

Adapting a Mindfulness-Based Childbirth and Parenting (MBCP) Program for Online Delivery
with Indonesian Pregnant Women with Depression

By

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Dedication

With a humble and grateful heart, I would like to begin by praising Allah the Almighty, the Most Gracious, and the Most Merciful for the favor He has bestowed upon me throughout my studies and in the completion of this dissertation. May Allah grant blessings to His final Prophet Muhammad (peace be upon him), his family, and his companions.

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Abstract

Depression during pregnancy is often not recognized, which can negatively affect the pregnant person, baby, partner, and other family members. Studies show that pregnant women are less depressed if they are more mindful and have better romantic and prenatal attachment. Evidence also demonstrates that prenatal mindfulness interventions can reduce depressive symptoms. Less is known about these phenomena in collectivist cultural contexts. This dissertation addressed this gap through three studies in Indonesia. Study 1 (N=427) examined the roles and interrelationships of self-report romantic attachment style, prenatal attachment, and mindfulness in relation to depressive symptoms among pregnant women in cross-sectional survey research. Study 2 (N=27) was a randomized controlled trial (RCT) that tested an online adaptation of Mindfulness-Based Childbirth and Parenting (MBCP) compared to treatment as usual (TAU) of pregnant women with depression and their partners. Study 3 (N=28) was an RCT that tested an online adaptation of Mindfulness-Based Childbirth and Parenting (MBCP) compared to treatment as usual (TAU) for pregnant women in general, without elevated depression and attending without their partners. Study 1 indicated depressive symptoms in pregnant women are positively associated with avoidant attachment and anxious attachment, and negatively associated with prenatal attachment and dispositional mindfulness. Prenatal attachment mediated the relationship between avoidant attachment and depressive symptoms. In Study 2, results revealed the MBCP program effectively reduced depressive symptoms in a small sample of pregnant women, despite substantial challenges with recruitment and partner involvement. Study 3 results revealed the acceptability of the online-adapted MBCP program. Open-ended feedback highlighted the benefits and drawbacks of online delivery. MBCP participants reported a significant increase in prenatal attachment after program participation compared to controls.

Prenatal and romantic attachment play an important role in pregnant women's well-being and mindfulness interventions during pregnancy are a promising approach for addressing perinatal depression in Indonesia that warrant further investigation.

Keywords: depression, pregnancy, attachment, mindfulness, prevention, Indonesia

Table of Contents

Adapting a Mindfulness-Based Childbirth and Parenting (MBCP) Program for Online Delivery with Indonesian Pregnant Women with Depression.....	
Dedication.....	i
Acknowledgements.....	ii
Abstract.....	iv
Table of contents.....	vi
Chapter 1: Introduction.....	1
References.....	8
Chapter 2: <i>Interrelationships of Romantic Attachment Style, Prenatal Attachment, Mindfulness, and Depressive Symptoms Among Pregnant Women in Indonesia (Study I)</i>.....	
Abstract.....	14
Introduction.....	15
Present Study	27
Methods.....	29
Data Analyses.....	34
Results.....	35
Discussion.....	38
References.....	50
Table 2.1.	69
Table 2.2.	71
Table 2.3.	72

Table 2.4.	73
Table 2.5.	74
Table 2.6.	75
Table 2.7.	76
Table 2.8.	77
Figure 2.2.	78
Figure 2.3.	79
Figure 2.4.	80
Figure 2.5.	81
Figure 2.6.	82
Chapter 3: <i>Adapting Mindfulness-Based Childbirth and Parenting (MBCP) for Online</i>	
<i>Delivery to Pregnant Women with Depression in Indonesia: A Pilot Study (Study</i>	
2).....	83
Abstract.....	84
Introduction.....	86
Present Study	95
Methods	95
Data Analyses.....	107
Results.....	108
Discussion.....	116
References.....	128
Table 3.1.	142
Table 3.2.	144

Table 3.3.	145
Table 3.4.	146
Table 3.5.	147
Figure 3.1.	149
Chapter 4: <i>Mindfulness-Based Childbirth and Parenting (MBCP) Program: A pilot RCT of A Mindfulness-Based Intervention for Pregnant Women in Indonesia (Study 3)</i>	150
Abstract.....	151
Introduction.....	153
Present Study	156
Methods	157
Data Analyses.....	164
Results.....	165
Discussion.....	172
References.....	185
Table 4.1.	197
Table 4.2.	199
Table 4.3.	200
Figure 4.1.	201
Chapter 5: Conclusions.....	202
References.....	207

Chapter 1: Introduction

Studies on depression in pregnant women in Indonesia represent a growing field. Previous evidence shows the importance of addressing depression in pregnant women in Indonesia, as it is associated with poor outcomes such as maternal preeclampsia (Kumala, 2015), low infant birth weight (Hapisah et al., 2010), and premature birth (Herlina et al., 2014). Having positive attachment relationships (e.g., romantic attachment with partner, prenatal attachment with the fetus) and higher dispositional mindfulness may be important protective factors in the etiology of depression in pregnant women (Goecke et al., 2012; Hicks et al., 2018; Meuti et al., 2015; Priel & Besser, 1999). Studies indicate the importance of providing interventions that can enhance attachment and mindfulness to reduce depression in this population. However, the mechanisms by which mindfulness, romantic attachment, and prenatal attachment protect pregnant women from depression during pregnancy in a collectivist and patriarchal cultural context such as Indonesia remain unclear.

In addition, previous research on Mindfulness-Based Interventions (MBIs) has established the Mindfulness-Based Childbirth and Parenting (MBCP; Bardacke, 2012; Duncan & Bardacke, 2010) program as a promising approach to improving depression that can otherwise jeopardize the well-being of pregnant women, their fetus, and their babies postpartum (Duncan et al., 2017; Lönnberg et al., 2020; Pan, Chang, et al., 2019; Pan, Gau, et al., 2019; Sbrilli et al., 2020; Warriner et al., 2018, Zhang et al., 2023). MBCP is a tailored and enhanced version of the evidence-based Mindfulness-Based Stress Reduction program (Kabat-Zinn, 2013). MBCP is designed as a universal prevention program to support well-being during pregnancy, childbirth, and early parenting. MBCP includes activities explicitly designed to increase the quality of the couple relationship and promote fetal bonding and attachment (Bardacke, 2012). Partners of

pregnant women also benefit from this program, which has been offered in the form of a full 9-week program of 3-hour sessions (Duncan & Bardacke, 2010) or a short program of 4 weeks of 2.5-hour sessions of MBCP-4-NHS (National Health Service; Warriner et al., 2018). Clinical reports suggest both versions seem to improve the quality of couple relationships. Considering the large use of virtual applications for intervention programs since the COVID-19 pandemic and the geographic dispersion of qualified MBCP instructors and potential participants in MBCP, delivery of an online version of this program is necessary, especially for Indonesian expectant families who are broadly geographically dispersed.

Living in a collectivist culture with extended family has both benefits and challenges for expectant families. They tend to experience common situations, such as pregnancy-related decision-making as more complex due to the need to discuss issues and make decisions at the extended family level. They also may have more responsibility for family member-related financial and social matters, which in turn can affect pregnant women's well-being (Aryastami & Mubasyiroh, 2019; Beegle et al., 2001; Lestari & Agustina, 2018). According to Kitayama and Markus (1995), the main goal of interdependent selves in collectivist cultures is to cooperate, participate, belong, or otherwise become a component of the pertinent social interactions.

Collectivist culture (collectivism) is a set of values that prioritizing interdependent relationships between members in their group (e.g., family, ethnicity, nation), giving priority to group goals, shaping behavior based on group norms, and behaving communally (Hofstede 1991; Triandis, 1992). In Indonesia, family context involves a great deal of intersectionality for expectant couples. There is a dynamic change of family structure and family members who live together, a geographical context, and shifting roles within the household (Brah & Phoenix, 2004). Despite the shift in the family dynamic, older adults typically live with their adult

children or grandchildren. As a result, it is feasible that extended relatives continue to live with the expectant couples and influence their decisions about pregnancy and birth planning (Khasanah, 2011).

Application of MBCP in Indonesia's cultural context

It is essential to adapt an MBCP program for Indonesian pregnant women in a collectivist culture context. Mainly, being a member of an extended family can serve as both a protective and risk factor for pregnant women, particularly those with depressive symptoms. The extended family is part of a system that supports pregnant women in many ways (e.g., emotionally, financially), yet it sometimes challenging for them to retain their independence while maintaining their relationship with their extended family (Litwak, 1960). Most nuclear families rely on family, friends, and their community to manage risk and uncertainty (Cox & Fafchamps, 2007). Therefore, autonomy is not a viable option for extended family backgrounds. In Indonesia, decisions are typically made at the level of the extended family (Witoelar, 2013). Individuals in collectivist culture context usually try to do what is expected of them. These phenomena can cause more risk to pregnant women's well-being, especially when they live with the extended family of their husbands versus their own.

To adjust to living in this culture and tradition of Indonesia, pregnant couples need to support one another during their interactions with extended family and the broader community. The MBCP program offers some practices that aim to strengthen relationships and attachments between them, and eventually build attachment to their babies. By strengthening the couple's romantic attachment, they can navigate complex interactions with their extended family, tribe, and community to best support a healthy pregnancy.

Family Systems Theory Perspective on Pregnant Women

This dissertation research project (comprised of studies 1, 2, and 3) is based upon the theoretical framework of Family Systems Theory, which suggests that each subsystem in a family system influence and is influenced by the other family members and subsystems (Cox & Paley, 1997; Minuchin, 1985). Family members, as a system, develop rules inside and through boundaries in the family's reciprocal interactions (Cox & Paley, 1997). This research focuses on the patterns of interaction within and across family subsystems (i.e., couple and parent-fetus). Few studies have examined the mechanisms through which pregnant women with depression relate to their partners and their fetus in terms of attachment.

Bowen (1986) sees the family as a dynamic system of interdependent parts that always strives for balance. According to Bowen, there are two processes in human interactions that are fundamental to action and decision-making: the feeling and thinking processes. In addition, Bowen suggests the main function of extended family is to resolve emotional conflict and transmit beliefs, such as negative emotional attachment. As part of the family system, pregnant women observe behaviors and values related to motherhood, which include recognizing and accepting or preparing for and bonding with a separate entity. There is a natural feeling of anxiety, which can influence mothers and the fetus negatively, both physically and emotionally, or avoidance, which reflects the unacceptable values of other family members. Thus, it is essential for pregnant women to find the meaning of family and pregnancy within the family, along with the attachment to the fetus and the fear of the shift in roles in the extended family (Poncelet, 1983). According to family systems theory, family members have an impact on one another's actions. Maternal depression was consistently linked to paternal depression, and the support of partners may affect prenatal depression (Klein et al., 2018; Pilkington et al., 2015;

Zhang et al., 2021). Thus, prevention and intervention approaches targeting prenatal depression in pregnant women and their partners is essential.

Meanwhile, mindfulness has the potential to help women adjust physically and psychologically during pregnancy, increasing empathy and bonding with the fetus and promoting well-being. Pregnancy stimulates mindfulness, which may improve attention and attachment and prevent sadness, high stress, and major role shifts. Mindfulness affects family system interactions. Dispositional mindfulness in one subsystem member can affect others (Parent et al., 2016). Mindfulness focused on individual performance may also affect subsystem relations (e.g., expectant couples, mother-fetus).

Gaps in the research related to pregnant women with depression

Given that most of the relevant background research has been conducted with white populations in English-speaking, individualistic contexts, there is little known about the influence of collectivist cultural factors such as those found in Indonesia. Considering previous studies on the MBCP program were conducted in person, an adaptation of the program to be delivered online also fills an important gap.

Present study

The aims of this research were divided into three studies: Study 1 examined the roles and interrelationships of romantic attachment style, prenatal attachment, and mindfulness in the course of depressive symptoms among pregnant women living in Indonesia's cultural context. This study set the stage for a subsequent intervention study targeting these factors in the same population. Study 2 included testing an online version of MBCP adapted for delivery in Indonesia to examine its benefits for improving depressive symptoms in pregnant women in Indonesia. Study 2 used an online version of the original MBCP program for expectant couples

and targeted women with elevated depression symptoms and their partners. Study 3 examined the benefits of the online version of MBCP adapted for delivery in Indonesia for pregnant women in general, without elevated depression, and did not require partner participation.

In study 1, the roles and interrelationships of romantic attachment style, prenatal attachment, and mindfulness to reduce depressive symptoms among pregnant women living in Indonesia's cultural context were examined. A sample of $N = 427$ in the age range of 18–40 answered an online Qualtrics survey on depressive symptoms, romantic attachment style, prenatal attachment, and dispositional mindfulness. This study employed the Experiences in Close Relationships Short Form (ECR-S) to measure romantic attachment style. The Maternal Antenatal Attachment Scale (MAAS) measured prenatal attachment, and the Five Facet Mindfulness Questionnaire-Short Form (FFMQ-SF) measured the dispositional mindfulness of pregnant women. Lastly, the Edinburg Postpartum Depression Scale (EPDS) assessed depressive symptoms.

Pregnant women who met the criteria with a cutoff score of 10 or higher for depressive symptoms in their Study 1 survey and agreed to be included in Study 2 were followed up for recruitment into the small randomized controlled trial (RCT). Their self-reported data from Study 1 were used as a baseline assessment prior to delivery of the intervention program in Study 2. Pregnant women with depressive symptoms whose husbands also gave consent to join the study were randomized to the MBCP or treatment as usual (TAU) groups. Self-reported data on depressive symptoms, romantic attachment style, prenatal attachment, and dispositional mindfulness were measured at baseline, post-intervention, and follow-up sessions after birth, for study 2. This pilot study adapted the MBCP program and delivered it online to Indonesian

pregnant women with depression. This pilot study evaluated the acceptability, feasibility, and effectiveness of the MBCP program for improving depression in participants.

In study 3, a modification of the MBCP online program was provided. This study was delivered to Indonesian pregnant women in general, without elevated depression symptoms and without partner participation required. This study evaluated the feasibility and efficacy of the MBCP program for pregnant women who joined the program by themselves. Pregnant women (N = 42) who gave consent to join the study were randomized to the MBCP or TAU group. Self-reported data on depressive symptoms, romantic attachment style, prenatal attachment, and dispositional mindfulness were measured at baseline and post-intervention for study 3.

Through these three studies, the goal of this dissertation is to better understand the role of romantic attachment and prenatal attachment in the depressive symptoms of pregnant women and to test whether online delivery of a mindfulness-based intervention program is beneficial to these processes in the cultural context of Indonesia.

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Chapter 2:

**Interrelationships of Romantic Attachment Style,
Prenatal Attachment, Mindfulness, and Depressive Symptoms
Among Pregnant Women in Indonesia
(Study 1)**

Abstract

Depression during pregnancy often goes undiagnosed and untreated and has critical consequences for the mother, fetus/child, and other family members. Previous studies indicate that higher mindfulness and better couple romantic attachment and maternal prenatal attachment are related to less depression in pregnant women. Less is known about these phenomena in collectivist cultural contexts, such as that found in Indonesia. The current study serves to investigate links between self-reports of dispositional mindfulness, romantic attachment style, prenatal attachment, and depressive symptoms among pregnant women living in Indonesia. The $N = 427$ pregnant women included in the study ($M_{age} = 27.71$, $SD = 4.071$) had an average gestational age of 25.77 weeks ($SD = 7.93$). As hypothesized, results indicated depressive symptoms were positively associated with avoidant attachment and anxious attachment, and negatively associated with prenatal attachment and dispositional mindfulness. Prenatal attachment mediated the relationship between avoidant attachment and depression, but not anxious attachment and depression. Dispositional mindfulness in general was not a significant moderator of this relationship. Dispositional mindfulness can be examined as a multidimensional construct, and the non-judging facet was found to be the only facet of dispositional mindfulness to moderate the mediation of the relationship between avoidant attachment and depressive symptoms by prenatal attachment. Results confirm the need to examine romantic and prenatal attachment and dispositional mindfulness in understanding depressive symptoms among pregnant women in Indonesia.

Keywords: depression; pregnancy; attachment; mindfulness; Indonesia.

Introduction

Depression during Pregnancy

Pregnancy can be experienced as a reward, a challenge, or stressful for a family. When planned, it often brings happiness to the pregnant person and their partner, as they will have a new family member. However, pregnancy often also comes with psychological distress that can be detrimental to well-being. Depression is one of the psychological problems that must be handled during pregnancy. Previous studies have found that many women experience symptoms of depression during pregnancy (Josefsson et al., 2001; Marcus et al., 2003; Melo et al., 2012). The prevalence of depressive symptoms among pregnant women ranges across countries: 24% of pregnant women in the U.S. (Thayer & Gildner, 2021), 28.4% of Chinese pregnant women (Zhang et al., 2020), and 18.9% of pregnant women living in urban areas in Thailand (Tuksanawes et al., 2020).

Depression is a common and significant mood disorder. Its severe symptoms impair how a person thinks, feels, and performs daily tasks, including sleeping, eating, and working (National Institute of Mental Health, 2016). Depressive disorders have common characteristics such as a sad, empty, or irritable mood, followed by somatic and cognitive changes that affect functioning (APA, 2013). Previous research has demonstrated that depression is associated with a small number of coping strategies, a lack of flexibility in strategy implementation, and a decrease in awareness or sensitivity (Joorman & Stanton, 2016). Particularly, people with depression are more likely to react to adverse outcomes with rumination, a maladaptive emotion regulation strategy characterized by passive and constant thinking about negative feelings (Aldao et al., 2010; Nolen-Hoeksema et al., 1991).

Common depressive symptoms are likely to be confused with the normal experience of pregnant women (Marcus, 2009). Previous studies (Bowen & Muhajarine, 2006; Matthey & Ross-Hamid, 2011) showed how pregnant women attributed depressive symptoms to normal physical changes of pregnancy. Atypical depressive symptoms may influence the result of general depression measurements, such as appetite gain, overeating, and oversleeping, and unspecified somatic complaints (Kammerer et al., 2011; Posternak & Zimmerman, 2001).

Depressive symptoms appear more often during the first and third trimesters of pregnancy (Marchesi et al., 2009). These circumstances suggest the need for comprehensive research on depressive symptoms in general and other factors that predict depression in pregnant women. Several factors may cause depressive symptoms in pregnant women, including previous depression, poor self-rated health, joblessness, less education, lack of support, unplanned or unintended pregnancy, complications of present or past pregnancy, and loss of pregnancy (Biaggi et al., 2016; Lancaster et al., 2010; Marcus et al., 2003).

Viewing these phenomena through a Family System lens, the impairment and suffering caused by depression affect not only pregnant women but can also affect whole families. The mother's depression-related functional disorder is likely to have a negative impact on her children (Bennett et al., 2004). Depression often goes undiagnosed and untreated (Field, 2011; Kelly et al., 2001) with critical consequences for the mother and the child, and sometimes with long-term consequences for the mother (e.g., birth complications, such as the need for a Caesarian section, preterm birth, and postpartum depression), the fetus (e.g., slower fetal heart rate), the infant (e.g., affective behaviors, bonding problems, neurocognitive deficits in the fetus, and low birth weight), and other family members (e.g., depression in fathers) (Chung et al., 2001; Gaynes et al., 2005; Hicks et al., 2018; Kinsella & Monk, 2009; Strat et al., 2011; Leigh &

Milgrom, 2008; Lefkovic et al., 2014; Martini et al., 2015; Robertson et al., 2004; Straub et al., 2012). As depression during pregnancy can lead to postpartum depression and poor newborn physical and neurocognitive developmental outcomes, there is an urgency to identify protective factors that may lessen depression during the prenatal period.

There is a clear impact of pregnancy for expectant parents on their family system relationships, both as adults and parents-to-be in a nuclear family. Related to dyadic patterns in the family system, pregnancy may cause prenatal depression not only in mothers, but also in fathers (Cameron et al., 2016; Wee et al., 2015). Conflict may arise in the family system and cause mental health problems, particularly an elevation of depressive symptoms in pregnant women, when family members keep the problem on one side and cannot distribute it around the system, or when family members avoid responsibility for problems (Watson, 2012; Westdahl et al., 2007). Depressed people's relationships with others, from an interpersonal perspective, are seen as a major contributor to the onset and persistence of their depressive symptoms (Brown & Harris, 1978; Rajhans et al., 2020). The maladaptive interactions of individuals experiencing depression with their significant others are believed to have a particularly crucial impact (Hinchcliffe et al., 1978; National Research Council, 2009). The dyadic patterns in romantic attachment between pregnant women and their partner and prenatal attachment between pregnant women and the fetus provides a framework for comprehending the dynamic patterns between family members in regulating their emotions that may cause elevated or decreased levels of depression (Bowlby, 1982; Brandon et al., 2008; Mikulincer & Shaver, 2016).

In recent years, researchers have found the importance of romantic attachment style and prenatal attachment for reducing depression in pregnant women, as pregnancy is one of the stressful life experiences that stimulates the attachment system (Brandon et al., 2008; Conde et

al., 2011; Meuti et al., 2015; Mikulincer & Shaver, 2016). This current study examines the roles that romantic attachment and prenatal attachment could play as protective or risk factors for pregnant women with depression.

The Role of Attachment

Attachment theory posits that individuals can exhibit different attachment styles, namely secure, anxious, avoidant, or disorganized. Secure attachment is characterized by a sense of trust, comfort, and confidence in relationships. Anxious attachment involves a heightened need for reassurance and fear of abandonment. Avoidant attachment is characterized by a desire for independence and difficulty in forming close emotional connections. Disorganized attachment arises when individuals exhibit both anxious and avoidant qualities, resulting in inconsistent and confused behaviors. It is important to note that a person's attachment style influences not only their relational behavior but also their ability to regulate emotions, forming a continuum ranging from anxious to avoidant, with secure attachment falling in the middle. These attachment styles are often activated or manifested during challenging or stressful situations (Bowlby, 1982; Sroufe, 2005).

Bowlby concentrated on a child's emotional bond with his or her mother and how it is disrupted by separation. Early experiences in caregiving are internalized as working models that include beliefs regarding whether support can be made accessible and how to attain it most successfully from significant others. Internal working models which are reflected in the development of attachment style, provide a model for future interactions with significant others throughout life and a set of informal rules for how individuals should respond to, express, and deal with difficult emotions (Bowlby, 1980; Bowlby, 1982). Furthermore, through her Strange Situation Procedure, Ainsworth added that the infant's involvement in the attachment process

was more than biological. The infant's involvement in affective appraisal of the mother's behaviors and sensitivity also contributes to the attachment process, by activating the attachment system's behaviors when threatened, through seeking and maintaining proximity, or by creating mental representations of their mother's behaviors (Ainsworth et al., 2015; Mikulincer et al., 2003; Mikulincer & Shaver, 2016). Proximity seeking, as part of the attachment behavior system, is an emotion regulation mechanism that protects against physical and psychological risks, and reduces stress (Mikulincer et al., 2003; Mikulincer & Shaver, 2016). Individuals tend to maintain proximity to others who may help them regulate distress. Bowlby suggested that the attachment behavioral system persists throughout life and occurs in thoughts and behaviors related to seeking support. (Bowlby, 1988).

The concept of attachment strategies has been extended into adulthood and developed as a framework for understanding adult attachment patterns (e.g., romantic attachment and other adult attachment forms) as people naturally interact emotionally with others. As a result, researchers also use the idea of adult attachment to inform depression interventions. In addition, as an interpersonal representation of attachment bonds during childhood, attachment style is a quite stable relationship between children and their primary caregiver that begins during pregnancy. The concepts of attachment have also been studied during pregnancy, especially between mothers and infants (Condon & Corkindale, 1997; Lumley, 1982; Muller, 1992; Rubin, 1976). Both adult attachment style and prenatal attachment are recognized as important factors in maternal prenatal mental health. Strengthening attachment is important in the romantic relationship with partners and with the fetus during pregnancy and with the infant in the postpartum period (Mikulincer & Florian, 1999; Priel & Besser, 1999).

The way people respond to a variety of life events is affected by their attachment style. The current study applies attachment theory to one of the most important life events in adulthood: pregnancy. Attachment theory emphasizes dyadic relationships, which benefit from being examined through the lens of the Family System (Markman & Notarius, 1987). Attachment patterns are related to family functioning patterns (Stevenson-Hinde, 1990).

Romantic Attachment

Romantic attachment, also known as adult romantic attachment, is influenced by attachment history. Romantic attachment has been defined through two independent dimensions: anxiety (the fears and worries of an individual about not being appreciated or being discarded and rejected by a partner) and avoidance (discomfort with closeness and dependence, representing an individual seeking to maintain an emotional distance from a partner) (Brennan et al., 1998; Pedro et al., 2015; Simpson & Rholes, 2019). Hazan and Shaver (1987) developed romantic attachment theory as an extension of Bowlby's attachment theory (1982) with similar attachment types (i.e., secure, avoidant, anxious/ambivalent). They suggest that adult attachment styles are like those found in childhood, and people's adult love styles are linked to their attachment styles. They focus on personal continuity, although they recognize that relationships are complex (e.g., a secure partner can be pushed to be anxious or avoidant in their relationship).

Mainly, attachment style is an internal representation of childhood attachment relationships. The internal working models of caregiving experiences since childhood persist and contribute to how adults act in relationships with others, such that attachment in childhood can predict how an individual will form relationships and emotional bonds with partners as an adult, specifically romantic attachment (Garnefski et al., 2002). People with higher levels of secure attachment are more likely to have had parents who were sensitive and responsive to their

emotional needs in their childhood, so they can develop more healthy attachment and greater emotion regulation as adults (Cassidy, 1994). Meanwhile, those with insecure attachment may not know how to regulate their emotions and may not have had attentive and responsive parents during their childhood. As adults, they are more likely to turn to destructive coping mechanisms or maladaptive emotion regulation like blaming others, self-criticism, ruminating, and exaggerating the worst-case scenario, which can lead to negative emotions such as anger and depression (Reyhani et al., 2016).

Romantic attachment is well-studied as one form of attachment; however, the link between romantic attachment and depressive symptoms during pregnancy has been the subject of relatively little investigation (Meuti et al., 2015; Rholes et al., 2011; Simpson et al., 2003; Simpson & Rholes, 2019). Related to pregnancy, romantic attachment style can be a risk and/or protective factor for depressive symptoms. As a protective factor, a secure romantic attachment may facilitate a greater ability for adaptation to the unique circumstances of pregnancy through the enhancement of emotion regulation (Reyhani et al., 2016). Meanwhile, an insecure attachment may cause depressive symptoms (Simpson et al., 2003). Individuals who experience insecure attachment tend to develop negative beliefs about themselves and others (Simpson et al., 2003).

Furthermore, romantic attachment in adults has a fundamental effect on prenatal attachment. It facilitates prenatal attachment as it shapes dyadic relationships at the earliest stages of attachment to the unborn child. Adult attachment styles influence the strength and developmental course of a pregnant women's bonding with their fetus. Secure women form a more substantial and early attachment to their fetus than insecure women. (Mikulincer & Florian, 1999). Anxious women tend to have poor bonding with the fetus. They often lack the inner tools

needed to shape this bond and may have concerns about their effectiveness in coping with the maternal role. These women obsess about their worries and depression, and they doubt their abilities. These women may have strong imaginations about the fetus, but their fear of rejection may interfere with developing a positive attachment with the fetus (Mikulincer & Florian, 1999; Shaver & Hazan, 1993). Although they show a gradual increase in prenatal attachment to the fetus every trimester, they can still rely on emotion-focused coping and have adverse mental health during pregnancy. In contrast, avoidant women who have a hard time forming close relationships and prefer distance view the fetus as a source of distress, which leads them to detachment and lowers bonding at the beginning and end of the pregnancy (Mikulincer & Florian, 1999; Rholes et al., 2011; Simpson & Rholes, 2019).

A previous study showed that secure maternal attachment improved maternal-fetal and romantic relationships, and secure attachment style protected against stress and depression in mothers who experienced premature birth (Lutkiewicz & Bidzan, 2022). However, little is known about prenatal attachment as a potential mediator of the relationship between romantic attachment and depression during pregnancy. Particularly, studies related to the role of romantic attachment style on prenatal attachment during pregnancy may contribute to the early detection of parents' and infants' mental health during pregnancy and after birth.

