MINDFULNESS TRAINING THAT AFFECTS POSTPARTUM ANXIETY AND/OR DEPRESSION: INTEGRATIVE REVIEW

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ABSTRACT

The aim of this integrative review is to explore how mindfulness training affects postpartum anxiety (PPA) and/or postpartum depression (PPD). PPA and PPD can have negative effects on the postpartum (PP) person and child's health, and which can result in intrauterine growth restrictions multigenerational repercussions or even perinatal suicide. Mindfulness is defined as the ability to maintain purposeful and intentional attention to the present moment. An emerging theme in the literature is the impact of mindfulness-based interventions on reducing anxiety and/or depression during PP. This integrative review included twelve studies examining the effects of mindfulness training on PPA and/or PPD. All studies reported that mindfulness training was associated with some reduction in PPA and/or PPD. However, findings were inconsistent as three out of the twelve studies found that anxiety and/or depression scores increased between six weeks to four months PP with mindfulness training. These findings highlight the need for further longitudinal, randomized control trials to explore the sustained effects of mindfulness training in this population.

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GLOSSARY

Anxiety: increased irrational fear of a future threat (American Psychiatric Association, 2013).

Cognitive behavioral therapy: psychotherapy that focuses on thinking, behaving and reacting to situations in a healthy way that changes unhelpful patterns (National Institute of Mental Health, 2020).

Emotional self-management training: a combination of cognitive behavioral therapy and Chinese culture with teachings focusing on self-management, positive communication, relaxation, problem solving and cognitive restructuring (Mao et al., 2012).

Generalized anxiety disorder: excessive worry and anxiety have occurred during a six-month period (American Psychiatric Association, 2013).

Informal and Formal Mindfulness Skills: Mindfulness skills focusing on mindful meditation, yoga and body scan, in addition to being mindful during everyday activities (Luberto et al., 2018).

Mindfulness: is having the ability to maintain purposeful and intentional attention to the present moment. (Kabat-Zinn, 2003).

Mindfulness-based childbirth and parenting program: a mindfulness program that teaches participants to be aware of their sensory, emotional and cognitive processes during childbirth and parenting (Pan et al., 2019).

Mindful self-compassion training: a combination of cognitive behavioral therapy and Chinese culture with teachings focusing on mindfulness and self-compassion while being a new parent (Guo et al., 2020).

Perinatal: is the time frame of a person during the pregnancy and up to the first year (Koukopoulos et al., 2020).

Postpartum depression: is diagnosed if the person has five or more of these symptoms during a

two-week period including symptoms of depressed mood, diminished interest in activities, significant weight loss, insomnia, agitation, fatigue, feelings of worthlessness, decreased concentration and/or recurrent thoughts of death (American Psychiatric Association, 2013; Peters, 2019).

Postpartum period: is also known as the fourth trimester and occurs after giving birth extending for one year or when the physiologic changes return to the nonpregnant state (Berens, 2024).

Three-minute breathing space: mini-medication exercise that teaches people to focus on awareness to the present moment when there are unpleasant feelings (Segal et al., 2013).

Author Note: The following integrative review uses inclusive language that focuses on people rather than gender. For example, the term people or person will be used instead of women which allows for the acknowledgement of diverse identities and reduces dehumanizing and harmful effects (American Psychological Association, 2022). As an exception, the terms “women” and “maternal” are used as applicable in the search terms and in reports of other authors’ terminology.

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CHAPTER ONE: INTRODUCTION AND BACKGROUND

Postpartum anxiety (PPA) and postpartum depression (PPD) are a global health crisis causing negative health effects on postpartum (PP) individuals and children (World Health Organization, n.d.-a). During the transitional stage of PP, hormones and disrupted sleep increase the vulnerability of developing or exacerbating symptoms of anxiety and/or depression (Carlson et al., 2025; Zappas et al., 2020). Furthermore, Zappas et al. (2020) found that inflammatory mediators contribute to the risk of PPA and/or PPD. Consequences of untreated PPA and/or PPD for the PP person are complications with infant bonding, substance use disorders, suicide, worsening health conditions (Zappas et al., 2020), and multigenerational repercussions (Avalos et al., 2020). Devastating effects for the infant include intrauterine growth restriction, low birth weight (Pan et al., 2023), reduced breastfeeding (Pawluski et al., 2017), delayed cognitive, neurological, motor and emotional development, and behavioral avoidance (Bear et al., 2022) with sustained effects into childhood (Pawluski et al., 2017; Zappas et al., 2020). Additionally, PP people with a previous diagnosis of PPD have a 30-40% recurrence of depression in subsequent pregnancies (Bear et al., 2022; Dimidijian et al., 2016). Furthermore, 20% of deaths occurring PP in the United States are due to suicide (Zappas et al., 2020). Disruption in PP mood is increasing worldwide and has become a global public health concern (World Health Organization, n.d.-a). There is an imperative need for non-pharmacologic (Pawluski et al., 2017; Yang et al., 2023a), accessible, and non-stigmatizing treatment to support people experiencing PPA and/or PPD (Carlson et al., 2025). Addressing this can help prevent negative consequences of untreated PPA and/or PPD for the PP person and the child (Carlson et al., 2025).

Mindfulness is a technique that is incorporated with multimodal interventions to decrease anxiety and/or depression. Mindfulness-based intervention is an emerging theme in the literature as an effective non-pharmacological approach to decreasing PPA and/or PPD (Avalos et al.,

2020; Bear et al., 2020; Dimidjian et al., 2015; Dimidjian et al., 2016; Dunn et al., 2012; Guo et al., 2020; Luberto et al., 2018; Mao et al., 2012; Pan et al, 2019; Pan et al., 2023; Shulman et al., 2018; Sun et al., 2021). This integrative review aims to explore how mindfulness training affects PPA and/or PPD. The effects of mindfulness-based interventions on PPA and/or PPD may be dependent on three major factors: delivery method, timing of intervention and multimodal interventions with mindfulness training.

Background

The following information will be discussed in this background section: PP, diagnosis of PPA and PPD, common screening tools and risk factors. To provide context for the integrative review, treatment options, including mindfulness-based interventions, and the significance of PPA and/or PPD will also be discussed.

Postpartum

The PP period, also known as the fourth trimester, occurs after giving birth and is generally considered to extend for one year. However, Berens (2024) defines the PP period ending when "physiologic changes related to pregnancy return to the nonpregnant state" (p.1), which can surpass one year. Though it is well known that numerous changes occur during PP, PPA and PPD remain underdiagnosed and undertreated (Cunningham et al., 2022; Yang et al., 2023a; Zappas et al., 2020). With promising research suggesting the efficacy of mindfulness training, it is necessary to understand how PPA and PPD are diagnosed.

Diagnosis of PPA

There are no Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, (DSM-5) criteria for PPA (American Psychiatric Association, 2013), even though 4.4-10.8% of people are affected by symptoms of anxiety during PP (Misri et al., 2015). However, the criteria for Generalized Anxiety Disorder (GAD; Lowe et al., 2008) are commonly used as a diagnostic

tool for PPA (American Psychiatric Association, 2013). GAD is diagnosed if excessive worry and anxiety have occurred during a six-month period with three or more accompanying symptoms such as restlessness, fatigue, difficulty concentration, irritability, muscle tension and sleep disturbance (American Psychiatric Association, 2013). Generally, people who experience anxiety have increased irrational fear of a future threat (American Psychiatric Association, 2013). Due to the lack of DSM-5 criteria for PPA, anxiety and depression during the PP period are often linked because of overlapping symptoms.

Diagnosis of PPD

A total of 13% of PP people are affected by depression (Peters, 2019). Unlike PPA, the DSM-5 has a diagnostic criteria for perinatal depression and is diagnosed if during a two-week period the person has five or more of these symptoms: depressed mood, diminished interest in activities, significant weight loss, insomnia, agitation, fatigue, feelings of worthlessness, decreased concentration and/or recurrent thoughts of death (American Psychiatric Association, 2013; Peters, 2019). However, symptoms such as insomnia, may be a normal sign during PP (Sivertsen et al., 2015). Though PPD has strong diagnosing criteria, it is imperative that we understand the risk factors to developing PPA and PPD to decrease the negative health effects on the PP person and infant, which may lead to a recognition, diagnosis and treatment. Various screening tools can be utilized to help the clinician with a diagnosis (David, 2025; Zappas et al., 2020) and will be discussed next.

Screening Tools

When screening for PPA and/or PPD several tools are utilized in practice and no single tool is superior (Zappas et al., 2020). Screening is used for clinical assessment and to monitor symptoms of anxiety and/or depression throughout the PP journey (American College of Obstetricians and Gynecologists [ACOG], 2023; David, 2025). Screening tools also monitor for

response and/or remission or treatment (ACOG, 2023). The ACOG (2023) suggests titrating treatment if screening tools indicate that symptoms of anxiety and/or depression during PP are worsening.

The Canadian Task Force on Preventive Healthcare recommends against the use of screening tools for PPD that have cut-off scores as it may lead to false negatives or/and positives (Lang et al., 2022). Additionally, the ACOG (2023) reports that screening for mental health conditions during pregnancy and PP does not improve health outcomes. However, a discussion with patients should include treatment options if there is a positive screening tool (ACOG, 2023). Risk factors to developing PPA and PPD are discussed next.

Risk Factors

Risk factors to PPA and/or PPD may include stressors occurring during the pregnancy, history of trauma, young paternal age (Pawluski et al., 2017), smoking, NICU stay, antenatal depression, physical and/or verbal abuse, low socioeconomic status (Cunningham et al., 2022; Peters, 2019), and family history of psychiatric disorders (Carlson et al., 2025). The hormones estrogen and progesterone drastically decline during PP, causing an increased risk for experiencing PPD (Carlson et al., 2025; Cunningham et al., 2022). However, it is less clear whether hormone production has a role in PPA (Pawluski et al., 2017). Additionally, breast/chest feeding people may delay or avoid seeking treatment for PPA and/or PPD due to the worry of medications' side effects to the child, potentially putting them at a higher risk compared to formula feeding (Grzeskowiak et al., 2022; Peters, 2019). This is further discussed in the treatment options, which will be discussed next.

