CLINICAL PRACTICE

Mindfulness meditation and improvement of anxiety among women trying to conceive

Sarah Zerbib Tisser, Lisa M. Hachey*, Tamara Pavlik-Maus, Jason A. Gregg

University of Cincinnati, United States

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ABSTRACT

Background and objective: Anxiety disorders are prevalent among women attempting to conceive, contributing to emotional distress and potentially affecting fertility outcomes. Traditional pharmacological treatments pose concerns during preconception and pregnancy, emphasizing the need for effective non-pharmacological interventions. Mindfulness meditation has emerged as a promising approach for reducing anxiety, yet limited research focuses on its impact on women trying to conceive. This quality improvement project aimed to evaluate the effectiveness of daily mindfulness meditation in reducing anxiety levels among women actively attempting to conceive within one year.

Methods: A nine-week cross-sectional survey study was conducted with 14 women aged 32-42 receiving care at a private practice in Chicago, Illinois. Participants engaged in daily ten-minute guided mindfulness meditation sessions using the Insight Timer app. Anxiety levels were assessed using the Generalized Anxiety Disorder 7-item (GAD-7) scale at baseline, weeks 3, 6, and 9. Data analysis included one-way ANOVA to compare mean GAD-7 scores across time points.

Results: GAD-7 scores demonstrated a clinically meaningful decrease over time, with mean scores declining from 9.6 at baseline to 4.2 at week 9. Although the reduction was not statistically significant ($p = .083$), sustained improvement in anxiety levels suggests the intervention's potential benefit. The highest drop in anxiety occurred between weeks 3 and 6, with effects persisting post-intervention.

Conclusions: Daily mindfulness meditation may serve as a valuable, non-pharmacological strategy for reducing anxiety in women attempting to conceive. Despite the small sample size and lack of statistical significance, the observed clinical improvements highlight the need for larger-scale studies to further explore mindfulness meditation's role in fertility-related anxiety management.

Key Words: Mindfulness meditation, Anxiety, Infertility, Women's health, Non-pharmacological intervention

1. INTRODUCTION

Generalized anxiety disorder (GAD) is a mental health condition characterized by excessive, uncontrollable worry. It is usually accompanied by physical symptoms such as restlessness, fatigue, difficulty concentrating, irritability, muscle tension, and sleep disturbances. Approximately 20% of U.S. adults experience an anxiety disorder annually, with a lifetime prevalence of around 33%.[1] Women are disproportionately affected, with perinatal anxiety being a significant concern. Mindfulness meditation has emerged as a promising intervention for anxiety, particularly among women experiencing fertility challenges.[2]

Anxiety and stress related to fertility issues can further exacerbate reproductive challenges. The mind-body connection has been extensively studied, and research suggests that psychological stress may interfere with hormonal regulation and ovulatory function.[3] Therefore, addressing anxiety through

*Correspondence: Lisa M. Hachey; Email: lmhcnm59@aol.com; Address: University of Cincinnati, United States.

evidence-based interventions such as mindfulness meditation is crucial for improving both mental well-being and reproductive health outcomes.[4]

1.1 Anxiety disorders in pregnancy

Research indicates that anxiety disorders are prevalent during pregnancy. A systematic review and meta-analysis reported that 1 in 5 women in low- and middle-income countries experience anxiety disorders during the perinatal period.[4] This statistic is particularly concerning, given the potential adverse outcomes associated with maternal anxiety, including preterm birth, low birth weight, and increased risk of postpartum depression.[5]

Mindfulness-based stress reduction (MBSR) has been shown to effectively reduce anxiety and stress in pregnant women, improving maternal mental health outcomes.[6] One recent study found that pregnant women who practiced mindfulness had significantly lower cortisol levels, suggesting a physiological basis for the intervention's effectiveness.[7]

1.2 Treatment options for anxiety during pregnancy

Cognitive-behavioral therapy and medication use

Given the prevalence and potential adverse outcomes of anxiety during pregnancy, effective management strategies are essential to safeguard maternal and fetal health. During pregnancy, cognitive-behavioral therapy (CBT) is preferred for mild to moderate anxiety, while medication is suggested for more moderate and severe cases. The potential risks associated with the use of psychotropic medication for pregnant and breastfeeding women, coupled with the preferences expressed by women for non-pharmacological interventions, highlight the importance of ensuring the availability of effective psychological interventions. Pregnant women generally prefer non-pharmacological treatments, as medication could add an extra layer of worry for the mother.[8]