Prenatal Attachment

Prenatal attachment, as a feeling of love for the unborn child, is related to the future relationship of parent and child. A representation of the fetus and emotional attachment during pregnancy influences mothers' later perception of and interaction with their infants (Muller, 1996; Priel & Besser, 1999). Mothers' previous experiences during childhood and their attachment with their own parents and other caregivers lay the framework for their later prenatal

attachment during pregnancy. Mothers' early childhood memories tend to influence prenatal attachment (Siddiqui et al., 2000).

The benefits of prenatal attachment on maternal well-being are becoming more widely recognized. Understanding prenatal attachment is important as it tends to influence the mother's mental health (Colpin et al., 1998; Condon & Corkindale, 1997; Priel & Besser, 1999). Prenatal attachment, which usually begins during week 18 to week 25, has a significant relationship with prenatal depression. Prenatal attachment is known to be a protective factor preventing or lessening depression and it can enhance pregnant women's self-esteem and feeling of competence (Goecke et al., 2012; Priel & Besser, 1999; Scharfe, 2007). Based on the above studies, as romantic attachment in pregnant women tends to affect both prenatal attachment and depressive symptoms, prenatal attachment might play a mediating role in the relationship between romantic attachment and depressive symptoms.

Dispositional Mindfulness

Broadly speaking, mindfulness is the ability to shift awareness to the present moment, through paying attention intentionally and in a non-judgmental way (Kabat-Zinn, 2003). Dispositional mindfulness is the ability to act with awareness, observe, describe one's thoughts and feelings, be non-reactive, and nonjudgmental of one's thoughts and feelings (Baer et al., 2006). Dispositional mindfulness tends to be relatively stable across time independent of intervention, e.g., mindfulness meditation training (Baer et al., 2008; Brown & Ryan, 2003). Recent research confirms that individuals with greater dispositional mindfulness will tend to be mindful in daily life even without any prior intervention or meditation practices (Parent et al., 2016).

Mindfulness can be automatically stimulated by any life event, including becoming pregnant. Individuals may have various responses to their pregnancy experiences. In this situation, mindfulness can manifest as the ability to pay attention, make connections, and build attachment to their baby in the womb. The ability to view their pregnancy mindfully as a transformative phase in their life can serve as a protective factor in relation to stressful events during pregnancy. From the Family Systems perspective, mindfulness influences interpersonal interactions, particularly those that arise within the family system. Dispositional mindfulness that lies within the individual in the subsystem can affect the functioning of others in the subsystem (Parent et al., 2016). Mindfulness that is mainly focused on individual functioning may also impact the relational level in the subsystem (e.g., pregnant couples, mother-fetus). Pregnant women's dispositional mindfulness may also affect the functioning of their partners and vice versa. Kabat-Zinn (2013) implied that mindfulness strengthens interpersonal relationships indirectly through self-compassion, which in turn contributes to more positive reactions to others.

Mindfulness has been shown to moderate adult romantic attachment and symptoms of depression, although we are not aware of any studies that have been conducted with pregnant women that assess all these constructs simultaneously. Davis et al. (2016) found that mindfulness moderated the relationship between insecure attachment and well-being significantly. Mindfulness diminished the effect of insecure attachment on depression, anxiety, and stress. Mindfulness is related to a decreased reliance on maladaptive emotion regulation (e.g., rumination) that can cause a diminished physical and emotional response to high-stress stimuli, anxiety, and depression (Desrosiers et al., 2013; Hill & Updegraff, 2012). Through mindfulness, individuals may have more flexible thoughts, emotions, and behaviors when facing threatening

situations, greater tolerance for unpleasant feelings, and less use of suppression as a way of emotion regulation (Baer, 2006; Bishop et al., 2004; McDonald et al., 2021).

Mindfulness skills allow people to pay more attention to relationships, allowing them to let go of distressing stories and relate in new ways to others (Nauman, 2014). Mindfulness reduces the urge to judge and describe things as good or bad. Therefore, mindfulness has the potential to reduce the activation of working models that are primed by threat feelings. Mindfulness lets individuals be more aware of the present moment intentionally, allowing them to pause before reacting automatically and better understand their automatic reactions, and reduce anxiety and stress involved with rejection or criticism (Cordon & Finney, 2008). Under the Family System perspective, disagreements within a relationship become more constructive. When a couple has the tendency to be mindful, they can take on new perspectives and concentrate on possible solutions.

Dispositional mindfulness is also protective for prenatal attachment among expectant couples. The ability to be mindful may help parents pay more attention to their unborn baby, resulting in increased feelings of bonding during pregnancy. Mindfulness moderates the relationship between depression and attachment, as higher levels of mindfulness were associated with a decrease in depressive symptoms and an increase in quality of prenatal bonding (Hicks, Dayton, Brown, et al., 2018). This early bonding can then serve as a protective factor for developmental outcomes for children throughout their lives (Huth-Bocks et al., 2004).

Dispositional mindfulness is inversely related to depressive symptoms in pregnant women (Hicks, Dayton, & Victor, 2018; Hicks, Dayton, Brown, et al., 2018; Krusche et al., 2019; Nyklíček et al., 2018; Pereira et al., 2016). Mindfulness reduces the risk of depression by redirecting focus away from ruminative thought patterns (Heeren et al., 2009). A longitudinal

study by Nyklíček et al. (2018) found that two mindfulness skills (acting with awareness and non-judging) correlated with less depressive symptoms at 22 weeks. Pereira et al. (2016) added that four mindfulness traits (non-judging of experience, acting with awareness, observing, and describing) are protective predictors of lower depression in pregnant women. Together with trauma symptoms, less dispositional mindfulness predicts depressive symptoms in expectant couples (Hicks, Dayton, & Victor, 2018).

In summary, within the family system, mindfulness may influence interpersonal interactions that occur. In terms of expectant couples, dispositional mindfulness may be expected to affect their interactions in developing a secure attachment that can impact their relationship and affect bonding to their fetus and mental health outcomes. By fostering less negative reactivity and less judging in interactions, dispositional mindfulness may affect the dynamic of couples' relationships for the better. Also, by improving their ability to act with awareness and mindfully observe the movement and the growth of the fetus, dispositional mindfulness may facilitate prenatal attachment as pregnant women become more aware of their fetus, which then can promote positive feelings and potentially contribute to reductions in depression during pregnancy.

Indonesia's Cultural Context for Pregnant Women

Indonesia is well known for its collectivist culture, where there is a high caring between individuals in a group (Hofstede, 1991). It is a developing country where the nuclear family usually lives with their extended family. Each family member is part of a broader family system. The problems that cause depression in pregnant women in Indonesia are more complicated as they live with this extended family which plays a role in the household's decisions. Many factors influence pregnant women's stress and depression in Indonesia, such as low education, low

income, unplanned pregnancy, family conflict, lack of social support, lack of spiritual well-being, and stressors from the environment (Dira & Wahyuni, 2016; Handayani & Fourianalistyawati, 2018; Wahyuni et al., 2014).

Considering the Family Systems framework, it is important to assess romantic attachment between pregnant women and their husbands in Indonesia. By strengthening romantic attachment in the couple, they can work as a team in navigating complex interactions with their extended family, which tend to play an important role in women's decision making during their pregnancy, childbirth, and the postpartum period (Aryastami & Mubasyiroh, 2019; Beegle et al., 2001; Lestari & Agustina, 2018). However, there has been no research related to romantic attachment in the pregnant couple in Indonesia. Most of the studies focus on husbands' support for pregnant women. Previous studies in Indonesia suggested that lack of spousal support is associated with depression during pregnancy (Russiska et al., 2020) and after birth (Winarni et al., 2018). Hence, there is an impetus to assess how romantic attachment plays a role in pregnant women's depression.

In short, the culturally specific circumstances for pregnant women in Indonesia indicate the need for comprehensive research on how best to support pregnant women and their partners, considering the role of extended family during the pregnancy. Pregnant couples need an integrative approach to depression prevention that is culturally sensitive to Indonesian families.

The Present Study

During pregnancy, women are facing major physical and psychological adjustments, as well as potential changes in their romantic relationships with their partners that present vulnerabilities. Pregnancy can be considered a stressful life event that activates the attachment system. Pregnant women with more secure attachment may have little difficulty with the

adjustment, while those with more insecure attachment may develop negative working models toward their partners that can negatively influence the way they regulate emotions, maladaptively placing them at increased risk of depression (Bowlby, 1982; Mikulincer & Florian, 1999). Moreover, romantic attachment is also related to and influences prenatal attachment that not only reflects the quality of the caregiving system (Mikulincer & Florian, 1999; Ponti et al., 2020), but can also serve as a risk or protective factor for prenatal and postpartum depression. Dispositional mindfulness may influence these relationships, impacting both the direct effect of romantic attachment on depressive symptoms, and the indirect effect of romantic attachment on depressive symptoms through prenatal attachment.

The present study is designed to explore the possible role of romantic attachment style, particularly avoidant and anxious attachment, in depressive symptoms among pregnant women. This study is also intended to test prenatal attachment as a mediator of the relationship between romantic attachment style and depressive symptoms among pregnant women living in Indonesia's cultural context. It is hypothesized that prenatal attachment will mediate the relationship between romantic attachment style and depression in pregnant women. Further, it is expected that dispositional mindfulness will moderate this mediation relationship. Specifically, this study hypothesized the following interrelationships in a sample of Indonesian pregnant women:

Hypothesis 1: Both anxious and avoidant styles of romantic attachment will be negatively related to prenatal attachment.

Hypothesis 2: Both anxious and avoidant styles of romantic attachment will be positively related to depressive symptoms during pregnancy.

Hypothesis 3: Prenatal attachment will be negatively related to depressive symptoms during pregnancy.

Hypothesis 4: Prenatal attachment will mediate the relation between both anxious and avoidant styles of romantic attachment and depressive symptoms during pregnancy.

Hypothesis 5: Dispositional mindfulness will moderate both the direct link between romantic attachment and depressive symptoms, and the indirect link through prenatal attachment (with more beneficial relations when dispositional mindfulness is higher). (See Figure 2.1).

Proposed Model of Study 1

The proposed model (Model 15; Hayes, 2022) is illustrated in Figure 2.1.

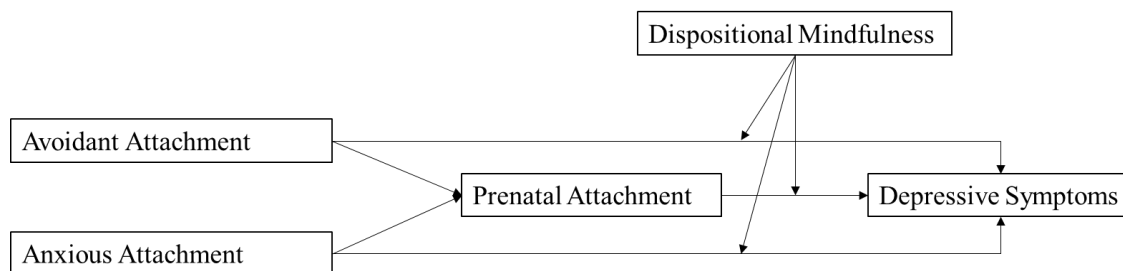


Figure 2.1. Proposed model of the roles and interrelationships of romantic attachment style, prenatal attachment, and mindfulness in the course of depressive symptoms in pregnant women.

In this model, direct and indirect effects of both anxious and avoidant styles of romantic attachment on prenatal depression via prenatal attachment are moderated by dispositional mindfulness. Ultimately, the relationship between the mediating and moderating variables determines the effect of the independent variable on the dependent variable.

Methods

Participants

There are established strategies for determining the sample size needed for the current study. If the exact number of the population is unknown, we can calculate sample size using

G*power software (Faul et al., 2007). Based on meta-analytic research on the effects of attachment anxiety and attachment avoidance on depressive symptoms by Zheng et al. (2020), we can use a medium effect size $f^2 = .08$, with power of a .95, that indicates a sample needed of $N = 197$. Alternatively, as the number of the population is known, we can use the Raosoft® Sample size calculator to estimate the sample size needed that reflects the target population as precisely as possible, with a 95% confidence level and 5% margin of error. The population of Indonesian pregnant women from age category of 15-19 to 35-39 from the latest national report of Basic Health Research (Riskesdas) from the Indonesian Ministry of Health's table on the proportion of pregnant women is $N = 126,822$ (2018). Thus, the minimum sample size needed for this study was established as $N = 383$. As a conservative estimate, we elected the higher sample size as the minimum targeted enrollment goal for the study, with ample power to detect a medium effect size.

The inclusion criteria were pregnant people who identified as women who speak Indonesian from different areas in Indonesia. This study limited the age range of 18 – 40 as this is the range for a normal and healthy pregnancy in general. Participants were required to be at least at ten weeks gestation as research shows that pregnant women develop prenatal attachment as early as ten weeks gestation (Caccia et al., 1991). The exclusion criteria were pregnant people who: a) refused to provide informed consent, b) were under 18 years or more than 40 years of age, or c) less than ten weeks of pregnancy. The study was deemed exempt by the University of Wisconsin-Madison IRB, #2021-1344.

A total of $N = 504$ pregnant women completed an online survey administered via Qualtrics. The researcher used two item distractors as a validity check to determine whether the participants read and responded to the questions consistently. Based on these item screeners, $n =$

427 participants were retained to include in data analysis with a mean age of 27.71 years ($SD = 4.071$), and $n = 403$ (94.39%) falling in the age range of 18–35 years.

The average gestational age was 25.77 weeks ($SD = 7.93$). Most pregnant women identified as Javanese (62.8%), had domicile in Java (76.8%), lived in their own home (39.6), and 51.5% lived only with nuclear family. 74.5% of pregnant women had a college or undergraduate degree or higher and were employed either full-time, part-time, or were self-employed (40.3%). Nearly half of women (48.9%) were experiencing their first pregnancy and 65.1% of them planned the pregnancy. Full demographic characteristics of the pregnant women are provided in Table 2.1.

Procedure

Participants were recruited using social media platforms, such as Facebook and Instagram. The study also recruited participants through email, motherhood forums, and other clinical practices. Interested pregnant people were screened for inclusion and exclusion criteria. Participants with a range of social economic status were recruited. This study collected electronic documentation of consent using the text of a full informed consent document. Eligible participants completed the demographic data questions and self-report questionnaires.

Measures

Regarding the scales used, this study adopted the cultural adaptation steps suggested by Beaton et al. (2000), particularly in applying the translation-back translation technique to guarantee that each item on the Indonesian scales had the same meaning as the original English-language version. Related to expert judgment, four professionals in the field of psychology with graduate level degrees were asked to determine the Indonesian compatibility of the translation and back translation results, particularly for some idioms.

Edinburgh postpartum depression scale (EPDS). The EPDS is a 10-item self-report questionnaire designed to assess depressive symptoms over the past two weeks during the perinatal stage (Cox et al., 1987). The questions are focused on feelings (e.g., happiness, sadness, and self-blame). The scores range from 0 to 30 on a 4-point Likert scale, and a higher score indicates higher depressive symptom severity. Items emphasize cognitive and affective symptoms of depression while de-emphasizing somatic symptoms that are common in pregnancy. A score of ten or higher indicates depressive symptoms that may indicate clinical levels of depression (Cox et al., 1987; Levis, et al., 2020). Reliability is relatively high in validation studies ($\alpha = .80$; Eberhard-Gran et al., 2001). This scale also generated good internal reliability in Indonesia ($\alpha = .834$; Fourianalistyawati et al., 2018). The Cronbach's alpha for EPDS in this study was calculated as $\alpha = .811$.

The Experiences in Close Relationship – Short Form (ECR - S). The ECR-S consists of a 12-item self-report questionnaire designed to measure romantic attachment style, divided into six items for the anxiety-related dimension and six items for the avoidance-related dimension (Wei et al., 2007). The anxiety dimension assesses concern for relationships, mainly the partner's availability to provide support, fear of rejection, or abandonment (the constructs are fear of interpersonal rejection or abandonment, an excessive need for approval from others, and distress when one's partner is unavailable or unresponsive). The dimension of avoidance assesses the difficulty and inconvenience of approaching and relying on others (the constructs are fear of interpersonal intimacy or closeness, reluctance to depend on others or excessive need for self-reliance, and reluctance to self-disclosure; Wei et al., 2007). The internal consistency for the ECR-S is good ($\alpha = .78$ for Anxiety and $\alpha = .84$ Avoidance; Wei et al., 2007). The Cronbach's alpha for the ECR-S in this study was calculated as $\alpha = .644$. Specifically, the coefficient alphas

were 0.65 for Avoidance and 0.55 for Anxiety for the ECR-S in this study. Although lower than the original version, the coefficient alphas in this study were still in the moderate range and acceptable (Hinton et al., 2014; Taber, 2018).

Maternal Antenatal Attachment Scale (MAAS). The MAAS consists of a 19-item self-report measure that assesses the dimension of quality of attachment, including closeness or distance, positive or negative feeling, and tenderness or irritation towards the fetus, and the dimension of intensity or time spent in the attachment with the fetus, over the past two weeks (Condon, 2015). The scores are rated on a 5-point Likert scale, ranging from: 1 (low attachment) to 5 (high attachment). The total scores ranging from 19 to 95 with higher score indicating stronger attachment. Reliability is relatively high in validation studies ($\alpha = .81$; Hicks, Dayton, Brown et al., 2018). The Cronbach's alpha for MAAS in this study was calculated as $\alpha = .79$.

Five Facet Mindfulness Questionnaire – Short Form (FFMQ - SF). The FFMQ-SF consists of 15 self-report items selected based on factor loadings of the long form of the FFMQ (39 items), selected by Baer et al. (2008). The FFMQ-SF assesses the same five core aspects of mindfulness as the long form: 1) observing; 2) describing; 3) acting with awareness; 4) non-judging of inner experience; and 5) non-reacting to inner experience (Baer et al., 2008). The scores are rated on a 5-point Likert scale, ranging from: 1 (never or very rarely true) to 5 (very often or always true). Based on a psychometric test by Gu et al. (2016), the factor structure of the FFMQ-SF was like the original FFMQ with 39 items, and that total facet scores of the short and long forms had strong relationships. Although the internal consistency for the FFMQ-SF is lower (ranging from .69 to .83 with three items for each facet) than the FFMQ long form (ranging from .82 to .90), it shows that the constructs measured by both versions of the FFMQ were very comparable (Gu et al., 2016). The Cronbach's alpha for the full FFMQ-SF scale in this study was

calculated as $\alpha = .817$. Cronbach's alpha for each facet in this study was calculated as follows: $\alpha = .52$ for observing, $\alpha = .42$ for describing, $\alpha = .60$ for acting with awareness, $\alpha = .76$ for non-judging, and $\alpha = .59$ for non-reactivity.

Covariates. In terms of the demographic variables used as covariates in this study, we assessed whether pregnant women lived with extended family or not, and then asked them to rank the level of support they perceived from the family who lived with them, from the highest to the lowest. Furthermore, pregnant women were asked a yes/no question regarding whether they currently owned their home.

Data Analyses

All analyses conducted to test hypotheses used R software. Methods for testing hypotheses included analyses of descriptive statistics and regression using PROCESS for R Version 4.1.1. (Hayes, 2022). PROCESS computes observed variable path analysis-based moderation, mediation, and conditional process analysis. PROCESS estimates model coefficients, standard errors, t- and p-values, and confidence intervals using OLS regression. PROCESS can build indirect effect percentile bootstrap and Monte Carlo confidence intervals and probe two- and three-way interactions. Mediation models can use parallel, series, or mixes of parallel and series mediator variables (Hayes, 2022). Before analysis, unfinished or incomplete surveys, along with participants who did not answer correctly on distractor items, were excluded from the analysis ($n = 74$) yielding a sample size for analysis of $n = 427$.

The PROCESS models were conducted for the two forms of romantic attachment: anxious and avoidant, however each model included the other form of attachment as a covariate (i.e., the anxious model include avoidant as a covariate and vice versa). Specifically, to test the model 15, PROCESS with the bootstrapping method was used to determine the significance of

the indirect mediated effects moderated by dispositional mindfulness, and to get robust standard errors for parameter estimation as suggested by Hayes (2022). The level of confidence for all confidence intervals in the output was 95%, with a total of 10,000 bootstraps for percentile bootstrap confidence intervals. An index of moderated mediation was used to test the significance of moderated mediation, with significant effects supported by the absence of zero within the confidence intervals.

Results

Demographics for the study sample are reported in Table 2.1. Means, SDs, and correlations are reported in Table 2.2. Depressive symptoms differed significantly by pregnancy week ($t(425) = 2.013, p = .045$), perceived level of partners support ($t(421) = 3.850, p < .001$), and home ownership ($t(425) = 2.270, p = .024$), indicating that pregnant women earlier in their pregnancy, who perceived less support from their husbands, and who did not own their own home reported higher levels of depressive symptoms.

Pregnant women who had pregnancy experience in the past ($t(425) = 2.258, p = .024$) or perceived less support from their partner ($t(421) = 3.503, p = .001$) reported higher avoidant attachment. Pregnant women reported higher levels of anxious attachment when they had a high school education background or below ($t(425) = 2.653, p = .008$) or perceived less support from their husbands ($t(421) = .538, p = .006$).

Pregnant women who had been together with their partners for five years and less, ($t(425) = 3.948, p < .001$), perceived high levels of support from their partner ($t(421) = 2.654, p = .008$), received the highest total support from all family members at home ($t(425) = 2.974, p = .003$), or practiced health behaviors ($t(425) = 2.416, p = .016$), also reported higher levels of prenatal attachment than those who had been with their partners longer, practiced fewer health behaviors,

or perceived less support from their partner or other family members. Lastly, pregnant women who report practicing health behaviors ($t(425) = 3.207, p = .001$) had higher dispositional mindfulness compared to those who did not. In addition, there was a negative correlation between age and anxious attachment ($r = -.19, p < .01$), such that younger women were more anxiously attached.

Relationship between romantic attachment and prenatal attachment

Anxious attachment was not significantly associated with prenatal attachment ($b = -.08, SE = .07, p = .27, 95\% CI [-.21, 0.06]$), while avoidant attachment was negatively associated with prenatal attachment ($b = -.41, SE = .08, p < .001, 95\% CI [-.57, -.25]$), after controlling for home ownership and perceived level of partner support. Pregnant women who reported higher avoidant attachment reported lower prenatal attachment.

Relationship between romantic attachment and depressive symptoms

Both anxious and avoidant attachment were positively associated with depressive symptoms, ($b = .34, SE = .04, p < .001, 95\% CI [.00, .26]$) and ($b = .15, SE = .05, p < .001, 95\% CI [.06, .24]$) respectively, after controlling for home ownership and perceived level of partner support. Pregnant women who reported higher avoidant and anxious attachment reported higher depressive symptoms.

Relationship between prenatal attachment and depressive symptoms

Prenatal attachment was negatively associated with depressive symptoms ($b = -.08, SE = .03, p < .001, 95\% CI [-.14, -.03]$), after controlling for home ownership and perceived level of partner support, such that pregnant women who reported higher prenatal attachment, reported lower depressive symptoms.

Prenatal Attachment as a Mediator

The current study also assessed the mediating role of prenatal attachment in the relationship between insecure (anxious and avoidant) attachment and depressive symptoms. Results of the PROCESS analysis for Hypothesis 4 on indirect effects revealed that after controlling for avoidant attachment, home ownership, and perceived of partner support, prenatal attachment did not significantly mediate the relationship between anxious romantic attachment and depressive symptom ($B = .009$, $SE = .013$, 95% CI [$-.012$, $.038$]).

Meanwhile, prenatal attachment significantly mediated the relationship between avoidant romantic attachment and depressive symptoms after controlling for anxious attachment, home ownership, and perceived partner support ($B = .045$, $SE = .015$, 95% CI [$.020$, $.087$]). Furthermore, the direct effect of avoidant attachment on depressive symptoms after controlling for prenatal attachment was significant ($B = .204$, $SE = .045$, $p < .001$). Hence, prenatal attachment partially mediated the relationship between avoidant attachment and depressive symptoms. A summary of the mediation analysis is presented in Figures 2.2 and 2.3.

Dispositional Mindfulness as a Moderator

The results of the moderated mediation analysis testing Hypothesis 5 revealed that a bootstrap confidence interval for the index of moderation of mediation included zero for both avoidant attachment and anxious attachment, indicating that there was no evidence of a moderated mediation for anxious attachment (Index = $-.00$, $SE = .00$, 95% CI [$-.00$, $.00$]) or avoidant attachment (Index = $-.00$, $SE = .00$, 95% CI [$-.01$, $.00$]). Dispositional mindfulness did not significantly moderate the direct relationship between anxious attachment and depressive symptoms ($\Delta R^2 = .00$, $p = .99$), or indirect relationship ($\Delta R^2 = .00$, $p = .18$) between anxious attachment and depressive symptoms via prenatal attachment. Dispositional mindfulness also did not significantly moderate the direct effect between avoidant attachment and depressive

symptoms ($\Delta R^2 = .00, p = .35$) or the indirect relationship ($\Delta R^2 = .00, p = .14$) between avoidant attachment and depressive symptoms via prenatal attachment. A summary of these analyses is presented in Figure 2.4 and Table 2.10, and in Figure 2.5 and Table 2.11, respectively.

As dispositional mindfulness can be measured as a multidimensional construct, additional exploratory, post-hoc analysis of its five constituent facets was conducted. Out of the analyses for all five facets, results revealed a significant effect for non-judging, that did not include zero within the CI (index = $-.01, SE = .00, 95\% CI [-.02, -.00]$). Specifically, the non-judging facet significantly moderated the indirect ($\Delta R^2 = 0.01, p < 0.001$) but not direct relationship ($\Delta R^2 = 0.00, p = .94$) between avoidant attachment and depressive symptoms via prenatal attachment. The conditional indirect effect was strongest for those lower in non-judging ($-1 SD; B = .0546, SE = .017, 95\% CI [.025, .09]$) and weakest in those high in non-judging ($+1 SD; B = .01, SE = .017, 95\% CI [-.025, .043]$). A summary of the moderated mediation analysis of the non-judging facet on avoidant attachment is presented in Figure 2.6 and Table 2.12.

Discussion

This study examined how avoidant and anxious attachment, the two main types of insecure romantic attachment style, might be related to depression in pregnant women in Indonesia. Additionally, prenatal attachment was examined as a mediator of the relation between romantic attachment style and depressive symptoms in Indonesian pregnant women. This study also examined how dispositional mindfulness may buffer the mediation relationships mentioned above. As hypothesized, significant relations were found between avoidant attachment, anxious attachment, prenatal attachment, and depressive symptoms in pregnant women. Prenatal attachment also mediated the relationship between avoidant attachment and depressive symptoms as expected, but it did not mediate the relationship between anxious attachment and

depressive symptoms. Overall dispositional mindfulness did not serve as a moderator of either the direct association between romantic attachment and depressive symptoms or the indirect relationship between attachment and depressive symptoms via prenatal attachment. However, the non-judging facet of dispositional mindfulness was found to significantly moderated the indirect relationship between avoidant attachment and depressive symptoms through prenatal attachment. This suggests that individuals with lower levels of non-judging experienced a stronger indirect effect, meaning that their avoidant attachment had a more pronounced influence on depressive symptoms through prenatal attachment. On the other hand, individuals with higher levels of non-judging exhibited a weaker indirect effect, implying that their non-judgmental attitude buffered the impact of avoidant attachment on depressive symptoms through prenatal attachment. Overall, the findings emphasize the multifaceted relationships that exist between romantic attachment style, prenatal attachment, dispositional mindfulness, and depressive symptoms, and the potential importance of examining specific aspects of the multidimensional construct of mindfulness.

