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NON-PHARMACOLOGIC INTERVENTIONS FOR THE TREATMENT OF ANXIETY IN
PREGNANCY: AN INTEGRATIVE REVIEW

A CAPSTONE PROJECT
SUBMITTED TO THE GRADUATE FACULTY
OF THE GRADUATE SCHOOL
BETHEL UNIVERSITY

BY

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Nonpharmacologic Interventions for the Treatment of Anxiety in Pregnancy

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Abstract

Introduction: Anxiety has become an increasing concern for women throughout the perinatal period. The mainstay treatment for anxiety in pregnancy is pharmacotherapy, particularly selective serotonin reuptake inhibitors (SSRIs). Less often are nonpharmacologic interventions offered, despite an increasing demand for alternative treatment options. Therefore, this gap in care necessitates the need for further research into nonpharmacologic treatment options. This integrative review investigates the efficacy of several different nonpharmacologic interventions for the treatment of anxiety during pregnancy.

Methods: This integrative review utilized the Whitemore and Knafl methodology (2005) as a framework to guide the review process. Database searches were conducted across CINAHL, PubMed and Scopus, yielding a total of 241 articles. Articles were screened in Covidence 2.0, according to a set eligibility criteria. A total of 20 articles were selected for this review.

Results: Several nonpharmacologic therapies were reviewed for their efficacy in treating anxiety in pregnancy. These therapies included cognitive behavioral therapy, mindfulness, yoga and physical activity, massage therapy, aromatherapy, and music therapy. This review found all selected therapies to show some benefit in reducing anxiety symptoms throughout pregnancy.

Discussion: Though this is an area that has not been comprehensively investigated, the use of nonpharmacologic treatments have shown to be a promising alternative treatment option for managing anxiety during pregnancy. Further research is necessary to better determine the degree of efficacy of nonpharmacologic therapies for the treatment of anxiety in pregnancy.

Keywords: anxiety, pregnancy, pregnant, complementary therapies, nonpharmacologic treatment, cognitive behavioral therapy, hypnosis, yoga and physical activity, massage therapy, aromatherapy, and music therapy

Nonpharmacologic Interventions for the Treatment of Anxiety in Pregnancy

Mental health disorders have become a common concern for pregnant women and their health care providers. Pregnancy is a time of increased vulnerability during which women undergo a wide variety of physical, emotional, and mental changes. Zgrabbe (2018) reports that one in seven (14%) women are dealing with a mental health disorder during the perinatal period. These occur independently and alongside other problems of pregnancy. Mental health disorders in the perinatal period are associated with gestational hypertension, preeclampsia, preterm birth, low birth weight infants, delayed bonding, developmental delays, early breastfeeding cessation, suicide, and infanticide (Zgrabbe, 2018).

Specifically, nearly 9.5% of women meet the criteria for generalized anxiety disorder (GAD) during pregnancy. This rate is highest during the first trimester (Nonacs, 2015). The American College of Nurse Midwives recommends that all perinatal patients be screened using a validated tool for anxiety, depression, and other mental health disorders at least twice throughout the course of the pregnancy (American College of Nurse-Midwives [ACNM], 2020). Frequently used screening tools include Generalized Anxiety Disorder-7 (GAD-7), Beck Anxiety Inventory (BAI), State-Trait Anxiety Inventory (STAI), and the Edinburgh Postnatal Depression Scale (EPDS). If left untreated, mental health disorders can have a negative impact on the mother and growing fetus.

Anxiety can be successfully managed by pharmacotherapy, such as selective serotonin reuptake inhibitors (SSRIs). These medications have a well accepted safety profile in pregnancy, though there can be slight risk of neonatal withdrawal following birth (Nonacs, 2015).

Benzodiazepines may also be used for the treatment of GAD and panic attacks, but there is

conflicting evidence regarding their safety in pregnancy, so they are generally avoided (Nonacs, 2015).

Unfortunately, many women may choose not to seek treatment for anxiety during pregnancy (Browne et al., 2021). They may believe that anxiety is a normal part of pregnancy, fear judgement, or desire to avoid taking additional medications during pregnancy. In recent years, nonpharmacologic interventions have begun to be implemented for the management of anxiety. These nonpharmacologic options utilize a more holistic approach to care which may be more acceptable to women who fear or chose to avoid medications during their pregnancy.

The purpose of this integrative review is to investigate the efficacy of nonpharmacologic interventions for the treatment of perinatal anxiety. The following research question guided our review: Do pregnant women with perinatal anxiety, who are treated with nonpharmacologic interventions, as compared to those who are not treated at all, have a reduction in anxiety symptoms during pregnancy? We elected to focus specifically on a selection of nonpharmacologic interventions for anxiety treatment, which included cognitive behavioral therapy (CBT), mindfulness, hypnosis, yoga and physical activity, massage therapy, aromatherapy, and music therapy. The efficacy and safety of each of the included interventions will be explored further throughout this review. The exploration of nonpharmacologic treatments for anxiety is particularly important for certified nurse-midwives and other obstetric care providers as this is a common question that is voiced at early prenatal visits (Browne et al., 2021). Additionally, women who become pregnant and are already taking medications for mental health disorders may desire to stop them during their pregnancy. Education regarding various

nonpharmacologic anxiety management methods will allow providers an opportunity to effectively counsel patients who are experiencing anxiety in the perinatal period.

Theoretical Framework

Dorothea Orem's Self-Care Theory guided this review. This theory states that assisting patients in the provision and management of their self-care can help to increase independence and overall wellbeing (Orem, 2001). The Self-Care theory focuses specifically on an individual's ability to perform necessary daily care independently, which in turn fosters health and wellbeing. Intervention is needed when a person is no longer able to perform necessary tasks of daily living.

The role of the nurse-midwife in implementing Self-Care theory is that they are caring for a vulnerable person who may not otherwise be able to care for herself; this includes pregnancy, especially when complicated by mental health disorders such as anxiety. It is critical that nurse-midwives are educated on the topic of nonpharmacologic treatments for anxiety, as these are holistic and minimally invasive interventions that the patient can implement with guidance from their provider. By empowering individuals to prioritize their mental health and to seek nonpharmacologic treatment for anxiety during pregnancy, midwives can promote the safety of both pregnant patients and infants, while also actively involving the patient in her own care.

Methods

This integrative review utilized the Whitemore and Knafl (2005) methodology as a framework to guide the review process. Their systematic approach outlines the stages of the

review process, which includes problem identification, literature search, data evaluation, data analysis and presentation (Whittemore & Knafl, 2005).

In January of 2022, a database search was performed using PubMed, CINAHL and Scopus. With the assistance of the university librarian, search terms were defined using Boolean operators and Medical Subject Headings (MeSH). The primary MeSH heading was “alternative therapies” in conjunction with the following keywords: “anxiety,” “pregn*,” “prenatal,” “cognitive behavioral therapy,” “mindfulness,” “hypnosis,” “yoga,” “physical activity,” “massage therapy,” “aromatherapy” and “music therapy.” In order to have the most up to date information, database searches were filtered to exclude studies prior to the year 2011. This search strategy yielded 241 articles across 3 databases, PubMed (n = 56), CINAHL (n = 33) and Scopus (n = 152). Database searches were then imported into Covidence version 2.0 (Veritas Health Innovation) and systematically screened by title, abstract, and full-text to assess eligibility. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) approach was used to guide this review management (Page et al., 2021). Following the removal of 23 duplicates, 218 studies were screened based on titles and abstracts. Next, 55 full-text studies were screened for eligibility using inclusion and exclusion criteria.