Treatment

Pharmacologic Treatment

Treatment for PPA and PPD is divided into two sections: pharmacologic and nonpharmacologic treatment. When managing PPA and/or PPD pharmacotherapy can be considered if the person has failed non-pharmacologic therapies or if the symptoms are severe (Peters, 2019; Zappas et al., 2020). First-line pharmacotherapy includes monotherapy of a selective serotonin reuptake inhibitor (SSRI) or serotonin-norepinephrine reuptake inhibitor (SNRI) (Peters, 2019; Zappas et al., 2020). However, 50% of pregnant people will discontinue their pharmacotherapy for anxiety and depression, causing a 70% relapse after discontinuing the medication and worsening symptoms in PP (Dimidijian et al., 2016). Studies suggest that perinatal people and practitioners may be hesitant to manage anxiety and/or depression during pregnancy and PP with pharmacologic therapy due to the unknown risks of the baby (Moore Simas et al., 2023; Pawluski et al., 2017; Zappas et al., 2020). However, the research suggests that a lactating person should continue breast/chest feeding while on antidepressants, such as sertraline and escitalopram, because the benefits overcome the risks of the medications (American College of Obstetricians and Gynecologists, 2023; Moore Simas et al., 2023; Peters, 2019).

Nonpharmacologic Treatment

Nonpharmacologic therapies are an emerging and popular treatment method that can be helpful in improving mild symptoms of PPA and/or PPD (Peters, 2019). Psychotherapy, such as cognitive behavioral therapy (CBT), is the first line of treatment for PPD and PPA (Moore Simas et al., 2023). However, there is a lack of research focusing on the efficacy of CBT during the PP period (Zappas et al., 2020).

Mindfulness. Due to the growing interest in alternative therapies, mindfulness-based interventions are a favorable therapy for PP people. Mindfulness is the ability to maintain purposeful and intentional attention to the present moment (Kabat-Zinn, 2003; Zappas et al., 2020). An example of mindfulness training is learning to focus on the present moment while breathing, meditating, walking and sitting (Pan et al., 2023). A common mindfulness skill is the three-minute breathing space, which is a mini-meditation exercise that teaches people to focus on awareness to the present moment when there are unpleasant feelings (Segal et al., 2013). Flexibility and accessibility of mindfulness training make it a desirable treatment for PP people. Additionally, mindfulness-based interventions have successfully been implemented to reduce "depression, anxiety, and negative affect; enhance [paternal] nurturing behaviors; and improve childhood outcomes" (Sun et al., 2021, p. 2). When mindfulness is practiced it may reduce cortisol levels, improve behavioral regulation and reduce blood pressure (Yang et al., 2023a).

Mindfulness training is commonly delivered in person and/or at home, with increasing attention in the literature toward delivery through mobile application (Avalos et al., 2020; Bear et al., 2022; Guo et al., 2020; Sun et al., 2021). Additionally, mindfulness-based interventions are often multimodal. A common therapy added with mindfulness-based interventions includes CBT. Integrating mindfulness training with CBT focuses on learning cognitive behavioral strategies to use during vulnerable periods to reduce the risk of an adverse event, such as a mental health crisis (Dimidjian et al., 2015). Emotional-self management training is a subtype of CBT that focuses on teaching self-management, positive communication, relaxation, problem solving and cognitive restructuring (Mao et al., 2012). Another subtype of CBT includes mindful-self compassion training that teaches mindfulness and self-compassion in preparation to being a new parent (Guo et al., 2020).

A meta-analysis and systematic review by Yang et al. (2023a) on mindfulness-based interventions for PPD reported a decrease across studies in Edinburgh Postnatal Depression Scale (EPDS) (Cox et al., 1987) and Beck Depression Inventory (Beck et al., 1961) scores. Yang et al. (2023a) recommends a 4-week mindfulness training prior to giving birth and to practice mindful meditation for a minimum of 30 minutes a day. Next, the significance of treating PPA and/or PPD will be discussed.

Significance of PPA and/or PPD

With 20% of PP people being affected by PPD and an additional 70% having a recurrent episode of PPD (Cunningham et al., 2022), it is crucial to understand that without treatment it can lead to mental health dysfunction, PP suicide, and long-term negative effects on the child (Carlson et al., 2025). The World Health Organization (n.d.-b) suggests that health practitioners should be aware of the increasing amount of PPA and PPD and how to manage symptoms. Increasing recognition and awareness of mental health changes in PP may improve access to PP mental health resources (Carlson et al., 2025). Furthermore, continued research may lead to a DSM-5 criteria that focuses on a diagnosis for PPA to improve diagnosis and treatment. The purpose of this integrative review is to explore how mindfulness training affects anxiety and/or depression during the PP period.

CHAPTER TWO: METHOD

Database Search

The databases used throughout the following integrative review include OVID, CINAHL and Google Scholar. The search was completed on October 25, 2024. OVID and CINAHL were accessed via the University of Northern British Columbia (UNBC) library. Google Scholar was accessed publicly on Google Chrome. No non-duplicate studies were identified in Google Scholar, however duplicate studies were noted. A total number of articles was not recorded as the results were over 24,000 (advice given from Catherine Schiller, NURS 798 instructor). However, the first 10 pages were screened. The purpose of using Google Scholar was to confidently state that no studies were missed and to mitigate publication bias (Toronto & Remington, 2020). Assistance from Terri McKellar, UNBC Librarian, was utilized to gain confidence that all available articles on the proposed topic were readily accessible.

Search Terms

A comprehensive search strategy is crucial to identify relevant literature on an integrative review topic (Whittemore & Knafl, 2005). First, quotation marks were used to narrow the search by ensuring that the two or more words were searched as an entire concept compared to separately (Toronto & Remington, 2020). Boolean operators AND and OR were used to search the terms as a unit and separately (Toronto & Remington, 2020). The AND search terms were grouped into themes; the time period of PP, mood focusing on anxiety and depression and lastly therapy focusing on mindfulness. No further techniques were used as the total search terms were not a very large number.

The search terms were created by CINAHL and OVID subject headings and additionally identified by the writer if an area of terms was lacking from the databases. This method may have resulted in duplicate studies; however, Toronto and Remington (2020) suggest both

techniques to complete a comprehensive search. See Table 1 for a summary of the search terms and databases that were used.

Table 1 *Search Terms and Databases*

Search Date	Database	Search Terms	Articles Retrieved	Total amount of articles after omitting due to non-relevant title/abstract
October 25th, 2024	CINAHL	(MH "Postnatal Period") OR (MH "Puerperium") OR (MH "Perinatal Period") OR Postpartum OR Fourth Trimester AND (MH "Anxiety") OR (MH "Perinatal Mood and Anxiety Disorders") OR (MH "Depression, Postpartum") OR (MH "Anxiety Disorders") OR adjustment disorders OR maternal anxiety OR anxiety or anxious or worries or nervousness AND (MH "Mindfulness") OR (MH "Biofeedback") OR (MH "Guided Imagery") OR (MH "Meditation") OR (MH "Mental Healing") OR (MH "Yoga") OR (MH “Mind body techniques”) OR (MH “Alternative therapies”) OR (MH "Mind Body Techniques") OR (MH "Mental Processes+") OR (“mindfulness app” or mindfulness application) AND (MH "Behavior Modification") OR (MH "Dance Therapy") OR (MH "Mentalization-Based Therapy") OR (MH "Interpersonal Psychotherapy") OR (MH "Psychosocial Intervention") OR (MH "Psychotherapy, Psychodynamic") OR (“intervention”) OR (“training”) OR (“treatment”)	216	10
October 25th, 2024	OVID	(MH "Postnatal Period") OR (MH "Puerperium") OR (MH "Perinatal Period") OR Postpartum OR Fourth Trimester AND (MH "Anxiety") OR (MH "Perinatal Mood and Anxiety Disorders") OR (MH "Depression, Postpartum") OR (MH "Anxiety Disorders") OR adjustment disorders OR maternal anxiety OR anxiety or anxious or worries or nervousness AND (MH "Mindfulness") OR (MH "Biofeedback") OR (MH "Guided Imagery") OR (MH "Meditation") OR (MH "Mental Healing") OR (MH "Yoga") OR (MH “Mind body techniques”) OR (MH “Alternative therapies”) OR (MH "Mind Body Techniques") OR (MH "Mental Processes") OR (“mindfulness app” or mindfulness application) AND (MH "Behavior Modification") OR (MH "Dance Therapy") OR (MH "Mentalization-Based Therapy") OR (MH "Interpersonal Psychotherapy") OR (MH "Psychosocial Intervention") OR (MH "Psychotherapy, Psychodynamic") OR (“intervention”) OR (“training”) OR (“treatment”)	113	33
October 25th, 2024	Google Scholar	Mindfulness AND Postpartum anxiety AND impact		

Inclusion and Exclusion Criteria

Inclusion and exclusion were incorporated to establish that the most appropriate studies were included. The inclusion criteria, which are specific characteristics that the study must include (Toronto & Remington, 2020), are as follows: publication in the English language, participants must have a child aged 0-12 months, aged 18+ and currently pregnant or PP within 1 year. International studies were incorporated due to the lack of studies focusing on Canada alone. Additionally, there was no restriction on the study design and the date the article was published.

The exclusion criteria, which is specific characteristics that would omit the study from being included (Toronto & Remington, 2020), are as follows: studies focusing on high-risk pregnancies, NICU hospitalization after delivery, maternal Axis 1 or 2 psychiatric disorders or a recent diagnosis of depression or/and anxiety in the last 2 months (Dimidjian et al., 2016), were omitted.

Data Extraction

A systematic approach was incorporated for the data extraction. Incorporating a comprehensive list of each study allows for a deeper understanding and trustworthiness of the findings, as combining diverse methodologies can lead to a lack rigor (Whittemore & Knafl, 2005). To improve rigor and reduce the chance of bias, the following studies were analyzed using the method of "data reduction, data display, data comparison, conclusion drawing and verification" (Whittemore & Knafl, 2005, p. 550). See Appendix A that organizes each article displaying the following information: author, date and title, purpose, framework and methods, sample and location, data analysis, key findings, strengths and limitations, and checklist rating.

Appraisal Tools

Miles and Huberman's (1994) framework, recommended by Whittemore and Knalf (2005), was used since there is a variety of methodologies represented in the articles included in this integrative review. The following appraisal tools were utilized; critical appraisal skills programme (CASP) tool for randomized control trials (CASP, 2024a) and qualitative studies (CASP, 2024b); JBI global (2020) tool for quasi-experimental studies; and mixed methods appraisal tool for mixed methods (Hong et al., 2018). See Appendix C for an outline of critical analysis tools used for each article.

