per week plus three home sessions) vs. high-dose yoga (three 90-minute sessions plus four home sessions) ²¹	No differences in compliance, rate of response, or remission between high- and low-dose groups immediately after intervention; at 12 weeks, high-dose group had more participants in remission
Meta-analysis of 12 RCTs of yoga vs. controls ²²	Moderate short-term effects of yoga compared with usual treatment; effects are less than or equal to those of relaxation and aerobic exercise; limited evidence of effect for anxiety
Systematic review of seven RCTs of yoga vs. controls for major depressive disorder ²³	Similar effects between yoga and other evidence-based treatments (e.g., medication, exercise)
RCT of adjunctive yoga vs. health maintenance control in people with persistent major depressive disorder ²⁴	No difference between yoga and control groups; yoga participants were more likely to show treatment response at three months
RCT of yoga vs. usual treatment in pregnant women with symptoms of depression and anxiety ²⁵	Depression scores significantly improved in both groups, but yoga group had greater improvement in negative affect over time; no difference in anxiety symptom reduction
Meta-analysis of six RCTs of yoga for perinatal depression ²⁶	Depression was significantly reduced in yoga groups compared with controls; integrated yoga interventions significantly lowered prenatal depression, but exercise-based yoga did not
Meta-analysis of 17 studies of yoga for anxiety ²⁷	Hatha yoga significantly reduced anxiety compared with waitlist controls, with moderate effect size; effectiveness was associated with total number of hours practiced
Three-arm RCT (weekly vs. twice-weekly yoga vs. waitlist control) in women with depression and/or anxiety ²⁸	Both yoga groups had significantly reduced symptoms of depression and anxiety compared with control; reductions were similar in yoga groups; compliance was greater in yoga group with fewer sessions
RCT of yoga vs. yoga plus cognitive behavior therapy in people with panic disorder ²⁹	Both groups had significant improvement in panic symptoms, but the combination group had nonsignificantly greater improvement
Three-arm RCT (yoga with relaxation vs. integrated yoga vs. nonactive control) in women with anxiety ³⁰	Both yoga groups had significant decreases in anxiety compared with control, with integrated yoga protocol showing greatest reduction
RCT of yoga vs. usual treatment in women with breast cancer and comorbid anxiety disorder ³¹	Significant improvement in state and trait anxiety compared with usual treatment

RCT = randomized controlled trial.

Information from references 16 through 31.

The movements can be practiced while walking, standing, or sitting. Although limited, the literature on these practices suggests that tai chi and qi gong may be effective in alleviating symptoms of

depression.^{32,33} However, systematic reviews and meta-analyses have shown variable effectiveness based on the study population and methodologic rigor.^{34,35} One meta-analysis of tai chi's effect

on depression symptoms found greater benefits among studies that included people with more severe symptoms, but some studies found small overall effects.³⁴ The actual effect on depression symptoms is likely small. Similarly, qi gong has a small but variable effect on depression.

Another study showed that tai chi reduces anxiety among older adults with anxiety disorders who are receiving medical therapy.³⁶ It found that anxiety recurrence rates were significantly lower among those in the tai chi group compared with the control group (9.09% vs. 42.86%, respectively). A study investigating a qi gong-based stress-reduction program found greater reductions in state and trait anxiety among participants in the treatment group.³⁷ However, these results contradict a meta-analysis of four randomized controlled trials (RCTs) that did not find qi gong to be beneficial for the reduction of anxiety symptoms.³⁵ In summary, there is a small body of literature showing mixed results for these interventions.

Mindfulness-Based Meditation

There is no consensus on a definition of meditation. However, it is generally agreed that it is a form of mental training that requires calming the mind with the goal of achieving a state of “detached observation.” Meditation approaches that have been studied in people with depression and anxiety disorders include mindfulness-based interventions (MBIs), mindfulness-based training, mindfulness-based stress reduction, and mindfulness-based cognitive therapy. Although these approaches differ, they all rely on calming the mind as their core modality.

A recent systematic review and meta-analysis of MBIs for psychiatric disorders found the clearest evidence for their use for depression.³⁸ MBIs were superior to no treatment and other active therapies, and equivalent to evidence-based treatments such as selective serotonin reuptake inhibitors. Another meta-analysis that included patients with clinically diagnosed anxiety and mood disorders showed that MBIs were moderately effective in reducing anxiety symptoms and improving mood.³⁹ Effect sizes were robust and did not seem to depend on the number of sessions. Moreover, improvements were sustained over an average of 27 weeks (median: 12 weeks). A systematic review of 209 studies found effect size estimates

suggesting that mindfulness-based training was moderately effective in reducing depression and anxiety symptoms in pre-post and waitlist control comparisons, and when compared with other active treatments, including other psychological treatments.⁴⁰ Mindfulness-based training was as effective as cognitive behavior therapy, other behavioral therapies, and pharmacologic treatments. The authors concluded that mindfulness-based training is an effective treatment for a variety of psychological conditions, and was especially effective in reducing anxiety, depression, and stress.