Inclusion criteria were defined as original studies or quality improvement studies that were published between 2011 and 2021 and conducted in developed countries. Additionally, studies were selected if they focused on nonpharmacological interventions for treatment of anxiety in the prenatal period. Inclusion criteria was also defined by a quantitative study design.

Exclusion criteria were defined as any study that primarily focused on the treatment of anxiety in labor, in the postpartum period, or in primary care settings. Articles that primarily focused on pharmacological treatment for perinatal anxiety were also excluded. Exclusion

criteria were also defined by any literature reviews, position statements, or editorials, as well as studies with a qualitative design, insufficient sample size (less than twenty participants), or were conducted prior to 2011.

After the full-text review, 19 studies were found to meet the inclusion criteria. A hand search was conducted across three journals including the *Journal of Midwifery and Women's Health*, *American Journal of Obstetrics and Gynecology*, and *Midwifery*, which yielded one eligible study relating to hypnosis for treatment of anxiety in pregnancy. Therefore, a total of 20 studies were included in this literature review. Review management through Covidence was performed independently by both research partners in the data selection process. The PRISMA flow diagram depicted in Figure 1 summarizes the review process. Studies were then organized according to topic and summarized in the Literature Matrix (Appendix 1). Topics included cognitive behavioral therapy, mindfulness, hypnosis, yoga and physical activity, massage therapy, aromatherapy and music therapy.

Results

The articles utilized in this integrative review were published between 2013 and 2021, with the focus divided amongst seven different nonpharmacologic interventions. Six studies focused on cognitive behavioral therapy (CBT), three on mindfulness, one on hypnosis, six on yoga and physical activity, one on massage therapy, one on aromatherapy, and two on music. All studies included were collected from professional journals written in English including from the United States, England, France, Taiwan, Iran, India, and Austria. There were 16 randomized controlled trials, two quasi-experimental studies, one retrospective cohort study, and an open label pilot study. As this data was collected from across a wide variety of countries, via different

models, and from different journals, the most uniform way to understand these is by breaking down individual interventions.

Cognitive Behavioral Therapy

Cognitive behavioral therapy (CBT) has long been used as an intervention for coping with various mental health conditions (Loughnan et al., 2019). Six studies investigated different methods of delivering CBT to patients experiencing anxiety during pregnancy. In these articles, CBT was offered via group therapy sessions, an internet-based program, a self-help booklet, and individual therapy sessions.

Heller et al. (2020) followed 159 pregnant women who had pre-existing depression and anxiety symptoms. Half received internet-based CBT and the control group received routine prenatal care. The intervention group received virtual CBT once a week for five weeks. Anxiety and depression scores were evaluated before beginning the program and after completion, as well as for the control group at the beginning and end of the 5-week period. The group that received CBT was found to have lower levels of both anxiety and depression following the five weeks of treatment ($p = .78$). Loughnan et al. (2019) also offered internet-based CBT for management of anxiety in pregnancy. In this study, 36 women received virtual CBT for six sessions. Anxiety levels of the participants were evaluated before and after the intervention. Participants were found to have a significant decrease in both anxiety and psychological distress following treatment with virtual CBT ($p = .84$).

Group CBT for management of anxiety during pregnancy was another common method of delivering CBT services. Green et al. (2020) followed 96 women who were either pregnant or in the first six months postpartum. Women were randomly assigned to either a CBT group or a waitlist for a group. The CBT group received weekly therapy sessions over the course of six

weeks. Anxiety measuring tools were completed before the first group therapy session and after the group had concluded. After the group therapy had been completed, 63.6% of women noted a significant decrease in their anxiety levels while there was minimal change in the scores of the waitlist group ($p = .02$). Salehi et al. (2016) also investigated the effectiveness of group CBT for managing perinatal anxiety. This quasi-experimental study included 91 low-risk nulliparous women with pre-existing mild to moderate anxiety levels. Four weeks of group CBT was given to half of the participants, while the other half received only routine prenatal care. After four weeks of group CBT, the intervention group showed a significant decline in anxiety levels especially compared to the control group ($p = .011$).

Lowndes et al. (2019) delivered CBT via a short self-help booklet. Pregnant women in their third trimester were randomly assigned to a control group or a group that received the booklets. There were four self-guided sessions that were completed as a part of the program in addition to a weekly telephone call checking in with the participants. Following completion, the intervention group had a noticeable reduction in anxiety and perfectionism. This group was reassessed three months following the intervention and the majority of participants continued to have decreased anxiety levels.

Individual CBT is another treatment option for people who may desire a more personal and intimate approach to therapy. Ugaz et al. (2020) conducted a retrospective study that explored the effectiveness of individual CBT in an outpatient psychiatry setting. The participants all had previously diagnosed anxiety disorders. Twenty eight pregnant women received routine care while 23 women received individual CBT therapy sessions. After several therapy sessions,

participants in the CBT intervention group were found to have nearly a 50% reduction in their anxiety levels.

Mindfulness

Mindfulness techniques are another nonpharmacological method by which anxiety in pregnancy may be alleviated. Application of mindfulness techniques in conjunction with cognitive behavioral therapy has the potential to substantially reduce anxiety and comorbid symptoms. A mixed methods pilot study by Goodman et al. (2014) investigated the efficacy of the Coping with Anxiety through Living Mindfully (CALM) Pregnancy intervention program in 24 pregnant women with generalized anxiety disorder. They found a 69.6% improvement rate when comparing pre- and post- intervention anxiety scores. Zemestani & Fazeli Nikoo (2020) and Zarenjad et al. (2020) also evaluated the impact of mindfulness-based therapies in high quality randomized controlled trials. Between both studies, a total of 333 pregnant women with obstetrically uncomplicated pregnancies and clinically significant anxiety in the prenatal period participated in mindfulness-based intervention. The mindfulness intervention group was compared to the control group, who received no treatment at all, and the intervention group was noted to have a greater improvement of anxiety and depression symptoms.

Hypnosis

There is limited high quality evidence regarding the use of hypnosis as a nonpharmacologic intervention for the treatment of anxiety in pregnancy. One quasi-experimental study by Beevi et al. (2016) investigated the efficacy of hypnotherapy on anxiety in pregnancy. A sample of 56 women in the second and third trimester of pregnancy were included in this study. Participants in the experimental group experienced an alleviation of psychological

symptoms (stress, anxiety and depression) by 36 weeks gestation while the control group experienced an increase in those psychological symptoms by 36 weeks' gestation.