CHAPTER THREE: FINDINGS

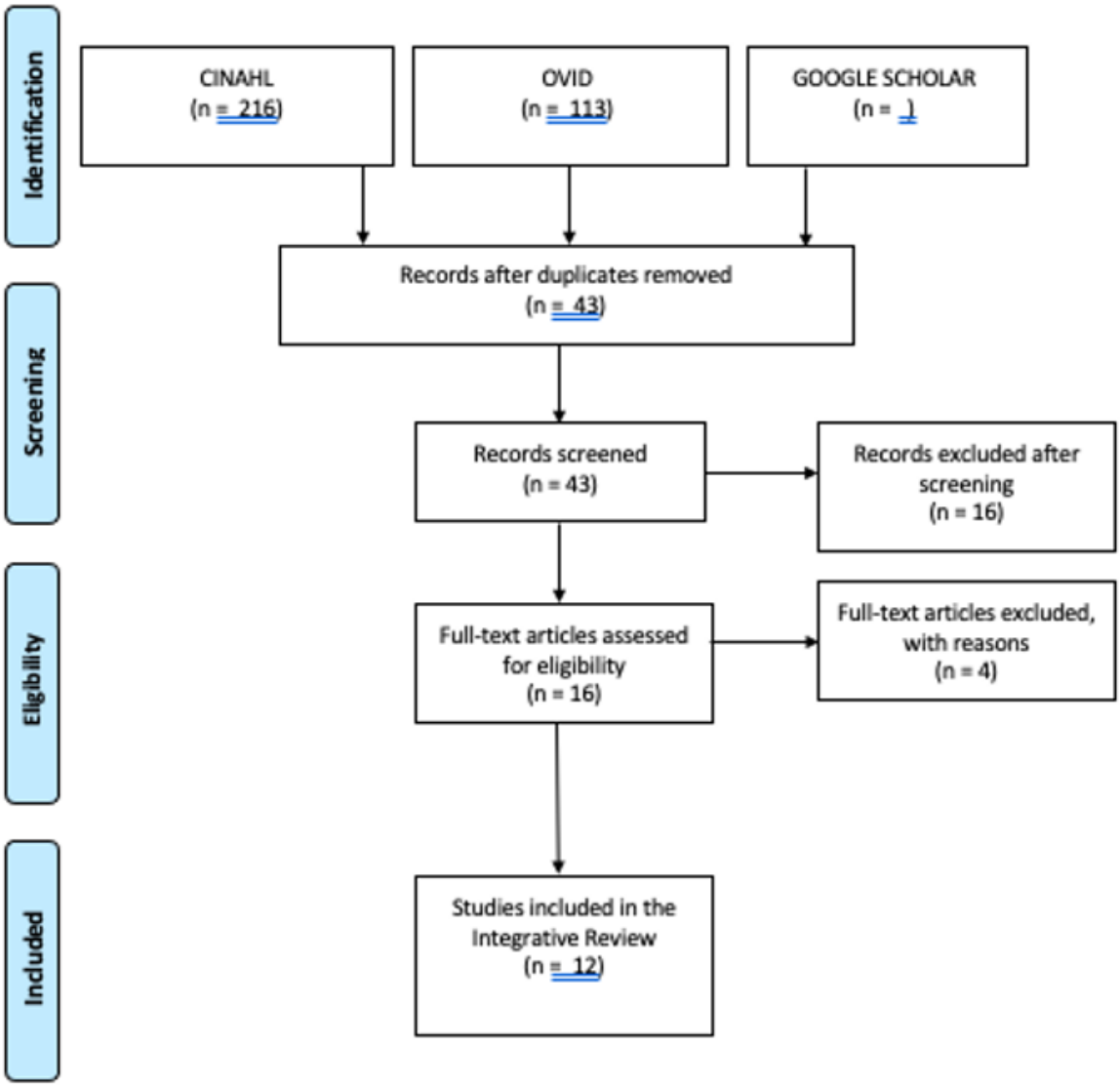
Prisma Diagram

The Prisma diagram (see Figure 1), adapted from Moher et al. (2009), is used to demonstrate the number of articles found from the search terms, duplicates, articles that were screened and excluded, articles that were assessed for eligibility and excluded and the total amount of articles used in the integrative review. A total of 329 articles were found during the identification section. After removing duplicates from the databases, 43 articles were screened for relevancy by reading the title and abstract, as recommended by Toronto and Remington (2020), which resulted in 27 articles being omitted. Sixteen full text articles were used to pick the final selection of 12 articles. Four articles were excluded because full access to the studies could not be located. No systematic review articles were included.

Study Characteristics

Twelve articles were identified as meeting the criteria for this integrative review (see Appendix A) exploring how mindfulness training affects anxiety and/or depression during the PP period. A variety of different methodologies were used in the articles selected, which, in keeping with an integrative review, allows for a diverse set of findings to fully "understand the phenomenon of concern" (Whittemore & Knafl, 2005, p. 547). The methodologies included; seven randomized control trials (RCT; Bear et al., 2022; Dimidjian et al., 2016; Guo et al., 2020; Mao et al., 2012; Pan et al., 2019; Pan et al., 2023; Sun et al., 2021); one quasi-experimental design (Shulman et al., 2018), two mixed methods designs (Avalos et al., 2020; Dunn et al., 2012), and two pre-experimental, longitudinal, quantitative designs (Dimidjian et al., 2015; Luberto et al., 2018).

Figure 1 *Prisma Diagram*



Note. This figure demonstrates the identification, screening, etiology and included in the screening process. The Prisma diagram is adapted from Moher et al. (2009).

Themes

Through data extraction, analysis and synthesis of the twelve articles, the following themes emerged: delivery method, timing of intervention and multimodal interventions with

mindfulness training. These themes demonstrate how mindfulness-based interventions are implemented and their effectiveness on anxiety and/or depression during PP.

Delivery Method

The literature explored various delivery methods of mindfulness training for reducing PPA and/or PPD. Six of the studies used a combination delivery method of in-person and at-home training sessions (Dimidjian et al., 2015; Dimidjian et al., 2016; Dunn et al., 2012, Luberto et al., 2018; Pan et al., 2019; Pan et al., 2023). However, in two cases, at-home training was encouraged but not required (Dunn et al., 2012; Shulman et al., 2018). Delivery methods included group therapy, mobile app or internet-based platforms and informal and formal training. Appendix B summarizes the delivery methods and indicates whether group therapy, at-home therapy, mobile-app/internet-based therapy, informal and/or formal training was utilized.

Group Therapy. Mindfulness-based interventions that were delivered through group therapy were used in several studies (Dimidjian et al., 2015; Dimidjian et al., 2016; Dunn et al., 2012; Luberto et al., 2018; Mao et al. 2012; Pan et al., 2017; Pan et al., 2023; Shulman et al., 2018). Dunn et al. (2012) highlighted the importance of a supportive cohort in group therapy settings, as group therapy focuses on forming relationships, sharing stories and normalizing people's experiences. Likewise, Mao et al. (2012) reported similar findings and added the importance of group therapy offering encouragement and trust between the participants. One pregnant participant from Dunn et al. (2012) shares similar findings; "it was good to meet other people and know you weren't the only person . . . it was good to know you were in a place where you felt comfortable to talk about it" (p. 142). Mao et al. (2012) concluded that their study was successful because a cultural collective was intertwined with the group training. However, conflicting research from Dimidjian et al. (2016) states that group therapy is time-consuming and difficult to prioritize.

Mobile Application or Internet-Based Platform. Another common delivery method of mindfulness training for PP people is through a mobile application (Avalos et al., 2020; Bear et al., 2022; Sun et al., 2021) or internet-based platform (Guo et al., 2020). The following mobile applications and internet-based platforms incorporated screening tools to measure anxiety and/or depression. Refer to Table 2 for a summary of screening tools used in each article. Avalos et al. (2020) incorporated a mobile application, Headspace, which focused on self-paced mindfulness meditation. A mean reduction of 3.8 using the PHQ-8 depression scoring tool was reported (Avalos et al., 2020). Bear et al. (2020) incorporated a mobile application, Smiling, which also focused on mindful meditation and reported a mean reduction of 2.74 using the DASS21 depression and anxiety scoring tool. Bear et al. (2022) and Avalos et al. (2020) reported sustained reductions in anxiety and/or depression while using the mobile application over four to six weeks. The internet-based platform by Guo et al. (2020), which focused on being a new parent and self-regulation, reported a mean reduction of 3.5 using the EPDS depression scoring tool at 3 months PP and a further reduction at 12 months PP. However, the exact reduction of EPDS depression scores at 12 months was not reported.

Despite a sustained decrease in anxiety symptoms for PP participants, Sun et al. (2021) reported an increase of 0.63 using the EPDS depression scoring tool at 6 weeks after childbirth, using a smart-phone self-guided mindfulness training called Spirits Healing App. However, the increase of EPDS scoring was not statistically significant ($p = 0.25$; Sun et al., 2021).

An additional tool to aid in mindfulness training was the mobile application LINE, for participants to communicate with each other in addition to their in-person sessions (Pan et al., 2023). Pan et al. (2023) was the only study that incorporated a mobile application designed to facilitate participant communication and peer support. Due to the time constraints after birth, PP participants reported difficulty remembering to complete mindfulness skills (Pan et al., 2023).

The LINE mobile application displayed participants practice time, which may aid in reminding PP people to complete mindfulness skills (Pan et al., 2023).