Romantic attachment plays an acknowledged role in pregnant women's mental health. The positive association between insecure attachment (anxious and avoidant attachment) and depressive symptoms in this study is in line with theory and previous studies. Poor romantic attachment is an essential risk factor for pregnant women with depression (Desrosiers et al., 2014; Meuti et al., 2015). This study suggests that a difficult life change like the transition to motherhood and a high level of insecure attachment is associated with depression. Based on theory, stress activates the attachment system, which in turn triggers behaviors such as attachment seeking or distancing in reaction to increasing emotional distress (Feeney, et al., 2003). Bowlby (1980) stated that anxiously attached people would be susceptible to depression during stressful occurrences as they tend to be overly sensitive to perceived threats to the self and

excessive rumination. In contrast, avoidantly attached people were more likely to experience discomfort with intimacy and develop more depression symptoms during pregnancy as they inhibit emotions defensively through denial or distortion (Brennan et al., 1998; Cassidy, 1994, Desrosiers et al., 2014; Rholes et al., 2006).

Little, if any, research has been published regarding the relationship between romantic attachment and depression in pregnant Indonesian women. Previous studies have only focused on the association between relationship quality, lack of social support from partners, and depression in pregnant women in Indonesia (Fitriani et al., 2019; Russiska et al., 2020). This study has important implications for future work with pregnant women in Indonesia with avoidant and anxious attachment regarding their vulnerability to depressive symptoms. Particularly, women with an insecure attachment style may have a greater chance of developing prenatal and postnatal depression (Bianciardi et al., 2020; Goecke et al., 2012).

Women who are securely attached to their partners during pregnancy are more likely to create a good prenatal attachment with the baby, protect it, and meet its needs. Pregnant women with insecure attachment (anxious and avoidant) can have a lower quality prenatal attachment and a less positive feeling toward their fetus (Mazzeschi et al., 2015; Ponti et al., 2020). Our findings show a negative correlation between avoidant romantic attachment and prenatal attachment (global attachment, attachment quality, and intensity to preoccupy), with only global attachment and attachment quality having a correlation with anxious attachment. There was no association between anxious attachment and prenatal attachment in the model. Only avoidant attachment had a negative association with prenatal attachment, which means that women who reported avoidant attachment relationships had a lower proportion of positive and warm feelings and a lower intensity of preoccupation for their unborn children.

It is likely that avoidantly attached women saw the fetus as a source of distress. They have trouble building deep relationships and prefer distance, which detaches them and reduces bonding at the beginning and end of pregnancy (Mikulincer & Florian, 1999; Rholes et al., 2011; Simpson & Rholes, 2019). Meanwhile, the lack of significant association between anxious attachment and prenatal attachment in this study contrasts with previous results that showed that pregnant women with anxious attachment tended to have the same level of prenatal attachment as securely attached pregnant women (Mikulincer & Florian, 1999). A possible reason is that they have overcome the anxiety of harm or loss and the ambivalence of attaching to the fetus during early pregnancy (Condon, 1993; Göbel et al., 2019; Mikulincer & Florian, 1999).

Prenatal attachment in this study was found to have a negative association with depressive symptoms. This result appears to be consistent with previous studies showing such associations (Goecke et al., 2012; Napoli et al., 2020; Rollè et al., 2020; Zhang, Wang, Cui, et al., 2021). Goecke et al. (2012) showed an association between increased prenatal attachment and decreased depression score at three times: during pregnancy, and at 3 and 6 weeks postpartum. Thus, these findings have important implications for developing studies that focus on improving prenatal attachment in pregnant women.

In the cross-sectional PROCESS analysis in this study, results revealed a partial mediation effect of prenatal attachment in the relationship between avoidant attachment and depressive symptoms, while no such effect was found for anxious attachment. The findings suggest that a lower level of avoidant attachment was associated with higher levels of prenatal attachment, partially accounting for when lower levels of depressive symptoms were observed among pregnant women. Few studies demonstrate the relationship between these variables, with

the direct and indirect associations varying based on the aim of the study (Røhder et al., 2020; Walsh et al., 2014; Zhang, Wang, Yuan, et al., 2021).

A previous study showed a possible bidirectional relationship, specifically between prenatal attachment and depression (Hicks et al., 2018). This suggests the possibility of testing the relationship in the opposite direction. However, this study focuses primarily on the effect of romantic attachment on prenatal depression as mediated through prenatal attachment to explore the possibility of targeting well-being through a family systems approach to attachment among pregnant women, given that romantic attachment exists prior to the prenatal attachment in each pregnancy. In addition, targeting prenatal depression through an attachment approach may allow for preventing emotional regulation problems in parents and prevent children from developing behavioral problems that may be caused by struggling to regulate their emotions (Raskin et al., 2016).

Dispositional mindfulness did not moderate the indirect relationships between avoidant or anxious attachment with depressive symptoms via prenatal attachment. When the individual facets of mindfulness were examined, only the non-judging facet significantly moderated the indirect relationship between avoidant attachment relationship and depressive symptoms via prenatal attachment. This moderated mediation result revealed that the indirect effect of avoidant attachment on depressive symptoms through prenatal attachment is more pronounced at a lower level of non-judging. This result is in line with the previous studies, which revealed a correlation between non-judging and fewer depressive symptoms (Nyklíček et al., 2018; Pereira et al., 2016). It is not surprising that non-judging has benefits, as accepting thoughts and feelings is a necessary step in non-judging (Baer et al., 2006). Negative self-judgments, which are linked to sad moods, can be avoided by accepting thoughts and feelings as they are (Nyklíček et al., 2018).

A previous study demonstrated that non-judging moderated the relationship between non-spontaneous delivery and more negative childbirth perceptions, and that a higher non-judging score in women with non-spontaneous delivery was not associated with a more negative childbirth experience (Hulsbosch et al., 2020). Based on the significant findings related to the non-judging facet of mindfulness in the current study, it can be inferred that mothers' capacity to accept their thoughts and feelings without judgment, and to establish a strong attachment with their baby, may potentially serve as protective factors in mitigating depressive symptoms. These results must be interpreted with caution given the lack of overall effect of dispositional mindfulness and that only one of the five facets was significant, yet the correlation results offer some confidence in the findings.

Furthermore, anxious attachment had a significant inverse relationship with all five facets and the total score of dispositional mindfulness. The correlation results of this study also showed dispositional mindfulness, both as a whole and in some facets, was inversely related with depressive symptoms and positively associated with prenatal attachment among pregnant women. Although dispositional mindfulness did not function as an overall moderator of the mediation model as anticipated, when elaborating on the correlation result, our results still suggest a potentially important role for mindfulness as a protective factor in relation to depression. Considering the limitation of using a self-report measure of mindfulness in this study, future studies may adopt a mindfulness-based intervention (MBI) as a more direct and powerful way to test the benefits of mindfulness for supporting these protective factors. The result may indicate the importance of MBIs for reducing the adverse effects commonly related to insecure attachment and depressive symptoms, and to improve prenatal attachment between mothers and the fetus.

These results represent an area for future investigation and longitudinal research in the pregnancy context to determine the specific contribution of mindfulness to depression. Particularly, mindfulness may decrease rumination, a maladaptive emotion regulation strategy, and anxiety in pregnant women with anxious attachment as pregnancy can activate the attachment system (McDonald et al., 2021), and it may increase the involvement of those with avoidant attachment (Mikulincer & Shaver, 2012).

Demographics and cultural context. Given that this is a relatively new area of study in Indonesia, we also used demographic assessments to compare our sample to prior work conducted in the field. In the current study, a relationship between prenatal attachment and gestational age was demonstrated. This finding backs up the findings of other studies (Camarneiro & Justo, 2017; Mazzeschi et al., 2015; Della Vedova et al., 2008) that showed an increase in prenatal attachment throughout pregnancy, corresponding to increased gestational weeks. In accordance with prior research (Camarneiro & de Miranda Justo, 2017; Laxton-Kane & Slade, 2002), we also discovered a negative relationship between the age of pregnant women and their prenatal attachment, suggesting that older women were both less positive and less preoccupied with their unborn children compared to younger women. This result is consistent with that of Berryman and Windridge (1996), who found that pregnant women whose age exceeds 35 have lower prenatal attachment scores compared to those aged 20–29. Specifically, the correlation between mothers' age and intensity of preoccupation in this study was stronger than attachment quality. This may reflect the fact that younger pregnant women may place more value on pregnancy in terms of role accomplishment (Damato, 2004). Previous research in Indonesia on related demographic data supports this finding (Lestari, 2019; Sukriani & Suryaningsih, 2018).

Meanwhile, there was no relationship found between depressive symptoms and the other demographic data (i.e., participants' level of education, domicile, employee status, living in a nuclear or extended family, income, experience in pregnancy, mothers' age, planned and unplanned pregnancy, health practices, and previous miscarriage). This non-significant result of the relationship between living in a nuclear or extended family and depressive symptoms can be explained by the previous study of Ansion and Merali (2018), who found that families negotiated and increased nuclear family cohesion in the absence of extended family in the childrearing process. Another possible explanation for these results may be the lack of adequate participants who represent pregnant women from every region in Indonesia. Most participants reside in towns, which may have adopted more individualistic societies than people who live in rural areas. In general, the similar backgrounds of the pregnant women sampled in our study may have contributed to the non-significant result showing no relationship with depressive symptoms.

A previous study showed that lack of support from husbands was associated with depression in Indonesian pregnant women (Russiska et al., 2020). This study observed consistent results, which found that pregnant women who perceived their husbands' support as the highest among other family members at home had fewer scores of depressive symptoms compared to those who evaluated their husbands as less supportive. Further analyses on demographic data in this study also found that pregnant women who owned their home had fewer depressive symptoms compared to those who did not ($t(425) = 2.270, p = .024$). The proportion of the sample made up of the group of pregnant women who did not own their home was higher (60.4%; $n = 258$) compared to those who did (39.6%; $n = 169$). This result was in line with a previous study by Hein et al. (2014), who found residential property status as one of the predictive factors for EPDS depression scores in their study on socioeconomic status and

depression during and after pregnancy. Another study from Szabo et al. (2018) also supported this finding on home ownership, as a reflection of better economic and living standards were linked with higher psychological outcomes such as decreased levels of depressive symptoms and higher levels of quality of life.

Related to the FFMQ-SF as measurement tool for dispositional mindfulness, despite the total Cronbach's alpha for the full scale of FFMQ-SF in this study being good ($\alpha = .88$), the alpha for the describing facet was quite low ($\alpha = .42$). Psychometric studies need to be done on this questionnaire to find out if it is sensitive to different cultures and to test whether certain questions do not work well in an Indonesian setting. Also, it is possible that the cultural setting of Indonesia, which is different from where the FFMQ-SF was developed (Gu et al., 2016), was the reason why the FFMQ-SF in this study was less reliable than the original measure. Previous research (Karl et al., 2021; Kirmayer, 2015) shows that both the theory and the practice of mindfulness need to be reframed based on the cultural backgrounds of the people involved.

In Indonesia, mindfulness may have various linguistic and cultural manifestations based on Indigenous perspectives. Each tribe has its own unique beliefs and customs, which can be incorporated in some way into the mindfulness concept. "Kawruh jiwa" is a concept from the Javanese cultural heritage that aligns with the concept of mindfulness. Ki Ageng Suryomentaram (1978) developed kawruh jiwa, a knowledge about feelings in Javanese culture. Individuals can effectively communicate with and comprehend others when they are aware of their own feelings. This concept is characterized by accepting things as they are, with awareness, without judging, and giving more (Rifani, 2019). The values of kawruh jiwa are somewhat like the five dimensions of mindfulness described by Baer (2008); for example, "nyawang karep" relates to the observing the aspect of mindfulness, which involves observing the desire and capturing the

process without judgment (Finayanti & Anggriana, 2021). Thus, future Indigenous studies expanding the concept of mindfulness based on Indonesian culture may enrich mindfulness theory and practice.

Limitations and future directions

The generalizability of these results is subject to certain limitations. The cross-sectional design of this study made it impossible to draw a direct causal conclusion. The data were collected with an online survey, which could only be filled out by those who had smartphones or gadgets and internet access, so the sample may not be fully representative of the population of pregnant women in Indonesia. In addition, the hypotheses in this study could be tested in the opposite direction. As there was a cross-sectional association between romantic attachment, prenatal attachment, and depression in this study, future studies may assess other possible directional relationships. In that sense, lower prenatal depression may cause individuals to have lower avoidant and anxious attachment, which in turn could explain an increase in prenatal attachment. Longitudinal and experimental research in future can be used to test causal relationships.

Although the findings should be interpreted with caution, this study has several strengths. Mainly, this is the first study that represents a comprehensive examination of both romantic and prenatal attachment, and dispositional mindfulness in pregnant women with depressive symptoms. Conducting this study in Indonesia adds diversity to the literature, as most research related to these topics has been with white populations and in developed countries. Furthermore, this study used a short-form measure of experiences in close relationships and five-facet mindfulness questionnaires, which are lower in reliability relative to the original version of the

measure. Despite the limitation of short form to cover the trait precisely, the use of a short form in this study was needed to reduce participant burden.

Despite certain limitations, our findings offer new insight into the association between attachment patterns and dispositional mindfulness during pregnancy and may be useful for recommending further longitudinal research that focuses on prenatal education or intervention programs. Particularly, by investigating prenatal attachment, our study reveals the importance of improving mothers' attachment with the fetus, to support a healthy transition into parenthood after birthing. Longitudinal studies may also focus on identifying the relationship between attachment and depressive symptoms within pregnant women across pregnancy, and between pregnant women and their partners. Furthermore, studies on these topics may be generated in other populations to provide more definitive evidence.

Given the perceived level of partners' support as a significant covariate in all attachment patterns in this study, it is important to consider including partners as dyadic relationships in family systems in future studies, especially in a longitudinal study. Future studies might explore an intervention program that includes pregnant women and partners to establish whether the involvement of partners may improve avoidant and anxious attachment and reduce depressive symptoms in pregnant women. Particularly, an intervention program may play a role in the prevention of the harmful effects of avoidant and anxious attachment and depression for infant development (Flykt, 2010).

In general, pregnancy and especially the delivery of the first child, is a difficult life circumstance that has the potential to have a significant impact on how women think about themselves, their relationship, their children, and their future. Previous research has not adequately explored the important role of attachment in decreasing depressive symptoms in

pregnant women. Although less generalizable due to the study design, our findings offer some insight on the relationship between avoidant and anxious of romantic attachment, prenatal attachment, and the depressive symptoms in pregnant women in Indonesia. Improving attachment patterns among pregnant couples with depressive symptoms may be important considerations for future research and clinical work with this population.

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Table 2.1 Pregnant Women's Demographic Characteristics

	n	%
Education		
Elementary – high school degree	109	25.5
College/Undergraduate degree	279	65.4
Graduate degree	39	9.1
Domicile		
Java island	328	76.8
Others	99	23.2
Suburbs		
Rural	87	20.4
Sub Urban	42	9.8
Urban	279	65.4
Others	19	4.4
Ethnic		
Javanese	268	62.8
Others	159	37.2
Insurance		
Yes	237	55.5
No	190	44.5
Employment		
Full-time employee	142	33.3
Part-time employee	15	3.5
Self- employee	15	3.5
Business owner/employee	18	4.2
Non-employee	189	44.3
Others	48	11.2
Income		
≤ Rp 5 million	308	72.1
Rp 5 – 10 million	98	23.0
Rp 11 – 20 million	15	3.5
≥ Rp 21 million	6	1.4
House ownership		
Yes	169	39.6
No	258	60.4
Time together with partner		
0 – 5 years	317	74.0
6 – 10 years	74	17.3
11 - 20 years	37	8.7
Living with		
Nuclear family	220	51.5
Extended family	207	48.5
Support of husband at home among others		
Number 1	382	89.5
Above 1 (2 – 8)	41	9.6
Missing (living at different house)	4	.9
Total numbers of support for family members at home		
Four supports	219	51.3
Less than four	205	47.9
None (live in different house)	3	0.8
Decisions related to pregnancy		
Decided by own self	218	51.1
Influenced by family members	209	48.9
Health problems		

Yes	96	22.5
No	331	77.5
Practice health behaviors		
Yes	394	92.3
No	33	7.7
Exercise practices		
Yes	110	25.8
No	317	74.2
Yoga and meditation experience		
Yes	72	16.9
No	355	83.1
Pregnancy planned		
Planned	278	65.1
Unplanned	149	34.9
Pregnancy experiences		
First time	209	48.9
More than one time	218	51.1
Miscarriages experience		
Yes	78	18.3
No	349	81.7
Current stressful event		
Yes	13	26.5
No	314	73.5

Note. $N = 427$. Participants were on average 27.71 years old ($SD = 4.071$)

Table 2.2. Descriptive Statistics and Correlations for Study Variables

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Depressive symptoms	8.83	4.72													
2. Avoidant attachment	12.53	4.46	.28**												
3. Anxious attachment	22.32	5.24	.46**	.19**											
4. Prenatal attachment	78.34	7.18	-.28**	-.25**	-.10*										
5. Quality of Attachment	49.48	4.04	-.44**	-.21**	-.19**	.85**									
6. Time Spent	33.42	4.66	-.06	-.23**	-.00	.88**	.52**								
7. Dispositional Mindfulness	51.86	8.19	-.46**	-.05	-.34**	-.01	.14**	-.16**							
8. Observe	8.65	2.39	.09	-.04	.16**	.27**	.17**	.31**	-.63**						
9. Acting with awareness	11.63	2.12	-.43**	-.17**	-.27**	.09	.21**	-.04	.73**	-.26**					
10. Describe	9.64	2.03	-.13**	-.19**	-.14**	.11*	.09	.12*	-.17**	.21**	.12*				
11. Non-judging	11.15	2.53	-.57**	-.08	-.38**	.14**	.29**	-.03	.78**	-.22**	.61**	.03			
12. Non-reactivity	7.82	2.38	.38**	.03	.25**	-.05	-.15**	.06	-.79**	.35**	-.46**	.12*	-.58**		
13. Age	27.71	4.07	-.08	.03	-.19**	-.16**	-.10*	-.17**	.01	.02	-.01	.18**	.09	-.03	
14. Week of pregnancy	25.77	7.93	-.07	.01	.01	.21**	.16**	.20**	-.01	.06	.02	.03	.02	-.02	-.02

Note. N = 427. M and SD are used to represent mean and standard deviation, respectively.

Bolded estimates are all significant.

* indicates $p < .05$. ** indicates $p < .01$.

Table 2.3. Descriptive Statistics and Correlations for Depressive Symptoms and Demographic data

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Depressive symptom	8.834	.719																			
Domicile	1.98	.901	.054																		
Education	3.80	.683	.079	.095*																	
Income	1.34	.617	-.059	-.032	.231**																
Live in nuclear or extended	1.48	.500	.007	.010	-.023	-.135**															
Employee status	3.832	.347	-.074	-.102*	-.174**	-.151**	.141**														
Time together	1.36	.672	-.063	-.044	-.103*	.100*	-.120*	.048													
Pregnancy plan	1.35	.477	.092	-.041	.115*	.064	-.002	.028	.114*												
Pregnancy experience	1.51	.500	-.007	-.036	-.069	.057	-.044	.056	.474**	.137**											
Health problems	1.78	.418	-.046	.117*	-.101*	-.111*	.028	-.001	-.080	-.100*	-.112*										
Stressful events	1.74	.442	-.398**	-.045	-.232**	-.107*	-.013	.047	-.044	-.129**	-.046	.224**									
Miscarriage experience	1.82	.387	-.039	.001	.074	.036	.034	-.058	-.163**	.015	-.354**	.065	-.050								
House ownership	1.60	.490	.109*	-.021	.000	-.110*	.325**	.098*	-.189**	.080	-.141**	-.057	-.062	.051							
Perceived of partner support	1.16	.641	.168**	.051	-.007	.004	-.073	.012	.134**	.048	.170**	-.015	-.033	.013	-.008						
Total support	2.931	.252	-.084	.043	.051	.032	.018	-.006	-.056	-.073	-.154**	-.074	.059	.034	.062	-.046					
Decision related pregnancy	1.49	.500	-.025	.052	-.006	-.156**	-.078	.053	-.006	-.088	-.053	-.023	.078	-.058	.026	-.024	.181**				
Health practices	1.08	.267	.031	-.012	-.133**	.053	.070	.044	-.024	.009	-.103*	.135**	-.105*	.023	.109*	-.017	-.029	.015			
Exercise	1.74	.438	.012	-.063	-.182**	.023	-.018	-.009	.067	.094	.227**	.003	.035	-.098*	-.061	.080	-.044	-.087	.030		
Yoga	1.83	.375	.041	.009	-.271**	-.248**	.036	.061	-.058	-.038	-.041	.132**	.127**	-.002	.058	-.005	-.013	.028	-.010	.250**	1

Note. N = 427. M and SD are used to represent mean and standard deviation, respectively.

* indicates $p < .05$. ** indicates $p < .01$.

Table 2.4. Mediation results for anxious attachment.

Antecedent	Consequent										
	Prenatal attachment					Depressive symptoms					
	<i>Coefficient</i>	<i>SE</i>	<i>p</i>	<i>LLCI</i>	<i>ULCI</i>		<i>Coefficient</i>	<i>SE</i>	<i>p</i>	<i>LLCI</i>	<i>ULCI</i>
Anxious attachment	<i>a</i> -.077	.069	.271	-.214	.06	<i>c'</i> .358	.038	<.001	.284	.432	
Prenatal attachment	-	-	-			<i>b</i> -.116	.026	<.001	-.167	-.064	
Constant	89.862	2.096	<.001	85.742	93.982	6.113	2.617	.02	0.969	11.256	
	$R^2 = .068$					$R^2 = .301$					

Source. Adapted from Hayes (2022). Coefficient = unstandardized coefficient (B); SE = Standard error. CI = Confidence interval.

Table 2.5. Mediation results for avoidant attachment.

Antecedent	Consequent									
	Prenatal attachment					Depressive symptoms				
	<i>Coefficient</i>	<i>SE</i>	<i>p</i>	<i>LLCI</i>	<i>ULCI</i>	<i>Coefficient</i>	<i>SE</i>	<i>p</i>	<i>LLCI</i>	<i>ULCI</i>
Avoidant attachment	<i>a</i> -.407	.082	<.001	-.567	-.247	<i>c'</i> .157	.045	<.001	.068	.246
Prenatal attachment	-	-	-	-	-	<i>b</i> -.116	.026	<.001	-.167	-.064
Constant	89.862	2.096	<.001	85.742	93.982	6.113	2.617	.02	.969	11.256
	R ² = .069					R ² = .301				

Source. Adapted from Hayes (2022). Coefficient = unstandardized coefficient (*B*); SE = Standard error. CI = Confidence interval.

Table 2.6. Moderated mediation results for anxious attachment.

Independent variables	Dependent variables	
	Prenatal Attachment	Depressive symptoms
	Coeff. (SE)	Coeff. (SE)
Predictor Control variables		
Home ownership	.23 (.73)	.85 (.39) *
Perceived level of partners' support	-.44 (.56)	.70 (.30) *
Avoidant Attachment	-.41(.08) ***	.14 (.05) ***
Independent Variables		
Anxious attachment	-.08 (.07)	.34 (.04) ***
Prenatal attachment	-	-.08 (.03) ***
Dispositional mindfulness	-	-.16 (.04) ***
Interaction term		
Anxious attachment*Mindfulness	-	.00 (.01)
Prenatal attachment*Mindfulness	-	.00 (.00)
R ²	.07	.33
Conditional indirect effects	Coeff. (SE)	95% CI
Low mindfulness	.01 (.01)	-.01, .03
Moderate mindfulness	.01 (.01)	-.01, .02
High mindfulness	.00 (.01)	-.01, .02
Index of moderated mediation	-.00 (.00)	-.00, .00

Note. Regression coefficients are unstandardized; standard errors are in parentheses. Bootstrap sample size = 10,000. CI, Confidence interval.

* indicates $p < .05$. ** indicates $p < .01$. *** indicates $p < .001$.

Table 2.7. Moderated mediation results for avoidant attachment.

Independent variables	Dependent variables	
	Prenatal Attachment	Depressive symptoms
	Coeff. (SE)	Coeff. (SE)
Predictor Control variables		
Home ownership	.23 (.73)	.87 (.39) *
Perceived level of partners' support	-.44 (.56)	.70 (.30) *
Anxious Attachment	-.08 (.07)	.33 (.04) ***
Independent Variables		
Avoidant attachment	-.41(.08) ***	.15 (.05) ***
Prenatal attachment	-	-.08 (.03) ***
Dispositional mindfulness	-	-.15 (.04) ***
Interaction term		
Avoidant attachment*Mindfulness	-	.01(.01)
Prenatal attachment*Mindfulness	-	.01 (.00)
R ²	.07	.33
Conditional indirect effects		
	Coeff. (SE)	95% CI
Low mindfulness	.04 (.02)	.01, .08
Moderate mindfulness	.03 (.01)	.01, .06
High mindfulness	.02 (.02)	-.01, .06
Index of moderated mediation	-.00 (.00)	-.01, .00

Note. Regression coefficients are unstandardized; standard errors are in parentheses. Bootstrap sample size = 10,000. CI, Confidence interval.

* indicates $p < .05$. ** indicates $p < .01$. *** indicates $p < .001$.

Table 2.8. Moderated mediation results for avoidant attachment with non-judging facet of dispositional mindfulness.

Independent variables	Dependent variables	
	Prenatal Attachment	Depressive symptoms
	Coeff. (SE)	Coeff. (SE)
Predictor Control variables		
Home ownership	.23 (.73)	.54 (.35)
Perceived level of partners' support	-.44 (.56)	.64 (.27) *
Anxious Attachment	-.08 (.07)	.22 (.04) ***
Independent Variables		
Avoidant attachment	-.41*** (.08)	.18 (.04) ***
Prenatal attachment	-	-.07 (.02) ***
Non-Judging	-	-.80 (.07) ***
Interaction term		
Avoidant attachment*Non-judging	-	.00(.02)
Prenatal attachment*Non-judging	-	.02 (.01) ***
R ²	.07	.47
Conditional indirect effects		
	Coeff. (SE)	95% CI
Low mindfulness	.05 (.02)	.02, .09
Moderate mindfulness	.03 (.01)	.01, .06
High mindfulness	.01 (.02)	-.02, .04
Index of moderated mediation	-.01 (.00)	-.02, -.00

Note. Regression coefficients are unstandardized; standard errors are in parentheses. Bootstrap sample size = 10,000. CI, Confidence interval.

* indicates $p < .05$. ** indicates $p < .01$. *** indicates $p < .001$.

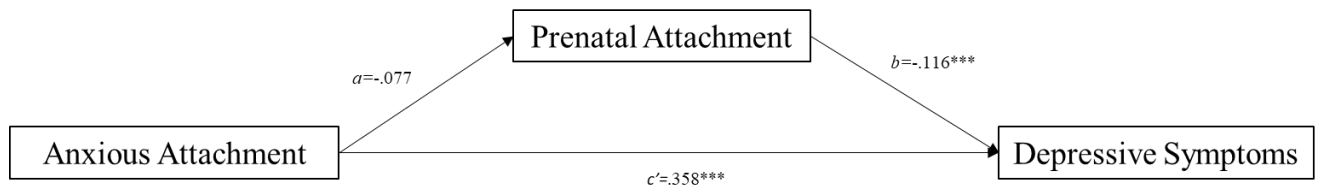


Figure 2.2. Path diagram of the indirect effects of anxious attachment on depressive symptoms. The coefficients in parentheses are unstandardized. * $p < .05$, ** $p < .01$, *** $p < .001$. The covariates in the model are avoidant attachment, home ownership, and perceived level of partner support.