Yoga and Physical Activity

Yoga and physical activity are another excellent nonpharmacological intervention to help alleviate anxiety in pregnancy. Yoga and physical activity help to modulate cortisol levels in response to increased stress in the antepartum period (Chen et al., 2017). Six high quality randomized controlled trial studies were selected for review. The primary aim of the included studies was to investigate the impact of yoga and physical activity on anxiety in pregnancy. Some of the studies measured secondary outcomes including depressive symptoms, stress level, immune function and overall well-being. Study participants included pregnant women with an uncomplicated singleton pregnancy in the second and third trimester, with the exception of Gallagher et al. (2020) which investigated anxiety among pregnant individuals on medically indicated bedrest. Chen et al. (2020), found that yoga and physical activity in pregnancy can help decrease an elevated level of cortisol in pregnancy. In addition, they found that a reduction in cortisol levels can also contribute to better immune function. Therefore, prenatal yoga has a potentially positive effect on overall immunologic functioning in pregnancy. Davis et al. (2015) found yoga to be a safe and effective coping method for anxiety and depression in pregnancy. Field et al. (2013) compared yoga and social support groups and found yoga to be just as effective as support groups in reducing perinatal anxiety and depression. Newham et al. (2014) and Satyapriya et al. (2013) found yoga and physical activity to be effective in reducing anxiety scores on standardized screening tools. However, Satyapriya et al. (2013) suggests that yoga and physical activity may not be sufficient for treatment alone, but rather, it may be better suited as an adjunctive therapy. Lastly, Gallagher et al. (2020) found a reduction in anxiety symptoms in

the inpatient hospital setting among pregnant women who were on medically indicated bedrest. This program included a series of gentle, modified in-bed exercises, such as neck rolls, arm raises, pelvic tilts, leg raises and breath work (Gallagher, et al., 2020).

Massage Therapy

Anxiety can cause many uncomfortable side effects such as muscle tension and soreness, which is one reason that massage therapy can be used as an intervention. Khojasteh et al. (2016) looked at the effects of massage therapy in reducing anxiety during pregnancy. Seventy five women were randomly divided into an experimental group and a control group. The intervention group received 20 minute long sessions once a week for six weeks, while the control group received a placebo cream. Anxiety levels were assessed before and after intervention. The group that received massage therapy was found to have lower anxiety levels overall ($p = 0.00$). The control group had minimal change in anxiety levels when compared to the baseline.

Aromatherapy

Essential oils and aromatherapy have become popular methods of relaxation in the past several years. Effati-Daryani et al. (2015) explored the use of lavender cream with or without the use of a foot bath to reduce anxiety, depression, and overall stress in pregnant women. Included were 141 pregnant women who were between 25-28 weeks gestation. They were divided into three groups, lavender cream with foot bath, lavender cream only, and placebo. The participants were observed over the course of two months during the interventions. Depression and anxiety levels were assessed at baseline, four weeks, eight weeks, and post intervention using the Depression, Anxiety, and Stress Scale-21 (DASS-21). At baseline testing, the three groups were similar. At the four week mark, only anxiety levels were reduced in the intervention groups. By

the eight week mark, anxiety and depression levels were significantly lower in both intervention groups as compared to the control group ($p = .003$).

Music Therapy

Music has long been known to impact the mood of the listener, and can even bring great healing and peace. One study by Chang et al. (2015) investigated the effects of listening to music on pregnancy specific stress and anxiety, and also explored the benefits of music on maternal-fetal attachment. This study consisted of 296 pregnant women in their second and third trimesters who were then divided into a control and intervention group. The intervention group received a 30-minute long CD with crystal music, nature sounds, classical music, lullabies, and symphonic music. Each of these musical choices were selected intentionally because they contained 60-80 BPM which mimics a heartbeat. This group listened to music for at least 30 minutes daily for two weeks and were assessed before and after intervention. The experimental group was found to have significantly lower psychosocial stress ($p = .02$). There were no statistically significant differences in the areas of perceived stress and maternal-fetal attachment following intervention.

Another study done by Nwebube et al. (2017) explored the effects of specially composed music and its effects on both anxiety and depression in pregnancy. One hundred eleven women were selected and separated into a music group and a control group. The songs used in the music group were composed intentionally using specific tempos and phrases intended to promote a calm state. The music group listened to these songs for 20 minutes daily for 12 weeks. Anxiety levels were assessed at baseline and following the intervention. There were no significant

differences in the baseline scores of either group, but the music group had lower anxiety and depression scores after intervention ($p = .02$).

Discussion

Summary of Methods and Application of Dorothea Orem's Self-Care Theory

This review of 20 articles sought to explore the efficacy of different nonpharmacologic therapies for the management of anxiety during pregnancy. Whittmore and Knafl's (2005) research model and Dorothea Orem's Self-Care theory (2001) guided this review. Self-Care theory ties in closely with the management of anxiety as these nonpharmacologic treatments strive to empower patients and help to make them active participants in the management of their care. These nonpharmacologic therapeutic options offer patients a variety of choices that they may not typically be aware of when seeking to manage their anxiety during pregnancy. By offering additional resources, the nurse-midwife can help them make an informed decision based on what most closely aligns with their personal goals and individual lifestyles.

Pregnancy is a time of heightened anxiety for many women, so by educating and equipping pregnant women with potential resources to help manage their anxiety they can then go on to have healthier pregnancies. Untreated anxiety in pregnancy can lead to complications such as preeclampsia, preterm birth, and low birth weight (Rejno et al., 2019). Maternal anxiety is also believed to cause neurodevelopmental changes in the fetus that can lead to lifelong complications (Rejno et al., 2019). Dorothea Orem's Self-Care theory focuses on promoting independence of patients and empowering them to take control over their own health and well-being. Each of the interventions discussed are effective ways in which a patient could

consciously choose to care for herself during pregnancy, by pursuing interventions that will help to decrease anxiety levels and fit into her lifestyle.

These interventions were all found to be safe during pregnancy and were effective in helping to reduce anxiety levels. Education regarding these interventions would be most beneficial either in the preconception period or in early pregnancy so that there is ample time to seek out these treatment options. It is important that patients take time to determine which nonpharmacologic anxiety treatment method would work best for them and their individual lifestyles. If they are able to find something that caters to their personal needs and interests, they are much more likely to integrate holistic methods and may result in healthier maternal and fetal outcomes (Vahdat et al., 2014).

Application of Common Themes

While pharmacotherapy in pregnancy for treatment of anxiety and other mood disorders has a reasonable safety profile, medication is not the best choice for every individual. In fact, many women often decline pharmacotherapy despite having increased anxiety levels in pregnancy. Therefore, it is essential for providers to have an understanding of alternative and adjunctive nonpharmacologic therapies to offer these women (Browne et al., 2021). The included studies offer evidence that alternative and nonpharmacological interventions have promising potential for treatment of anxiety in pregnancy. The greater body of literature recognizes the potential for nonpharmacological interventions in treating mental health disorders. However, one resounding theme throughout the literature is that there is limited compelling evidence on safety and efficacy of these holistic therapies. Safety and efficacy are important factors to consider when evaluating evidence and considering integration into practice. Each of these studies identifies a need for further high quality research. Additionally, some authors recognized that not

all nonpharmacological therapies are easily accessible for patients. For example, therapies that are less mainstream, such as hypnosis or music therapy, may not be readily available resources for a clinician to recommend in practice. Therefore, clinicians should become aware of local holistic and alternative therapies available, so as to make a recommendation or referral for patients that are both safe and accessible.

Limitations

This review had several limitations. One limitation is that the findings are not generalizable to all populations as the studies included looked specifically at pregnant women struggling with anxiety. Additionally, since not all of the studies evaluated anxiety scores with the same measurement tools and questionnaires, the validity of the results found may vary.

Midwives and other obstetrical care providers should continue to improve their practice by seeking out the most up to date information on a diverse array of therapies for mental health disorders, specifically anxiety and depression in pregnancy. In addition to this independent review of current research on nonpharmacologic therapies for anxiety in pregnancy, providers should seek guidance from their national organization.