Table 2 *Common Screening Tools used for Anxiety and/or Depression*

Study	Instrument	
Dimidjian et al. (2015) Dimidjian et al. (2016) Dunn et al. (2012) Guo et al. 2020 Mao et al. (2012) Pan et al. (2023) Sun et al. (2021)	Edinburgh Postnatal Depression Scale (EPDS)	10-item self-report Assess symptoms of depression Higher score means that increased likelihood of PPD (Cox et al., 1987).
Shulman et al. (2018) Sun et al. (2021)	Generalized Anxiety Disorder Scale - 7 (GAD-7)	7-item self-report Assess symptoms of anxiety (Lowe et al., 2008)
Bear et al. (2022) Dunn et al. (2012)	Depression, Anxiety and Stress Scale (DASS21)	21-item self-report Assess symptoms of depression, anxiety and stress Higher score means that increased likelihood of symptoms (Lovibond & Lovibond, 1995)
Mao et al. (2012) Shulman et al. (2018)	Patient Health Questionnaire-9 (PHQ-9)	9-item self-report Assess symptoms of depression Higher score indicates more severe symptoms (Kroenke et al., 2001)
Avalos et al. (2020)	Patient Health Questionnaire-8 (PHQ-8)	8-item self-report Shortened version of the PHQ-9 and omits the question about suicide Assess symptoms of anxiety Higher score indicates more severe symptoms (Kroenke et al., 2009)
Luberto et al. (2018)	Beck Depression Inventory	21-item self-report Assess symptoms of depression over the past 2 weeks Higher score indicates more severe symptoms (Beck et al., 1961)
Luberto et al. (2018)	Beck Anxiety Inventory	21-item self-report Assess symptoms of anxiety (physical and cognitive symptoms) Higher score indicates more severe symptoms (Beck et al., 1988)
Pan et al. (2023)	Pregnancy Related Thoughts Questionnaire for Anxiety (PRT)	10-item self-report Assess symptoms of anxiety focusing on how often the person has worried about infants health Higher scores indicate the likelihood of increased anxiety (Rini et al., 1999)

Informal and Formal Training Practices. Mindfulness interventions focused on teaching participants informal and/or formal training skills, as both help shift depressing thoughts into being mindful (Dimidjian et al., 2014). Appendix B summarizes which studies categorized and defined informal or formal skills, or if the term was grouped in the same definition. Luberto et al. (2018) reported that less than 55% of PP participants practiced formal mindfulness skills, such as mindful meditation and yoga. However, if the skill was easily integrated into daily life, like mindful breathing, it was practiced more often (Dunn et al., 2012; Dimidjian et al., 2015; Luberto et al., 2018) as a lack of time to complete skills was a common complaint (Dimidjian et al., 2016). For example, Avalos et al. (2020) reported that the three-minute breathing space exercise, which was unspecified as informal or formal skill, was time consuming as participants would have preferred the exercise to be one minute. At-home informal and/or formal skills were more desired as they were flexible for participants to complete, compared to in-person sessions completing informal and/or formal skills (Dimidjian et al., 2016). Pan et al. (2019) and Dimidjian et al. (2015) reported that informal and/or formal skills resulted in a reduction of anxiety and depressive symptoms with long-term mediating effects.

Timing of Intervention

A common theme in the findings suggests that the effects of PP anxiety and/or depression may depend on the timing of the mindfulness intervention. Nine of the studies administered the mindfulness intervention during the prenatal period, while three studies implemented mindfulness intervention during the PP period (see Table 3). For this integrative review, only PP measurements of anxiety and/or depression are discussed. No measurements during the prenatal period are included in this analysis.

Table 3 *Timing of Mindfulness Interventions Across Studies*

Prenatal Intervention	**Study characteristics**	**Postpartum Intervention**	**Study characteristics**
Dimidjian et al. (2015)	8-week mindfulness-based cognitive therapy	Avalos et al. (2020)	6-week mindfulness intervention based mobile program
Dimidjian et al. (2016)	8-week mindfulness based cognitive therapy	Bear et al. (2022)	8-week mindfulness based mobile program
Dunn et al. (2012)	8-week mindfulness based cognitive therapy program	Shulman et al. (2018)	8-week mindfulness based cognitive therapy program
Guo et al. (2020)	6-week self-compassion program		
Luberto et al. (2018)	8-week CALM pregnancy intervention		
Mao et al. (2012)	4-week emotional self-management training program		
Pan et al. (2019)	8-week mindfulness-based childbirth and parenting program		
Pan et al. (2023)	8-week mindfulness-based childbirth and parenting program		
Sun et al. (2021)	8-week mindfulness behavioral cognitive therapy program		

Prenatal Intervention. Nine studies administered mindfulness training during the prenatal period (Dimidjian et al., 2015; Dimidjian et al., 2016; Dunn et al., 2012 ; Guo et al., 2020; Luberto et al., 2018; Mao et al., 2012; Pan et al., 2019; Pan et al., 2023; Sun et al., 2021). Dunn et al. (2022) incorporated an 8-week mindfulness-based cognitive therapy program during the prenatal period to determine the effects of mindfulness training on psychological distress. Dunn et al.'s (2022) PP measurements included that 50% reported improved depression EPDS

scoring and 33% had improved DASS21 anxiety scoring. Luberto et al. (2018) also found decreased anxiety and depression scores and incorporated an 8-week CALM pregnancy intervention, focusing on formal and informal mindfulness practices. However, Luberto et al. (2018) used the Beck Depression Inventory, compared to the EPDS scoring tool seen in Dunn et al.'s (2022) study. The EPDS scoring tool (Cox et al., 1987) screens for PPD, where the Beck Depression Inventory (Beck et al., 1961) screens for depression alone with no PP focus. Also, Luberto et al. (2018) used the Beck Anxiety Inventory, compared to the DASS21 scoring tool seen in Dunn et al.'s (2022) study. Despite using different anxiety scoring tools, both are validated screening tools. Additionally, both studies (Dunn et al., 2022; Luberto et al., 2018) incorporated similar mindfulness interventions with overlapping themes, such as teaching mindful breathing as a mindfulness skill.

Several studies measured depression, using the EPDS scoring tool, and reported a decrease with mindfulness training administered prenatally (Dimidjian et al., 2015; Dimidjian et al., 2016; Guo et al., 2020; Mao et al., 2012; Pan et al., 2019; Pan et al., 2023). Guo et al.'s (2020) 6-week mindful self-compassion program administered prenatally focused on self-compassion and mindfulness to prepare for parenthood. Guo et al. (2020) internet-based intervention reported long-term reductions in EPDS depression scoring (EPDS score below 9) at 3 months PP and a further reduction at 12 months PP (EPDS score not indicated). However, conflicting findings from Sun et al (2021) eight-week mindfulness CBT intervention reported an increase in the EPDS depression scoring PP, though the increase was not statistically significant ($p = 0.10$). Sun et al. (2021) only assessed EPDS scoring until six weeks PP, compared to other studies assessing until six months (Dimidjian et al., 2016) to a year PP (Guo et al., 2020). The variability of mindfulness training durations, differences in PP scoring tools and diverse frameworks (see Table 3) creates challenge to evaluate the sustained effects of mindfulness training. Overall, the studies that administered mindfulness training prenatally reported that

participants continued to practice mindfulness skills into the PP period (Dunn et al., 2012; Dimidjian et al., 2015; Luberto et al., 2018). For example, breathing awareness was the most practiced skill PP (Dunn et al., 2012; Dimidjian et al., 2015; Luberto et al., 2018).

Postpartum Intervention. The remaining studies (Avalos et al., 2020; Bear et al., 2022; Shulman et al., 2018) administered mindfulness training exclusively during the PP period. Bear et al. (2022) found significant decreases in depression and anxiety post-intervention and sustained at six months PP ($p = 0.001$). Bear et al. (2022) measured anxiety and depression using the DASS21 tool (Lovibond & Lovibond, 1995). Despite measuring depression scores alone, Avalos et al.'s (2020) study reported a decreased in PHQ-8 depression scores, when administered during PP. Conversely, Shulman et al. (2018) found a non-significant ($p = 0.17$) increase of anxiety at three months PP, using the GAD-7 tool.

Timing of mindfulness training varied across studies in the PP period. Avalos et al. (2020) administered mindfulness training until 6 weeks PP, whereas Shulman et al. (2018) administered training until 12 weeks PP. Bear et al. (2020) administered training anytime from birth to 12 months PP.

Multimodal Interventions with Mindfulness Training

A common theme in the findings suggests that the effects of PPA and/or PPD may depend on the use of multimodal interventions with mindfulness training. Several studies within this integrative review highlight the benefit of combining therapy methods with mindfulness-based intervention training leading to a decrease in PPA and/or PPD (Dimidjian et al., 2014; Dimidjian et al., 2016; Guo et al., 2020; Mao et al., 2020). However, Shulman et al. (2018) and Pan et al. (2023) suggest that the decreased PPA and/or PPD is not sustained long term. See Table 4 summarizing the multimodal interventions with mindfulness training programs.

Table 4 *Interventions Used in Multimodal and Mindfulness Training Programs*

Study	Intervention	Details of intervention
Dimidjian et al. (2015); Dimidjian et al. (2016); Luberto et al. (2018); Shulman et al. (2018); Sun et al. (2021)	8-Week Mindfulness Based Cognitive Therapy (MCBT)	-Combination of Mindfulness Training and Cognitive Behavioral Therapy (CBT) -Focuses on awareness, acceptance and teaching the participants to not have destructive thinking patterns. (Shulman et al., 2018).
Mao et al. (2020)	4-Week Emotional Self-Management Group Training (ESMGT)	- Combination of CBT and incorporating Chinese culture of delivery. -Focuses on self-management, effective problem solving, relaxation, cognitive restructuring and improving self-confidence (Mao et al., 2020)
Guo et al. (2020)	6-Week Mindful Self Compassion Program (MBSP)	-Combination of CBT and Mindfulness (Chinese version) -Focuses on self-regulation of being a new mother (Guo et al., 2020)
Pan et al. (2019); Pan et al. (2023)	8-Week Mindfulness-Based Childbirth and Parenting Program (MBCP)	- Combination of Mindfulness training and Child-Parenting program - Adapted from Nancy Bardack's "Mindful birthing: training the mind, body and heart for childbirth and beyond" (Pan et al., 2023, p. 3) -Focuses on teaching the participants how to cope with stressful situations during the PP period (Pan et al., 2023).

Cognitive Behavioral Therapy (CBT) and Mindfulness Training. Combination of CBT and mindfulness training were used in several studies (Dimidjian et al., 2015; Dimidjian et al., 2016; Luberto et al., 2018; Shulman et al., 2018; Sun et al., 2021). Dimidjian et al. (2014) and Dimidjian et al. (2016) found that their eight-week CBT and mindfulness training was effective in preventing a recurrence or relapse of PPD. The recurrence rates were higher for the control group at 50.2%, whereas the combined-therapy intervention group had a decreased relapse rate of 18.4% (Dimidjian et al., 2016). Additionally, relapse rates continued to have a further reduction to 4.6% at six-months PP (Dimidjian et al., 2016). No other studies examined PPD recurrence rates.

Shulman et al. (2018) found that their eight-week CBT and mindfulness training had a sustained reduction from baseline of 3.29 PHQ-9 depression scoring. However, there was no sustained reduction in GAD-7 anxiety scoring (Shulman et al., 2018). Shulman et al. reported an increase of anxiety scores at three months PP, which was not statistically significant ($p = 0.17$; Shulman et al., 2018). Shulman et al. did not indicate the exact increase of GAD-7 scoring but reported that the scores indicated mild anxiety. Additionally, Shulman et al. focused on participants who were on monotherapy with an antidepressant. No other study in this integrative review specified if the participant was on an antidepressant prior to starting the intervention.