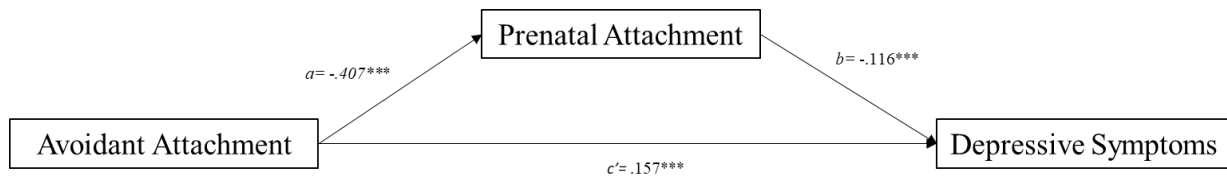


Figure 2.3. Path diagram of the indirect effects of avoidant attachment on depressive symptoms. The coefficients in parentheses are unstandardized. * $p < .05$, ** $p < .01$, *** $p < .001$. The covariates in the model are anxious attachment, home ownership, and perceived level of partner support.

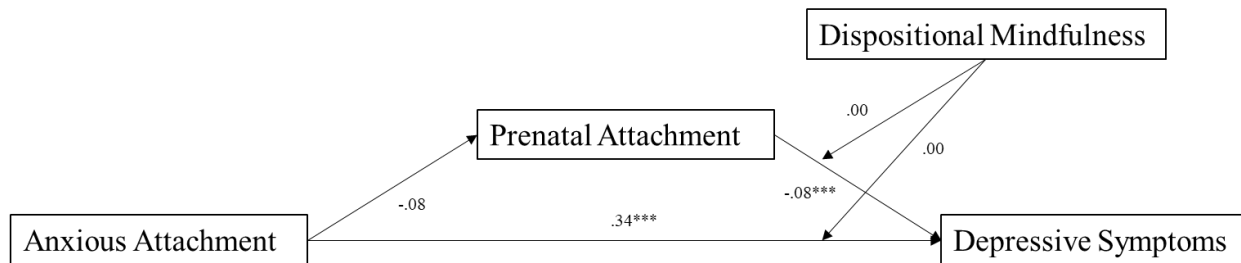


Figure 2.4. Conditional indirect effects anxious attachment and depressive symptoms via prenatal attachment, at each level of dispositional mindfulness. The coefficients in parentheses are unstandardized. * $p < .05$, ** $p < .01$, *** $p < .001$.

The covariates in the model are avoidant attachment, home ownership, and perceived level of partner support.

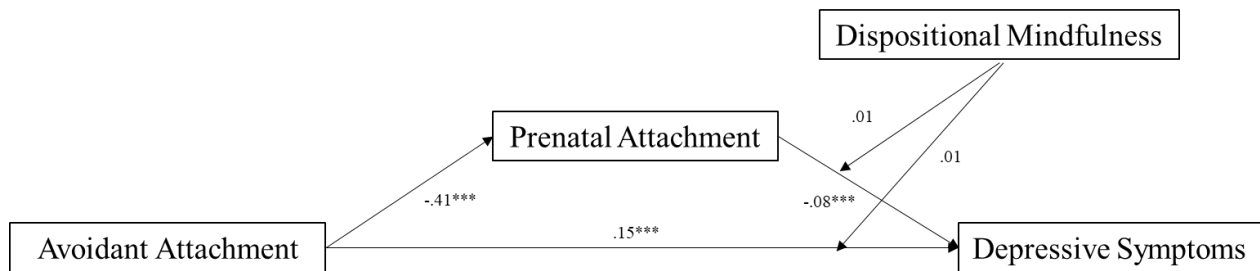


Figure 2.5. Conditional indirect effects avoidant attachment and depressive symptoms via prenatal attachment, at each level of dispositional mindfulness. The coefficients in parentheses are unstandardized. * $p < .05$, ** $p < .01$, *** $p < .001$.

The covariates in the model are anxious attachment, home ownership, and perceived level of partner support.

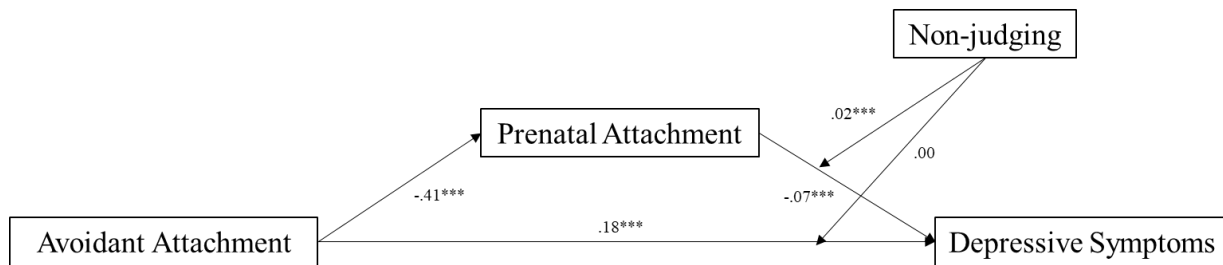


Figure 2.6. Conditional indirect effects avoidant attachment and depressive symptoms via prenatal attachment, at each level of non-judging. The coefficients in parentheses are unstandardized. * $p < .05$, ** $p < .01$, *** $p < .001$. The covariates in the model are anxious attachment, home ownership, and perceived level of partner support.

Chapter 3

Adapting Mindfulness-Based Childbirth and Parenting (MBCP) for Online Delivery to Pregnant Women with Depression in Indonesia: A Pilot Study (Study 2)

Abstract

Depression during pregnancy is a significant problem that can adversely affect not only both the mother and child, but also the entire family. This pilot study aimed to determine whether an online Mindfulness-Based Childbirth and Parenting (MBCP) program could be adapted for Indonesian pregnant women with depression and their partners, and whether it could reduce their depressive symptoms. This study was a mixed methods randomized controlled trial with three assessment time points (pre- and post-intervention and post-birth follow up). The study included self-report questionnaires to assess depressive symptoms, mindfulness, prenatal attachment, and romantic attachment. Additionally, semi-structured, open-ended questions were included to gather qualitative feedback on participants' experiences of the MBCP program. The inclusion criteria for this study were Indonesian pregnant women aged 18-40 years, at least ten weeks gestation, with current depressive symptoms of 10 or above on the Edinburgh Postpartum Depression Scale (EPDS). The results showed that the MBCP program effectively reduced depressive symptoms in a small sample of pregnant women, despite substantial challenges with recruitment and partner involvement. A simple main effect analysis of time*group showed that pregnant women in the MBCP group experienced a greater reduction in depressive symptoms compared to the TAU group ($F(6, 46) = 4.118, p < .05$). There was also a statistically significant interaction between the effects of time*group for avoidant attachment such that pregnant women in the MBCP group had a significant decrease compared to other groups ($F(6, 46) = 2.463, p < .05$). In terms of anxious romantic attachment, there was a statistically significant difference between

groups ($F(3, 23) = 3.073, p < .05$), but no significant difference across three times, and no significant time*group interaction. Regarding attachment to the fetus, simple main effects analysis of the group*time interaction showed that the MBCP group of pregnant women significantly increased from baseline to post-intervention ($p < .001$) and baseline to post-birth ($p < .05$), while TAU groups did not. Finally, the study found that there was no significant difference between groups in dispositional mindfulness. This pilot provides preliminary evidence that an online MBCP program may be an effective way to reduce depressive symptoms in pregnant women, improve their romantic attachment to their partners and prenatal attachment to their fetus. However, there were significant challenges with recruiting participants with depression above the EPDS cut-off score of >10 and with engaging partners in the intervention. Caution is advised when interpreting the study's findings due to the very small sample size requiring further research.

Keywords: mindfulness, intervention, pregnancy, depression, attachment, Indonesia

Introduction

Prenatal depression in the family system

Prenatal depression has been the subject of much investigation across several disciplines in recent years. This type of depression can have short- and long-term adverse effects on the mother, fetus, and child, as well as other family members (Asselmann et al., 2018; Gaynes et al., 2005; Field et al., 2006; Shea et al., 2008; Straub et al., 2012; Zhang et al., 2018). In Indonesia, there is a growing body of studies on prenatal depression and its association with poor outcomes for mothers and infants (Hapisah et al., 2010; Herlina et al., 2014; Kumala, 2015). Women with depression who receive poor or no prenatal care in the third trimester of pregnancy are at a higher risk of neonatal and maternal morbidity, and fetal and neonatal mortality (Price & Caughey, 2020). Using a Family Systems approach, the negative effects of depression during pregnancy may be considered to affect all family members (Bennett et al., 2004).

Understanding risk factors for depression during pregnancy is essential for identifying women who may be at higher risk for adverse outcomes. Several risk factors have been identified that can increase the likelihood of depression during pregnancy. Poor self-rated health, a history of depression, conflict with partners and other family members, a lack of support, and domestic abuse have all been linked to depression during pregnancy (Biaggi et al., 2016; Marcus et al., 2003). In a collectivist cultural context, poor relationship patterns with other subsystems of the family system, such as in-laws, have also been found to predict depression among pregnant women, in addition to couple conflict (Kazi et al., 2006; Jain et al., 2004). Moreover, romantic attachment and prenatal attachment have been identified as potential factors that predict depression during pregnancy (Brandon et al., 2008; Conde et al., 2011; Krusche et al., 2019; Meuti et al., 2015).

The impact of family dynamics on individuals can also be extended to their experiences during pregnancy. The quality of attachment in a family can impact the emotional climate and patterns of interaction among family members, which can affect pregnant women's mental health (Byng-Hall & Stevenson-Hinde, 1991; Hawkins et al., 2021). According to Hall (2013), the family is the most strongly bonded relational structure where individuals participate for an extended period. Family interactions and the emotional climate of the family can affect individuals' attachment styles from childhood into adulthood (Bowlby, 1988). The quality of attachment in a family determines the strength and tension of the emotional climate of a family relationship, and the patterns of family interactions affect the family members' behavior long-term. Evidence shows that attachment orientations begin at the early stages of relationships (Mikulincer & Shaver, 2016). The current working model of relationship with partners and the fetus may impact family functioning, affecting depression in pregnant women.

Within a family systems framework, attachment provides insight into mental health conditions such as depression. Three components of family systems (Watson, 2012) consist of elements (people in a family), interconnections (the flow of information in a family), and a function or purpose (to nurture and protect its members). The family system framework facilitates forming and maintaining dyadic attachment relationships (Stevenson-Hinde, 1990). This framework shows romantic attachment between pregnant women and their partners and prenatal attachment with the fetus as circular rather than linear. Based on the three components of the family system (Watson, 2012), the system's function can be understood by observing it develops over time. The purpose of the system can be seen from the behavior, not from the intention.

In short, increased depressive symptoms of pregnant women in the family involve all the

family members in the home as part of the system. Therefore, there is a tendency for everyone in the family to influence each other, which can serve as risk and protective factors for pregnant women simultaneously. Previous studies showed that poor partner support predicted depression in pregnant women (Conde et al., 2011; Desrosiers et al., 2013). Family systems theory suggests intervening with pregnant women and their partners together may promote the healthy function of the couple and in turn, support better mental health for the pregnant woman.

Mindfulness-based interventions for prenatal depression

Recent Mindfulness-Based Intervention (MBI) research supports the use of mindfulness programs to prevent prenatal depression and the risk of future episodes/relapse (Dhillon et al., 2017; Dimidjian et al., 2015; Felder et al., 2017; Gu et al., 2015; Shorey et al., 2019).

Mindfulness is generally defined as an awareness that arises by paying attention purposely and nonjudgmentally to the present moment (Kabat-Zinn, 2003). Mindfulness focuses on cultivating the ability to observe things as they are without being trapped in the emotion that may happen throughout the situations. Mindfulness derives from Eastern practices and has been developed into standardized MBIs in Europe and North America.

Mindfulness practice can lead to increased mindfulness in individuals. The process of improving mindfulness relies on increasing dispositional mindfulness. As a stable construct, dispositional mindfulness is an individual's innate ability to be mindful over time. Despite the trait-like qualities of dispositional mindfulness in the absence of mindfulness meditation training, mindfulness interventions have been shown to increase dispositional mindfulness (e.g., Bailey et al., 2019; Mothes et al., 2014; Quaglia et al., 2016). Mindfulness can be developed as a skill through activities like meditation (Kiken et al., 2015; Ortner et al., 2007). Mindfulness development as a skill is a key objective of MBIs both in clinical and non-clinical settings

(Burzler & Tran, 2022).

MBIs have been widely used for various mental health issues by integrating traditional and contemporary mindfulness practices (Gu et al., 2015; Michalak et al., 2020). In recent years, growing research has focused on MBIs in addressing depression in pregnant women. The most studied are Mindfulness-Based Childbirth and Parenting (MBCP) (Duncan & Bardacke, 2010; Duncan et al., 2017; Lönnberg, 2020; Pan et al., 2019; Sbrilli et al., 2020; Warriner et al., 2018; Zhang et al., 2023) and Mindfulness-Based Cognitive Therapy (MBCT) (Dimidjian et al., 2015, 2016; Dunn et al., 2012; Miklowitz et al., 2015; Zemestani & Nikoo, 2020). In addition, recent studies have integrated the practices of mindfulness as a contemporary method of treatment to prevent and lessen depressive symptoms (Dimidjian, 2015, 2016; Miklowitz et al., 2015), to reduce depression during pregnancy (Muzik et al., 2012; Pan, Chang, et al., 2019; Pan, Gau, et al., 2019; Woolhouse et al., 2014), and to reduce the risk of postpartum depression (Duncan et al., 2017; Hughes et al., 2009; Zhang & Emory, 2015). The studies mentioned above complement each other in helping pregnant women and the family alleviate perinatal depression.

Despite their common usage in other parts of the world, there is still limited research on MBIs in pregnant women in Indonesia (Febriani et al., 2018; Putri & Gunatirin, 2020; Sumakul & Wayong, 2021). Of three known studies on MBIs for pregnant women in Indonesia, none focused on depression. A study by Febriani et al. (2018) used a one-day MBI program with five participants that showed a decrease in stress from pretest to follow up. A study of MBCT showed a decrease in anxiety in two participants (Putri & Gunatirin, 2020). Meanwhile Sumakul and Wayong (2021) conducted an MBI to decrease anxiety showing improvement in the $n = 4$ experimental condition participants compared to a worsening of anxiety in $n = 4$ control participants. Despite the small samples, these three studies showed a pattern of reductions in

stress and anxiety among pregnant women following MBI participation. These small studies provide support for developing a more comprehensive MBI program that focuses on pregnant women with depressive symptoms, including their partners as part of the family system.

The current study focuses on the MBCP program for expectant couples (Bardacke, 2012). The MBCP course is the first MBI program designed for pregnant women and their partners to support their psychological condition and build relationship quality between the couples and with their baby (Duncan & Bardacke, 2010). The MBCP course is based on the Mindfulness-Based Stress Reduction (MBSR) curriculum with additional childbirth education content aimed to reduce stress and fear of childbirth and improve mindfulness in parenting.

Studies from diverse communities are needed to support the generalization of the MBCP approach. Little is known about the impact of collectivist cultural influences on potential candidate processes linking MBCP involvement with improved depression symptoms. Furthermore, most MBCP studies have mainly been conducted in white populations in English-speaking countries (Lönnberg et al., 2020; Warriner et al., 2018). Hence, it is more challenging to generalize the results to more diverse populations with collectivist cultural backgrounds, such as those in Indonesia. Considering the widespread problem of depression among pregnant women and the increasing interest in MBIs in Indonesia, there is a critical gap to be filled by understanding the possible protective benefit of MBCP participation in this context.

MBCP and depressive symptoms in pregnant women from the family system perspective

To better understand how MBCP can be used for improving depression in pregnant women, it is essential to examine further how MBCP relates to depression from a Family Systems perspective. The Family Systems view is that family interaction usually shapes patterns that repeat over time. Families with a high level of emotional interdependence tend to exhibit

more predictable behavior during their interactions. As a result, any disruptions within the family can be easily anticipated (Hall, 2013). Poor attachment patterns and unhealthy relationships between the subsystems in the family (e.g., pregnant woman-partner, pregnant woman-fetus) may increase risk for depression in pregnant people. In contrast, a secure romantic attachment style (Mikulincer & Florian, 1999) and positive prenatal attachment (Goecke et al., 2012) may help pregnant women to cope with their pregnancy and improve their depressive symptoms. Hence, to reduce depression in pregnant women, the Family Systems Theory sees the importance of improving relationship quality and attachment patterns for each subsystem in the family.

The Family Systems perspective focuses on interpersonal processes, developing models for how interactions among family members lead to or manage pathological behavior (Watson, 2012). The problem within a family should be viewed through the lens of circular causality, which means that the behavior of pregnant women towards their partners and fetus is influenced by the behavior or existence of their partners and fetus towards them. As the Family Systems perspective sees problems as coming from the system, not from individuals per se, providing intervention to the family unit may promote faster recovery than only focusing on pregnant women. Symptoms can be seen as the family member's attempts to solve a problem or send a message. For example, the depressive symptoms in pregnant women could be a message that the family should solve challenges together.

As a family-focused intervention, the MBCP program (Duncan & Bardacke, 2010) could provide an approach to enhance attachment patterns in the dyadic relationships in the system of the pregnant person's family, and in turn improve their depressive symptoms. In addition, MBCP may help couples build understanding and be aware of their thoughts and provide them with the skills to solve conflict or problems in the family mindfully.

MBCP is held for three hours once a week for nine weeks to provide in-depth knowledge of pregnancy, birth, breastfeeding, and postpartum adjustment, reduce stress related to the pregnancy, and teach a broad range of pain coping skills, all offered within a framework of mindfulness and with development of a formal meditation practice (Bardacke, 2012). MBCP also includes one silent retreat day held for six hours between class 6 and class 7, and a reunion class after everyone has given birth. MBCP participants develop formal mindfulness skills during the program based on mindfulness practices used in MBSR, such as body scan, sitting meditation, walking meditation, mindful breathing, and loving-kindness meditation practice. During the program, participants are asked to practice meditation six days per week for about 30 minutes per day. This independent practice is an important element that requires a high level of commitment.

The MBCP program offers pregnant people and their partners skills to enhance their perception and attention to the present moment, to be conscious of breathing, and to work with thoughts, sensations, and emotions nonjudgmentally. Participants also find that accepting instead of judging can ease stressful events. Mindfulness practice helps them be more self-compassionate and self-kind (Malis et al., 2017). In the MBCP program, observing the inner patterns and habits of the mind may help pregnant women connect to stories about who they are and what shapes their tendency to have a particular attachment style (Bardacke, 2012).

MBCP also encourages expectant couples to provide support to one another and use mindfulness practice as a basis for parenting mindfully: "...with present moment attentiveness, nonreactivity, emotional awareness, nonjudgmental acceptance, and compassion for oneself and one's [baby]..." (Duncan et al., 2009). Participants can also benefit from mindful presence in interactions with babies and partners and mindful awareness of emotional reactivity. The MBCP program includes a "Being with Baby" practice that explicitly targets fetal bonding and prenatal

attachment, during which the pregnant person practices mindfully attending to sensations of fetal movement. The Body Scan practice during the program enhances concentration and awareness of the body. Body scan practice can also be an excellent opportunity to build a connection and strong attachment with the fetus (Bardacke, 2012).

The MBCP program provides additional activities that may enhance romantic attachment in expectant couples. By practicing mindfulness together, expectant couples become more aware and have a greater sense of connection, letting go of old habits of relating less mindfully. Mindfulness helps the couple have more options to behave with care and transform their relationship into a more positive romantic attachment. During the program, an ice meditation practice, known as pain practice, is provided for pregnant women and their partners to prepare for working with childbirth pain. The ice practice teaches participants to be non-reactive, calm, and focused, even during unpleasant moments of holding pieces of ice in their hands. By providing support during the ice practice, partners learn to provide empathetic understanding to pregnant women that can be applied during experiences of pain in labor. Dyadic mindful communication practices couples practice during the MBCP program may also enhance romantic attachment (Bardacke, 2012).

Based on three components of the Family Systems (i.e., elements, interconnections, function or purpose; Watson, 2012), the MBCP program can help couples as the elements of the family to build their interconnections as part of the system, by implementing the knowledge they receive from participating in the MBCP program to build their relationship and improve their romantic attachment. In short, MBCP for couples is a program for pregnant women and their partners to build their understanding of pregnancy, the birthing process, and subsequent parenting. Regarding the purpose component of the Family System, the MBCP program

encourages couples to practice all the session activities together to achieve their purpose. The ice practice facilitates them building their understanding and empathy for their partners' pain. They learn to cultivate mindful attitudes (i.e., non-reactive, focused, calm; Bardacke, 2012). It confirms their purpose to enhance their awareness of themselves and the baby. They learn together what they should and should not do during the pregnancy process, including choosing what information from society they should consider. The MBCP program helps couples be aware of the context they experience and relate it to their new role. It can thus enhance the quality of their relationship.

Adaptation of MBCP as an online program for expectant Indonesian parents

An online or web-based program is a potential alternative in this digital era, particularly prevalent since the start of the COVID-19 pandemic (Anderson et al., 2021; Shapira et al., 2021; Ziadni et al., 2021). Researchers have shown an increased interest in conducting online interventions in recent years through various platforms such as WeChat application, web-based programs, Zoom, and hybrid programs using phone calls and recorded weekly mindfulness programs (Anderson, 2021; Ebert et al., 2018; Heckendorf et al., 2019; Matvienko-Sikar & Dockray, 2017; Shapira et al., 2021; Wong et al., 2021; Yang et al., 2019; Ziadni et al., 2021). Previous MBI research has shown benefits for pregnant women from online mindfulness programs (Felder et al., 2017). A prior study from Krusche et al. (2013) also suggests that a web-based mindful course significantly reduced self-referral participants' stress, anxiety, and depression. With the growth of using the internet and smartphones, pregnant women have started using the internet to access information related to pregnancy and to join online antenatal education (Gao et al., 2013; Tripp et al., 2014). An online or web-based program thus appears to be a viable delivery strategy for a prenatal mindfulness intervention but requires further study in

the Indonesian context.

The present study

In the current study, an online version of MBCP was developed in Indonesian to support pregnant people with elevated depression and their partners in Indonesia. In a randomized controlled trial (RCT) of online MBCP compared to treatment as usual (TAU), online MBCP was expected to decrease depression symptoms. It was hypothesized that the MBCP online program would be feasible to deliver, acceptable for the participants, and improve depression, romantic attachment, prenatal attachment, and dispositional mindfulness more than TAU. Specifically, this study hypothesized the following:

Hypothesis 1: An online MBCP program will be feasible to deliver and acceptable to pregnant women in Indonesia and their partners.

Hypothesis 2: Participation in online MBCP will lead to a greater reduction in depression symptoms among Indonesian pregnant women from pre- to post-intervention compared to TAU.

Hypothesis 3: Participation in the online MBCP program will lead to greater improvement in romantic attachment, prenatal attachment, and dispositional mindfulness for Indonesian pregnant women compared to TAU.

In addition, exploratory secondary hypotheses regarding improvements for partners on these outcomes will also be examined.

Methods

Participants

The inclusion criteria for this study were pregnant people who identified as women with current depressive symptoms who live in Indonesia and speak Indonesian. Pregnant women's

depressive symptoms were assessed with the widely used Edinburgh Postpartum Depression Scale (EPDS). Only participants with at least ten weeks gestation and with cut-off ratings of ten or above on the EPDS were included in the study. The minimum age was 18 years, and the maximum was 40 years, the age range for typically healthy pregnancies.

The MBCP program is designed to help pregnant women and their partners prepare together for childbirth. Thus, pregnant women eligible for this study were required to join the program with their partners. The couples were divided randomly in a 1:1 allocation into two groups: an online MBCP condition (the experimental group) vs. a TAU control group. The exclusion criteria were pregnant women and/or their partners who refused to provide informed consent, depressive symptoms below ten on the EPDS, under 18 years or more than 40 years, less than ten weeks and above 28 gestational age.

Materials

Participants in this study must have Internet access and a computer or cell phone with working audio and video to attend and participate in the Zoom session. Participants received the suggestion to attend the class from a quiet space where they could focus on their session without being disturbed by other people. The materials also included multiple measurements, audio for self-practice, and weekly self-report worksheets sent through email.

Procedures

This study was a pilot RCT that consisted of two groups: MBCP and TAU. Participants were recruited between April—June 2022. To recruit a diverse group of participants with varying social and economic backgrounds, the study utilized social media platforms such as Facebook and Instagram, as well as email, WhatsApp, motherhood forums, and clinical practices. Potential participants who expressed interest were screened for eligibility based on the specific criteria

described above. An online form was utilized to obtain their consent, and the need for a physical signature was waived. All study procedures were approved by the University of Wisconsin—Madison Institutional Review Board (IRB). The IRB deemed the study exempt, #2021-1344.

Participants who met the cut off for EPDS depressive symptoms of 10 and higher and their partners who completed the informed consent were randomized using an online random number generator (Calc-Site). Participants in the MBCP group were invited for a pre-class meeting with a short introduction about the MBCP program before the 9-week MBCP online class started. Study participants in both groups completed self-report questionnaires before and after the program and in a follow-up session after all women had given birth. Participants in the MBCP group were also asked semi-structured, open-ended questions related to their experiences of pregnancy during the MBCP program, while participants in TAU group were provided questions related to their chosen childbirth education program.

Data collection was completed online through a Qualtrics survey. There was no tuition charged or incentive provided for participation in the MBCP group. However, we offered Rp.200,000 (around \$15) to TAU group participants to cover potential costs of other childbirth education courses and increase retention. Self-report assessments were conducted three times: Time 1 (T1) = baseline (pre-intervention), Time 2 (T2) = in the week after the last week of the MBCP program, and Time 3 (T3) = post-birth follow-up.

Out of 419 participants who completed screening questionnaires, $n = 211$ did not meet the criteria of EPDS score at 10 and above, $n = 44$ declined to include their partners in the study, and there were no responses from $n = 80$. Meanwhile, $n = 62$ participants could not be included in the study as they were too far along in their pregnancies by the randomization period. Twenty-two pregnant women whose partners consented to the study and completed the pre-test survey

participated in the study. Thus, only sixteen pregnant women were involved in the study. See Figure 3.1 for the CONSORT flow chart of study participants for more details.

The MBCP program for the experimental group

This MBCP online program was conducted through Zoom. The MBCP online program was the same length as the original MBCP, held for nine weeks for three hours a week, with one silent retreat day for six hours between class 6 and class 7, and a reunion class between four to twelve weeks after all women have given birth. The participants and partners were asked to be in the same room to make it feasible for them to join the online session without any distractions. In addition, they were asked to dedicate a comfortable place in their home, alone or together, with minimal external distractions, to practice mindfulness during the nine-week program.

Participants in the MBCP program were shown how to build a new habit by practicing mindfulness meditation formally and informally. Each week consisted of formal and informal practices and provided specific mindfulness practices. For example, the opening session includes mindfully eating a raisin, which acts as an introduction to mindfulness practice. Mindful breathing was introduced as the first formal practice this week. Afterward, pregnant couples were encouraged to maintain the practice during the week between sessions. Particularly for the informal practice, the couple was asked to practice it together for several minutes, at least once a day.

The MBCP program for the second week provided the Body Scan as a formal practice for thirty minutes and eating mindfully as an informal practice. Pregnant couples could eat whatever they wanted and practice eating it mindfully as they had done with the raisins. The participants might continue the Awareness of Breathing and Being with Baby practice this second week as they have time. In the Being with Baby practice, pregnant women learn to bring their awareness

back to the present moment through the sensations of the baby's movements. If possible, they can pause for a while from any activities they are doing and feel the sensations the baby is giving them inside their body (Bardacke, 2012).

In week three, participants completed the Body Scan for formal practice. In addition, they had to choose one of the activities of daily life, such as brushing their teeth, taking a shower, cooking, or any other daily activity, to focus on for informal practice this week. Besides practicing mindfulness formally and informally, participants started to write down experiences of pleasant moments that might bring calm and happiness during the week.

In the fourth week, the couples did formal practices including Mindful Movement, adding to the Body Scan, and Being with Pain. Also, during this week, they were asked to be more aware of stress reactions and something they did not like as informal practice. Therefore, they were encouraged to do the Being with Pain Practice at least once and to manage their daily activities mindfully. They were also asked to write about their unpleasant experiences this week.