Anxiety during pregnancy is linked to adverse neonatal outcomes, including cognitive delays, neurodevelopmental disorders, asthma, endocrine disorders, and increased risk of anxiety disorders in offspring.[9] Prenatal maternal stress exposure has enduring consequences on offspring brain development, including altered regional brain volumetric growth, leading to long-term cognitive and psychiatric impairments. These findings highlight the critical importance of addressing maternal anxiety during pregnancy to promote optimal neurodevelopmental outcomes in children.[10] Cognitive-behavioral strategies, including positive thinking counseling and cognitive restructuring, have been shown to effectively reduce stress among infertile women undergoing IVF, particularly for those with previous unsuccessful cycles. Recent meta-analyses indicate that CBT interventions not only alleviate psychological distress but also enhance pregnancy rates, emphasizing the importance of integrating psychological support into fertility care. Recent evidence highlights that mindfulness meditation can reduce pregnancy-related anxiety and depression, making it a valuable alternative to pharmacological interventions.[11,12] Unlike CBT, which often requires structured therapy sessions, MBIs can be self-guided and easily integrated into daily life, making them a more accessible and sustainable option for many women during pregnancy.

1.3 Impact of infertility on anxiety

As the focus on women's reproductive health narrows, infertility emerges as a significant contributor to anxiety. Women experiencing infertility are more likely to suffer from anxiety and stress compared to those who conceive naturally. The uncertainty surrounding fertility treatments and the emotional toll of repeated unsuccessful attempts may exacerbate psychological distress. In addition to its emotional burden, high levels of stress and anxiety have been shown to negatively impact fertility outcomes.[5,9,13]

Given the mental health challenges associated with infertility, mindfulness-based interventions (MBIs) have gained attention as a promising non-pharmacological approach to managing anxiety. Research has demonstrated that mindfulness interventions significantly reduce psychological distress, including anxiety and depression, in women facing infertility, thereby enhancing their emotional well-being and potentially supporting fertility outcomes.[14] Mindfulness-based interventions have been identified as a potentially useful strategy for improving prenatal well-being by reducing levels of depression, anxiety, and negative affect. Proper psychological support for women undergoing fertility treatments may reduce anxiety and depression and even increase their chances of achieving pregnancy.[13]

1.4 Mindfulness meditation as a non-pharmacological intervention

Building on the potential benefits of psychological interventions, mindfulness meditation has emerged as a holistic approach to managing stress and anxiety. Mindfulness involves intentional engagement in the present moment through techniques such as meditation, breathing exercises, and body awareness.[14,15] This practice has gained significant attention for addressing various health concerns, particularly mental health.

Research indicates that regular mindfulness practice can reduce physiological markers of stress, such as cortisol levels, and improve overall well-being by fostering resilience and emotional balance.[16] Emerging studies highlight the ben-

efits of mindfulness for women during the perinatal period, including those struggling with conception.[15]

Mindfulness meditation in the perinatal period

Practicing mindfulness during the perinatal period has been shown to significantly reduce negative emotions, anxiety, pregnancy-specific anxiety, and stress in nonclinical populations.[13,15] Studies suggest that regular mindfulness meditation can improve cognitive and emotional regulation by reducing activation in the brain's stress response centers.[15] Beyond mental health benefits, mindfulness may influence physiological processes, such as reducing inflammatory markers and promoting cellular longevity through telomerase regulation, which could be particularly beneficial during the physical demands of pregnancy.[16] Recent studies suggest that mindfulness interventions may also contribute to lower risks of pregnancy complications, such as preterm birth and gestational hypertension, by modulating inflammatory pathways and autonomic nervous system function.[17,18] However, despite its documented effectiveness in various populations, mindfulness meditation remains underutilized as a stress and anxiety management strategy during the perinatal period.

Given the growing body of evidence supporting the effectiveness of mindfulness interventions in reducing stress and improving mental and physical health outcomes, integrating mindfulness practices during pregnancy may offer a holistic and accessible approach to improving maternal and fetal well-being.

1.5 Research gap in mindfulness-based interventions

Mindfulness-based interventions have demonstrated positive impacts on physical, mental, and emotional health outcomes, particularly by reducing stress-related biomarkers and promoting neuroplastic changes conducive to improved mental well-being.[17–19] However, the literature remains sparse on how these interventions specifically affect women trying to conceive. This research gap poses a significant challenge for healthcare providers and therapists working in infertility care, highlighting the need for further studies involving diverse populations and distinct life stages.

Furthermore, a 2020 systematic review and meta-analysis underscore the significant psychological burden experienced by infertile women, with anxiety rates reaching 36.17% globally and up to 54.24% in low- and middle-income countries.[20] The findings suggest the negative effects of infertility-related anxiety, which not only affect emotional well-being but also undermine treatment adherence and fertility outcomes. The sociocultural stigma surrounding infertility exacerbates these challenges, emphasizing the need for accessible mental health interventions.