Two other studies incorporated a subtype of CBT therapy; emotional self-management training (Mao et al., 2012) and mindful self-compassion training (Guo et al., 2020). Guo et al. (2020) found that their six-week mindful self-compassion program had a reduction of 3.5 EPDS depression scoring. Additionally, Guo et al. (2020) found a reduction of anxiety PP but did not report the mean score. Mao et al. (2012) found that their four-week emotional self-management program had an average reduction of 2.78 EPDS depression scores at six weeks PP. However, this reduction from Mao et al. (2012) was compared to the control group rather than to baseline EPDS depression scores seen in Guo et al. (2020). Anxiety was not measured in Mao et al. 's, (2012) article. Overall, there was a decrease of depression scores demonstrated when the use of CBT was combined with mindfulness training (Dimidjian et al., 2015; Dimidjian et al., 2016; Guo et al., 2020; Mao et al., 2012).

Mindfulness-Based Childbirth and Parenting Program. A combination of mindfulness training with childbirth and parenting programs were used in two studies (Pan et al., 2019; Pan et al., 2023). Pan et al. (2019) found that their eight-week mindfulness, childbirth and parenting program had an average reduction from baseline of 2.98 in EPDS depression scores during PP. Pan et al. (2019) highlighted the importance of integrating mindfulness interventions

with childbirth and parenting programs, due to the importance for Northern Taiwan PP people to recover at home for the first 30 days after birth. Pan et al. (2023) found similar results with an average reduction of 5.7 EPDS depression scores at two months but increased by 2.25 EPDS depression scores at four months PP. Pan et al. (2023) reported a reduced 0.52 anxiety score using the Pregnancy Related Thoughts Questionnaire. However, the reduction in anxiety was only measured prenatally, not PP. Pan et al. (2019) did not measure anxiety scores. It is unclear if the use of childbirth and parenting programs combined with mindfulness training leads to a sustained reduction of anxiety and/or depression during PP.

CHAPTER FOUR: DISCUSSION

This integrative review analyzed and synthesized research on mindfulness training and its effects on PPA and/or PPD. All studies in this review reported that mindfulness training had some reduction in PPA and/or PPD. These results are consistent with a meta-analysis from Yang et al. (2023a) reporting that the use of mindfulness interventions reduced PP anxiety and/or depression. However, there were inconsistent findings throughout this review as some studies found that anxiety and/or depression increased with mindfulness training between 6 weeks to four months PP, indicating that the effects of mindfulness training were not sustained long-term (Shulman et al., 2018; Sun et al., 2021; Pan et al., 2023). These inconsistencies may be attributed to the differences of study location, discrepancies in mindfulness training definitions and different assessment tools, which causes a potential challenge for comparison. The following section explores how the identified themes - delivery mode, timing of intervention, and multimodal interventions with mindfulness training – affect PPA and/or PPD with mindfulness training.

Themes

Delivery Method

Multiple uses of delivery modes were reported in this integrative review. All studies focused on mindfulness interventions delivered in person or at home. Three studies reported that participants preferred the flexibility of interventions delivered at home or through a mobile application (Avalos et al., 2020; Bear et al., 2022; Luberto et al., 2018). Tabi et al. (2022) report that mobile applications of mindfulness training enhance accessibility to treatment as most perinatal mental health services are in urbans areas and require in-person time commitments. A limitation of articles focusing on mobile applications is the use of different platforms, which

limits the generalizability of the findings. Further, some of the mobile applications did not have a perinatal focus and were designed for any individual wanting to learn mindfulness (Avalos et al., 2020; Bear et al., 2022). Additionally, all mobile application studies delivered mindfulness intervention at different times throughout a person's PP journey, ranging from two weeks to eight months PP. These results were aligned with Balsam et al. (2023) and Worku et al. (2025), who reported that mindfulness training delivered through mobile applications can enhance mental health during pregnancy and PP.

Timing of Intervention

Timing of mindfulness-based interventions varied, either being administered prenatally or PP. However, it is unclear if specific timing is optimal in reducing PPA and/or PPD. Yang et al.'s (2023a) systemic review and meta-analysis suggests that mindfulness training that occurs four weeks before birth may play a crucial role in preventing PPD. These results are supported by Min et al. (2023) meta-analysis reporting that anxiety and/or depression were reduced for healthy pregnant people with the use of mindfulness training delivered during pregnancy. However, Min et al. (2023) and Yang et al. (2023a) did not review the effects of mindfulness training delivered during PP. The research throughout this integrative review reported that the studies that delivered mindfulness intervention during pregnancy decreased PPA and/or PPD (Dimidjian et al., 2015; Dimidjian et al., 2016; Guo et al., 2020; Mao et al., 2012; Luberto et al., 2018). Similarly, several studies reported a decrease in anxiety and/or depression when mindfulness interventions occurred during PP (Avalos et al., 2020; Bear et al., 2022; Shulman et al., 2018). Unfortunately, no studies in this integrative review or the literature have administered mindfulness training prenatally and PP. Further RCTs should evaluate if delivering mindfulness training prenatally is optimal in decreasing PPA and/or PPD compared to delivery during PP.

In addition to intervention timing, there is no definitive recommendation on intervention duration to reduce PPA and/or PPD. Throughout this review, the intervention duration ranged from four to eight weeks. The variability of mindfulness training durations creates a challenge in analyzing the effects of mindfulness training on anxiety and/or depression during PP. Yang et al. (2023a) meta-analysis reported that interventions longer than four weeks had a worsening effect on patients' depression. With variety of intervention lengths, a direct comparison is unachievable.

Multimodal Interventions with Mindfulness Training

Most studies found that the use of multimodal interventions with mindfulness training reduced PPA and/or PPD (Dimidjian et al., 2015; Dimidjian et al., 2016; Guo et al., 2020; Mao et al., 2020). These results are supported by Muspitha et al. (2023), who reported a decrease in PP depression symptoms with the use of mindfulness-based CBT and assertiveness training, compared to using mindfulness techniques alone. Additionally, Dennis and Hodnet (2012) report that using psychosocial and psychological interventions, such as CBT, interpersonal psychotherapy, and educational strategies, are shown to decrease PPD. Using multimodal interventions focus on improving selfcare, social and emotional support and reducing stress (Athanasiadi, 2025). Overall, the use of multimodal interventions with mindfulness training reports a reduction in PPA and/or PPD.

Limitations of the Articles

Throughout this integrative review, limitations of the articles include study location, discrepancies in mindfulness training definitions and different assessment tools. The following limitations will be discussed and are a potential challenge for direct comparison of studies.

Study Location

A factor that may have contributed to the inconsistency of results is the use of international studies. Since Canadian research on mindfulness training on PP anxiety and/or depression is lacking, a diverse geographical set of articles were used. Some studies focused on Chinese interventions and Chinese scoring tools (Mao et al., 2020; Guo et al., 2020), whereas most of the studies did not specify a cultural focus. Notably, China has the highest PPD rates worldwide (Yang et al., 2023a) which may explain the increase of studies conducted in China. A common event for PP people practicing traditional Chinese culture is "Zuoyuezi", also known as doing the month (Yang et al., 2023b). Zuoyuezi focuses on the PP person practicing restricting behaviors, such as staying in bed and reducing personal cleaning practices (Yang et al., 2023b). It is unclear of the effects that Zuoyuenzi has on PPA and/or PPD. For the results to be generalized to the Canadian population, further research should focus on East Indian, Asian and Indigenous cultures as Canada is multicultural. However, a multi-cultural approach is difficult to compare as cultural beliefs are different between regions and cultures (Min et al., 2023).

Discrepancies in Mindfulness Training Definitions

A discrepancy in definitions for informal and formal mindfulness training practices was noted throughout the literature. A lack of concrete definitions poses a challenge to identify effective mindfulness skills in reducing PPA and/or PPD. Additionally, some studies did not define informal and formal mindfulness training and grouped the skills together, as seen in studies by Dimidjian et al. (2015), Dunn et al. (2012), and Pan et al. (2023), summarized in Appendix B. A lack of a standardized definition of informal and formal mindfulness practices hinders the ability to determine what skill is effective. Additionally, it is crucial to focus on a few mindfulness techniques, compared to numerous options, as individuals can get overwhelmed,

known as choice overload (Bate & Robert, 2005). Further research should identify what activity is informal or formal skills and if one skill is superior in reducing PPA and/or PPD. No studies reported discrepancies in informal and formal definitions.

Assessment Tools

Despite the research reporting that mindfulness training reduces anxiety and/or depression during PP, direct comparisons between the studies are challenging. A limitation is the heterogeneity of anxiety and/or depression assessment tools utilized within this integrative review. The ACOG (2023) recommends the use of a validated anxiety and/or depression screen tool; however, no specific screening tool is recommended. In addition, discussion on treatment options and referral to behavioral health interventions is strongly recommended (ACOG, 2023). Throughout this review, seven articles utilized the EPDS tool (Dimidjian et al., 2015; Dimidjian et al., 2016; Dunn et al., 2012; Guo et al., 2020; Mao et al., 2012; Pan et al., 2023; Sun et al., 2021), whereas two articles utilized the PHQ-9 tool (Mao et al., 2012; Shulman et al., 2018) to measure depression. EPDS focuses only on PPD (Cox et al., 1987), whereas PHQ-9 focuses on depression for the general population (Kroenke et al., 2001). With no standardized PPA and/or PPD screening tool anxiety and/or depressive symptoms, directly comparing studies is unachievable.

Implications and Future Research Directions

Effective, non-pharmacological therapies are crucial to reduce the rates of PPA and/or PPD and improve perinatal and infant health. Untreated PPA and/or PPD can lead to perinatal and infant health complications, such as uterine and infant growth restrictions and PP suicide (Pan et al., 2023; Zappas et al., 2020). Historically, mental health focusing during the PP period has received limited attention and is undertreated and underrecognized (Athanasiadi, 2025).

Mindfulness training is an effective intervention to reduce PPA and/or PPD that can be implemented globally and is affordable. The devastating complications of untreated PPA and/or PPD combined with the inconsistent findings throughout this review highlight the importance of further research. Conducting Canadian longitudinal randomized control trials may help identify the effects of mindfulness training long-term and allow for generalizability of results. Additionally, further research may identify if the inconsistent effects of mindfulness training on PPA and/or PPD stems from increased stress, lack of sleep, hormone disruptions, menstruation restarting and weaning of breastfeeding that occur normally during PP (Athanasadi, 2025).