During the fifth week, the MBCP program continued the Mindful Movement and Body Scan practice and pain practice for pregnant couples. For informal practice, the couples were encouraged to practice mindful pooping (as a preparation for mindfully working with the contractions of labor and physical sensations of giving birth). In general, they were encouraged to keep practicing the previous practices, such as: Being with Baby, Three-Minute Breathing Space, and mindfulness practice during physical discomforts in everyday life.

The sixth-week practice elaborated on the thirty minutes of Sitting Meditation, Body Scan, or Mindful Movement as formal practice. Before shifting their attention to Choiceless Awareness, participants were encouraged to become more aware of their thoughts and emotions as objects of awareness. There was a more advanced pain practice this week. The participants

practiced working with pain together, using Awareness of Breathing, touch, sounding, movement, and various positions. Then they were encouraged to acknowledge which one worked best for them. The breath is an anchor between the pain they felt during the practice.

The participants continued the previous informal practice during this week. They continued to be aware of the pleasant and unpleasant events, and the inquiry related to the thoughts and feelings that arose. They were asked to notice any negative thoughts and feelings that might arise about the future and to practice a mindful pause during the moment of noticing them. Other daily activities, such as mindful pooping, Being with Baby, and Three-Minute Breathing Space, were encouraged.

Between weeks six and seven, there was a day of mindfulness practice. The couples deepened their practice during a long mindfulness practice throughout the day. The day of practice began with sharing the intention of joining the day of mindfulness practice. They then engaged in formal and informal practices such as sitting meditation, yoga, body scan, walking meditation, mindful eating, and mindful speaking and listening. The practice day concluded with everyone sharing their experiences.

Week seven's formal practice consisted of a thirty-minute sitting meditation, body scan, or mindful movement practice, elaborating on choiceless awareness. Loving-kindness meditation was an additional formal practice this week. Pregnant couples practiced mindful speaking and listening inquiry this week. They were encouraged to do informal practice such as being with the baby, pain practice, or any informal practice they wanted.

For week eight, the couples practiced the formal practice on their own without using the audio and learned to use loving-kindness practice. They would keep doing the same informal practice, such as being aware of the sensations in the body and all daily routines, pain practice,

being with the baby, and loving-kindness practice throughout the week.

Week 9 was the last guided mindful practice before expecting couples to start building their daily mindful practice on their own. The class had a meditative reflection. They would keep practicing the formal and informal practices by themselves, noticing all the sensations, likes and dislikes, and pleasant and unpleasant moments that may arise. There was a reunion week after the birth of all the babies. Participants were encouraged to share their experiences with mindfulness practice during birth and parenting a new baby.

Pre-pilot of online MBCP for pregnant women in Indonesia

The MBCP online program in this study was modified from the MBCP program that was developed to be delivered through in-person meetings. This study modified the program to be delivered via an online program using the Zoom application, allowing greater accessibility from any location. An effort was made to keep participants engaged during the program by checking in with them frequently (for example, through email or the WhatsApp platform). Since no MBCP program for Indonesian pregnant families has been conducted previously, either in-person or online, a pre-pilot group was conducted with one group of expectant couples prior to the current study.

Between August and October 2021, the first online MBCP program was held by Zoom with three pregnant women; two participated with partners. After the initial pre-pilot of the online MBCP program in Indonesia, the participants provided written feedback for the program. Two of them mentioned challenges related to poor internet connections causing session interruptions. Other participants suggested providing the class on weekdays as they found it challenging to join the class on weekends as there were many conflicting events (e.g., attending family or cultural events to celebrate and pray for the pregnancy, or attending other family

members' events).

Despite the challenges, the participants mentioned many benefits of following the online MBCP program. First, they had a convenient option to join from wherever they were at the time. Two participants joined the session from their parents' house in two of the nine weeks. In addition, they felt the "blessing" of the online session as they could participate from their current place in Indonesia while the instructor was in the U.S. Indonesia has five large islands and countless lesser islands, making this benefit crucial for expectant couple participation regardless of instructor location. Online interventions can also be of benefit by allowing program participation without a need for paying for transportation and accommodation.

Pre-pilot participants described positive changes they experienced during the program supporting its feasibility. Related to the question about how they cope with stress after the program, one participant answered that she felt much had changed through becoming able to quickly recognize when stressed and avoid "dragging herself into it." Another participant said she could control herself and deal with stress more patiently. The third participant answered that she could make positive suggestions and became more aware of her breath.

The two pregnant women whose partners attended with them felt an improvement in their relationship. In contrast, the pregnant woman who attended the class without her partner said nothing had changed regarding her relationship with her partner. Regarding their relationship with their fetus, all participants felt more connection with the baby in the womb. Specifically, the first pregnant woman felt calm and comfortable during Being with Baby bonding moments. It helped her to release her fear of childbirth. The second pregnant woman felt more affectionate and caring. She could also control her unnecessary thoughts. These promising indications of receptivity to and perceived benefit of online MBCP provided a foundation for the current small

pilot RCT and suggested the value of requiring partner participation.

Treatment as usual (TAU)

People in the TAU group were encouraged to join a childbirth education class but not required to do so. Participants could join a standard Pregnant Women Class (PWC) that is commonly provided in community health centers or public hospitals with a standardized module from the health ministry of Indonesia. The PWC activity for pregnant women consisted of four meetings. In the first meeting, there was information about pregnancy check-ups to help the mother and fetus stay healthy. The participants got materials about safe childbirth, safe mothers, and healthy babies in the second meeting. In the third meeting, the material was about preventing complications during pregnancy, delivery, and postpartum so that mothers and babies are healthy. The material in the fourth meeting was about newborn care for optimal growth and development. In addition, the PWC program had materials that contained recommended physical activities for pregnant women. Participants in the TAU group could also enroll in another class provided by their private health provider or private hospital.

Measures

This study followed Beaton et al.'s (2000) cultural adaptation stages, including using the translation-back translation technique to ensure that each item on the Indonesian scales had the same meaning as the original English language versions. Four professionals in the field of psychology with graduate level degrees were invited to evaluate the translation and back translation results for Indonesian compatibility, especially for idioms.

Edinburgh Postpartum Depression Scale (EPDS). The EPDS consists of a 10-item self-report questionnaire designed to assess depressive symptoms over the past two weeks during the perinatal stage (Cox et al., 1987). The question concerns feelings (e.g., happiness, sadness,

and self-blame). The scores range from 0 to 30 on a 4-point Likert scale; a higher score indicates higher depressive symptoms severity. Items emphasize cognitive and affective symptoms of depression while de-emphasizing somatic symptoms common in pregnancy. A score of ten or higher indicates depressive symptoms that may indicate clinical levels of depression (Cox et al., 1987; Levis et al., 2020). Reliability is relatively high in validation studies ($\alpha = .80$; Eberhard-Gran et al., 2001). This scale also generated good internal reliability in Indonesia ($\alpha = .834$; Fourianalistyawati et al., 2018). The Cronbach's alpha for EPDS in this study was calculated as $\alpha = .57$.

The Experiences in Close Relationship – Short Form (ECR-S). ECR-S consists of a 12-item self-report questionnaire designed to measure romantic attachment style, divided into six items for anxiety-related and six for avoidance-related dimensions (Wei et al., 2007). The anxiety dimension assesses concern for relationships, mainly the partner's availability to provide support, fear of rejection or abandonment (the constructs are fear of interpersonal rejection or abandonment, an excessive need for approval from others, and distress when one's partner is unavailable or unresponsive). The dimension of avoidance assesses the difficulty and inconvenience of approaching and relying on others (the constructs are fear of interpersonal intimacy or closeness, reluctance to depend on others or excessive need for self-reliance, and reluctance to self-disclosure; Wei et al., 2007). The internal consistency for the ECR-S is good ($\alpha = .78$ for anxiety and $\alpha = .84$ for avoidance; Wei et al., 2007). Cronbach's alpha for the ECR-S in this study was calculated as $\alpha = .62$. Specifically, the coefficient alphas were .53 (Avoidance) and .72 (Anxiety). Although lower than the original version, the coefficient alphas in this study were still in the moderate range and acceptable (Hinton et al., 2014; Taber, 2018).

Maternal Antenatal Attachment Scale (MAAS). MAAS consists of a 19-item self-report measure that assesses the dimension of quality of attachment, including closeness or distance, positive or negative feelings, tenderness or irritation towards the fetus, and the dimension of intensity or time spent in the attachment with the fetus, over the past two weeks (Condon, 2015). The scores are rated on a 5-point Likert scale, ranging from 1 (low attachment) to 5 (high attachment). The total scores ranged from 19 to 95, which a higher score indicating a stronger attachment. Reliability is relatively high in validation studies ($\alpha = .81$; Hicks, Dayton, Brown, et al., 2018). The Cronbach's alpha for the MAAS in this study was calculated as $\alpha = .84$.

Maternal Postnatal Attachment Scale (MPAS). The MPAS consists of a 19-item self-report measure that assesses the dimension of quality of attachment, absence of hostility, and pleasure in interaction with the baby (Condon, 2015). The scores were recoded to ensure equal weighting of items of all response options ranging from 1 (low attachment) to 5 (high attachment). Reliability has been relatively high in prior validation studies (e.g., $\alpha = .85$; Rizzo & Watsford, 2020). The Cronbach's alpha for the MPAS in this study was calculated as $\alpha = 0.82$.

Paternal Antenatal Attachment Scale (PAAS). The PAAS consists of a 16-item self-report measure that assesses 2 dimensions: the quality of attachment and the intensity or time spent in the attachment with the fetus, over the past two weeks (Condon, 2015). The scores are rated on a 5-point Likert scale, ranging from 1 (low attachment) to 5 (high attachment). Prior research demonstrated the PAAS is a reliable measure ($\alpha = .82$; Benli & Derya, 2020). The Cronbach's alpha for the PAAS in this study was calculated as $\alpha = 0.65$.

Paternal Postnatal Attachment Scale (PPAS). The PPAS consists of a 16-item self-report measure that assesses the 2 dimensions of: quality of attachment and the intensity or time

spent in the attachment with the fetus, over the past two weeks (Condon, 2015). The scores are rated on a 5-point Likert scale, ranging from 1 (low attachment) to 5 (high attachment). The Cronbach's alpha for the PPAS in this study was calculated as $\alpha = .71$ and was $\alpha = .81$ in prior research (Deng et al., 2018).

Five Facet Mindfulness Questionnaire – Short Form (FFMQ-SF). The FFMQ-SF consists of 15 self-report items selected based on factor loadings of the 39-item long form of the FFMQ (Baer et al. 2012). The FFMQ-SF assesses the same five core aspects of mindfulness as the long form: 1) observing; 2) describing; 3) acting with awareness; 4) non-judging of inner experience; and 5) non-reacting to inner experience (Baer et al., 2008). The scores are rated on a 5-point Likert scale, ranging from 1 (never or very rarely true) to 5 (very often or always true). Based on a psychometric test by Gu et al. (2016), the factor structure of the FFMQ-SF was like the original FFMQ with 39 items, and the total facet scores of the short and long forms had strong relationships. Although the internal consistency for FFMQ-SF is lower (ranging from .69 to .83 with three items for each facet) than the FFMQ long form (ranging from .82 to .90), it shows that the constructs measured by both versions of the FFMQ were very comparable (Gu et al., 2016). Cronbach's alpha for the full scale of the FFMQ-SF in this study was calculated as $\alpha = .74$. Cronbach's alphas for each facet in this study was calculated as follows: $\alpha = .35$ for observing, $\alpha = .50$ for describing, $\alpha = .52$ for acting with awareness, $\alpha = .75$ for non-judging, and $\alpha = .45$ for non-reactivity.

Demographic and Pregnancy Background. Demographic information, including age, was collected from each participant. This study also collected information on marital status, whether the pregnancy was planned or unplanned, parity, culture group/ethnicity (including whether the pregnant couple identified as having the same ethnicity or not), and previous

pregnancy experience. Furthermore, there were questions about their residence (i.e., rural or urban area) and SES, including educational background, household income, insurance status, and employment status.

Additional covariates. This study also assessed the following factors to gauge aspects of living in a collectivist culture and management of health during pregnancy: 1) whether pregnant women live with extended family or not, 2) whether pregnant women get support from their extended family or not, 3) other forms of supports that they receive (i.e., emotional, informational, appraisal, and instrumental support), 4) whether they decide things related to the pregnancy and the birthing process by themselves or not, and if not, who else make decisions related to their pregnancy, and 5) whether they practice health behaviors to maintain their health or not.

Data analyses

Descriptive statistics were used to analyze demographic data. Hypothesis 1 was examined using recruitment and attendance data and qualitative reports. Hypotheses 2 and 3 related to the effects of the intervention were tested using repeated-measure ANOVAs, using IBM SPSS Statistics 27. All MBCP participants who completed the pretest, posttest, and follow-up questionnaires were included; complete cases were analyzed regardless of class attendance. Participants lost to follow up were excluded given the very small sample size for this pilot trial and the focus on examining intervention feasibility. Participants' pretest, posttest, and follow-up were examined on all variables. The decision to further exclude participants from our analyses was based on invalid responses: incorrect answers to the filter question, zero scores on the depression scale, or the wrong name provided. Data provided by eight pregnant women from the Mindfulness-Based Childbirth and Parenting (MBCP) group and six from the TAU group were

included in the final analyses for a total sample size of 14. Table 3.1 presents demographic data for the MBCP and TAU groups at baseline. There were no significant differences between groups on demographics or scores on the baseline questionnaires, other than baseline prenatal attachment which favored the TAU group having higher prenatal attachment than the MBCP group.

Results

Feasibility: Participant retention and attendance

Twenty-two eligible pregnant women with partners enrolled in the current pilot RCT, randomly divided into $n = 11$ for each group. There was no response from $n = 3$ participants assigned to the TAU group after being contacted three times by email and WhatsApp. Two participants in the MBCP group were unable to find the time to join, and one participant decided not to join the program as their partner could not participate in the class. Out of the nine weeks of the MBCP program plus one silent retreat day (10 sessions in total), Pregnant women attended at least seven sessions ($n = 2$ participants), $n = 1$ participant attended nine sessions, and $n = 5$ participants attended all ten sessions. Meanwhile, the attendance rate of partners was five sessions at the lowest ($n = 2$ participants), $n = 3$ participants attended seven sessions, and $n = 3$ participants fully attended the program.

Home mindfulness practice and weekly self-reflection reports were encouraged but not required. After each weekly session, participants received an email with a recap, suggestions for formal and informal practice, and a link to the audio guidance. When participants did not attend classes, it was usually because of conflicting schedules with family events, changes to work shifts, and additional events at the workplace.

Acceptability

Open-ended feedback from a reflection section of the posttest questionnaire served as the basis for evaluating acceptability. Sixteen participants (n = 8 pregnant women, n = 8 partners) completed the questionnaire including these reflection questions. Their experiences fell into five categories, i.e., well-being-related improvement, relationship with partners and baby in the womb, overall attitude after joining MBCP, and using the Zoom application.

Well-being-related improvement.

Participants reported various benefits of joining the MBCP program for their well-being. For example, regarding coping with stress after joining the program, pregnant women reported being less reactive, more calm, more accepting, easily regulating emotion, and being more realistic in thinking and dealing with things.

One pregnant woman explained in more detail:

Yes, there is. Before, physical fatigue and mixed thoughts could cause stress. Now I am able to differentiate between physical and mental fatigue. So, when I am physically tired, I take a rest, and when my mind is tired, I take a break.

Furthermore, partners reported somewhat similar themes, i.e., feeling calmer and at ease, more easily controlling emotion, pausing to respond rather than react, and accepting and reducing their stress more. Other partners described how they felt better able to handle their stress and understand other people's perspectives.

Relationship with partners and the baby in the womb

The program seemed to positively impact the relationships between partners and the unborn baby. Pregnant women who participated in the program reported significant improvements in their relationships with their partners. They felt more open-minded, gentle, attentive, and aware of each other's roles and responsibilities, leading to better communication

and increased patience and calmness. Additionally, pregnant women noticed that their partners were more conscious of the baby growing in the womb, showing greater respect and appreciation for their shared journey. As a result of the program, pregnant women become more mindful of the baby, fostering a stronger bond and deeper emotional connection with their partner. Overall, participants reported the program helped to strengthen the relationship between them and their partners as well as with their unborn babies, bringing them closer together during this special time in their lives.

Partners who participated in the program also reported positive changes in their relationship with their pregnant partner and the baby. They described similar themes of understanding and getting closer, enjoying quality time together, and communicating more deeply. For example, one partner participant mentioned feeling more intimate and affectionate as their wife became more patient in managing her emotions. Others highlighted the benefits of practicing meditation and breathing techniques together, which helped them support their partner through nausea and gain new skills and knowledge from the program. Regarding their relationship with the baby, partners expressed increased verbal and physical communication, paying close attention to every detail of the baby's development. This showed their growing commitment to their shared journey toward parenthood and their desire to establish a strong bond with their unborn child.

Overall attitude after joining MBCP.

Pregnant women felt more aware, calm, careful, and accepting of whatever conditions they faced. They also reported feeling more prepared and being more ready for childbirth after receiving information regarding the labor process and practicing a mindful attitude when thinking about labor. Specifically, the theme of acceptance was raised by three pregnant women:

Yes, I pay more attention to everything I do, and I am able to accept the pain I felt during pregnancy better; Yes I become more accepting of whatever conditions I experienced during pregnancy and adopted a 'don't know mind' when thinking about labor; Definitely, particularly prior to the birthing process. I was first unable to accept my pregnancy until I was eventually able to accept and be extremely grateful for what was unfolding right now.

One pregnant woman with multigravida expressed her perspective after participating in the program:

(My perspective) on pregnancy and childbirth has become more positive, and my anxiety has reduced and changed to a feeling of excitement as I approach labor. Regarding parenting, I am more able to restrain from reacting to children's circumstances that do not meet my expectations and to respond more calmly regardless of their circumstances.

Regarding significant insight during the program, pregnant women reported being more mindful and aware of their breath. They felt empowered and capable of addressing what was happening and found the meaning of activities of daily life. One participant reflected more on the mindfulness theme being given at the beginning of the class every week:

Understanding the themes in each MBCP meeting session dramatically influences [my] way of looking at and dealing with various things that happen daily.

Meanwhile, partners reported being calmer and patient and controlling their emotions better. In addition, the ability to observe increased through having a more emotional connection with their pregnant partner and the baby.

The use of the Zoom application

Pregnant women reported benefits of participating in MBCP via Zoom such as appreciating the flexibility in terms of being able to join regardless of where they were, and that they could still attend even if they did not feel well and needed to be laying down. They also liked that they did not need to pay for transportation, except they needed an internet connection to join the program. They also reported some challenges during participation in the program. They felt that three hours was a long class length as they felt sleepy and wanted to get rest. The signal or internet connection was sometimes unstable, and they got cut off. Others had a problem with the session times conflicting with their work and other activities. Some participants that needed to join the program from somewhere other than their own home felt challenged to focus, while others who had other children needed to share attention with taking care of their children. Some participants gave feedback that they would prefer reducing the hours of the meeting and the addition of interactive games. They also felt challenged to join a one-day silent retreat that required a more extended time commitment that day.

In addition, partners reported appreciating the flexibility of joining the program from anywhere. Internet connection challenges were also reported, in addition to schedule management and sleepiness. Some participants also suggested reducing the class meetings to two hours from three.

Additional results on living in a collective culture.

In general, half of pregnant women in this study lived with at least one other extended family member and got influence from them regarding decision making. Three participants had brother or sister in-laws in their list. Half of participants reported the influence they received was usually related to where to go to check the pregnancy, which doctor to choose, and where to give

birth. Almost all participants reported receiving emotional support from their extended family who lived with them. Although 86% of participants ranked their husband as the primary person in their family providing support to them, almost 50% of participants reported conflict with their husbands as a source of stress.

One participant expressed more details related to her conflict with her husband:

The house is not yet well organized, and I feel like working by myself while my husband is busy with his gadget. I cried when a situation like this happened for only a moment. So far, I have tried to control my thoughts by forgetting about them, praying, and doing other activities to distract myself from things that are burdening my mind.

Some participants reported the conflict of living with extended family as a source of stress. One participant explained the pressure to also take responsibility for the financial situation of other family members at home:

I have mostly financial problems as I live with my parents, so there is a sense of tolerance and responsibility toward other family members at home, while there are times when we need to use my husband's income to meet other urgent needs.

Another participant explained more themes about conflict sources as she lives with extended family:

During this pregnancy, there are a lot of people around me (such as my husband's aunt or my husband's work friend) who provide information related to foods that are not prohibited during pregnancy. I usually consult about it with my obstetrician during my monthly checkup schedule. Other than that, a sudden financial expense from my husband's family member made me try to find the root of the problem and help them if possible. But if we cannot help them, I will give an explanation to my mother-in-law.

Although sometimes she cannot accept my explanation, it is okay for me.

Regarding pregnancy, some participants reported their feelings of anxiety about the baby in the womb, wondering whether it was healthy or not. They found that sharing their anxiety with a friend or reading about other mothers' experiences with birth could be a way to reduce their fear and anxiety.

Within and between-group analyses

To test Hypotheses 2 and 3, mixed-design repeated-measure ANOVAs were conducted to compare scores on depressive symptoms, avoidant and anxious dimensions of romantic attachment, prenatal attachment, and dispositional mindfulness. With $n = 14$ pregnant women and $n = 13$ partners, the analyses compared four groups: MBCP pregnant women, TAU pregnant women, MBCP partners, and TAU partners (Total $N = 27$). One pregnant woman in the TAU group missed the post-birth follow-up assessment, and three partners in the TAU group missed the post-test assessment. We re-ran the analyses with multiple imputation in SPSS to account for these missing data.

Depressive symptoms

There was no significant difference between the four groups at baseline on depressive symptoms. There was a significant interaction between time*group, $F(6, 46) = 4.118, p < .05$. The imputed datasets did not change the results substantially, and the interaction between time and group remained significant compared to the non-imputed dataset ($F(3, 20) = 14.01, p < .001$). The mean scores of the MBCP group of pregnant women decreased over time, while the other three groups did not. There was an increase in mean scores of depressive symptoms across post-intervention and post-birth in the TAU group, both for pregnant women and their partners, while the mean score of MBCP partners decreased at post-birth compared to post-intervention

(see Table 3.3.).

Romantic attachment (avoidant and anxious attachment)

Regarding avoidant attachment, there was a statistically significant interaction between the effects of time*group ($F(6, 46) = 2.463, p < .05$). There was a decrease in the mean score of avoidant attachment in the MBCP group of pregnant women, while pregnant women in the TAU group experienced a mean increase across the three-time points. Partners in the MBCP group had a decreased mean score at post-birth compared to post-intervention.

Furthermore, the anxious attachment result showed that there was a statistically significant between groups effect, ($F(3, 23) = 3.073, p < .05$), but no significant difference across the three times and no significant time by group interaction. As shown in Table 3.3. there was a slight decrease in the mean score of pregnant women in the MBCP group from baseline to post-birth, while the mean score in the TAU group increased over time.

Prenatal and postnatal attachment

There was a significant time*group interaction for parental attachment, $F(6, 46) = 8.322, p < .001$. Simple main effects analysis showed that the MBCP group of pregnant women significantly increased from baseline to post-intervention ($p < .001$) and baseline to post-birth ($p < .05$), while TAU groups did not. The attachment of partners to the fetus in MBCP ($p < .05$) and TAU ($p < .001$) also increased significantly post-intervention and after birth.

Dispositional mindfulness

The time by group interaction for dispositional mindfulness was not significant ($F(6, 46) = .91, p > .05$). Despite not reaching statistical significance, dispositional mindfulness (measured with the FMMQ-Short Form) showed a slight increase by 1.50 points in the MBCP group of women from baseline to post-intervention and was essentially unchanged in the TAU group.

Discussion

The online MBCP program was feasible regarding acceptability and implementation, and improvements were reported concerning overall well-being and relationship quality with partners and babies. This study examined the effect of expectant couples' participation in the online MBCP program on depressive symptoms, romantic and prenatal attachment, and dispositional mindfulness as compared to a TAU group in Indonesia. Results indicate that MBCP participation led to greater improvement in depressive symptoms, avoidant attachment, and prenatal attachment for pregnant women, compared to the TAU group. Fewer intervention effects were seen for partners. This study was the first to focus on improving depression in pregnant women in Indonesia through a MBI approach. Previous research on MBIs in Indonesia has only focused on anxiety and stress (Putri & Gunatirin, 2020; Febriani et al., 2018; Sumakul & Wayong, 2021).

Analysis of repeated assessments revealed a decrease in depressive symptoms in pregnant women over three time points from pre- to post-intervention, and post-birth. In addition, partners in the MBCP group experienced a decrease in depressive scores post-birth compared to post-intervention, while both pregnant women and partners in the TAU group experienced the opposite. There was a significant decrease in avoidant attachment but not in anxious attachment in the MBCP group of pregnant women, while pregnant women in the TAU group experienced an increase in avoidant attachment. Significant differences in attachment to the fetus occurred across the three-time points and between the groups. There was no significant improvement in dispositional mindfulness, however the patterns of means suggested possible movement in the expected direction that this study was underpowered to detect.

The result of this study suggests the feasibility of an online adaptation of the MBCP program for expectant couples in Indonesia. Although the very small sample size for this pilot

limited our statistical power and generalizability of our conclusions, positive results found with an RCT design and rich qualitative data supports further investigation of this intervention model. Qualitative reports indicate pregnant women generally feel more aware, calm, accepting, and caring about their fetuses after MBCP participation. They also reported many insights and feeling well-prepared for the birthing process after participating in the program. Pregnant women also stated that attending the program enhanced their relationships with their husbands and their fetus. The couples become more aware of each other's needs and become more understanding, patient, and calm. Qualitative answers related to attitudes toward MBCP suggested that it helped pregnant women and their partners adapt well during pregnancy by enhancing their well-being and relationships with their partners and the baby.

Related to retention and attendance, pregnant women attended at least seven of the 10 sessions and partners attended at least five sessions. Completing home practice was challenging, especially for those who work. They were able to practice informal mindfulness at the workplace, such as mindful eating, mindful praying, or mindful commuting, that did not take up their working schedule. It was hard for them to practice formal mindfulness between sessions as most of them commuted daily and spent more time on the road than at home during waking hours.

Based on qualitative reports related to benefits, the results showed the importance of attending the weekly session so that participants still managed to gain the benefits of the program, despite the challenges of finding time for the formal mindfulness home practice. A previous study by Kerr et al. (2019) on web-based mindfulness interventions supported this result. The result of the study by Kerr et al. (201) showed that, despite the challenges of web-based mindfulness participation due to work-related activities, participants still showed high

commitment to practicing what they learned and gained benefits, particularly in terms of their awareness of stress they were experiencing.

From the first week of MBCP, most of the partners in the introduction session explained that they joined the class because of their wives. After participating in the guided reflection in the second week, their answer somewhat developed as they also felt the urgency and importance of participating in the MBCP program to support not only their wives, but also themselves. The increase in depressive scores in partners after the program compared to pretest may relate to the rise of awareness of their condition. We saw that partners increased in the acting with awareness facet of mindfulness (0.5 points) from baseline to post-test ($p < .05$). Acting with awareness also means attending to what is happening in the present, which plays an essential role in husbands becoming more aware of their condition, internally and externally. An aspect of MBI research being investigated is whether mindfulness training can make participants better able to accurately provide self-reports. The awareness that partners gained of their wives and other family members' condition, along with the preparation for childbirth, may have contributed to their increase in depressive scores after the program, which could then eventually decrease significantly after navigating the childbirth and early parenting with mindfulness skills. Longer-term follow-up is needed to assess this possibility.

One of the most important findings from this study is that MBCP participation led to significant reductions in depressive symptoms in pregnant women. The results support previous studies examining the MBCP program for pregnant women in the U.S., UK, Sweden, Taiwan, and Hong Kong (Duncan et al., 2017; Lönnberg et al., 2020; Warriner et al., 2018; Zhang et al., 2023). MBCP helps pregnant women improve their mental health, which is represented by a decrease in depression scores. Partners of pregnant women also benefit from MBCP, which has

been offered in the form of a complete, in-person, 9-week program of 3-hour sessions (Duncan & Bardacke, 2010) or a short program (4 weeks of 2.5-hour sessions of MBCP-4-NHS (National Health Service); Warriner et al., 2018). Both versions were found to improve the quality of the couple's relationship.