The ACNM offers a position statement regarding mental health in antenatal and primary care settings. They recommend that all midwifery practices should offer a screening for depressive and anxiety disorders to perinatal clients at least twice during pregnancy (American College of Nurse-Midwives [ACNM], 2020). Additionally, every midwifery practice should appropriately respond to positive screenings and risk assessments. Because perinatal mental health disorders have a significant impact on the overall maternal wellbeing in pregnancy, and have been shown to increase maternal and infant morbidity and mortality rates if left untreated,

the ACNM advocates for safe and effective treatment modalities through a collaborative model of care (ACNM, 2020).

Research Gaps

This review contributes to current clinical practice in that it offers an overview of several nonpharmacologic interventions for the management of anxiety in pregnancy. However, the volume and quality of evidence is not enough to make generalizable conclusions. Further research on each selected nonpharmacologic therapy is necessary. Future research should be conducted with high-quality research design, utilizing randomized controlled trials, large sample sizes and strong study designs. As further research becomes available on nonpharmacologic therapies in pregnancy, policymakers and organizational leadership may be more willing to consider a standardized protocol for treatment of perinatal anxiety, with the inclusion of nonpharmacologic therapies. Until a broader research base becomes available, clinicians should consider pursuing their own research in this subject area. Nonpharmacologic therapies have great potential to change the mainstream treatment approach of mental health disorders in pregnancy.

Conclusion

Due to the prevalence of anxiety, especially in the prenatal period, it is necessary to explore a full range of treatment options, including nonpharmacologic methods. Based on the findings of this review, cognitive behavioral therapy, mindfulness, hypnosis, yoga and physical activity, massage therapy, aromatherapy, and music therapy may all be effective interventions for reducing anxiety symptoms throughout pregnancy. While the findings of this review show great promise, this subject area is still a relatively unexplored area of research. Therefore, further studies investigating the safety of each intervention for use in pregnancy should be conducted. Lastly, education for obstetrical providers regarding nonpharmacologic anxiety treatments is

essential, so as to increase awareness of the diverse treatment options available for mental health disorders in pregnancy.

References

- American College of Nurse-Midwives. (2020, October). Mental health during childbirth and across the lifespan (Position Statement).
https://www.midwife.org/acnm/files/acnmldata/uploadfilename/000000000324/P_Mental%20Health%20During%20Childbirth%20and%20Across%20Lifespan.pdf
- Beevi, Z., Low, W.Y. & Hassan J. (2016). Impact of hypnosis intervention in alleviating psychological and physical symptoms during pregnancy. *American Journal of Clinical Hypnosis*, 58(4), 368-82. <http://dx.doi.org/10.1080/00029157.2015.1063476>
- Browne, P., Bossenbroek, R., Kluft, A., van Tetering, E., & de Weerth, C. (2021). Prenatal anxiety and depression: Treatment uptake, barriers, and facilitators in midwifery care. *Journal of Women's Health*, 30(8)
<https://www.liebertpub.com/doi/full/10.1089/jwh.2019.8198>
- Chang, H., Yu, C., Chen, S., & Chen, C. (2015). The effects of music listening on psychosocial stress and maternal–fetal attachment during pregnancy. *Complementary Therapies in Medicine*, 23(4), 509-515. 10.1016/j.ctim.2015.05.002
- Chen, P.-J., Yang, L., Chou, C.-C., Li, C.-C., Chang, Y.-C., & Liaw, J.-J. (2017). Effects of prenatal yoga on women’s stress and immune function across pregnancy: A randomized controlled trial. *Complementary Therapies in Medicine*, 31, 109–117.
<https://doi.org/10.1016/j.ctim.2017.03.003>
- Davis, K., Goodman, S. H., Leiferman, J., Taylor, M., & Dimidjian, S. (2015). A randomized controlled trial of yoga for pregnant women with symptoms of depression and anxiety. *Complementary Therapies in Clinical Practice*, 21(3), 166–172.
<https://doi.org/10.1016/j.ctcp.2015.06.005>

- Effati-Daryani, F., Mohammad-Alizadeh-Charandabi, S., Mirghafourvand, M., Taghizadeh, M., & Mohammadi, A. (2015). Effect of lavender cream with or without foot-bath on anxiety, stress, and depression in pregnancy: A randomized placebo-controlled trial. *Journal of Caring Sciences*, 4(1), 63-73. 10.5681/jcs.2015.007
- Field, T., Diego, M., Delgado, J., & Medina, L. (2013). Yoga and social support reduce prenatal depression, anxiety, and cortisol. *Journal of bodywork and movement therapies*, 17(4), 397–403. <https://doi.org/10.1016/j.jbmt.2013.03.010>
- Gallagher, A., Kring, D., & Whitley, T. (2020). Effects of yoga on anxiety and depression for high risk mothers on hospital bedrest. *Complementary Therapies in Clinical Practice*, 38, 101079–101079. <https://doi.org/10.1016/j.ctcp.2019.101079>
- Goodman, J. H., Guarino, A., Chenausky, K., Klein, L., Prager, J., Petersen, R., Forget, A., & Freeman, M. (2014). *Archives of Women's Mental Health*, 17(5), 373-87. <http://dx.doi.org.ezproxy.bethel.edu/10.1007/s00737-013-0402-7>
- Green, S. M., Donegan, E., McCabe, R. E., Streiner, D. L., Agako, A., & Frey, B. N. (2020). Cognitive behavioral therapy for perinatal anxiety: A randomized controlled trial. *Australian and New Zealand Journal of Psychiatry*, 54(4), 423-432. 10.1177/0004867419898528
- Heller, H. M., Hoogendoorn, A. W., Honig, A., Broekman, B. F. P., & van Straten, A. (2020). The effectiveness of a guided Internet-based tool for the treatment of depression and anxiety in pregnancy (Mamakits online): Randomized controlled trial. *Journal of Medical Internet Research*, 22(3), e15172. 10.2196/15172

Khojasteh, F., Rezaee, N., Safarzadeh, A., Sahlabadi, R., & Shahrakipoor, M. (2016).

Comparison of the effects of massage therapy and guided imagery on anxiety of nulliparous women during pregnancy. *Der Pharmacia Lettre*

Loughnan, S. A., Sie, A., Hobbs, M. J., Joubert, A. E., Smith, J., Haskelberg, H., Mahoney, A. E.

J., Kladnitski, N., Holt, C. J., Milgrom, J., Austin, M., Andrews, G., & Newby, J. M.

(2019). A randomized controlled trial of ‘MUMentum Pregnancy’: Internet-delivered cognitive behavioral therapy program for antenatal anxiety and depression. *Journal of Affective Disorders*, 243, 381-390. 10.1016/j.jad.2018.09.057

Lowndes, T. A., Egan, S. J., & Mcevoy, P. M. (2019). *Efficacy of brief guided self-help cognitive*

behavioral treatment for perfectionism in reducing perinatal depression and anxiety: a randomized controlled trial Informa UK Limited. 10.1080/16506073.2018.1490810

Newham, J. J., Wittkowski, A., Hurley, J., Aplin, J. D., & Westwood, M. (2014). Effects of

antenatal yoga on maternal anxiety and depression: A randomized controlled trial.