Given these findings, this quality improvement project aims to examine how practicing mindfulness meditation can impact anxiety levels among women who are actively trying to become pregnant within a year, addressing a critical gap in existing research and offering a holistic approach to supporting women's reproductive and mental health. Future research should prioritize large-scale, multi-center randomized controlled trials to assess the efficacy of MBIs on pregnancy outcomes across diverse socioeconomic and ethnic populations.

1.6 Theoretical framework: Bandura's theory of self-Efficacy and the Iowa Model

Bandura's Theory of Self-Efficacy was used to frame and guide the implementation of this quality improvement project by encouraging participants' belief in their ability to manage anxiety through mindfulness meditation. This theoretical framework informed strategies to enhance participant engagement and consistency. Additionally, the Iowa Model was employed to identify practice gaps and evaluate improvements in outcomes, reinforcing the project's evidence-based approach.[21] The primary objective was to explore mindfulness as an alternative or complementary intervention for managing anxiety in women trying to conceive within a year, with the potential for broader implementation across diverse demographic groups. The Iowa Model was instrumental in systematically identifying a practice gap in anxiety management for women trying to conceive, providing a structured framework to integrate evidence-based mindfulness interventions into clinical practice.

2. METHODS

2.1 Project design and participants

This quality improvement project aimed to explore the impact of mindfulness meditation on anxiety levels in women with anxiety disorders who are actively trying to conceive. Utilizing a cross-sectional survey design, the project spanned nine weeks, during which participants engaged in daily ten-minute guided meditation sessions through the Insight Timer app—a free platform offering diverse mindfulness exercises accessible via mobile devices and web browsers.

Recruitment involved distributing electronic survey invitations to 352 patients from a private practice database, specifically targeting women aged 21 years and older experiencing conception-related anxiety. Fourteen women aged between 32 and 42 expressed initial interest and subsequently received detailed follow-up communications outlining study procedures. Participant enrollment implied informed consent, as evidenced by their voluntary completion and continuation of study tasks.

2.2 Inclusion criteria

Participants were biological females aged 21 years or older, self-identifying as women, of childbearing potential, planning to conceive within the next 12 months, and self-reporting symptoms of anxiety.

2.3 Exclusion criteria

Individuals were excluded from participation if they had nonfunctional or expired email addresses, or a self-reported diagnosis of schizophrenia or bipolar disorder.

2.4 Data collection

Participants completed a demographic survey, and the GAD-7 scale at baseline, weeks 3, 6, and 9 via Simple Practice, a HIPAA-compliant electronic health record system. Demographic data included age, pregnancy history, and willingness to participate in non-medication-based anxiety management. A total of 352 emails were sent via SurveyMonkey, yielding 14 participants. Weekly compliance emails were sent every Monday, with a new 10-minute mindfulness meditation session from Insight Timer. Eleven participants completed the first GAD-7, eight completed the second, and five completed both the third and fourth assessments. Data was securely stored per Institutional Review Board protocols. The mindfulness meditation sessions were conducted over six-week timeframe, with an additional GAD-7 assessment at week 9 to evaluate the intervention's long-term impact.

The Generalized Anxiety Disorder 7-item (GAD-7) scale is a widely used self-administered tool designed to screen for and assess the severity of generalized anxiety disorder (GAD). Developed by Spitzer et al. (2006), the GAD-7 has demonstrated high sensitivity (89%) and specificity (82%) for identifying GAD at a cut-off score of 10. It also correlates well with functional impairment and effectively distinguishes anxiety from depression.[22,23] These findings underscore the GAD-7's utility as a reliable and valid measure for assessing anxiety symptoms, making it a valuable instrument in both clinical and research settings.[24]

2.5 Statistical analysis

A one-way analysis of variance (ANOVA) was conducted to compare mean GAD-7 scores across four time points (see Table 2). The analysis yielded an F-ratio of 2.67 and a p-value of 0.083, indicating that differences between group means did not reach statistical significance at the 0.05 level. Despite this, a clinically meaningful reduction in GAD-7 scores was evident, particularly from Time 2 (T2) to Time 3 (T3), with sustained improvement three weeks post-intervention. Although not statistically significant, these findings suggest clinically relevant improvements in anxiety symptoms, supporting the need for further investigation with larger sample sizes. Table 1 provides a summary of the ANOVA data.