A significant decrease of depressive symptoms in the MBCP group but not in the TAU group in this study is consistent with previous studies demonstrating that participation in an MBCP program reduces depressive symptoms in pregnant women (Duncan & Bardacke, 2010, Lönnberg et al., 2020; Warriner et al., 2018). In this study, pregnant women and their partners had different depression scores at baseline, with pregnant women having a higher score ($M = 13.13$, $SD = 2.59$) than their partners ($M = 5.00$, $SD = 3.21$). Thus, it is interesting that both samples demonstrated significant improvement after birth, for women ($M = 7.75$, $SD = 3.33$) and their partners ($M = 3.75$, $SD = 2.49$). Couples in the TAU group showed consistent patterns throughout all three time points: the score for depressive symptoms reduced at the second time point compared to the first, before considerably increasing after the birth. The results in the TAU groups were supported by a study from Brotherson (2007) which mentioned that additional demands on time, adjusting to new identities and roles, and loss of sleep that might accompany having a child can put parents at risk for depression, stress, and reductions in psychological well-being postpartum. In short, these findings of the MBCP group compared to the TAU group suggests MBCP participation may play a role in supporting healthy adjustment and coping mechanisms in pregnant women and their partners postpartum.

Following this, similar results were observed concerning avoidant attachment, i.e., pregnant women in the MBCP group experienced a significant decrease in avoidant attachment over three times, but not in anxious attachment. Furthermore, after the birth, partners of pregnant

women in the MBCP group exhibited less avoidant attachment than before the program's implementation. Meanwhile, TAU couples experienced the opposite. One fundamental principle of MBIs is that greater awareness can improve an individual's understanding and coping mechanisms in difficult situations, and thus eventually reduce negativity (Gheibi et al., 2020). Taken together, the result of a decrease in avoidant attachment of pregnant women after the MBCP program is consistent with the aim of MBCP to improve the well-being of the expectant family and to provide a method for enhancing attachment patterns in dyadic relationships within the family system, and in turn improve depressive symptoms in pregnant women (Duncan & Bardacke, 2010). The establishment of mindful speaking and listening during the retreat and continuing to week seven of the program may have an essential role in the significant decrease of avoidant attachment in pregnant women as couples build mindful communication, which facilitates understanding between them (Bardacke, 2012).

There was no significant reduction in anxious attachment, despite a pattern of a slight downward trend, which may be explained through an emotion regulation perspective. The decrease in avoidant attachment may have created more secure feelings between pregnant women and their partners. Thus, pregnant women may have felt safer in showing their vulnerability to express their needs, worries, and desire for attention from their partners (Mikulincer & Shaver, 2016). This study also found a significant increase in attachment with the babies in pregnant women in the MBCP group at posttest and post-birth follow up. Partners in both the MBCP and TAU groups also experienced a significant increase in attachment to the fetus after birth, compared to pregnant women in the TAU group, who experienced a decrease in attachment after birth. This result aligned with previous findings on MBIs that revealed increased prenatal attachment from baseline to program completion (De Luna, 2015). The Family System

perspective can explain the increased scores of prenatal attachments for all groups post-program before birth, which explains that dyadic relationships can still occur without interaction (Byng-Hall & Stevenson-Hinde, 1991). The decrease in attachment between pregnant women and the baby post-birth in the TAU group may relate to the increased depression symptoms they experienced. Previous studies from Goecke et al. (2010) showing the opposite result found that higher prenatal attachment related to a lower score of depression during pregnancy, at three weeks postpartum, and at six months postpartum. Higher prenatal attachment is also a moderator in pregnant women with depression as it prevents them from experiencing postpartum depression (Brandon et al., 2008).

When considering the collective culture of Indonesia and how it impacts the couples in the study, qualitative reports showed that there was a shift in themes around the sources of stress before and after MBCP program participation. Before the program, most pregnant women reported conflicts with husbands as a source of stress, while after the program most of the mothers reported other themes such as life after birthing and pain during birthing as their main concern. The increase of understanding and caring between pregnant women and their partners after program participation may indicate improvement in their relationship quality. Although there were still demands from extended family for couples, the enhancement of communication between them helped them solve the situations with extended family together.

Related to the qualitative report on extended family in determining what pregnant women should and should not eat, many traditions from different tribes in Indonesia influence pregnant women in certain ways, such as the way they eat and behave. For example, pregnant women in Tengger, East Java, are forbidden to eat certain fruits, side dishes, vegetables, foods that are considered hot, and some unusual foods because of their faith, values, and symbolic meanings of

the foods (Sholihah & Sartika, 2014). At certain points throughout the pregnancy, their mother or other elderly women in their family play an important role in deciding what they should or should not eat. It is hard for them to break the rules, as doing so often leads to being considered “disobedient daughters.”

Regarding the symbolic interaction framework, particularly the sixth assumption (LaRossa and Reitzes, 2009), where individuals and small groups are influenced by larger cultural and societal processes, partners need to consider their roles to support pregnant women as they face other challenges in terms of context, such as which tribe and cultural tradition they belong to, that shape their identities and roles. Couples need to support each other during their interactions with the broader family and environment, as well as the society where they live, because it may affect their relationship quality as couples. It is important to build understanding and purpose together between pregnant women and their partners to broaden understandings not only about the pregnancy, but also in relation to a new role as parents, while they are also part of their extended family and their culture.

Despite culturally influenced power imbalances favoring men in the couple relationship, there were some situations observed during the program with families who already had children where husbands helped their wives focus on joining the weekly class by handling and playing with the other children. One participant who had a long-distance marriage reported her husband’s change to being more attentive to their children and her after the program. Her husband even tried to go home more frequently and help her take care of their children. This result showed the importance of joining the MBCP program with partners to build understanding and attachment and even perhaps begin breaking patterns of patriarchal beliefs and practices. Yoon et al. (2020) found that patriarchal beliefs influence women's mental health in such a manner that they are

positively associated with depression, particularly at low levels of vertical collectivism (collectivism emphasizing hierarchical relations) such as that found in Indonesia.

From a prevention science perspective, the significant benefits of MBCP participation suggest potential for long-term effects on the healthy development of children. Specifically, qualitative reports from participants demonstrated an improvement in their ability to regulate and control their emotions, as well as a more realistic approach to coping with situations. They also reported a stronger emotional connection with their unborn child. Focusing on reducing depressive symptoms in pregnant women may be one way to prevent emotion regulation problems from being passed down from one generation to the next, as parents with depression during their child's infancy may affect their children's subsequent ability to regulate their own emotions, which can lead to more behavior problems in children (Raskin et al., 2016). In addition, the decrease of depressive symptoms during pregnancy, along with the support of their partners may also prevent mothers from experiencing depression postpartum. Preventing postpartum depression in turn can benefit the mother-infant relationship and maternal-infant attachment behavior. A decrease in depressive symptoms during pregnancy may prevent adverse obstetric and harmful maternal and newborn effects in infants (Brandon et al., 2009; Chung et al., 2001; Fields, et al., 2023; Townsend, 2000).

Limitations and future directions

There are some challenges encountered in the study. This study had a small sample size that limits the generalization to broader populations. We also experienced a severe selection effect in this study since so few participants enrolled. It was necessary to analyze pregnant women and their partners as individuals due to the very small sample size, while the appropriate way to analyze dyads in a bigger sample with enough power would be in multilevel models with

individuals nested within dyads.

Despite the limited sample, some expected outcomes were supported for all hypotheses. This study is also the first MBCP program implemented for Indonesian pregnant women, including partners in the program. Although the partners were not as involved as frequently as pregnant women, they still managed to do the practices and gained benefits from the program as well. Notably, the partners' attendance in couple-based practices, such as pain practice with ice and the silent retreat day that introduced mindful speaking and listening, showed that they valued the impact of their participation in supporting their pregnant partners.

Related to the FFMQ-SF as measurement tool for dispositional mindfulness, despite the total Cronbach's alpha for the full scale of FFMQ-SF in this study being adequate ($\alpha = .74$), the alpha for the observing facet was low ($\alpha = .35$). The reliability of the five-factor mindfulness questionnaire (FFMQ) short form utilized in this study in general was also lower than that of the full-length version. Although a longer version of the FFMQ might be preferable for assessing the interventions' effects on pregnant women's levels of mindfulness, stress, and depression (Kantrowitz-Gordon, 2018), we opted for a shorter version to ease participant burden and increase survey completion rates. We chose the less rigorous option out of concern for retention, although this may not have been adequate.

In addition, it is possible that the cultural context of Indonesia, which is distinct from the origin of the FFMQ-SF that was utilized (Gu et al., 2016), was the cause of the FFMQ-SF being less reliable in this study when compared to the original measure. Previous research (Karl et al., 2021; Kirmayer, 2015) suggests that the practice of mindfulness needs to be recontextualized based on the cultural background of participants of the study. As a result, findings here suggest future psychometric evaluations of the FFMQ's features in the Indonesian community is needed,

particularly among pregnant women, to determine its cultural sensitivity, and whether specific items are not functioning well in an Indonesian context.

The MBCP program delivered online via the Zoom application in the study sometimes experienced lag due to a poor internet connection. Despite this challenge, participants revealed the benefit of joining the program online. Five out of eight participants wrote about a similar theme, i.e., having the program through Zoom meetings is more flexible regarding time, place, and personal conditions. For example, they did not need to visit a place, so they did not have to spend time on the street before coming to the class. They also managed to join the session when they were not well enough to join the class by lying on their couch or bed at home. Particularly, participants managed to join from different provinces and even different islands. Considering the geographical situation in Indonesia, the Zoom delivery style helped this program reach more diverse participants from different areas in Indonesia.

Additionally, three participants said the time was too long and suggested a reduction to two hours for the weekly formal meeting. Despite these challenges, they wished to have a continuing mindfulness program after birth that focuses on parenting mindfully. Although the homework assignments suggested practicing mindfulness formally and informally at home, we did not assess the exact frequency of self-practice completed at home. Therefore, future research may consider daily sampling to monitor home practice.

In addition, we experienced many challenges in finding participants who met the criteria for this study. Although many of the pregnant women in Study 1 were eligible to join Study 2 in terms of their depressive symptoms scores and weeks of pregnancy at the time they filled out the survey, we could not follow up with them to join Study 2 as they had already reached above 28 weeks of pregnancy (or given birth) by the time we followed up with them to join Study 2 or at

the time we needed to randomize them. Another reason was that their partners did not give consent to join the study. Pregnant women who were not interested in joining Study 2 gave reasons that they were busy as full-time working mothers, having a long-distance marriage, or simply not wanting to join without further information. Other eligible participants could not be reached by their WhatsApp number or email (they did not answer the emails and messages sent through WhatsApp).

Other than that, participants that had been assigned to the MBCP group could not join because they could not attend the schedule assigned for the MBCP session due to time conflicts with work, study, or other family scheduling conflicts such as picking up the other children from school, etc.; partners could not attend the session due to a time conflict; or they did not want to be assigned to certain groups (MBCP or TAU).

Another challenge was to set up the time to meet as Indonesia has three different time zones, which affected the MBCP program in the way that participants mostly consist of Muslims who need to pray on a specific schedule; participants had different working times for each time zone. For those participants who commute to work, it was challenging to join the class during the weekdays, while during the weekend, some of them still work on weekends (Saturday), and participants who are Christians could not join on Sunday. The weekend was usually family time when people in Indonesia visited their parents or attended many other ceremonies.

Based on these challenges, future studies should consider recruiting pregnant women only without requiring partners to join. Researchers should ask for participant availability as one of their screening questions before including them in the program. Regarding recruitment, the next study can recruit pregnant women in general to assess the feasibility of this program for not only clinical participants but also for a general population of pregnant women.

In conclusion, this study offers preliminary evidence regarding the potential impact of offering the MBCP program online for expectant couples in Indonesia, especially those pregnant women with depressive symptoms. It points to the value of this approach for couples, particularly in a collectivist culture with patriarchal traditions. It adds to the emerging literature on how MBCP enhances pregnant couples' well-being. Particularly, to our knowledge, this is the first study to investigate the efficacy of MBCP in reducing depressive symptoms in pregnant women in Indonesia and provides a rich array of potential avenues for future investigation from a mixed methods approach.

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Table 3.1 Pregnant women's Demographic Characteristics at baseline.

	MBCP group	TAU group
Participants (n)	8	8
Age in years <i>M (SD)</i>	28.75 (4.06)	26.50 (4.59)
Weeks <i>M(SD)</i>	18.00 (4.56)	20.00 (6.82)
Education <i>n (%)</i>		
Elementary – high school degree	0	0
College/Undergraduate degree	5 (62.5)	3 (37.5)
Graduate degree	3 (37.5)	5 (62.5)
Domicile <i>n (%)</i>		
Java island	7 (87.5)	7 (87.5)
Others	1 (12.5)	1 (12.5)
Insurance <i>n (%)</i>		
Yes	4 (50)	5 (62.5)
No	4 (50)	3 (37.5)
Income <i>n (%)</i>		
≤ Rp 5 million	5 (62.5)	7 (87.5)
Rp 5 – 10 million	2 (25.0)	1 (12.5)
Rp 11 – 20 million	1 (12.5)	0
≥ Rp 21 million	0	0
House ownership <i>n (%)</i>		
Yes	1 (12.5)	5 (62.5)
No	7 (87.5)	3 (37.5)
Time together with partner <i>n (%)</i>		
0 – 5 years	7 (87.5)	5 (62.5)
6 – 10 years	1 (12.5)	2 (25.0)
11 - 20 years	0	1 (12.5)
Living with <i>n (%)</i>		
Nuclear family	4 (50)	3 (37.5)
Extended family	4 (50)	5 (62.5)
Support of partners at home among others <i>n (%)</i>		
Number 1	6 (75)	8(100)
Above 1 (2 – 8)	2 (25)	0
Total numbers of support for family members at home <i>n (%)</i>		
Four supports	2 (25)	3 (37.5)
Less than four	6 (75)	5 (62.5)
Decisions related to pregnancy <i>n (%)</i>		
Decided by own self	4 (50)	3 (37.5)
Influenced by family members	4 (50)	5 (62.5)
Health problems <i>n (%)</i>		
Yes	3 (37.5)	1 (12.5)
No	5 (62.5)	7 (87.5)
Practice health behaviors <i>n (%)</i>		
Yes	7 (87.5)	8(100)
No	1 (12.5)	0
Exercise practices <i>n (%)</i>		
Yes	6 (75)	1 (12.5)
No	2 (25)	7 (87.5)
Yoga and meditation experience <i>n (%)</i>		
Yes	4 (50)	2 (25)
No	4 (50)	6 (75)
Pregnancy planned <i>n (%)</i>		

Planned	3 (37.5)	7 (87.5)
Unplanned	5 (62.5)	1 (12.5)
Pregnancy experiences <i>n</i> (%)		
First time	4 (50)	6 (75)
More than one time	4 (50)	2 (25)
Miscarriages experience <i>n</i> (%)		
Yes	4 (50)	1 (12.5)
No	4 (50)	7 (87.5)
Current stressful event <i>n</i> (%)		
Yes	4 (50)	5 (62.5)
No	4 (50)	3 (37.5)

Note. $N = 16$. Participants were on average 27.63 years old ($SD = 4.349$) and weeks pregnancy were on average 19.00 weeks ($SD = 5.704$).

Table 3.2. Test of MBCP vs TAU condition equivalence at baseline

Measures	MBCP		TAU		t (df 14)	p	Cohen's <i>d</i>	LLCI	ULCI
	M	SD	M	SD					
Depressive symptoms	13.13	2.59	12.75	2.61	.29	.78	.14	-.84	1.12
Avoidant attachment	13.50	4.99	15.75	4.95	-.91	.38	-.45	-1.44	.55
Anxious attachment	22.13	5.41	24.75	7.05	-.86	.42	-.42	-1.43	.58
Prenatal attachment	71.50	8.67	80.00	4.14	-.25	.03*	-1.25	-2.32	-.15
Dispositional mindfulness	50.63	1.59	48.88	4.45	1.05	.31	.52	-.49	1.51

Note. $N = 16$; M= Mean; SD = Standard deviations; CI = Confidence interval 95%; LL = Lower limit; UL = Upper limit. Cohen's *d* is a standardized effect size. * $p < .05$. ** $p < .01$.

Table 3.3. Descriptive Statistics for Study Variables by Condition Across Three Time Points for Pregnant Women

	MBCP (n = 8)						TAU (n = 6)					
	T1		T2		T3		T1		T2		T3	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Depressive symptoms	13.13	2.59	8.75	2.87	7.75	3.33	13.33	2.73	11.33	2.34	13.17	5.88
Avoidant attachment	13.50	4.98	12.00	4.38	11.38	3.89	14.50	4.68	15.67	3.26	17.33	5.68
Anxious attachment	22.13	5.41	21.13	5.36	21.25	5.60	25.50	7.06	26.00	4.82	28.33	5.43
Prenatal and postnatal attachment	71.50	8.67	80.50	4.11	79.38	7.27	78.33	3.01	81.17	3.49	77.18	7.47
Dispositional mindfulness	50.63	1.59	52.13	4.32	51.13	5.36	46.67	1.37	47.50	2.74	47.50	.55

Note. $N = 14$; M= Mean; SD = Standard deviations At T1/baseline, there was a statistically significant difference between MBCP and TAU groups in prenatal attachment.

Table 3.4. Descriptive Statistics for Study Variables by Condition Across Three Time Points for Partners

	MBCP (n = 8)						TAU (n = 5)					
	T1		T2		T3		T1		T2		T3	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Depressive symptoms	5.00	3.21	7.13	3.31	3.75	2.49	8.60	2.88	4.80	4.09	9.00	1.41
Avoidant attachment	12.13	4.19	13.88	4.49	12.00	3.67	14.40	3.36	11.20	3.89	16.60	6.03
Anxious attachment	17.63	5.98	20.63	4.72	19.25	5.55	22.40	3.36	23.60	2.41	21.40	1.67
Prenatal and postnatal attachment	63.00	5.56	63.75	4.46	70.38	5.78	58.60	4.04	73.20	4.66	76.74	7.83
Dispositional mindfulness	49.13	9.66	50.75	6.84	53.13	8.61	48.00	2.35	47.60	1.95	47.00	1.87

Note. $N = 13$; M= Mean; SD = Standard deviations At T1/baseline, no statistically significant differences were observed between MBCP and TAU groups.

Table 3.5. Measures over time for MBCP and TAU groups.

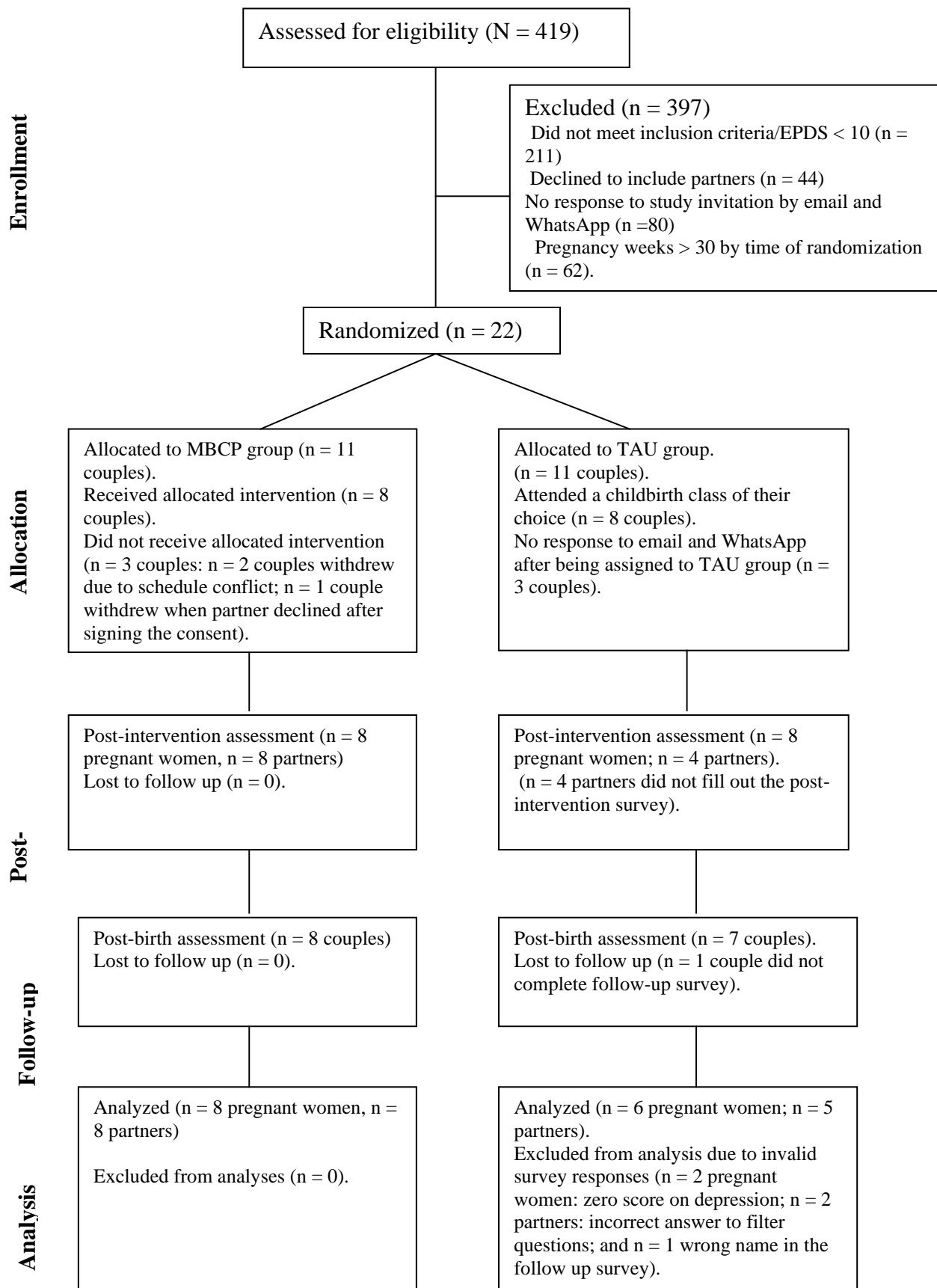
Measure and group	Pre-test		Post-test		Follow Up		Within-Subjects Effects (Time)		
	M	SD	M	SD	M	SD	F (2, 46)	p	η^2
Depressive symptoms									
MBCP - PW	13.13	2.59	8.75	2.87	7.75	3.33	3.96	.026*	.147
TAU - PW	13.33	2.73	11.33	2.34	13.17	5.88			
MBCP - P	5.00	3.21	7.13	3.31	3.75	2.49			
TAU - P	8.60	2.88	4.80	4.09	9.00	1.41			
Avoidant attachment									
MBCP - PW	13.50	4.98	12.00	4.38	11.38	3.89	.981	.382	.041
TAU - PW	14.50	4.68	15.67	3.26	17.33	5.68			
MBCP - P	12.13	4.19	13.88	4.49	12.00	3.67			
TAU - P	14.40	3.36	11.20	3.89	16.60	6.03			
Anxious attachment									
MBCP - PW	22.13	5.41	21.13	5.36	21.25	5.60	.700	.502	.030
TAU - PW	25.50	7.06	26.00	4.82	28.33	5.43			
MBCP - P	17.63	5.98	20.63	4.72	19.25	5.55			
TAU - P	22.40	3.36	23.60	2.41	21.40	1.67			
Pre-postnatal attachment									
MBCP - PW	71.50	8.67	80.50	4.11	79.38	7.27	29.255	.000**	.560
TAU - PW	78.33	3.01	81.17	3.49	77.18	7.47			
MBCP - P	63.00	5.56	63.75	4.46	70.38	5.78			
TAU - P	58.60	4.04	73.20	4.66	76.74	7.83			
Dispositional mindfulness									
MBCP - PW	50.63	1.59	52.13	4.32	51.13	5.36	.889	.418	.037
TAU - PW	46.67	1.37	47.50	2.74	47.50	.55			
MBCP - P	49.13	9.66	50.75	6.84	53.13	8.61			
TAU - P	48.00	2.35	47.60	1.95	47.00	1.87			
Observing									
MBCP - PW	9.38	2.134	10.00	1.690	10.25	2.252	2.250	.117	.089
TAU - PW	8.67	.816	9.50	1.378	9.50	2.588			
MBCP - P	9.75	3.370	10.25	1.753	9.13	2.900			
TAU - P	9.80	1.483	9.80	1.095	7.00	1.581			
Describing									
MBCP - PW	11.25	.886	10.38	1.996	10.25	2.315	.698	.503	.029
TAU - PW	8.50	.837	8.17	.753	9.17	1.472			
MBCP - P	10.38	2.504	10.00	2.878	11.13	3.227			
TAU - P	8.80	2.168	9.00	1.414	8.60	.894			
Acting with awareness									
MBCP - PW	11.63	1.768	9.87	1.246	9.63	.916	6.684	.003**	.225
TAU - PW	11.33	1.366	9.67	.816	9.33	1.633			
MBCP - P	9.38	1.847	9.88	1.727	9.00	1.852			
TAU - P	10.20	1.643	8.80	.447	10.20	.837			
Non-judging									
MBCP - PW	8.75	2.252	9.88	.641	8.88	.835	3.412	.042*	.129
TAU - PW	8.83	2.401	9.83	1.472	9.50	1.871			
MBCP - P	9.38	1.188	9.38	1.408	9.50	1.414			

TAU - P	8.80	.837	9.80	.837	8.60	1.517			
Non-reactivity									
MBCP - PW	9.63	1.061	9.75	1.581	9.37	3.068	.324	.725	.014
TAU - PW	9.33	2.422	8.67	1.033	8.33	2.160			
MBCP - P	8.00	1.690	8.50	2.204	9.63	2.925			
TAU - P	8.00	3.162	9.60	.548	8.20	1.095			

Note. $N = 27$. PW = Pregnant women; P = Partners; MBCP - PW: $n = 8$; TAU - PW: $n = 8$; MBCP - P: $n = 6$; TAU - P = 5. M= Mean; SD = Standard deviations.

* $p < .05$. ** $p < .01$.

Figure 3.1 CONSORT flow chart of study participants.



Chapter 4

Mindfulness-Based Childbirth and Parenting (MBCP):

A Pilot RCT of a Mindfulness-Based Intervention for Pregnant Women in Indonesia

(Study 3)

Abstract

Recent research on the application of Mindfulness-Based Interventions (MBIs) during the prenatal period suggests that they may help pregnant women improve their well-being. However, there is limited research on implementing such approaches for pregnant women in Indonesia and a recent effort to recruit depressed pregnant women and their partners for participation in an online Mindfulness-Based Childbirth and Parenting (MBCP) had promising effects yet poor recruitment success. This study aimed to evaluate the feasibility, acceptability, and preliminary effects of delivering an online MBCP program to pregnant women from the general population in Indonesia as a prevention strategy, without involvement of their partners. Aims included testing intervention effects on reducing depressive symptoms and avoidant and anxious romantic attachment and increasing prenatal attachment and dispositional mindfulness. A mixed-methods randomized controlled trial was conducted to determine the feasibility and effectiveness of the program. Participants completed questionnaires on depressive symptoms, dispositional mindfulness, and prenatal and romantic attachments at baseline and post-intervention. Semi-structured open-ended questions were also included to obtain participant feedback about the intervention. The results revealed the overall acceptability of the online-adapted MBCP program. Open-ended feedback highlighted the benefits and drawbacks of online delivery. MBCP participants reported a significant increase in prenatal attachment after program participation ($F(1, 25) = 4.89, p < .05$). A simple main effect analysis of time*group showed that the MBCP group had higher prenatal attachment at post-test compared to TAU participants who joined another childbirth class ($p < .05, 95\% \text{ CI } [.186, 12.450]$). There was no significant difference between the MBCP

group and TAU in dispositional mindfulness. As dispositional mindfulness can be examined as a multidimensional construct, the observing facet was found to have a significant increase in MBCP group after the program, ($F(1, 25) = 4.66, p < .05$), and significant difference between groups ($F(2, 25) = 5.697, p < .01$) compared to the TAU subgroup who did not attend childbirth education. However, there were no significant differences in depressive symptoms or avoidant or anxious attachment between MBCP and TAU groups. The online Mindfulness-Based Childbirth and Parenting (MBCP) program is feasible and acceptable for pregnant women in Indonesia. The program showed some preliminary effects on increasing prenatal attachment. However, more extensive studies with longer term follow up are needed to determine the effects of the program on postpartum mental health, infant development, and parenting. Further research is also needed to explore the reasons for the lack of significant effects on depressive symptoms and romantic attachment in contrast to earlier pilot work (Study 2). Intervening with women alone, without partners, was more feasible but had fewer significant effects. Men hold greater power in both public and domestic spheres in Indonesia which may play a role in the lack of MBCP effects on improving romantic attachment and depressive symptoms when delivered to pregnant women alone.