Depression and Anxiety, 31(8), 631–640. <https://doi.org/10.1002/da.22268>

Nonacs, R. (2015, April 30). *Anxiety during pregnancy: Options for treatment*. MGH Center For Women’s Mental Health.

<https://womensmentalhealth.org/posts/anxiety-during-pregnancy -options-for-treatment>

Nwebube, C., Glover, V., & Stewart, L. (2017). *Prenatal listening to songs composed for*

pregnancy and symptoms of anxiety and depression: a pilot study Springer Science and

Business Media LLC. 10.1186/s12906-017-1759-3

Orem, E. D. (2001). *Nursing concepts of practice* (6th ed.). *Mosby*.

Page, M.J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D.,

Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J.,

- Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *PLoS Medicine*, *18*(3), e1003583–e1003583.
<https://doi.org/10.1371/JOURNAL.PMED.1003583>
- Rejno, G., Lundholm, C., Oberg, S., Lichtenstein, P., Larsson, H., D’Onofrio, B., Larsson, K., Saltvedt, S., Brew, B., & Almqvist, C. (2019). Maternal anxiety, depression, and asthma, and adverse pregnancy outcomes – a population based study. *Scientific Reports*,
<https://www.nature.com/articles/s41598-019-49508-z#citeas>
- Salehi, F., Pourasghar, M., Khalilian, A., & Shahhosseini, Z. (2016). Comparison of group cognitive behavioral therapy and interactive lectures in reducing anxiety during pregnancy. *Medicine*, *95*(43)10.1097/MD.0000000000005224
- Satyapriya, M., Nagarathna, R., Padmalatha, V., & Nagendra, H. . (2013). Effect of integrated yoga on anxiety, depression, and well being in normal pregnancy. *Complementary Therapies in Clinical Practice*, *19*(4), 230–236.
<https://doi.org/10.1016/j.ctcp.2013.06.003>
- Uguz, F., & Ak, M. (2020). Cognitive-behavioral therapy in pregnant women with generalized anxiety disorder: A retrospective cohort study on therapeutic efficacy, gestational age and birth weight. *Revista Brasileira De Psiquiatria*, *43*(1), 61-64.
10.1590/1516-4446-2019-0792
- Vahdat, S., Hamzehgardeshi, L., Hessam, S., & Hamzehgardeshi, Z. (2014). Patient involvement in health care decision making: A review. *Iranian Red Crescent medical journal*, *16*(1), e12454. <https://doi.org/10.5812/ircmj.12454>

Whittemore, R. & Knafl, K. (2005). The integrative review: Updated methodology. *Journal of Advanced Nursing*, 52(5), 546-553.

Zarenejad, M., Yazdkhasti, M., Rahimzadeh, M., Mehdizadeh Tourzani, Z., & Esmailzadeh-Saeieh, S. (2020). The effect of mindfulness-based stress reduction on maternal anxiety and self efficacy: A randomized controlled trial. *Brain and Behavior*, 10(4), e01561–n/a. <https://doi.org/10.1002/brb3.1561>

Zagrabbe, K. (2018, March 6). *Perinatal suicide: Highest risk occurs at 9 to 12 months postpartum*. MGH Center For Women’s Mental Health. <https://womensmentalhealth.org/posts/perinatal-suicide-highest-risk-occurs-at-9-to-12-months-postpartum/>

Zemestani, M., & Fazeli Nikoo, Z. (2020). Effectiveness of mindfulness-based cognitive therapy for comorbid depression and anxiety in pregnancy: A randomized controlled trial. *Archives of Women’s Mental Health*, 23(2), 207–214. <https://doi.org/10.1007/s00737-019-00962-8>

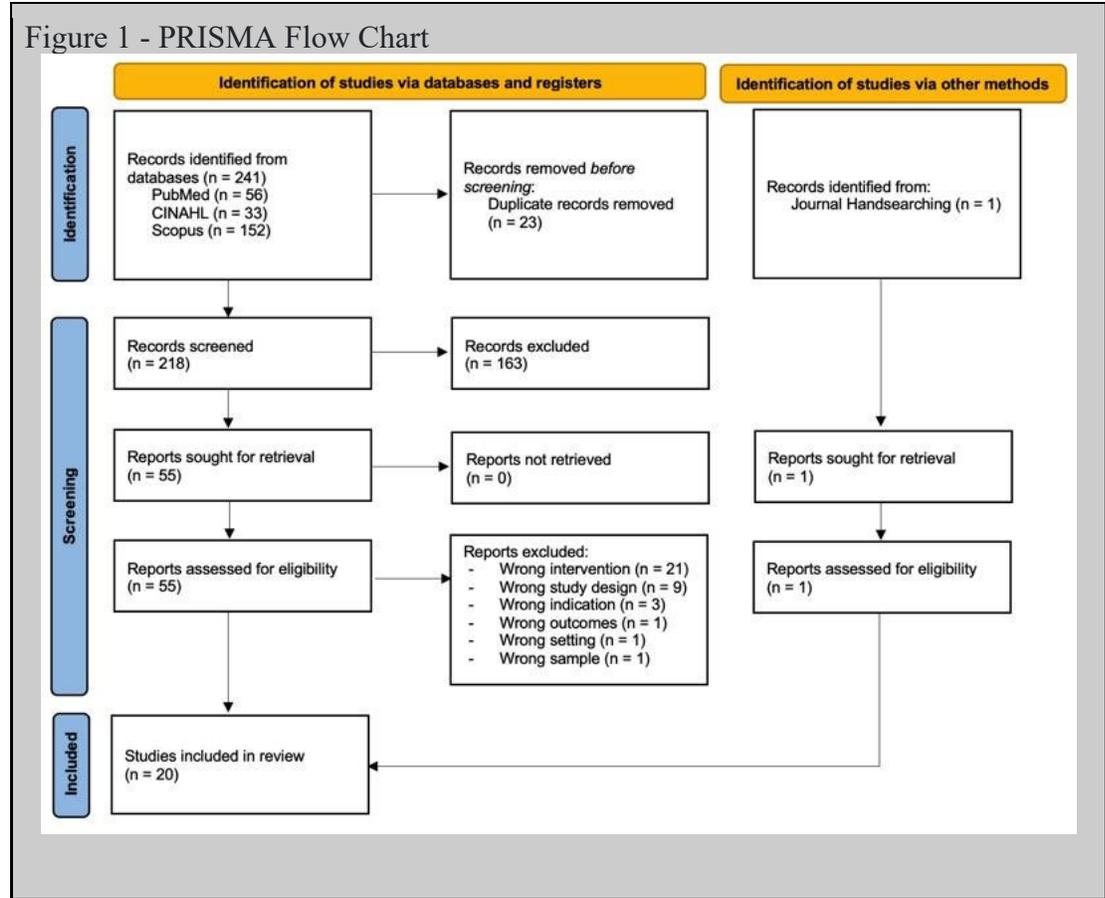


Table 1 – Mental Health Assessment Tools Key

Tool	Abbreviation
Beck Anxiety Inventory	BAI
Beck Depression Inventory I and II	BDI-II
Centers for Epidemiological Studies - Depression	CES-D
Edinburgh Postpartum Depression Scale	EPDS
Frost Multidimensional Perfectionism Scale	FMPS
Generalized Anxiety Disorder-7	GAD-7
Hospital Anxiety Depression Scale	HADS
Mindful Attention Awareness Tool	MAAS
Pregnancy Experiences Questionnaire	PEQ
Pregnancy-Related Anxiety Questionnaire	PRAQ
Pregnancy Related Anxiety Questionnaire- Revised	PRAQ-R
Pregnancy Stress Rating Scale	PSRS
Penn State Worry Questionnaire	PSWQ
Perceived Stress Scale	PSS
Self Compassion Scale	SCS
State-Trait Anxiety Inventory	STAI
State-Trait Anger Expression Inventory	STAXI
State-Trait Inventory of Cognitive and Somatic Anxiety	STICSA