Not all studies showed immediate benefit. A meta-analysis of RCTs showed that MBIs were effective in people currently experiencing an episode of depression, but not for anxiety.⁴¹ It found significant postintervention differences between groups of participants with depressive disorders, with a large effect size on primary symptom severity favoring the intervention. Evidence for benefit in anxiety was lacking.

A 2012 literature review concluded that there was growing evidence supporting MBIs in the prevention of depression and anxiety relapse.⁴² Another study with a two-year follow-up found that mindfulness-based cognitive therapy was as effective as subspecialist care in people with recurrent depression, and that it seemed to work well when combined with antidepressants.⁴³

MBIs are typically integrated into a larger therapeutic framework, and it is not clear whether stand-alone MBIs are beneficial without such a framework. A systematic review and meta-analysis of the effects of stand-alone MBIs on symptoms of anxiety and depression concluded that these exercises had small to medium effects on anxiety compared with controls.⁴⁴ This was the first meta-analysis to show that regular performance of mindfulness-based approaches is beneficial, even if they are not integrated into a larger therapeutic framework.

MBIs may be helpful for some subgroups of patients with depression and anxiety disorders, but results are mixed. One RCT found that mindfulness-based cognitive therapy reduced symptoms of depression in people with a traumatic brain injury.⁴⁵ A meta-analysis of MBIs in adults with PTSD found 10 RCTs that met inclusion criteria.⁴⁶ Adjunctive mindfulness-based stress reduction, yoga, and a mantra repetition program

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improved symptoms of PTSD and depression compared with controls, but the findings were based on low- to moderate-quality evidence. Effects were positive but not statistically significant for quality of life and anxiety, and no studies addressed functional status. An RCT reported that mindfulness-based stress reduction in veterans resulted in a greater decrease in PTSD symptom severity compared with present-centered group therapy (a standard non-trauma-focused treatment for PTSD).⁴⁷ Although meditation seems to be effective for PTSD symptoms, more high-quality studies are needed with samples large enough to detect statistical differences in outcomes.⁴⁶

Some studies have evaluated MBIs for treatment of social anxiety disorder^{48,49} and panic disorder⁵⁰ with encouraging results. However, until adequately powered trials are conducted, clinicians should use caution in offering these treatments as first-line interventions for social anxiety and panic disorders.

In summary, MBIs seem to be effective for the treatment of depression and anxiety disorders (Table 3).^{38-45,47,48} Because no data suggest that these interventions cause harm in patients with these conditions, they can be recommended with the understanding that additional medications or psychotherapy may be needed.

TABLE 3

Effectiveness of MBIs for Treatment of Depression and Anxiety

Evidence source	Findings
Systematic review and meta-analysis ³⁸	MBIs were superior to no treatment, minimal treatment, nonspecific active controls, and specific active controls
Meta-analysis of 39 studies of mindfulness-based therapies for anxiety and depression ³⁹	Mindfulness-based therapies were moderately effective for improving anxiety and mood symptoms in pre-post analyses
Systematic review of mindfulness-based therapies ⁴⁰	Mindfulness-based therapies showed large and clinically significant effects on anxiety and depression, which were maintained at follow-up
Meta-analysis of RCTs of MBIs for current episodes of anxiety or depressive disorder ⁴¹	MBIs significantly improved primary symptom severity in people with depression (outcomes may be similar to those achieved with group cognitive behavior therapy); results did not support MBIs for anxiety disorder
Review of mindfulness-based meditation as self-help for anxiety and depression ⁴²	Mindfulness-based meditation may be viable approach to treatment of anxiety and depression, but more rigorous studies are needed
RCT of MBCT for relapse or recurrence of depression over two years of follow-up ⁴³	MBCT seemed to work well in combination with antidepressant therapy; combined treatment (MBCT plus medication) may be an effective option for many people with extensive histories of recurrent depression
Meta-analysis of 18 studies of stand-alone MBIs for symptoms of anxiety and depression ⁴⁴	MBIs had small to medium effects on anxiety and depression compared with controls
RCT of MBCT vs. control for depression ⁴⁵	MBCT reduced symptoms of depression in people with traumatic brain injury, as measured by the Beck Depression Inventory II; reduction was maintained at three-month follow-up
RCT of MBSR vs. person-centered group therapy in military veterans with posttraumatic stress disorder ⁴⁷	MBSR group had greater improvement in self-reported severity of posttraumatic stress disorder symptoms during treatment and at two-month follow-up
RCT of MBSR vs. aerobic exercise for social anxiety disorder ⁴⁸	MBSR and aerobic exercise reduced social anxiety and depression, and increased subjective well-being immediately and at three months postintervention

MBCT = mindfulness-based cognitive therapy; MBI = mindfulness-based intervention; MBSR = mindfulness-based stress reduction; RCT = randomized controlled trial.

Information from references 38 through 45, 47, and 48.

This article updates a previous article on this topic by Saeed, et al.²

Data Sources: PubMed searches were completed using the key terms anxiety (specific diagnoses), depression (specific diagnoses), yoga, qi gong, tai chi, meditation, exercise, and RCT. Also searched were the Cochrane database, Medline, and Sumsearch. Search date: November 2018.

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