Keywords: MBCP, Indonesia, pregnancy, depressive, romantic attachment, prenatal attachment.

Introduction

Over the last few decades, pregnancy-related issues have become a global healthcare priority. As a result, there has been increasing concern regarding how to help pregnant women, from both non-clinical and clinical populations, to enhance their well-being, such as through sleep enhancement programs and exercise programs, and to improve mental health problems, such as reducing stress, anxiety, and depression, and preventing postpartum depressive symptoms (Byrne et al., 2011; Duncan et al., 2017; Gustafsson et al., 2016; Lee et al., 2016; Lönnberg et al., 2020; Matvienko-Sikar et al., 2016; Miklowitz et al., 2015; Tomfohr-Madsen et al., 2016, Tunnel et al., 2019). Thus, regardless of the presence or absence of clinical conditions, developing prevention programs to enhance pregnant women's overall health and well-being remains crucial.

Many efforts to develop preventive interventions have been established to make them more accessible to general and clinical populations of pregnant women. Cultivating mindfulness may have important mental health advantages for pregnant women. Previous studies revealed significant improvement in pregnant women's overall well-being and reduced mental health problems from participation in various mindfulness-based interventions (MBIs) (e.g., Beddoe et al., 2010; Hulsbosch et al., 2020; Kubo et al., 2021; Müller et al., 2020; Papini et al., 2022).

Mindfulness-based intervention (MBI) programs for pregnant women

Mindfulness has gained much theoretical and empirical attention in the past 20 years. Kabat-Zinn (2003) defines mindfulness as paying attention to the present moment without judgment. Mindfulness interventions aim to enhance awareness and acceptance of the present moment through a training process (e.g., mindful breathing as a basic form among many other mindfulness practices), develop stress tolerance, and weaken reactivity to unpleasant experiences

(Creswell, 2017; Kabat-Zinn, 2013). MBIs cover the seven attitudes of mindfulness from Kabat-Zinn: non-judging, non-striving, patience, beginner's mind, trust, acceptance, and letting go (2013). Mindfulness-Based Stress Reduction (MBSR), the most well-established of the MBIs, was introduced by Jon Kabat-Zinn in 1979 at the Stress Reduction Clinic at the University of Massachusetts Medical Center (Kabat-Zinn, 2013). MBSR has been used in medicine and psychology and adapted into other mindfulness-based programs by scholars and clinicians, such as Mindfulness-Based Cognitive Therapy (MBCT; Segal et al., 2013) and Mindfulness-Based Childbirth and Parenting (MBCP; Bardacke, 2012).

Despite growing research on MBIs for pregnant women worldwide, there remains a paucity of evidence on MBI studies in Indonesia (Febriani et al., 2018; Anggorowati et al., 2019). Other psychological interventions have been conducted to improve comorbid conditions for pregnant women in Indonesia, such as anxiety (Murni et al., 2014; Sukandar, 2009; Sulistiyarningsih & Rofika, 2020). A study by Murni et al. (2014) on the effect of guided imagery and music to reduce anxiety in 34 pregnant women with a quasi-experimental design showed a significant decrease in anxiety in the experimental group compared to the control group. Sukandar's (2009) study of Cognitive Behavior Therapy with an RCT design with 20 pregnant women also revealed a significant decrease in anxiety in the experimental group compared to the control group. Sulistiyarningsih and Rofika's (2020) one-group, pretest-posttest study with 30 pregnant women in prenatal gentle yoga also showed a significant decrease in anxiety after the program. The significant effects of such programs suggest an important role for intervention programs to help pregnant women in Indonesia. Given this prior work in Indonesia, investigating an MBI program that focuses on pregnant women in general will fill an important gap in providing support during the pregnancy and birthing process.

Mindfulness-Based Childbirth and Parenting (MBCP) adaptation

The Mindfulness-Based Childbirth and Parenting (MBCP) program was initially designed for pregnant couples to promote their psychological health and provide helpful information to prepare for childbirth and parenthood (Duncan & Bardacke, 2010). An online adaptation for expectant couples in Indonesia yielded promising indications of acceptability and beneficial impact, however recruitment was severely limited (Fourianalistyawati, Study 2). Thus, to gather a larger participant pool and gain further insight into how the program may benefit pregnant women in general, further modifications were made to the program implementation protocol. The current study aimed to remove the inclusion criteria related to partner participation and expand beyond pregnant women with elevated depression to include the general population of pregnant women in Indonesia. This modification of the MBCP program aims to investigate its suitability for pregnant women participating alone, and its potential for becoming a supportive program for both general populations of pregnant women in Indonesia.

The current study employed an online MBCP program delivered through the Zoom application. An online delivery program can be a feasible choice and an essential strategy for increasing the accessibility and impact of an MBI program, especially for pregnant women. As the number of people who use the internet and computers grows, more and more pregnant women use the internet to learn about pregnancy and join online antenatal education programs (Goetz et al., 2020; Hulsboch et al., 2020). Previous studies have explored the benefit of using Zoom as the most used application since the start of the COVID-19 pandemic (Shapira et al., 2021; Ziadni et al., 2021). A study by Asih et al. (2022) revealed that providing health promotion education through Zoom improved pregnant women's attitudes and knowledge regarding signs of important health concerns of pregnancy. Zoom delivery can be feasible and acceptable for

psychological intervention (Sun et al., 2021; Wong et al., 2021). Additionally, delivering interventions via Zoom can enhance participants' satisfaction and participation and improve the accessibility of home-based treatment (Fourianalistyawati, Study 2; Ziadni et al., 2021).

The present study

This study modified the online MBCP program from Study 2 to examine the feasibility and accessibility of offering this online MBCP program for general population pregnant women in Indonesia. Despite the benefits of partners joining the MBCP program with pregnant women as revealed in Study 2, there was severely limited recruitment success in Study 2, in part due to partners declining to join. Given the potential for MBCP to prevent depression even among those without elevated levels early in pregnancy, we also expanded inclusion criteria to allow women with any level of depressive symptoms to participate. Thus, this study recruited pregnant women in general without requiring their partners to join and without requiring elevated levels of depressive symptoms, to broaden the reach of the program and allow for a larger pilot sample size to test preliminary effectiveness. Thus, we modified the MBCP program that was originally developed for pregnant couples to be feasible for pregnant women in general.

Specifically, this study hypothesized the following:

Hypothesis 1: An adapted MBCP program will be feasible to be delivered online for a general population sample of pregnant women in Indonesia participating without their partners.

Hypothesis 2: Participation in the MBCP online program will reduce depressive symptoms more than TAU (treatment as usual).

Hypothesis 3: Participation in the MBCP online program will improve romantic attachment, prenatal attachment, and dispositional mindfulness compared to TAU.

Methods

Participants

To be included in the current study, participants had to be pregnant, identify as women, be at least ten weeks gestational age, and speak Indonesian. The minimum age was 18 years, and the maximum was 40 years, the age range for a typically healthy pregnancy.

The participants were randomly assigned to two conditions: the experimental group, online MBCP (Mindfulness-Based Childbirth and Parenting) and the TAU (treatment as usual) control group. The exclusion criteria were pregnant women who refused to provide informed consent, those under 18 years of age or older than 40 years of age, and those with less than ten weeks of gestation at enrollment.

Materials

Participants must be able to access the internet, own at least one device capable of online communication, and have at least basic ability to use that device to participate in the Zoom session to take part in this study. In addition, attendees were advised to find a peaceful location to conduct their session without distractions. Finally, worksheets for weekly self-reporting, measurement tools, and audio for self-practice were emailed.

Procedures

This study was a randomized controlled trial (RCT). To randomize participants, we used an online random number generator to assign conditions in advance (Calc-Site). Pregnant women received an email with information regarding their group assignment within a day after completing the screening survey. N = 42 pregnant women completed the pre-test survey and consent form to participate in the study. The details of this process are presented in a CONSORT diagram showing the flow of participants in Figure 4.1. After randomization and allocation to either the MBCP or TAU group (n = 21 for each group), the participants were informed via email

and followed up with through WhatsApp. There was no response from $n = 3$ participants in the MBCP group after being followed up three times by email and WhatsApp, and $n = 1$ participant could not attend the program after the first session as her child needed to use her device for accessing the internet. Seventeen MBCP participants completed the post-intervention survey, and $n = 17$ TAU participants also completed the post-intervention survey. There was no reply from $n = 4$ TAU participants after being contacted by email and WhatsApp.

Participants in the MBCP group received the program free of charge, while participants in the TAU group were paid Rp. 200,000 (around \$15) after the study ended to encourage participation in another childbirth education program of their choice. Pre-test survey data collection for the current study was started upon approval from the University of Wisconsin—Madison IRB on January 9, 2023. The IRB deemed the study exempt, #2021-1344-CP002. Participants with a range of social and economic statuses were recruited. The participants were recruited using social media platforms like Facebook and Instagram. In addition, the study recruited participants through email, WhatsApp, motherhood forums, and other clinical practices. Online consent with a waiver of signed consent was used. Study participants completed self-report questionnaires before and after the program. Participants were also provided semi-structured open-ended questions related to their experiences of pregnancy during the program for the MBCP group or related to pregnancy in general for the TAU group. Participants who filled out the informed consent and randomized to be in the MBCP group were invited to join an introductory session with a short introduction about the MBCP program before the MBCP class started.

The MBCP program for pregnant women

This MBCP online course was delivered via Zoom. The duration of the MBCP online

program was identical to that of the original MBCP and the online-adapted MBCP in Study 2, except that pregnant woman attended the class by themselves, and curriculum modifications were made to account for lack of partner participation. The program was scheduled to run for nine weeks, three hours per week, with one day of silent retreat lasting six hours between classes 6 and 7. During the nine-week program, the participants were asked to find a quiet, comfortable place with few outside interruptions.

In the first week, the participants practiced mindful eating of raisins moment-by-moment by seeing, smelling, and tasting them. A 15-minute Awareness of Breathing formal practice and a Being with Baby practice was conducted in the first week. Being with Baby practice involves mindfully attending to felt sensations of movements of the fetus. The formal practice introduced in the second week was the body scan, which lasted about thirty minutes. Pregnant women were advised to incorporate mindful eating into their daily habits, complementing their formal mindfulness practice.

The body scan practice was repeated in the third week and suggested as a formal practice choice at home, besides the informal practice of mindful activities of daily life. Participants were also encouraged to notice pleasant moments and write them down during week three. In the fourth week of the program, the participants were introduced to 'Mindful Movement' practice. This practice was added to the previous formal practices of 'Body Scan' and the 'Ice Practice for Being with Pain' that is preparation for mindful coping with labor pain. Participants were asked to compare their experience of noticing unpleasant moments during week four with their experience in the previous week. The continuation of previous formal practices, such as mindful yoga, body scanning, and pain management with ice, was carried into the fifth week. After explaining the Mechanisms of Labor, the participants were given homework to practice 'mindful

pooping' (to prepare for mindfully managing labor contractions and birthing sensations). Sitting meditation was introduced in the sixth week, along with the advanced session of pain practice with ice. The pain practice during this week was modified from the original MBCP curriculum so that pregnant women could practice it alone without their partners accompanying them.

After practicing formal mindful meditation and informal daily activities, a silent retreat was held between weeks six and seven. The goal was to deepen and experience how to be mindful for a longer period alternating between formal and informal mindfulness practices. Some modifications were made to the retreat curriculum as it was initially intended for couples to attend together in the original MBCP program. Before the retreat, pregnant women were informed that they needed to be in a space that allowed them to practice alone, without other family members around them, including their partners. Mindful speaking and listening activities practiced by couples in the original MBCP were modified to be practiced in Zoom break-out sessions with other pregnant participants who attended the retreat.

Weeks seven through nine were focused more on preparation for life with the baby after birth. These meetings' goals were to deepen the formal and informal mindfulness practices, with additional loving-kindness meditation practice in week seven. In addition, there was a whiteboard session on how to practice mindfulness after birth by having the baby as their mindfulness teacher, who teaches them to be mindful of the baby's cycle. Other discussion segments were about the physical, emotional, and social needs of a newly birthed family in week seven; breastfeeding and the relationship with mindfulness practice in week eight; and a visit to class from MBCP alumni in week nine, to share their mindfulness practice during the birthing and parenting process learned through the MBCP program.

Treatment as usual (TAU)

People in the TAU group were encouraged to attend a childbirth education class at their expense, or a standard Pregnant Women Class (PWC) commonly offered at community health centers or public hospitals with a module regulated by the Indonesian health ministry.

Measures

This study followed the cultural adaptation steps outlined by Beaton et al. (2000) for the measures employed. As part of this process, a translation-back translation technique was utilized to guarantee that each item on the Indonesian versions of the scales represented the same meaning as the English versions. Four professionals in the field of psychology with graduate level degrees were asked to evaluate the translation and back translation results for their consistency with Indonesian, particularly regarding idioms.

Demographic and Pregnancy Background. Demographic information was collected from each participant: age, marital status, planned or unplanned pregnancy, parity, previous experience of pregnancy, and miscarriage. Furthermore, there were questions about their residence (i.e., rural or urban area) and SES, including educational background, household income, insurance status, employment status, and house ownership.

Edinburgh Postpartum Depression Scale (EPDS). The EPDS consists of a 10-item self-report questionnaire designed to assess depressive symptoms over the past two weeks during the perinatal stage (Cox et al., 1987). Questions are about feelings (e.g., happiness, sadness, and self-blame). The scores range from 0 to 30 on a 4-point Likert scale, and a higher score indicates higher depressive symptom severity. Items emphasize cognitive and affective symptoms of depression while de-emphasizing somatic symptoms common in pregnancy. A score of ten or higher in a group setting indicates depressive symptoms that may indicate clinical levels of depression (Cox et al., 1987; Levis et al., 2020). Reliability is relatively high in validation studies

($\alpha = .80$; Eberhard-Gran et al., 2001). This scale also generated good internal reliability in Indonesia ($\alpha = .834$; Fourianalistyawati et al., 2018). Cronbach's alpha for EPDS in this study was calculated as $\alpha = .84$.

The Experiences in Close Relationship – Short Form (ECR-S). The ECR-S consists of a 12-item self-report questionnaire designed to measure romantic attachment style, divided into six items for the anxiety-related dimension and six for the avoidance-related dimension (Wei et al., 2007). The anxiety dimension assesses concern for relationships, mainly the partner's availability to provide support, fear of rejection or abandonment (the constructs are fear of interpersonal rejection or abandonment, an excessive need for approval from others, and distress when one's partner is unavailable or unresponsive). The dimension of avoidance assesses the difficulty and inconvenience of approaching and relying on others (the constructs are fear of interpersonal intimacy or closeness, reluctance to depend on others, or excessive need for self-reliance, and reluctance to self-disclose; Wei et al., 2007). The internal consistency for the ECR-S is good ($\alpha = .78$ for anxiety and $\alpha = .84$ for avoidance; Wei et al., 2007). The Cronbach's alpha for the ECR-S in this study was calculated as $\alpha = .66$. Specifically, the subscale coefficient alphas were $.77$ (avoidance) and $.58$ (anxiety) for the ECR-S in this study. Although lower than the original version, the coefficient alphas in this study were still in the moderate range and acceptable (Hinton et al., 2014; Taber, 2018).

Maternal Antenatal Attachment Scale (MAAS). The MAAS consists of a 19-item self-report measure that assesses two dimensions: quality of attachment, including closeness or distance, positive or negative feelings, tenderness or irritation towards the fetus, and the dimension of intensity or time spent in the attachment with the fetus over the past two weeks (Condon, 2015). The scores are rated on a 5-point Likert scale, ranging from 1 (low attachment)

to 5 (high attachment). The total scores ranged from 19 to 95, which a higher score indicating a stronger attachment. Reliability has been relatively high in previous validation studies ($\alpha = .81$; Hicks et al., 2018). Cronbach's alpha for the MAAS in this study was calculated as $\alpha = .87$.

Five Facet Mindfulness Questionnaire – Short Form (FFMQ-SF). The FFMQ-SF consists of 15 self-report items selected based on factor loadings of the long form of the FFMQ (39 items), selected by Baer et al. (2008). The FFMQ-SF assesses the same five core aspects of mindfulness as the long form: 1) observing; 2) describing; 3) acting with awareness; 4) non-judging of inner experience; and 5) non-reacting to inner experience (Baer et al., 2008). The scores are rated on a 5-point Likert scale, ranging from 1 (never or very rarely true) to 5 (very often or always true). Based on a psychometric test by Gu et al. (2016), the factor structure of the FFMQ-SF was like the original FFMQ with 39 items, and the total facet scores of the short and long forms had strong relationships. Although the internal consistency for the FFMQ-SF is lower (ranging from .69 to .83 with three items for each facet) than the FFMQ long form (ranging from .82 to .90), it shows that the constructs measured by both versions of the FFMQ were very comparable (Gu et al., 2016). The Cronbach's alpha for the full scale of the FFMQ-SF in this study was calculated as $\alpha = .52$. Cronbach's alpha for each facet in this study was calculated as follows: $\alpha = .63$ for observing, $\alpha = .51$ for describing, $\alpha = .83$ for acting with awareness, $\alpha = .85$ for non-judging), and $\alpha = .53$ for non-reactivity.

Additional covariates. This study also included assessment of the following factors to gauge aspects of living in a collectivist culture and management of health during pregnancy: 1) whether pregnant women live with extended family or not; 2) whether pregnant women get support from their extended family or not, 3) other forms of supports that they receive (i.e., emotional, informational, appraisal, and instrumental support), 4) whether they decide things

related to the pregnancy and the birthing process by themselves or not, and if not, who else makes decisions related to their pregnancy, and 5) whether they practice health behaviors to maintain their health or not.

Data analyses

Regardless of class attendance, we initially analyzed all participants who completed pretest and posttest questionnaires using intent-to-treat analyses. Hypotheses related to the effects of the intervention were tested using repeated-measure ANOVAs, with time (pre-posttest) as a within-subject variable and group as a between-subjects variable, with additional pairwise analyses on the interaction between time and group. Descriptive statistics were used to analyze demographic data. Table 4.1 presents demographic data.

Follow-up “as-treated” analyses were conducted based on attendance level: MBCP participants were considered “as treated” if they attended at least five of the weekly sessions. Further, the TAU control group was divided based upon whether they reported attending any form of childbirth preparation course (i.e., TAU “treated” + prenatal care vs. TAU prenatal care only). In total, out of 21 participants from the MBCP group, $n = 11$ were included in the final “as-treated” analyses.

In addition, out of 21 participants from the TAU group, only $n = 17$ participants completed the posttest. Meanwhile, $n = 4$ participants randomized to the TAU group were defined as lost to follow up, as they did not reply to email or WhatsApp messages after being contacted at least four times after they were informed they were TAU participants, up until the posttest survey was emailed and sent through WhatsApp to them. Thus, considering them missing at random, complete case analysis or listwise deletion was used to only analyze the available cases in the final analyses (Kang, 2013). For the final analyses the $n = 17$ TAU

participants who finished the post-test were further divided into two groups based on whether they reported attending any form of childbirth education class. Of these, $n = 8$ attended a childbirth class and $n = 9$ did not report attending a childbirth education class.

Results

Retention in the study

Of the 21 participants that gave consent to join Study 3 and were assigned to the MBCP group, $n = 11$ attended the orientation pre-program session, $n = 2$ participants informed the instructor they could not join, and there was no response from $n = 8$ participants. The attendance rate each week was between 8–15 participants, with at least another 3–4 participants keeping in contact and informing the instructor of their need to be absent from the class. A make-up class was offered weekly after the regular class meeting on Saturday, to facilitate participants who could not attend the class for reasons such as family events on the weekend or changing shift work hours. The make-up class was held either on Monday or Tuesday night, after working hours to allow time for practicing that week's home practice in advance of the next Saturday session.

In keeping with the guidelines, home practice and the weekly self-reflection report were encouraged but not imposed. Participants received an email after the weekly session ended that informed them of the summary of the day's session, the suggestion of formal and informal home practices during the week, and the link to audio guides for the formal practice. Some reasons for being unable to attend the weekly class were conflicts with family events, general pregnancy check-ups, and work-related situations (e.g., changing work shift hours or being still in transit on the way home from the workplace). Some participants had pregnancy-related illnesses, such as vomiting, dizziness, and migraine, making it impossible to attend the class even with the camera

off. One participant needed to stop joining the class in the last three sessions as the doctors advised bed rest. Others had challenges with their internet connection, technical problems with their phone, or their phone was used by their children.

Feasibility and acceptability of the MBCP program

Participants were provided reflection questions related to the MBCP program along with the post-test questionnaires. Responses were translated from Indonesian to English and were thematically coded. Some key themes were found in participant answers about changes in their attitude toward pregnancy, childbirth, or parenting since the course began. For example, participants reported being more aware (n = 7), calm (n= 3), more ready to face childbirth (n = 3), had reduced their anxiety (n = 2), and felt more connection with their baby (n = 2) after MBCP participation.

One participant explained how the MBCP class helped her in improving mindfulness habits, taking a pause, and improving her connection with the baby:

Even though sometimes I feel that the mindfulness muscles are not that strong enough in me because I might forget to practice them every day formally and informally, I feel that afterward (although sometimes being reactive quite often happens in some situations) I can step back for a moment and try to manage the situation through breathing and observe how I feel. I also feel that my connection with my baby has deepened since joining MBCP. I feel even more that this pregnancy is very meaningful.

Other participants reported benefits from MBCP. The five key quotes below provide representative examples:

(1) I became more focused and aware of the activities I was doing. I often daydreamed and did things in autopilot mode in the past; (2) I became calmer because it was easier

to think positively currently and set expectations that previously were too big; (3) I was more able to be grateful by focusing on what I got instead of hoping for many things to happen in the future; (4) I am more connected to the child and have fewer worries about his condition in the womb; (5) I feel more able to be present in accompanying activities and assisting the growth and development of my first child and becoming more familiar with the child's character.

Participants reflected on their ability to handle stressful situations after joining the program as they increased their understanding of impermanence in everything. They became more aware of the situation, knew how to respond better rather than react, used their breath as an anchor, and took pauses as needed during the unpleasant moment. One participant reported relief from the physical discomfort she felt previously from increased stomach acid triggered by negative thinking prior to MBCP participation. Another participant described her substantial improvement since joining the program:

I don't know if this is directly related, but indeed, at the beginning of joining the program, I felt that I was experiencing severe stress, so I often cried within seconds. Now I no longer experience it.

Regarding their relationships with their partners, participants mentioned that they had better communication with their partners (n = 3), were more able to accept their partner's situation (n = 3), were more open, and were more appreciative of things their partners did. Some participants even got MBCP practice support from their partners despite the partners not participating in the intervention:

My husband supports or reminds me to do breathing techniques, such as practicing being mindful of my breath when I feel uncomfortable.

Another participant reflected on feeling more positive about herself regardless of external influences, including her partner:

Yes. I'm trying more to build a positive relationship with myself so that what is outside of myself including my partner does not really affect my condition.

Pregnant women also felt that their attachment to their baby in the womb was getting stronger in many ways, communicating with their babies more often, being more aware of the presence of the baby, and feeling more connected. Participants also felt that they became closer emotionally when they felt something and had the insight that babies need them physically and mentally. One participant explained how she previously lived her pregnancy like a robot and how that shifted through MBCP participation:

Yes, there is. Before joining MBCP, I felt this pregnancy was happening as it was. I live it like a robot. I rarely felt connection or belly rubs. I didn't feel really connected to the fetus yet. Since joining MBCP, I have paid a lot of attention to what I feel, both body sensations and movements in the stomach, as well as images like the process of growing a fetus in the stomach. Every time I have an ultrasound check, I become more mindful of paying attention to my baby's development. I feel much stronger in terms of bonding with my fetus with each passing week.

Most of the participants experienced some fear related to their pregnancy and the birthing process, such as first-time pregnancy experience, Cesarean-section-related situations (i.e., previous C-section trauma, concern about needing a C-section due to a clinical condition, conflict with parents around their C-section decision), and future-related fear about the birthing time being just around the major Muslim holiday of Eid in Indonesia where health providers have limited time at the hospital compared to a normal day. Despite

such challenges, they felt that the MBCP program helped them to handle their fear so that they became calmer and more in control of their fearful thoughts and feelings of anxiety. They became more confident knowing that their pain was temporary. They remembered that the more they feel pain, the closer they were to the time they would meet their baby.

The materials related to pregnancy and birthing and the role of a mindful attitude also helped participants in preparing for the birth:

In addition to being guided on mindfulness, it turns out that the MBCP program also provides theories about pregnancy which are very helpful. There are even practices that can really train yourself to prepare for childbirth.

Benefits and challenges of using the Zoom application.

Most of the participants said that besides the valuable materials related to their pregnancy and the enhancement of their relationship with their baby, the benefits of joining this MBCP program through Zoom meetings were the flexibility (n = 6) and the possibility to have participants from different areas of Indonesia (n = 3). In addition, zoom sessions also accommodated participants who had severe medical conditions:

Yes, using the Zoom application, you can do classes without having to [be] face to face, especially [beneficial] for me, a pregnant woman with a hyperemesis condition.

When asked about challenges using Zoom, n = 4 participants mentioned that they were sometimes not entirely focused on the session as there were some distractions from other things, such as their child needing attention or unexpected events at home, such as family events or the sickness of other family members. Internet connection was also a challenge for some participants (n = 5).

Based on these qualitative answers, the MBCP program was found to be overall feasible

and acceptable as participants shared more benefits than drawbacks regarding the impact of joining the program with reports of benefits for themselves, their relationships with partners, connection with the baby in the womb, and advantages of using Zoom.

Within and between group analyses

Mixed-design repeated measure ANOVAs were used to compare the scores on depressive symptoms, romantic attachment, prenatal attachment, and dispositional mindfulness between the MBCP and TAU groups. With a total sample size of $n = 42$, the baseline analyses compared two groups: MBCP ($n = 21$) and TAU group ($n = 21$). Final as-treated analyses for all variables included $n = 11$ participants in the MBCP group, $n = 8$ participants in TAU who joined a childbirth program, and ($n = 9$) participants who did not attend a childbirth program.

All analyses above used IBM SPSS Statistics 27. There were no significant differences between groups in terms of baseline scores for all study variables ($p > .05$). However, there were significant group differences on domicile, exercise, and stressful life events ($p < .05$). We explored these 3 demographic indicators as covariates but removed them from the final models as they were non-significant.

Depressive symptoms

The findings suggested no significant difference across the three time points ($F(1, 25) = 2.91, p = .100$) and no significant differences between groups ($F(2, 25) = .297, p = .746$) in depressive symptoms. Furthermore, the groups had the same pattern of decreasing depressive symptoms from pre- to post-test. Therefore, these results revealed that pregnant women in the MBCP online program did not differ from pregnant women in the TAU group in terms of depressive symptom scores across pregnancy (See Table 4.3).