Table 2 – Literature Review Matrix: Nonpharmacologic Interventions for the Treatment of Anxiety in Pregnancy

Author/Date	Purpose	Design	Sample	Results	Recommendations	Strengths and Limitations	Level and Quality of Evidence
Cognitive Behavioral Therapy (CBT)							
Green et al., 2020	To investigate the efficacy of group CBT for the treatment of perinatal anxiety.	RCT	86 women who were currently pregnant or were within the first 6 months of the postpartum period, ages 22-41, with a clinically diagnosed anxiety disorder.	Participants who were randomly assigned to the CBT group had a significant reduction in anxiety symptoms as measured by the STICSA. In addition there was a notable reduction in worry (PSWQ), perceived stress (PSC) and depressive symptoms (EPDS).	Nonpharmacologic interventions are an appropriate and effective first-line treatment for the treatment of perinatal anxiety disorders.	<p><i>Strengths:</i> Study strengths include a high quality RCT design, an adequate sample size as well as additional pertinent secondary outcomes that add to the overall study relevance.</p> <p><i>Limitations:</i> Study limitations include a relatively short follow up of 3 months. Previous studies relating to CBT protocols have used longer follow up periods, such as 6-9 months. Longer follow up periods may be helpful to investigate in future studies to examine interventional effects beyond the initial</p>	<p><i>Level:</i> I</p> <p><i>Quality:</i> B</p>

						postpartum period.	
Heller et al., 2020	To investigate the efficacy of a guided internet intervention (MamaKits online) for the treatment of perinatal anxiety or depression.	RCT	159 women, 18 and older, who were in the 1st and 2nd trimester of pregnancy with symptoms of anxiety and depression or both.	Participants who were randomly assigned to the intervention group had a notable decrease in symptoms of anxiety and depression as compared to the control group who were only given “treatment as usual.” Anxiety and depressive symptoms were measured by the CES-D scale and the HADS-A scale.	Web-based interventions such as the MamaKits online program are a practical, cost-effective, complementary therapy option that shows promising results for the treatment of perinatal anxiety. Further research is necessary to investigate an internet based therapy in the 3rd trimester and its potential impact on postnatal anxiety and depression.	<p><i>Strengths:</i> Strengths of this study include a long follow-up of 20 weeks and various outcome measures. In addition, participants were allowed to use concurrent treatment, which is consistent with “treatment as usual” and therefore can be translated more easily to traditional clinical practice.</p> <p><i>Limitations:</i> One major limitation of this study is that pregnant women who were 30 weeks’ or greater were excluded due to the concern that they would not be able to finish the 5 week program. However, an intervention in the 3rd trimester of pregnancy may have had a significant impact on perinatal and postnatal anxiety if initiated in that time period.</p>	<p><i>Level:</i> I</p> <p><i>Quality:</i> B</p>

Loughnan et al., 2019	To investigate the efficacy of an internet based cognitive behavioral therapy (iCBT), the MUMentum Pregnancy program, for the treatment of anxiety and/or depression in pregnancy.	RCT	59 women, ages 23-40, with obstetrically uncomplicated pregnancy between 13 and 30 weeks of gestation, who had prominent anxiety and/or depressive symptoms.	Participants in the iCBT group had significant reduction in anxiety symptoms as measured by the GAD-7 assessment tool. There was no significant difference in depressive symptoms as measured by the PHQ-9 assessment tool in the iCBT group when compared to treatment as usual.	Internet based CBT offers a cost-effective and convenient non-pharmacological option for treating anxiety in pregnancy. Given its promising efficacy as evidenced by this study, further RCTs should be conducted on this area of study.	<p><i>Strengths:</i> Strengths of this study include an adequate sample size per the Hedges' g test and an extensive recruitment process which yielded a diverse group of participants from both urban and rural populations.</p> <p><i>Limitations:</i> The follow-up period was limited to 4 weeks post-treatment to ensure that the participants' were likely still pregnant. However, additional postpartum follow-up could have been beneficial to investigate more long-term benefits of the program.</p>	<p><i>Level:</i> I</p> <p><i>Quality:</i> B</p>
Lowndes et al., 2019	To investigate the effect of CBT on perfectionism, depression, and anxiety in pregnancy.	RCT	60 women in their third trimester of pregnancy, ages 24-41, who had notable symptoms of anxiety or depression in	There were significant reductions in symptoms of anxiety and depression as well as self-reported perfectionism	This study was the first study to evaluate the efficacy of self-guided CBT for the treatment of clinical perfectionism in pregnancy. Often perfectionism and	<p><i>Strengths:</i> This study had a strong randomized controlled design as well as multiple outcomes that were measured for analysis.</p> <p><i>Limitations:</i> Anxiety symptoms were only measured by anxiety</p>	<p><i>Level:</i> I</p> <p><i>Quality:</i> B</p>

			conjunction with clinical perfectionism as measured by the FMPS assessment tool.	between the pre- and post-treatment. These results were maintained when reassessed after 3-month follow-up assessment.	anxiety are concurrent and this study offers promising results for alleviating these mood disorders within the context of pregnancy.	specific questions on the EPDS instead of on an anxiety specific assessment tool, such as the GAD-7 tool. The follow-up period was relatively short at 3 months post-treatment.	
Salehi et al., 2016	To investigate the efficacy of group CBT with comparison to interactive lectures on perinatal anxiety.	Quasi-experimental trial	91 women with obstetrically uncomplicated pregnancy between 13 and 26 weeks gestation, ages 16-39, who had mild to moderate anxiety in pregnancy.	Group CBT and interactive lectures were both found to significantly reduce perinatal anxiety. The difference between the two therapy options was not significant.	Group CBT and interactive lectures are both beneficial options for reducing perinatal anxiety. In addition, both interventions are cost effective and have minimal to no maternal risk.	<p><i>Strengths:</i> Strengths of this study include multiple precision measures and an adequate sample size for this modality of research.</p> <p><i>Limitations:</i> The 4-week follow up period was too short to draw conclusions about the long-term effect of the interventions. A larger study with an RCT design and a longer follow-up period is recommended.</p>	<p><i>Level:</i> II</p> <p><i>Quality:</i> B</p>
Uguz & Ak, 2020	To evaluate the efficacy of CBT as a treatment for perinatal anxiety as	Retrospective Cohort study	51 women, ages 27-37, with obstetrically uncomplicated pregnancy and clinically	Participants who were treated with CBT had significantly lower levels of anxiety than	CBT may offer significant benefits for alleviating anxiety in pregnancy. Further research may be	<p><i>Strengths:</i> Strengths of this study include diagnosis with a consistent structured clinical interview and standardized symptoms</p>	<p><i>Level:</i> II</p> <p><i>Quality:</i> B</p>