In addition to further research, health practitioners must recognize, diagnose and treat PPA and PPD to reduce mental health consequences (Zappas et al., 2020). Improvement and frequency of anxiety and/or depression screening is recommended, as well as utilizing effective treatment and interventions (Athansiadi, 2025; Ferraro, 2024). All perinatal people should have standardized perinatal assessments focusing on prevention of mental illness, nutritional advice, and group counseling (ACOG, 2023; Ferraro, 2024). Ferraro (2024) recommends several home visits by health practitioners, extending till six months PP. In conclusion, with improved recognition it is promising that the DSM-5 will offer standardizes assessment and criteria for PPA (Zappas et al., 2020).

Limitations and Strengths

Throughout this integrative review, there were limitations. One limitation is the lack of studies from the Middle East and countries in Africa, Central and South America. Additionally, no studies in this review focus on mindfulness interventions for Indigenous Peoples to decrease PPA and/or PPD. It is crucial for further research to determine if mindfulness training is effective for Indigenous Peoples as they are at an increased risk for mental health illnesses (Owais et al., 2019). With the wide geographical range, the findings may not be generalized to a specific

population and future research should focus on local studies. Another potential limitation is the possibility that relevant research studies were not included. Studies were excluded if accessibility to access the literature was not available or if the article was not in the English language. Additionally, during the literature search, there were several studies that had focused on mindfulness training to decrease anxiety and/or depression during PP for high-risk patients including NICU patients, and perinatal mental health illnesses such as schizophrenia or bipolar disorder. However, these studies were excluded from this integrative review due to focusing on high-risk populations. An integrative review should focus on evaluating if mindfulness training affects high-risk PP anxiety and/or depression.

A strength discovered throughout this integrative review was the studies that expanded their research to further determine if mindfulness during pregnancy and PP can decrease anxiety and/or depression (Dimidjian et al., 2015; Dimidjian et al., 2016; Pan et al., 2019; Pan et al., 2023). This demonstrates extensive knowledge on PPA and/or PPD, production of high-quality research and building from previous findings.

CHAPTER FIVE: CONCLUSION

PPA and/or PPD may have lasting negative effects on the PP person and the child's health (Avalos et al., 2020; Pan et al., 2023; Zappas et al., 2020). Mindfulness-based interventions are an emerging theme in the literature as an effective non-pharmacological approach to decrease PP anxiety and/or depression. This integrative review included twelve studies examining the effects of mindfulness training on PPA and/or PPD. All studies reported some reduction of PPA and/or PPD with mindfulness training. However, three studies reported that mindfulness training may increase anxiety and/or depression symptoms around six weeks to four months PP (Shulman et al., 2018; Sun et al., 2021; Pan et al., 2023). Moving forward, longitudinal, RCTs should explore the sustained effects of mindfulness training on PPA and/or PPD delivered during the prenatal period and PP period. Expanding research on mindfulness training affecting PPA and/or PPD can equip health practitioners with evidence-based techniques to educate perinatal people on how to prioritize their mental health during the life-altering experience of pregnancy, giving birth and PP.

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APPENDIX A

Integrative Review Matrix

Author, Date & Title	Avalos, L, A., Aghaee, S., Kurtovich, E., Quesenberry, C, J., Nkemere, L., Mcginnis, M, K., & Kubo, A 2020 A mobile health mindfulness intervention for PP people with moderate to moderately severe PPD symptoms: feasibility study
Purpose	To determine the effectiveness of a mobile health mindfulness intervention with depressive symptoms for PP people
Method	Mixed methods single arm (no control group)
Framework	Intervention: Mindfulness Mobile App called Headspace - Self paced guided mindfulness meditation for 10-20 min per day for 6 weeks
Scales	PHQ-8 -Completed at: baseline at 6 weeks PP
Sample & Location	Location: Kaiser Permanente North California Participants: 19 PP people
Key findings	Depression only: It was found that at 6 weeks PP there was significant improvement in depressive symptoms.
Strengths and limitations	Limitations - No control group - Feasibility study - Small sample size of only 19 participants - The intervention started only in PP not during the prenatal stage. - Used the PHQ-8 instead of PHQ-9 which included removing the questions on suicidal thoughts - The study was only assessed until 6 weeks PP, which makes it difficult to assess the long-term effects of training - Must have scored between 10-19 on the PHQ-9 Strengths - Used a mobile health app intervention which make its widely available to the PP population
Reference	Avalos, L. A., Aghaee, S., Kurtovich, E., Quesenberry, C., Nkemere, L., McGinnis, M. K., & Kubo, A. (2020). A mobile health mindfulness intervention for women with moderate to moderately severe postpartum depressive symptoms: Feasibility study. *JMIR Mental Health*, *7*(11), Article e17405. https://doi.org/10.2196/17405

Author, Date & Title	Bear, K, A., Barber, C, C., & Medvedev, O, N 2022 The impact of a mindfulness app on postnatal distress
Purpose	To evaluate the effectiveness of 8-week mindfulness-based interventions, delivered via an app, on decreasing PP participants stress, anxiety and depression.
Method	Randomized Control Trial
Framework	Intervention Group (Smiling Mind Application) - Encouraged to complete 1 session per day (minimum of 3 days per week) - App offers 100+ hours of guided and unguided mindfulness meditation practices Control Group (Baby + Tracker Application) - 10 minutes per day on the app (minimum of 3 days per week) - Offers "postnatal support and information, tracking infant progress, milestones and daily routine and capturing memorable moments" (Bear et al., 2022, p. 2769)
Scales	Measurement of distress and mindful attention/awareness - Completed at: post-intervention and 4-week follow-up Depression Anxiety and Stress Scale Form (DASS21) -Completed at: post-intervention and 4-week follow-up
Sample & Location	Location: NewZealand Participants 49 PP people in the intervention group & 50 PP people in the control group
Key findings	Depression: It was found that depression scores were decreased at the intervention at 4-week follow-up for the intervention group Anxiety: Anxiety scores were decreased at the intervention at 4-week follow-up for the intervention group
Strengths and limitations	Limitations - Smiling Mind Application is not specific towards postnatal period - High dropout rate - Self-reported measures - Participants were at different stages of PP (0-12 months) Strengths - App is free, easily accessible globally
Reference	Bear, K. A., Barber, C. C., & Medvedev, O. N. (2022). The impact of a mindfulness app on postnatal distress. *Mindfulness*, *13*(11), 2765–2776. https://doi.org/10.1007/s12671-022-01992-7

Author, Date & Title	Dimidjian, S., Goodman, S, H., Gallop, F, R., Brown, A, P., & Beck, A 2015 An open trial of mindfulness-based cognitive therapy for the prevention of perinatal depressive relapse/recurrence
Purpose	To evaluate mindfulness-based cognitive therapy on change in depression symptoms and relapse/recurrence during PP
Methods	Qualitative design
Framework	All participants received MBCT-PD (Formal and informal) 8 weeks - 8 sessions that were designed using the MBCT treatment model with added modifications to focus on the perinatal period.
Scales	EPDS - primary measure of depression severity. - Completed at: intake, each MBCT-PD session, post-intervention, monthly till 6 months PP Longitudinal Interval Follow-up Evaluation (LIFE) - psychiatric status rating - Completed at: post-intervention + 1 & 6 months PP
Sample & Location	Location: Colorado, USA Participants 46 patients
Key findings	Depression only: The finding found that there was an average reduction of EPDS scores during PP. In addition, there was a 18.37% relapse/recurrence occurred at 6-months PP.
Strengths and limitations	Limitations - Open trial design - 30% were dispensed psychotropic medication and 20% had two or more psychotherapy visits, making it difficult to rule out different causes of why the EPDS scores decreased. Strengths - Modification was made to the treatment to focus on perinatal period - The study assessed EPDS scoring at 6-months PP aiming to understand the long-term effects of the intervention
Reference	Dimidjian, S., Goodman, S. H., Felder, J. N., Gallop, R., Brown, A. P., & Beck, A. (2015). An open trial of mindfulness-based cognitive therapy for the prevention of perinatal depressive relapse/recurrence. *Archives of Women's Mental Health: Official Journal of the Section on Women's Health of the World Psychiatric Association*, *18*(1), 85–94. https://doi.org/10.1007/s00737-014-0468-x

Author, Date & Title	Dimidjian, S., Goodman, S. H., Felder, J. N., Gallop, R., Brown, A. P., & Beck, A. 2016 Staying well during pregnancy and the postpartum: A pilot randomized trial of mindfulness-based cognitive therapy for the prevention of depressive relapse/recurrence
Purpose	To prevent PP people from having depression relapse/recurrence by incorporating MBCT-PD (Mindfulness-Based Cognitive Therapy for Perinatal Depression) and comparing it to TAU (treatment as usual).
Method	Randomized Control Trial
Framework	Intervention Group: MBCT-PD (8 week program) - 4+ out of 8 classes required attendance and completion of all at-home assignments (6 days each week from sessions 1-7). - Loving-Kindness Meditation - Allowed to start pharmacology if requested Control Group: TAU - Continue treatment or started on mental health treatment
Scales	Depression severity - Edinburgh Postpartum Depression Scale (EPDS) - TAU group completed at: intake, baseline prior to randomization, mid-intervention and post-intervention - MBCT-PD group completed at: scale completed at each session, monthly during pregnancy and 6 months PP Longitudinal Interval Follow-up Evaluation (LIFE) - Completed at: 1 month prior to delivery, 1 & 6 month PP
Sample & Location	Location: obstetrics clinical settings at Kaiser Permanente in Colorado and Georgia Sample: 86 pregnant people; 43 participants in MBCT-PD and 43 participants in TAU
Key findings	Depression only: There was significantly lower levels of depression for the MBCT-PD group, compared to the TAU group The relapse rates were significantly lower for the MBCT-PD group, 18.4%, compared to 50.2% for the TAU group.
Strengths and limitations	Limitations: - High rate of refusal at allocation in the MBCT-PD group - Sample is predominantly white (18.60% black, 2.32% asian, 6.98 hispanic and 1.12 other, the remaining were white) - Only focuses on who have had depression prior - The at-home session attendance were self-reported Strengths: - Has a wide range of when the depression scales took place during PP
References	Dimidjian, S., Goodman, S. H., Felder, J. N., Gallop, R., Brown, A. P., & Beck, A. (2016). Staying well during pregnancy and the postpartum: A pilot randomized trial of mindfulness-based cognitive therapy for the prevention of depressive relapse/recurrence. *Journal of Consulting and Clinical Psychology, 84*(2), 134–145. https://doi.org/10.1037/ccp0000068