Table 1. Summary of data

Summary of Data					
	Treatments				
	1	2	3	4	Total
N	5	5	5	5	20
$\sum X$	48	39	23	21	131
Mean	9.6	7.8	4.6	4.2	6.55
$\sum X^2$	536	389	129	107	1161
Std.Dev.	4.3359	4.6043	2.4083	2.1679	3.9931

3. Results

The overall response rate was 6.8%, with 24/352 surveys completed. Of the 24 participants, 15 reported trying to conceive within a year. Among the respondents, seven reported trying to conceive for 0-3 months, two for 3 to 6 months, and 7 for more than 6 months. Of the 19 respondents, three indicated that it would be their first pregnancy, while 16 stated that it would not be their first pregnancy. Additionally, 20 participants expressed interest in taking part in this quality improvement project to address anxiety without medication, while three were not interested. GAD-7 scores showed a decreasing trend over time, suggesting mindfulness meditation may help lower anxiety among women trying to conceive. Refer to Table 2 for GAD-7 participant scores.

Table 2. GAD-7 participant scores at time intervals

Participants	GAD-7 T1	GAD-7 T2	GAD-7 T3	GAD-7 T4
P1	3	2	2	3
P2	9	10	6	3
P3	14	8	8	8
P4	13	14	3	3
P5	9	5	4	4
Total score	48	39	23	21
Average	9.8	7.8	4.6	4.2

4. Discussion

The primary aim of this quality improvement project was to evaluate the impact of daily ten-minute mindfulness meditation on anxiety levels in women trying to conceive. GAD-7 scores showed a notable reduction between weeks three and six, with continued improvement post-intervention, reinforcing the link between mindfulness practice and anxiety reduction. Although statistical significance was not achieved ($p > .05$), the observed clinical improvements suggest meaningful benefits.

Applying Bandura's Theory of Self-Efficacy, the findings suggest that participants' belief in their ability to manage

anxiety through mindfulness may have contributed to their commitment and consistency. The Iowa Model further supports this intervention by emphasizing the importance of evidence-based practices in addressing practice gaps and improving patient outcomes.

These results align with existing research by Jamil et al. (2023) on the positive impact of mindfulness meditation on emotional regulation, stress biomarkers, and neuroplastic changes that support mental health. Similarly, Kiani et al. (2020) highlight the significant psychological burden experienced by infertile women, underscoring the urgent need for accessible mental health interventions. Further, mindfulness has been shown to reduce physiological stress markers such as cortisol and inflammatory cytokines, mechanisms that contribute to improved fertility outcomes.[16,17] This growing body of evidence supports mindfulness-based interventions as a viable tool in managing anxiety throughout the fertility journey.

While findings suggest mindfulness meditation as a promising intervention, challenges such as small sample size and high dropout rates limit definitive conclusions. Additionally, reliance on self-reported measures introduces potential bias, and seasonal factors may influence engagement levels. Addressing these limitations in future studies will provide more robust evidence for implementing mindfulness-based interventions.

This project highlights mindfulness meditation as an accessible, non-pharmacological tool for anxiety management in women attempting to conceive. Future research should prioritize larger, randomized trials to validate its long-term efficacy in fertility care.

5. Conclusion

This quality improvement project provides preliminary evidence that a structured 10-minute daily mindfulness meditation practice may serve as an effective, non-pharmacological tool for reducing anxiety among women actively trying to conceive. While statistical significance was not achieved, the observed decline in anxiety scores over time suggests clinically meaningful benefits, reinforcing the feasibility of mindfulness as part of holistic reproductive healthcare. Despite the small sample size and participant dropout challenges, findings highlight the potential of mindfulness practices to enhance emotional well-being and support fertility-related mental health care. The intervention's short duration improved accessibility, though some participants struggled with daily commitment, emphasizing the need for flexible implementation strategies.

By fostering emotional stability and reducing anxiety, mindfulness meditation may contribute to improved fertility outcomes. Future research should prioritize larger, more diverse samples, extended intervention periods, and randomized controlled trials to further validate its efficacy. Additionally, investigating seasonal influences on engagement and adherence may offer further insights into optimizing participation.

Ultimately, this project underscores the importance of integrating mindfulness-based interventions into fertility counseling and prenatal care. Given its accessibility, minimal risk, and potential for broad application, mindfulness meditation represents a valuable, evidence-based approach to enhancing both emotional and reproductive health for women striving to conceive.

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Authors contributions

Dr. Sarah Zerbib Tisser conceptualized the project concepts, led its implementation, and conducted data collection.
Dr. Lisa Hachey was primarily responsible for structural development of the manuscript and contributed substantial evidence-based revisions to the conceptual draft. Dr. Hachey served as a content expert for infertility and obstetrical/midwifery.
Professor Tamara Pavlik-Maus served as a content expert in mindfulness and women's health.
Dr. Jason Gregg provided guidance to Dr. Tisser throughout project implementation and data collection.

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Obtained.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

DATA SHARING STATEMENT

No additional data are available.

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