	well as investigate its effects on gestational age at birth and birth weight.		diagnosed generalized anxiety disorder.	those in the untreated group. There was not any notable difference in gestational age or newborn weight at birth in the treated and untreated group.	necessary to determine whether or not treatment with CBT has an impact on gestational age or newborn weight at birth.	rating scales. Retrospective design takes away any ethical concern that some participants are getting a potentially beneficial treatment over the group who did not receive treatment. <i>Limitations:</i> Limitations include a small sample size and lack of a randomized placebo-controlled group.	
Mindfulness							
Goodman et al., 2014	To investigate the preliminary efficacy of the CALM Pregnancy intervention program and to assess the relationship between mindfulness for the treatment of anxiety and	Mixed Methods (open label pilot study)	24 pregnant women, ages 27-45, with generalized anxiety disorder (GAD) or prominent symptoms of anxiety in pregnancy.	<i>Qualitative responses to study:</i> Participants found the CALM Pregnancy intervention to be a positive experience and noted the intervention to be helpful with their anxiety symptoms. <i>Quantitative</i>	This is the first pilot study to investigate a mindfulness program for the treatment of anxiety in pregnancy. Results indicate that mindfulness has a promising effect on treating perinatal anxiety. Further study in a RCT is necessary in order to yield a higher level of evidence on this	<i>Strengths:</i> This study utilized multiple anxiety measurement tools, including the BAI, PSWQ, MAAS, SCS, and BDI-II tools, to evaluate symptoms pre and post intervention. In addition to quantitative data, this hybrid study offered qualitative remarks by participants which may encourage more further studies in both realms of research.	<i>Level:</i> III <i>Quality:</i> B

	depression in pregnancy.			<i>results:</i> There were statistically significant improvements with comparison of pre and post test scores on multiple GAD measures.	topic.	<i>Limitations:</i> The study sample was small and therefore lacks sufficiency in statistical power. Qualitative self-report is subject to individual bias. The design of the study was open label and not blinded to either participants or researchers which may contribute to bias in both qualitative and quantitative results of this study.	
Zemestani & Fazeli Nikoo, 2020	To evaluate the impact of mindfulness-based CBT on anxiety and depression during pregnancy.	RCT	263 pregnant women between 1 and 6 months gestation who met DSM-5 criteria for anxiety and/or depression.	There was greater improvement of anxiety and depression in the group that received MBCT and who were also offered stronger emotional regulation strategies.	Implementation of MBCT over the course of at least 8 weeks during pregnancy can help to reduce levels of anxiety and depression, while also improving emotional regulation.	<i>Strengths:</i> This study found results that were consistent with previous studies regarding MBCT and improved psychological well-being. <i>Limitations:</i> There was a small participant size in each control and intervention group. This study also included women of different gestational ages so it lacks generalizability to all pregnant women. The follow up with patients	<i>Level:</i> I <i>Quality:</i> B

						was also self-reported and may not have been long term enough to evaluate lasting impact of MBCT.	
Zarenejad et al., 2020	To investigate the effect of mindfulness-based stress reduction (MBSR) on maternal anxiety and self-efficacy in pregnancy.	RCT	70 women, ages 19-32, with obstetrically uncomplicated pregnancy between 24 and 36 weeks of gestation, who had clinically significant symptoms of anxiety in pregnancy.	There was a significant reduction in symptoms of anxiety on the PRAQ scale in participants who were in the MBSR intervention group. Self efficacy scores were slightly increased with the post intervention and one-month follow-up assessments in both the intervention group and “treatment as usual” control group.	Though this study only found a significant effect of the MBSR program on maternal anxiety and not significant effect on self efficacy, further research with more rigorous control may yield more compelling results on this topic.	<p><i>Strengths:</i> This study had a strong randomized controlled design with an adequate sample size and multiple outcome measures.</p> <p><i>Limitations:</i> Self-efficacy and mindfulness scores did not have significant differences between the intervention and control groups. Participation in the study may contribute to slightly improved post-test scores in the control group. Researchers did not have control over participants’ access to non-study related resources that may have impacted a participants’ perception of mindfulness and self-efficacy in pregnancy, particularly in the control group.</p>	<p><i>Level:</i> I</p> <p><i>Quality:</i> B</p>

Hypnosis							
Beevi et al., 2016	To investigate the impact of hypnosis in reducing physical symptoms, as well as anxiety, stress and depression during pregnancy.	Quasi-experimental trial	56 women, ages 23-36, in the second and third trimesters of pregnancy	Pregnant women in the experimental group experienced an alleviation of psychological symptoms (stress, anxiety and depression) by 36 weeks gestation. The control group experienced an increase in those psychological symptoms by 36 week gestation.	This study offers promise that hypnosis in pregnancy may alleviate physical and psychological symptoms. Therefore, it may be considered as a CAM therapy in pregnancy. However, further research should include other parameters of well-being to better understand the efficacy of hypnosis in pregnancy. Researchers suggest that future studies analyze participants' satisfaction and coping skills.	<p><i>Strengths:</i> This study is strengthened by its multifactorial analysis of both psychological and physical outcomes. Researchers intentionally divided participants based on parity between the experimental and control group.</p> <p><i>Limitations:</i> This study is limited by a smaller sample size. Therefore, findings should not be generalized and further research is required. Additionally, given the nature of this study, it cannot be ruled out that participants in both experimental and control groups did not participate in other therapies throughout their pregnancy to enhance physical and psychological well being.</p>	<p><i>Level:</i> II</p> <p><i>Quality:</i> B</p>

Yoga and Physical Activity							
Chen et al., 2017	To investigate the effect of prenatal yoga on perinatal stress and immune function.	RCT	94 women, ages 24-43, at 16 weeks gestation with obstetrically uncomplicated pregnancy.	Pretest and posttest salivary cortisol levels were significantly decreased with the initial yoga session at 16 weeks and with subsequent sessions and testing. IgA levels were found to be increased with the yoga intervention group, indicating increased immune function.	Cortisol levels may normally increase throughout pregnancy and excessive concentrations of cortisol may contribute to suppressed immune function. This study demonstrates the potential for prenatal yoga to reduce perinatal stress and improve immune function. Decreased perinatal stress has potential to reduce pregnancy related anxiety.	<p><i>Strengths:</i> Study outcome variables were biological markers, salivary cortisol and IgA levels, which offer objective data. This study had a strong randomized controlled design.</p> <p><i>Limitations:</i> Interveners and assessors were not blinded to the treatment conditions. Some participants had to drop out of the study due to inability to attend greater than 85% of the yoga sessions which could have been avoided if more flexible yoga schedules were offered.</p>	<p><i>Level:</i> I</p> <p><i>Quality:</i> A</p>
Davis et al., 2015	To investigate the potential benefits of yoga for pregnant women with symptoms of anxiety and depression.	RCT	46 pregnant women with elevated anxiety and depression symptoms.	Practicing yoga weekly over the course of 8 weeks can help to manage anxiety and depression during pregnancy.	Yoga is an effective and safe intervention throughout pregnancy, unless otherwise contraindicated, to help cope with anxiety and depression	<p><i>Strengths:</i> Anxiety and depression symptoms were evaluated using the EPDS and STAI which are the most widely used assessments.</p> <p><i>Limitations:</i> Study subjects were demographically</p>	<p><i>Level:</i> I</p> <p><i>Quality:</i> B</p>