Author, Date & Title	Dunn, C., Hanieh, E., & Roberts, R 2012 Mindful pregnancy and childbirth: effects of a mindfulness-based intervention on women's psychological distress and well being in the perinatal period
Purpose	To explore the effects of mindfulness training on psychological distress
Method	Mixed Methods using Qualitative and Quantitative (Non-Randomized)
Framework	Intervention Group: Mindfulness Based Cognitive Therapy Program - 8 week course with semi-structured interview Control group: - Regular outpatient antenatal care
Scales	Depression, Anxiety and Stress Scale (DASS21) -Completed at: baseline, end of treatment and 6 weeks PP Edinburgh Postnatal Depression Scale -Completed at: baseline, end of treatment and 6 weeks PP Lovibond (Anxiety scale) -Completed at: baseline, end of treatment and 6 weeks PP
Sample & Location	Location: Australia Participants: 14 pregnant people
Key findings	Depression: The findings found only 50% of the participants reported a positive change in depression scores (EPDS scale) during PP. Additionally, the control group had no significant change with zero participants reporting a positive change in depression scores. Anxiety: The findings found that 33.3% of the participants reported an improvement in anxiety scores (DASS21 scale) during PP. There was only 1 participant difference which resulted in 20% of participants reporting an improvement in anxiety scores in the control group.
Strengths and limitations	Limitations: - Small sample size - High attrition rate - Non-randomized & doesn't explicitly say that a mixed-methods was used. - The study was only assessed until 6 weeks PP, which makes it difficult to assess the long-term effects of training Strengths: - Measured depression and anxiety
Reference	Dunn, C., Hanieh, E., Roberts, R., & Powrie, R. (2012). Mindful pregnancy and childbirth: Effects of a mindfulness-based intervention on women's psychological distress and well-being in the perinatal period. *Archives of Women's Mental Health*, *15*(2), 139–143. https://doi.org/10.1007/s00737-012-0264-4

Author, Date & Title	Guo, L., Zhang, J., Mu, L., & Ye, Z. 2020 Preventing postpartum depression with mindful self-compassion intervention: A randomized control study
Purpose	To determine if a 6-week internet-based mindfulness based self-compassion program can prevent the development of PPD
Methods	Randomized controlled trial
Framework & Methods	Intervention Group - Chinese version of the MBSP (mindful self-compassion program) program developed by Neff and Germer - 6 week online program Control Group - Waitlist
Scales	EPDS -Completed at baseline, 3 months PP and 1 year PP State-Trait Anxiety Inventory I and II -Completed at baseline, 3 months PP and 1 year PP Beck Depression Inventory II -Completed at baseline, 3 months PP and 1 year PP
Sample & Location	Location: Tianjin First Center Hospital Participants: 354 pregnant people (157 in each group)
Key findings	Depression: Depression scores decreased at 3 months PP and continued to decrease further at 12-months PP for the intervention group. There was no significant difference seen from baseline to 3 months PP in the control group with a slight decrease at 12 months. Anxiety: Anxiety scoring is not discussed in the study
Strengths and limitations	Limitations - Anxiety scoring was suppose to be completed via the State-Trait Anxiety Inventory I and II but the study does not indicate the findings - The authors did not indicate any limitations of the study Strengths -The study assessed EPDS scoring at 1-year PP aiming to understand the long-term effects of the intervention
Reference	Guo, L., Zhang, J., Mu, L., & Ye, Z. (2020). Preventing postpartum depression with mindful self-compassion intervention: A randomized control study. *The Journal of Nervous and Mental Disease*, *208*(2), 101–107. https://doi.org/10.1097/NMD.0000000000001096

Author, Date & Title	Luberto, C. M., Park, E. R., & Goodman, J. H. 2018 Postpartum outcomes and formal mindfulness practice in mindfulness based cognitive therapy for perinatal women
Purpose	To determine if effects of the intervention, CALM pregnancy, will be maintained throughout PP
Method	Quantitative Study
Framework	Intervention group: - 8-week CALM Pregnancy classes + at home No control group
Scales	Beck Depression Inventory (2nd edition) -Completed at: before intervention, 1 week post intervention and 3 months PP Beck Anxiety Inventory -Completed at: before intervention, 1 week post intervention and 3 months PP
Sample & Location	Location: Boston, USA Participants: 24 Pregnant People
Key findings	Depression: It was found that depression symptoms decreased from baseline to PP and continued to decrease to from post-intervention to PP Anxiety: Findings showed that anxiety symptoms decreased from baseline to PP, however no significant change from post-intervention to PP.
Strengths and limitations	Limitations: - Small sample size - Uncontrolled, non-randomized study - Self-selection causes bias due to being interested and motivated about the idea of mindfulness training - The study was only assessed until 12 weeks PP, which makes it difficult to assess the long-term effects of training Strengths: - Follow-up completed at 3 months PP - High participant rate of weekly practice logs - Inclusive criteria allowed participants with elevated anxiety symptoms (this is sometimes included as a exclusion criteria) - Measured depression and anxiety
Reference	Luberto, C. M., Park, E. R., & Goodman, J. H. (2018). Postpartum outcomes and formal mindfulness practice in mindfulness-based cognitive therapy for perinatal women. *Mindfulness*, *9*(3), 850–859. https://doi.org/10.1007/s12671-017-0825-8

Author, Date & Title	Mao, H.J., Li, H.J., Chiu, H., Chan, W.C., & Chen, S.L. 2012 Effectiveness of antenatal emotional self-management training program in prevention of postnatal depression in Chinese people
Purpose	To assess if an emotional self-management training program to pregnant people can prevent postnatal depression
Methods	Randomized control trial
Framework	Intervention group (emotional self-management training program) - 4 weekly group sessions and 1 independent counseling session Control group: Standard antenatal care - four 90 minute group sessions focusing on childbirth education
Scales	PHQ-9 - Chinese version -completed at: done at baseline, post-intervention (36 weeks pregnant) EPDS - Chinese version -completed at: 6 weeks PP SCID-TR Axis I disorders -completed at: 6 weeks PP if EPDS score was 11 or higher
Sample & Location	Location: China Participants: 240 pregnant people at 32 weeks gestation
Key findings	Depression only: They found that there was decreased depression scores via the EPDS for the intervention group compared to the control group at 6 weeks PP. There was a total of 2.7% of participants who had PPD for the intervention group, compared to 9.5% who had PPD for the control group.
Strengths and limitations	Limitation: - Only EPDS was measured at 6 weeks PP, not PHQ-9. Additionally, EPDS was not measured at baseline or post-intervention. - Selection bias - specific to only one hospital - Sample had no past of mental health problems - The participants completed PHQ-9 before they were randomized into groups. It was not specified if the information collected from the depression scale instrument was used to divide the groups up. - The study was only assessed until 6 weeks PP, which makes it difficult to assess the long-term effects of training - There was more of a focus on self-management training compared to mindfulness training. Strengths: - RCT - Used a Chinese version of PHQ-9
Reference	Mao, H. J., Li, H. J., Chiu, H., Chan, W. C., & Chen, S. L. (2012). Effectiveness of antenatal emotional self-management training program in prevention of postnatal depression in Chinese women. *Perspectives in Psychiatric Care*, *48*(4), 218–224. https://doi.org/10.1111/j.1744-6163.2012.00331.x

Author, Date & Title	Pan, W, L., Chang, C, W., Chen, S, M., & Gau, M, L. 2019 Assessing the effectiveness of mindfulness-based programs on mental health during pregnancy and early motherhood - a randomized control trial
Purpose	To assess how effective a mindfulness-based intervention is on long-term psychological health of PP people.
Method	Randomized Control Trial
Framework	Intervention group = Mindfulness Based Childbirth and Parenting Program - Once a week for 8 weeks. Group setting. Practice 6 days a week of mindfulness exercises Control group = Hospitals routine childbirth education - 4-hour discussion on physiological and psychological about pregnancy and childbirth
Scales	EPDS - Completed at: mid-pregnancy and 3 months PP
Sample & Location	Northern Taiwan Participants: 52 intervention group and 52 in control group
Key findings	Depression only: It was found that depression scores decreased at the 3-month PP mark, whereas the control group had a minimal change of depression scores.
Strengths and limitations	Limitations -High attrition rate -Researchers were not blind to the groups -Mindfulness practice at home was not tracked - The study was only assessed until 12 weeks PP, which makes it difficult to assess the long-term effects of training Strengths -Randomized control study
Reference	Pan, W. L., Chang, C. W., Chen, S. M., & Gau, M. L. (2019). Assessing the effectiveness of mindfulness-based programs on mental health during pregnancy and early motherhood: A randomized control trial. *BMC Pregnancy and Childbirth*, *19*(1), 1–8. https://doi.org/10.1186/s12884-019-2503-4

Author, Date & Title	Pan, W, L., Lin, L, C., Kuo, L, Y., Chiu, M, J., & Ling, P, Y 2023 Effects of a prenatal mindfulness program on longitudinal changes in stress, anxiety, depression, and mother-infant bonding of women with a tendency to perinatal mood and anxiety disorder: a randomized control trial
Purpose	To evaluate how mindfulness interventions during the prenatal period can improve psychological distress during PP
Method	Randomized control trial
Framework	Intervention course - MBCP (Mindfulness based childbirth and parenting program) - 8 weeks, 2 hour long sessions + encouraged to engage in 30 min at home practices, 6 days a week - Communication with the group via the app LINE Control group: - Standard antenatal care
Scales	EPDS -Completed at: Baseline, post-intervention, 36 weeks pregnant, 2 and 4 months PP Pregnancy Related Thoughts Questionnaire for Anxiety -Completed at: Baseline, post-intervention and 36 weeks pregnant
Sample & Location	Location: Taipei, Taiwan between July 2021 and March 2022 Participants: 102 pregnant people
Key findings	Depression: It was found that depression scores in the intervention group decreased with time Anxiety: It was found that anxiety scores in the intervention group decreased with time from baseline to 36-weeks pregnant, but unfortunately this study did not assess anxiety scores PP.
Strengths and limitations	Limitations - High attrition rate (35.29%) - Self-reported measure - Most participants have university level or higher education. This does not account for individuals that do not have education and may be part of a vulnerable population. - 51.72% stayed in a confinement care center after birth (which is common in Taiwan) but difficult to measure this locally. - Anxiety effects were not measured during PP Strengths - RCT
Reference	Pan, W, L., Lin, L, C., Kuo, L, Y., Chiu, M, J., & Ling, P, Y. (2023). Effects of a prenatal mindfulness program on longitudinal changes in stress, anxiety, depression, and mother-infant bonding of women with a tendency to perinatal mood and anxiety disorder: A randomized controlled trial. *BMC Pregnancy and Childbirth*, *23*. https://doi.org/10.1186/s12884-023-05873-2

Author, Date & Title	Shulman, B., Dueck, R., Ryan, D., Breau, G., Sadowski, I., & Misri, S. 2018 Feasibility of a mindfulness-based cognitive therapy group intervention as an adjunctive treatment for postpartum depression and anxiety
Purpose	To evaluate the feasibility of mindfulness-based cognitive therapy in the PP population for treatment of PPA and PPD with a focus on MBCT being adjunctive treatment to pharmacotherapy
Method	Non-equivalent control group quasi experimental design
Framework	Intervention Group - 8 week MBCT in a class setting + encouraged to complete mindfulness exercises at home Control group - Treatment as usual. *All participants were on monotherapy of an antidepressant medication
Scales	PHQ-9 -Completed at: week 1, 4, 8 and 12 weeks PP GAD-7 -Completed at: week 1, 4, 8 and 12 weeks PP
Sample & Location	Western Canada Participants: 27 PP people
Key findings	Depression: It was found that depression scores decreased from week 1-8, compared to the control group. Anxiety: Additionally, it was found that anxiety scores were decreased from week 1-8, compared to the control group. However, there was a slight increase of anxiety scores at 3-months follow-up for the intervention group.
Strengths and limitations	Limitations - Small sample size of 27 PP people - Predominantly white or caucasian. Did not specify the other ethnicities. 85.7% white in the intervention group and 56.3% white in the control group - Since there was a high number of participants in the control group (14) who did not complete the 3 month follow-up, the control group was omitted from the follow-up longitudinal analysis -All participants were on monotherapy antidepressant medication - The study was only assessed until 12 weeks PP, which makes it difficult to assess the long-term effects of training Strengths - Canadian study - able to use locally
Reference	Shulman, B., Dueck, R., Ryan, D., Breau, G., Sadowski, I., & Misri, S. (2018). Feasibility of a mindfulness-based cognitive therapy group intervention as an adjunctive treatment for postpartum depression and anxiety. *Journal of Affective Disorders*, *235*, 61–67. https://doi.org/10.1016/j.jad.2017.12.065

Author, Date & Title	Sun Y, Li Y, Wang J, Chen Q, Bazzano AN & Cao F 2021 Effectiveness of smart-phone based mindfulness training on maternal perinatal depression: Randomized controlled trial
Purpose	To evaluate how mindfulness training (smartphone based) can affect perinatal depression symptoms.
Method	Randomized control trial
Framework	Intervention group: Mindfulness Behavioural Cognitive Therapy 8 week Thematic curriculum + formal & informal training Control Group: WeChat: regular prenatal/postnatal care
Scales	EPDS -Completed at: baseline (T1), 4 weeks post intervention (T2), 8 weeks post intervention (T3), 18 weeks post intervention (T4) and 6 weeks PP (T5) Generalized Anxiety Disorder Scale -Completed at: baseline (T1), 4 weeks post intervention (T2), 8 weeks post intervention (T3), 18 weeks post intervention (T4) and 6 weeks PP (T5)
Sample & Location	Location: Jinan, Shandong, China. Participants: 168 pregnant people (84 in each group)
Key findings	Depression: It was found that in the mindful group, the EPDS depression scores decreased at T2/3/4. However there was a slight increase during PP. An overall decreased number of depressive symptoms. As for the control group, the EPDS depression scores increased at T3 but there was a decline at T4/5 Anxiety: It was found that in the mindful group, anxiety scores decreased at T2 and remained low for T3/4/5. However, in the control group, anxiety was increased at T3/4
Strengths and limitations	Limitations - High percentage of dropouts: only 8% of the participants completed the 8 week training - Population was from one single hospital - Analysis was done for 84 in each group, even though there was a high drop out number - The study was only assessed until 6 weeks PP, which makes it difficult to assess the long-term effects of training Strengths - Completed scoring at multiple different times, baseline, 4, 8, 18 weeks post-intervention and 6 weeks PP
Reference	Sun, Y., Li, Y., Wang, J., Chen, Q., Bazzano A, N., & Cao, F. (2021). Effectiveness of smartphone-based mindfulness training on maternal perinatal depression: Randomized controlled trial. *Journal of Medical Internet Research*, *23*(1), Article 23410. https://doi.org/10.2196/23410

APPENDIX B

Delivery Methods and Types of Mindfulness Training

Study	Group therapy	At-home therapy	Mobile-App or Internet-Based	Informal training	Formal training
Avalos et al. (2020)	-	Y	Headspace App Guided meditation	Did not specify	Did not specify
Bear et al. (2022)	-	Y	Smiling App (intervention group) that has hours of guided and unguided meditation focusing on mindfulness Modules: "breath, sound and taste, thoughts, emotions, everyday mindfulness, curiosity and beginners mind, stress, sleep and gratitude, relationships and mindful listening" (Bear et al., 2022, p. 2769) Baby + tracker Application (control group) that focuses on postnatal support, baby tracking information and milestones	Did not specify	Did not specify
Dimidjian et al. (2015)	Y	Y	-	- Mindfulness of activities - 3-minute breathing exercise	- Sitting and walking - Meditation - Body scan - Yoga
Dimidjian et al. (2016)	Y	Y	-	Dimidjian et al. (2016) combined informal and formal skills and did not specify the skills individually as informal or formal: - 3-minute breathing exercise - Body scan - Daily mindfulness - Yoga - Being with baby	
Dunn et al. (2012)	Y	Y	-	Dunn et al. (2012) combined informal and formal skills and did not specify the skills individually as informal or formal: - Mindful breathing	
Guo et al. (2020)	-	Y	Internet based Mindful-Self compassion program focusing on the pressure of being a new parent and self-regulation Did not specify what the classes consistent of other than stating that meditation and	Did not specify	Did not specify

			exercises were to be completed		
Luberto et al. (2018)	Y	Y	-	- Mindful walking and eating	- Mindful meditation - Yoga - Body scan - 3-minute breathing exercise - Sitting meditation
Mao et al. (2012)	Y	-	-	Did not specify	Did not specify
Pan et al. (2019)	Y	Y	-	"Noticing their experience from moment to moment" (Pan et al., 2019, p. 3)	- Body scan - Mindful yoga - Being with the ice - 3-minute breathing exercise
Pan et al. (2023)	Y	Y	Not required, only encouraged LINE App - available to interact with the other participants	Pan et al. (2023) combined informal and formal skills and did not specify the skills individually as informal or formal: - Mindfulness eating, breathing, stretching, walking, meditation - Body scan - Awareness of breathing and body - Ice cube exercise - 3-minute breathing exercise - Mindfulness practices for coping and pain	
Shulman et al. (2018)	Y	Encouraged not required	-	Did not specify	Did not specify
Sun et al. (2021)	-	Y	Mindfulness behavioral cognitive therapy delivered via smart-phone application Sessions included: - "Understanding mindfulness - Be in the present - Be mindful of negative emotions - Accept difficulties - Thoughts are just thoughts - Enjoy daily happiness - Mindful pregnancy and childbirth - Continued mindfulness practice" (Sun et al., 2021, p. 3)	- Pausing mid-day - Mindful eating and walking - 3-minute breathing	- Body scan - Mindful breathing, stretching, and meditation

APPENDIX C

Critical Analysis Tools

Randomized Control Trials using CASP (2024a)											
Study	Clearly formulated research question	Participants randomized	All participants accounted for	Participants/investigators/analyzers blind to the intervention	Were the groups similar	Treated equally	Were the effects of the intervention reported	Estimate of intervention reported?	Do the benefits outweigh the potential risks	Can the study be used locally	Scoring
Dimidjian et al. (2016)	Y	U	N	N/U/Y	U	Y	Y	Y	Y	Y	M
Bear et al. (2022)	Y	Y	N	U/U/U	Y	N	Y	U	Y	Y	M
Pan et al. (2019)	Y	Y	N	N/N/U	U	N	Y	U	Y	U	M
Pan et al. (2023)	Y	Y	N	Y/Y/Y	Y	Y	Y	U	U	U	M-H
Guo et al. (2020)	Y	Y	N	U/Y/U	Y	U	Y	U	Y	U	L-M
Mao et al. (2012)	Y	Y	N	U/U/U	Y	Y	Y	Y	Y	U	M
Sun et al. (2021)	Y	Y	N	U/Y/Y	Y	Y	U	U	U	U	L-M

Qualitative using CASP (2024b)											
Study	Clear statement of the aims	Method appropriate	Research design appropriate	Recruitment strategy appropriate	Data collected appropriately	Relationship between researcher and participants considered	Ethical issues considered	Data analysis rigorous	Clear statement of findings	Research valuable?	Scoring

Dimidjian et al. (2015)	Y	Y	Y	U	Y	U	U	Y	Y	Y	M-H
Luberto et al. (2018)	Y	Y	Y	N	Y	N	U	Y	Y	Y	M

Non-Equivalent Quasi Experimental Design using JBI Global (2020)										
Study	Clear cause and effect	Participants similar?	Participants included in any compassions	Control group?	Multiple measurements of the outcome	Follow-up complete?	Outcomes compassion measured in the same way	Outcomes measured reliable	Appropriate statistical analysis	Scoring
Shulman et al. (2018)	Y	U	Y	Y	Y	Y	Y	Y	Y	M-H

Mixed Methods using McGill (Hong et al., 2018)								
Study	Clear research question	Does the collected data allow the research question to be answered	Adequate rationale for methods	Different components integrated	Qualitative quantitative components integrated	Inconsistencies	Components adhere to the quality criteria of each method	Scoring
Avalos et al. (2020)	Y	Y	U	Y	Y	U	Y	M
Dunn et al. (2012)	Y	Y	U	Y	Y	N	Y	L-M

Note. Y = yes, N = no, U = unsure, L = low scoring, M = medium scoring, H = high scoring, L-M = low to medium scoring, M-H = medium to high scoring.