					symptoms.	homogeneous and all reported to be physically active prior to joining the study. The control group also received normal care in the community so it was not closely regulated.	
Field et al., 2013	To investigate and compare the effects of yoga and social support for women with prenatal and postpartum anxiety and depression.	RCT	92 prenatally depressed women, ages 20-38, in the second trimester of a singleton pregnancy.	Both social support and yoga groups had lower depression (CES-D), anxiety (STAI), anger (STAXI) and improved relationship scores at the end of the 12 weeks of sessions. In addition, postpartum depression and anxiety levels were lower for both groups.	Yoga may be just as effective as support groups for the reduction of perinatal anxiety and depression. Increased vagal activity following physical activity/yoga facilitates a decrease in cortisol levels and likely has an impact on a lower incidence of preterm labor.	<i>Strengths:</i> This study had a strong sample size and analyzed multiple measures while building on existing research. <i>Limitations:</i> The CES-D and STAI scales were used to measure depression and anxiety. While these are reliable measures, the PHQ-9 and GAD-7 could have been utilized to facilitate a greater comparison as these are more widely used.	<i>Level:</i> I <i>Quality:</i> B
Gallagher et al., 2020	To study the effects of yoga on anxiety and depression in	RCT	79 patients on medically ordered bed rest in pregnancy.	Yoga was found to significantly decrease reported levels of anxiety and depression	Using yoga in an inpatient hospital setting is effective in reducing self-reported levels of	<i>Strengths:</i> These findings matched with previous studies about the effects of yoga on anxiety. Implementing this	<i>Level:</i> I <i>Quality:</i> B

	high-risk hospitalized pregnant women who are on bedrest.			when implemented as little as 3 times during hospitalization.	both anxiety and depression.	intervention for patients could be very accessible if video instruction was used. <i>Limitations:</i> A small sample size was used and patients were sampled from only one hospital. Data collection was all done through self-reporting and may not have been accurately evaluated. Due to the high risk status of patients, health complications could have also altered their ability to participate in the study.	
Newham et al., 2014	To explore yoga as an intervention to reduce anxiety during pregnancy.	RCT	59 primiparous low risk pregnant women in the second or third trimester.	Yoga was found to reduce both subjective and physiologic ratings of anxiety in pregnant women.	An 8 week course of yoga can potentially help to reduce perinatal anxiety.	<i>Strengths:</i> This study incorporated subjective and physiological assessment tools. <i>Limitations:</i> Participants preexisting beliefs of yoga practice may have impacted their willingness and participation. Some of the yoga classes that were attended were not catered specifically	<i>Level:</i> I <i>Quality:</i> B

						towards pregnant women so this could have altered the effectiveness of the intervention. The participants that were recruited for this study also had similar demographics and health status, so these findings may not be generalizable to different populations.	
Satyapriya et al., 2013	To explore the effect of integrated approach yoga on anxiety, depression, and general wellbeing during pregnancy.	RCT	96 women between 18-20 weeks of pregnancy.	STAI and HADS scores decreased in the group who participated in yoga, while scores increased in the control group. Yoga was also found to improve the overall experience of pregnancy.	Physical activity, such as yoga, during pregnancy can help to improve anxiety and depression symptoms but may not be sufficient to manage symptoms alone.	<p><i>Strengths:</i> The PEQ, STAI, and HADS were used to assess the women's general pregnancy experiences as well as anxiety levels; these are all reliable measurement tools.</p> <p><i>Limitations:</i> Possible interactions between the two groups could not have been avoided. Several participants in the control group requested to switch to the yoga group, and then dropped out of the study.</p>	<p><i>Level:</i> I</p> <p><i>Quality:</i> A</p>

Massage Therapy							
Khojasteh et al., 2016	To compare effectiveness of massage therapy and guided imagery on nulliparous pregnant women.	RCT	40 women ages 18-35, in the second trimester of singleton pregnancy.	Both massage therapy and guided imagery were found to decrease levels of anxiety, the study did not clarify which was more effective.	Massage therapy and guided imagery can be recommended to decrease anxiety during pregnancy.	<p><i>Strengths:</i> This study specifically explored pregnancy-related anxiety and found that nonpharmacologic methods of relaxation such as guided imagery and massage were effective for anxiety reduction.</p> <p><i>Limitations:</i> The PRAQR was used to assess participants' anxiety levels relating to 3 pregnancy related topics. This did not explore general anxiety levels, so the GAD-7 assessment or a similar tool would be beneficial as well. There was also a reported lack of a safe place within the health centers to implement these interventions. Some patients in the guided imagery group were also not willing to practice this strategy at home,</p>	<p><i>Level:</i> I</p> <p><i>Quality:</i> B</p>

						which may have altered the outcomes.	
Aromatherapy							
Effati-Daryan et al., 2015	To evaluate whether lavender foot cream with or without a foot bath decreases anxiety and depression in pregnant women.	RCT	141 women at 25-28 weeks gestation, divided into 3 groups.	Both the lavender foot cream with foot bath and the lavender foot cream without foot bath groups scored lower levels of anxiety than the control group.	Lavender foot cream can be used in pregnancy to safely and effectively decrease anxiety and depression.	<p><i>Strengths:</i> This is a simple and affordable intervention that has been proven to be beneficial in reducing anxiety.</p> <p><i>Limitations:</i> Due to time constraints there was not a group who received a foot bath with a placebo cream to better study the effectiveness of the foot bath on anxiety. This study also has previously been done on women who are not experiencing psychological disorders, so it may not be generalizable to all pregnant populations. Measuring the stress markers from the blood directly would be a more reliable measurement of stress levels.</p>	<p><i>Level:</i> I</p> <p><i>Quality:</i> B</p>

Music Therapy							
Chang et al., 2015	To explore the effects of music on psychosocial stress and maternal-fetal attachment during pregnancy.	RCT	236 women in the second or third trimester of pregnancy.	Listening to music with a BPM of 60-80 for 30 minutes a day helped to decrease pregnancy related stress and anxiety.	Listening to calming music when feeling overwhelmed by pregnancy-related anxiety may be beneficial for patients.	<p><i>Strengths:</i> Patients' stress levels were evaluated with the PSRS as well as the PSS, both of which are reliable measures.</p> <p><i>Limitations:</i> The patients were not observed while listening to music, and were allowed to do other activities while listening to the provided music which could have caused different outcomes. This study also elected to use 5 different kinds of music, and it was not possible to distinguish if any type of music was more beneficial for stress and anxiety reduction than others.</p>	<p><i>Level:</i> I</p> <p><i>Quality:</i> B</p>
Nwebube et al., 2017	To study the effectiveness of listening to specifically composed songs to decrease	RCT	222 pregnant women were divided between a music listening group and a control group.	The music listening group demonstrated decreased anxiety compared to the control group.	Consistent listening to relaxing music throughout pregnancy should be further studied for its effectiveness.	<p><i>Strengths:</i> The EPDS and STAI were both used to measure patient anxiety and depression levels.</p> <p><i>Limitations:</i> The size of this study was quite</p>	<p><i>Level:</i> I</p> <p><i>Quality:</i> B</p>

	prenatal anxiety and depression.					small. There was also a high attrition rate because the participants were only recruited online and never had contact in person. There also is little generalizability as it is uncertain if different types of music would also be effective in reducing anxiety levels.	
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