Romantic attachment (avoidance and anxious attachment)

The findings suggested no significant difference in avoidant attachment across the three time points ($F(1, 25) = 1.626, p = .214$) and no significant differences between groups ($F(2, 25) = .037, p = .964$). There was also no significant difference in anxious attachment across the three time points ($F(1, 25) = 1.054, p = .314$) and no significant differences between groups ($F(2, 25) = .089, p = .915$).

A visual examination of the descriptive statistics for study variables suggested both groups of MBCP and TAU participants who attended a childbirth program had a pattern of increasing avoidant attachment across times, while the TAU group who did not attend any childbirth education appeared to decrease at post-test. In addition, all groups showed a pattern of decreasing anxious attachment from pre- to post-test.

Prenatal attachment

After the program, MBCP participants experienced a significant increase in prenatal attachment, $F(1, 25) = 4.89, p < .05$. Simple main effect analysis of time*group showed that the MBCP group had higher prenatal attachment at post-test compared to TAU participants who joined another childbirth class ($p < .05, 95\% \text{ CI } [.186, 12.450]$).

Dispositional mindfulness

The findings suggested no significant difference across the three time points ($F(1, 25) = .309, p = .583$) and no significant differences between groups ($F(2, 25) = .107, p = .899$) in dispositional mindfulness. Despite not reaching statistical significance, when the distributions were inspected visually, the MBCP group appeared to show a slight increase while TAU groups showed patterns of decline.

Furthermore, as dispositional mindfulness can be measured as a multidimensional construct, we also ran secondary analyses including the five facets of mindfulness. The results

revealed a significant difference across time for the observing facet ($F(1, 25) = 4.66, p < .05$) and significant differences between groups ($F(2, 25) = 5.697, p < .01$) favoring the MBCP group. The simple main effects analysis of the interaction between time*group showed that the MBCP group had a significant increase in observing scores at posttest compared to the TAU group who did not join any childbirth program ($p < .001$), but not compared to the TAU group who joined other childbirth programs ($p > .05$).

Additional results on collective culture

Regarding pregnancy and the birthing process, most participants ($n = 22$) reported that their husbands influence their pregnancy decision-making, and fourteen participants added that other extended family members also influence their decisions. Pregnant women provided at least one checkmark on the topics that are influenced by their family members, including: where to go to check the pregnancy, which doctor to select, which hospital to visit, what kind of food to consume, and where to give birth. In addition, some participants reported receiving more recommendations regarding birthing methods, lifestyle during pregnancy, tips for daily activities, and birth preparation. In the meantime, qualitative reports revealed that the influence of other extended family members in decision-making did not always result in positive outcomes, as some pregnant women reported that the sources of stress during their pregnancy were the involvement of their mother-in-law, conflict with their husbands as their main support person, and the influence of their parents in Cesarean-section decisions. These findings illustrate the dynamic in Indonesia's collectivist culture where the distribution of power in decision making in the family is shared among pregnant women and their partners and extended family.

Discussion

This study examined the feasibility and acceptability of an adapted online MBCP

program for general population pregnant women in Indonesia participating solo without their partners, and investigated preliminary program effects on depressive symptoms, romantic attachment, prenatal attachment, and dispositional mindfulness compared to TAU controls who both did and did not attend another form of childbirth education. In our findings, this online MBCP program was feasible to be implemented for pregnant women in general in Indonesia with higher rates of recruitment and enrollment compared to an earlier pilot with couples (Fourianalistyawati, Study 2). In addition, two beneficial effects were found on factors hypothesized to be sensitive to MBCP: prenatal attachment and a facet of dispositional mindfulness. Overall, however, most hypothesized effects were not supported in this pre-/post-comparison during pregnancy. Future research ought to include post-birth follow-up to determine whether an MBI delivered during pregnancy in this way can prevent postpartum depression.

As a new avenue following the Study 2 pilot, we focused on pregnant women only in this study with no inclusion criterion for depressive symptom scores. Previous research has also implemented MBI programs for pregnant women only, without their partners, that aimed to reduce depressive symptoms, anxiety, and negative affect (Roubinov et al., 2022; Vieten & Astin, 2008). The current study, however, focused on a non-clinical sample of pregnant women who in the Indonesian collectivist and patriarchal cultural context may need a prevention approach for supporting their overall well-being.

Furthermore, there was no significant difference between groups at baseline regarding depressive symptoms. However, a *t*-test showed a significant difference in stressful life events between the groups, showing that MBCP participants experienced more stressful life events compared to the TAU group. The higher level of stress experienced by the MBCP group may have attenuated the impact of the intervention on reducing depressive symptoms in MBCP

participants compared to TAU participants. Previous studies suggest that stressful life events are associated with experiencing greater perinatal depression (Agostini et al., 2015; Dayan et al., 2010; O'hara, 1986).

The qualitative reports on stressful life events in this study were consistent with previous studies that reported women who experienced higher depression scores also had higher stressful events during their pregnancy (Agostini et al., 2015; Rahman et al., 2003). The life stress events reported were the deaths of relatives or close friends, financial problems, a moving plan or house-related difficulties, and specific problems with significant others (Agostini et al., 2015). In addition, most of the MBCP participants lived on Java Island, while TAU participants lived mostly outside. Java Island has the highest population density due to the impact of urbanization. Previous studies showed that living in urban areas tends to cause more perinatal depression (Collins et al., 2020).

In addition, some participants asked for make-up classes as they had many other life events and work schedule conflicts. They reported the challenge of joining the scheduled class and practicing mindfulness during the weekdays due to their work schedules, visits from other family members at their house, routine medical checkups, or other social activities. Pregnant women also reported stressful conditions in the workplace, as they still had to work as usual despite feeling fatigue due to their advancing pregnancy. Other studies have also shown life stress as presenting a challenge for engagement with mindfulness programs (Kerr et al., 2019; Laurie & Blandford, 2016).

In comparison to Study 2, which took approximately three months to enroll a small number of eligible participants, this study only took approximately three weeks to enroll twice as many participants. By expanding the inclusion criteria beyond the specific clinical condition of

elevated depression and removing the participation requirements for partners, we were much more successful with participation. However, this study was a small pilot with only intervention cohort. In future, a full-scale RCT conducted over a longer time frame, with multiple MBCP cohorts, could enroll a fully powered sample to produce results that can be generalized to the desired population.

The primary finding from this study is the strong indication of feasibility and acceptability of MBCP when modified for pregnant women in general. Participants reported positive feedback with most participants reporting that their awareness, patience, and calmness increased after program participation. Reports suggest they now practice mindful attitudes such as “beginner’s mind,” “do-not-know mind,” non-judging, and acting with awareness in their daily activities. Specifically, they shared they could now pause, observe, and respond rather than react. The flexibility of the program was also the central theme that arose when they explained the benefits of taking the online program through Zoom. A previous study reported feasibility, acceptability, and satisfaction with the Zoom application (Wong et al., 2021; Ziadni et al., 2021) with the same suggestion to control the length of the program through Zoom (Anderson, 2021) as one of the goals is to prevent from Zoom fatigue (Knox, 2021). Participants reported the benefit of 10–15 minutes of break time every 50 minutes. Most felt more comfortable turning off the video as they could open their veil in a typically hot season in Indonesia and attended the class while lying down or feeding their kids. As Islam is the largest religion in Indonesia, most of participants joining the program were Muslim women that use wearing of a veil or hijab as religious and cultural practices, especially when they must be in a public space or meet other people of the opposite sex. Considering the typically hot climate in Indonesia, participants felt more comfortable being able open their veils at home when they were in the Zoom meeting

versus remaining covered being in public spaces.

This pilot RCT demonstrated the potential utility of the online-adapted MBCP program for pregnant women who joined the program by themselves. The adaptation was made in mindful speaking and listening that is originally practiced with partners into practice with other participants in the breakout group of Zoom, and pain practice with ice with partners was adapted into a soothing touch to their own body while holding the ice. It helped pregnant women in this study to still benefit from these main topics in the MBCP program despite the absence of their partners. Besides, pregnant women reported that the mindful speaking and listening with other participants in the break-out room gave them a sense of community since they rarely spoke in the weekly meeting. By communicating and discussing their fear and happiness as the main topics during the mindful speaking and listening practice, pregnant women feel like part of a peer support group as they realized that they were not the only ones who had challenges and fears during their pregnancy.

The significant finding for improvement in prenatal attachment in this study was in line with Study 2, which also found a significant MBCP intervention effect for prenatal attachment. The “Being with Baby” practice learned in MBCP starting with the first week specifically targets building a connection with the baby in the womb. This practice is intended to help pregnant women to be aware of their baby’s presence, which eventually may enhance their attachment. Qualitative reports in this study suggested an increase in prenatal attachment with the fetus was supported through the practice of mindfulness of body sensations and Being with Baby practice, which helped them to be mindful and connect with the baby more. This significant result is closely theoretically linked with the aim of MBCP mindfulness practice to enhance attachment with the baby. MBIs, in general, aim to improve awareness of thoughts, feelings, and body

sensations (Lee et al., 2008) as found here.

Confidence in this finding is further supported by comparison with the TAU controls some of whom attended and some of whom did not attend another form of childbirth education. The MBCP program for pregnant women still produced benefit by increasing the bonding of mothers to their fetuses, which in the long run will facilitate mothers' building attachment to their infants after the birth. As infants develop their attachment style based on their interactions with their earlier caregivers, this program result is important to help mothers recognize and strengthen their connection with their baby. One participant expressed gratitude for the opportunity to participate in this MBCP program because she acquired knowledge and was mentally prepared to care for two children on her own.

In addition, from a prevention science perspective, better prenatal attachment may protect mothers from postpartum depression as it is associated with dyadic adjustment during pregnancy. Prenatal attachment also has been shown to predict less parenting stress three months after birth (Goecke et al., 2012; Mazzeschi et al., 2015). Previous studies also demonstrated that prenatal attachment, which was associated with the socioemotional competence of children, may be inhibited by parenting stress (Hruschack et al., 2022). As parenting stress is also related to infant temperament (Moe et al., 2018), this study suggests MBCP program implementation as a valuable part of prevention strategies for pregnant women and aims at supporting mothers and their infants to adjust and regulate their emotions well after the birth.

The lack of findings for depressive symptoms in this study can be explained by the focus of the study on general population pregnant women. There was no inclusion criterion regarding level of depression scores and participants were mostly at subclinical levels at baseline. In addition, the randomization in this study did not consider the distribution of depression scores in

the two groups and did not screen for participants' life event stress that may affect pregnant women's ability to cope in their daily life. Thus, both groups had a lower-than-expected rate of depressive symptoms and therefore far less room for improvement than our previous study of people with elevated depression symptoms.

Furthermore, half of the participants in TAU actively participated in a birthing class, while another half of TAU participants attended ongoing prenatal care actively. This could provide some explanation for the decreasing pattern seen in all groups over time, from pretest to posttest, as could simple regression toward the mean. Previous studies with larger samples also found no difference in depression at post-test between the intervention and control group (Le et al., 2011). It is essential to note that most studies of MBIs during pregnancy are aimed at increasing well-being, rather than specific clinical symptoms of pregnant women. It is possible that the benefits of the mindfulness intervention were not evident in women who had low scores on depression (Yang et al., 2019). An even more important consideration for this study and future work is the lack of post-birth longitudinal follow-up. Because this approach was one of a universal prevention strategy, it may be much more likely that Indonesian pregnant women's MBCP participation in the prenatal period could prevent subsequent postpartum depression as has been found in other studies of MBCP (Lönnberg et al., 2020; Duncan et al., 2017; Setterberg et al., 2017; Warriner et al., 2018; Zhang et al., 2023).

No change was found in avoidant and anxious romantic attachment. Since it was no longer a couple intervention with partners not participating then perhaps expecting a change in romantic attachment style was not reasonable to expect. Despite the lack of impact shown in the quantitative findings on romantic attachment style, qualitative responses suggested some improvement in how participants related with their partners. For example, participants reported

how they managed to understand themselves better and had more acceptance of their partners' behavior. One participant who had difficulty building a relationship with her husband as they had an arranged marriage reported an increased understanding and positive relationship with herself so that she would be less affected by situations outside herself, including her partner. Eventually, it also improved her acceptance of her unplanned pregnancy and led to less anxiety about how to cope after her baby's birth. A previous study explained how people with avoidant attachment tended to rely more on themselves and did not count on their partners as a support system (Kirby, 2017).

This example highlights cultural dimensions of couple relationships in Indonesia. Having an arranged marriage is more common in Eastern-based cultures. Especially in Indonesia, arranged marriage is based on cultural and religious Muslim tradition, as it is believed to have a better chance of success. A study by Aktürk (2010) revealed no significant difference between arranged and love marriages in terms of the intensity and timing of attachment figure transference to the spouse. In both categories of marriage, sensitive and responsive caregiving styles and low attachment avoidance were related to a stronger attachment security to the spouse.

As qualitative reports demonstrated, experiencing the childbirth education aspects of the MBCP program helped participants to reduce their anxiety and fear of birthing. Previous studies support this statement as prenatal education is associated with a decrease in prenatal depression (Zhang et al., 2021). Another notable theme from participant responses was that they felt more ready for childbirth and parenting. There was a shifting perspective indicating a more mindful relationship with expected childbirth experiences, e.g., one participant previously expected to have a vaginal birth after a C-section (VBAC), but then she felt more acceptance and was ready for whatever birthing process she would experience even if it could not be a VBAC. Previous

studies supported this result, such as mindfulness-based childbirth education (MBCE) that facilitated pregnant women's sense of control and enabled them to be involved in decision-making during the birth (Fisher et al., 2012).

In terms of mindfulness, the fact that the observing facet increased in the MBCP group in this study was supported by previous studies which mentioned the improvement of observing score as an essential dimension of mindfulness that can be cultivated by meditation practice (Lilja et al., 2013). Observing during meditation can help people objectively assess their internal and external experiences, which can lead to positive coping (Neale-Lorello & Haaga, 2015). However, finding that only one facet of mindfulness changed could have been a measurement issue. The FFMQ-SF used in this study was less reliable than desired which may have been affected by cultural and linguistic factors for Indonesians, a different population from the origin of the FFMQ-SF (Gu et al., 2016). Previous studies suggest mindfulness research should consider cultural context and background knowledge of participants (Karl et al., 2021; Kirmayer, 2015).

Regarding the results related to pregnancy decision making and conflict around it in this study, there is a social and cultural context that can be understood through the Symbolic Interactionism perspective (LaRossa & Reitzes, 2009). Symbolic Interactionism sees the family as a part of social group where the individual develops self and identity through social interaction that makes it possible for them to assess and assign value in the activity of family. Being part of extended family can operate as both a protective and risk factor at the same time. Pregnant couples interpret extended family as part of the system that supports them in many things (e.g., emotionally, financially) that they become willing to give up some of their independence to maintain their relationship with their extended family (Litwak, 1960).

Autonomy is not a feasible option in extended family background as most nuclear families depend on family, friends, and their community to cope with risk and uncertainty (Cox & Fafchamps, 2007).

In Indonesia, decisions are usually made at the extended family level (Witoelar, 2013). In general, cultural practices towards pregnancy and childbirth in Indonesia can be supportive or harmful. These practices are drawn from the knowledge, beliefs, perceptions, and actions of the community. For example, in the Sanggau Dayak community, pregnant mothers still must do routine activities as usual, such as farming, with a larger portion of work compared to their husbands (Suprabowo, 2006). These practices may harmful during pregnancy, as they tend to experience miscarriage and premature birth. In the Sanggau community, pregnant women are forbidden to eat foods due to traditional cultural practices regarding beliefs about the impact on the fetus, yet the lack of those foods may decrease their nutrition intake. At low levels of vertical collectivism (collectivism stressing hierarchical interactions), which is how Indonesia can be characterized, Yoon et al. (2020) discovered that patriarchal attitudes have an association with an increase in depression in women. Thus, approaches such as MBCP may yield promising shifts to benefit pregnancy women and their psychological functioning and parenting postpartum.

Limitations and future directions

This study had several important limitations that may be addressed in future research. As with any small pilot study, the sample size limited our power to detect effects. There may have also been key measurement issues that hindered our ability to truly test study hypotheses. The short-form measure of the FFMQ used in this study is less reliable than the original measure. Even though FFMQ in a long form may be more useful in examining the interventions' effects to improve mindfulness and decrease stress and depression (Kantrowitz-Gordon, 2018), we elected

to use a short form to reduce participant burden and make it easier for pregnant women to complete the survey. With concerns about recruitment and retention, we opted for the lower burden measure, however it may not have been sufficient. Further research is needed to investigate the psychometric properties of the FFMQ in the Indonesian population, specifically with pregnant people.

Future studies in Indonesia may consider assessing pregnant women using the long form of FFMQ and doing further psychometric testing that is culturally sensitive in choosing which items are more valid and reliable to use with the Indonesian population. Other than that, as a vulnerable group, pregnant women may become tired more easily, so a short-form questionnaire is more likely to be practical and convenient for use in this population. Future studies may thus consider using other mindfulness scales that originally had fewer items, such as the Toronto Mindfulness Scale (13 items; Lau et al., 2006) or the Mindfulness Awareness Attention Scale (15 items; Brown & Ryan, 2003). In addition, future studies may consider using measurement tools that may assess emotional regulation or give more explanation of attachment styles, fear related to birthing, stress, and anxiety as comorbidities of depression. Thus, we can see more comprehensive results on how the MBCP program benefits pregnant women in broader domains of functioning.

Furthermore, this study design only focused on measuring effects from pre-test to post-test after the MBCP program, suggesting longer term follow up is needed. In Study 2, most of the significant results were found after the birth in the follow-up session. Future studies may consider assessing the effectiveness of the program after birth to determine the implementation of the knowledge they gained from the MBCP program in their real-life experiences during and after giving birth.

In addition, while the MBCP program originally aimed to enhance the relationship quality in pregnant couples, the absence of partners' involvement in this study might have contributed to the limited results of this study as some pregnant women reported that there was no difference in how they communicate and interact with their partners. This result was totally the opposite of the previous study, which revealed the feeling of calm and relief of pregnant women as their partners showed more responsibility and cared more about their condition, and they had more shared understanding because of the MBCP mindful speaking and listening practices.

The study found that the three-hour weekly class and one-day silent retreat were long and challenging for pregnant women to participate in through Zoom. Some pregnant women also reported their difficulties in joining for three hours as they also needed to take care of their other children during the program. Some pregnant women reported that they felt uncomfortable leaving their children with other family members during the program. To address these issues, future studies could consider breaking down the material from the silent retreat into smaller sections, such as mindful speaking and listening and walking meditation, and presenting them in weekly meetings. This approach would allow participants who may not be able to attend the silent retreat to learn and understand how to practice these techniques.

Conclusion

In general, there are many factors that affect depression in pregnant women in Indonesia. Being part of an extended family in a collective culture can operate as both a protective and a risk factor at the same time. Particularly, collectivism in a patriarchal society may influence how pregnant women interact with their social system and do what is expected of them, such as taking care of their children and household in general but also supporting their husband when

their husband has less income. Meanwhile, partners typically contribute less to childcare. This cultural dualism may increase depression in pregnant women, as they feel pressure whenever they fail to meet their social responsibilities.

Thus, despite all the challenges of living in a collectivist and patriarchal society, preparing pregnant women with a program such as MBCP, which provides mindfulness skills related to pregnancy, childbirth, and parenting after the birth, may support them in having a good pregnancy, building attachment with their fetus, and preparing them physically and mentally to face their birthing process. Findings related to pregnancy decision-making, perceived partner support, and stressful events emphasize the importance of having a comprehensive intervention for pregnant women in countries with a collectivist cultural context such as Indonesia.

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Table 4.1. Participants' Demographic Characteristics at baseline.

	MBCP group	TAU group
Participants (n)	21	21
Age in years <i>M (SD)</i>	29.24 (4.58)	29.29 (4.77)
Weeks gestations <i>M (SD)</i>	22.29 (5.26)	19.00 (5.42)
Education <i>n (%)</i>		
Elementary – high school degree	4 (19.0)	9 (42.8)
College/Undergraduate degree	12 (57.1)	11 (52.4)
Graduate degree	5 (23.8)	1 (4.8)
Domicile <i>n (%)</i>		
Java island	15 (71.4)	7 (33.3)
Others	6 (28.6)	14 (66.7)
Insurance <i>n (%)</i>		
Yes	15 (71.4)	14 (66.7)
No	6 (28.6)	7 (33.3)
Income <i>n (%)</i>		
≤ Rp 5 million	10 (47.6)	16 (76.2)
Rp 5 – 10 million	10 (47.6)	3 (14.3)
Rp 11 – 20 million	0	2 (9.5)
≥ Rp 21 million	1 (4.8)	0
Home ownership <i>n (%)</i>		
Yes	3 (14.3)	7 (33.4)
No	18 (85.7)	14 (66.7)
Time together with partner <i>n (%)</i>		
0 – 5 years	14 (66.7)	12 (57.1)
6 – 10 years	6 (28.6)	2 (9.5)
11 - 20 years	1 (4.8)	7 (23.4)
Living with <i>n (%)</i>		
Nuclear family	11 (52.4)	11 (52.4)
Extended family	10 (47.6)	10 (47.6)
Support of partners at home among others <i>n (%)</i>		
Number 1	19 (90.5)	19 (90.5)
Above 1 (2 – 8)	2 (9.5)	2 (9.5)
Total numbers of support for family members at home <i>n (%)</i>		
Four supports	7 (33.3)	9 (42.9)
Less than four	14 (66.7)	12 (57.0)
Decisions related to pregnancy <i>n (%)</i>		
Decided by own self	9 (42.9)	11 (52.4)
Influenced by family members	12 (57.1)	10 (47.6)
Health problems <i>n (%)</i>		
Yes	2 (9.5)	1 (4.8)
No	19 (90.5)	20 (95.2)
Practice health behaviors <i>n (%)</i>		
Yes	16 (76.2)	16 (76.2)
No	5 (23.8)	5 (23.8)
Exercise practices <i>n (%)</i>		
Yes	6 (28.6)	1 (4.8)
No	15 (71.4)	20 (95.2)
Yoga and meditation experience <i>n (%)</i>		
Yes	7 (33.3)	3 (14.3)
No	14 (66.7)	18 (85.7)
Pregnancy planned <i>n (%)</i>		
Planned	13 (61.9)	15 (71.4)

Unplanned	8 (38.1)	6 (28.6)
Pregnancy experiences <i>n</i> (%)		
First time	11 (52.4)	7 (33.3)
More than one time	10 (47.6)	14 (66.7)
Miscarriages experience <i>n</i> (%)		
Yes	5 (23.8)	7 (33.3)
No	16 (76.2)	14 (66.7)
Current stressful event <i>n</i> (%)		
Yes	13 (61.9)	5 (23.8)
No	8 (38.1)	16 (76.2)

Note. $N = 42$. Participants were on average 29.26 years old ($SD = 4.617$) and weeks pregnancy were on average 20.64 weeks ($SD = 5.534$).

Table 4.2. Test of MBCP vs TAU condition equivalence at baseline

Measures	MBCP (n = 21)		TAU (n = 21)		t (df 40)	p	Cohen's <i>d</i>	LLCI	ULCI
	M	SD	M	SD					
Depressive symptoms	10.33	5.517	7.57	4.770	1.735	.090	.536	-.455	5.978
Avoidant attachment	12.14	5.525	11.71	4.185	.283	.778	.087	-2.628	3.486
Anxious attachment	23.19	7.243	21.10	3.434	1.198	.238	.370	-1.440	5.630
Prenatal attachment	74.05	11.960	73.95	7.180	.031	.975	.010	-6.057	6.248
Dispositional mindfulness	47.76	5.638	49.05	5.652	-.738	.465	-.228	-4.807	2.235

Note. $N = 42$; M = Mean; SD = Standard deviations; CI = Confidence interval 95%; LL = Lower limit; UL = Upper limit. Cohen's *d* is a standardized effect size. * $p < .05$. ** $p < .01$.

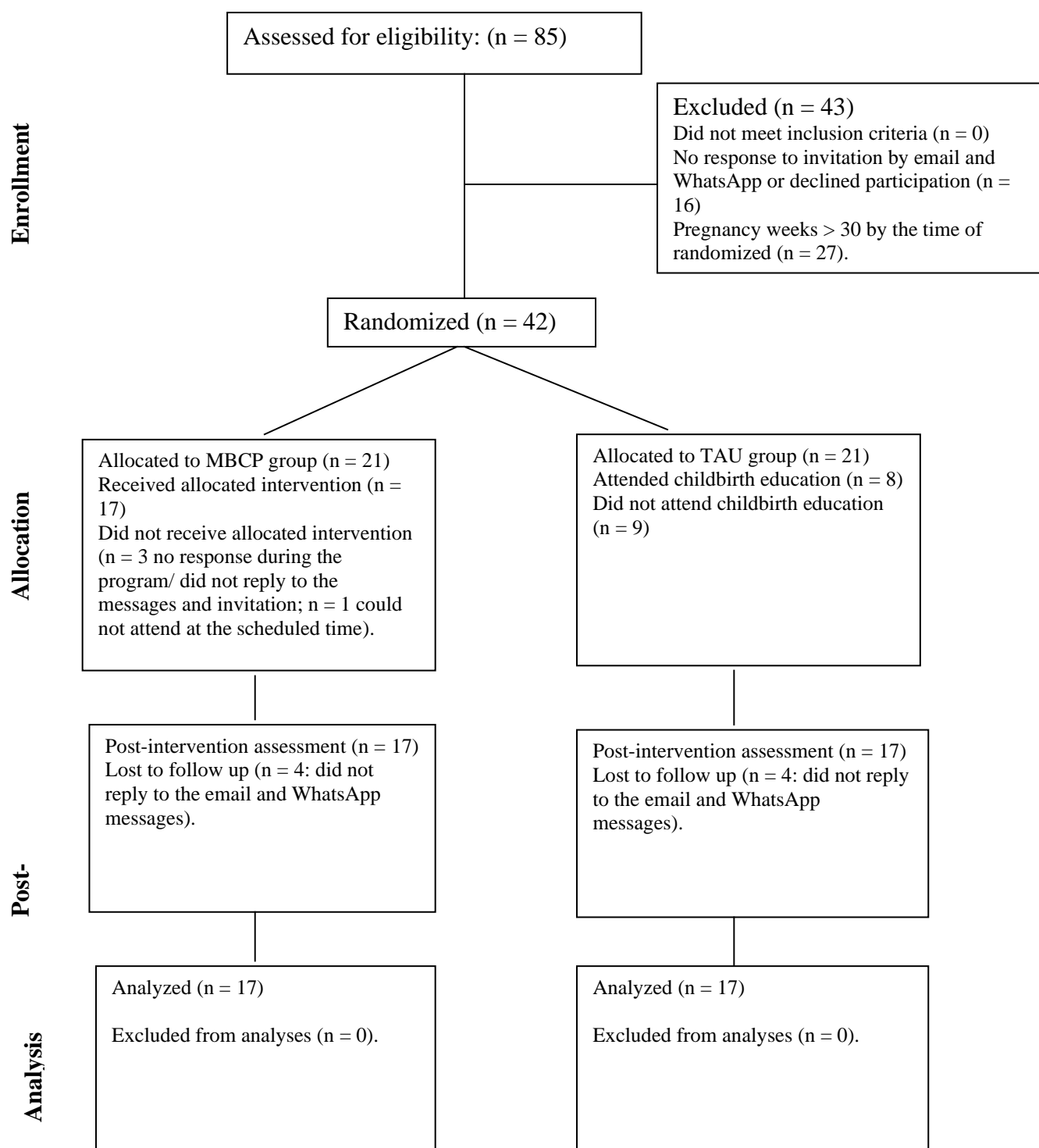
Table 4.3. As - Treated Analyses: Measures over time for MBCP and TAU groups.

Measure and group	Pre-test		Post-test		Within-Subjects Effects (Time)		
	M	SD	M	SD	F (1, 25)	p	η^2
Depressive symptoms							
MBCP	8.45	3.560	7.64	4.411	2.911	.100	.104
TAU - 1	8.13	5.357	5.63	3.777			
TAU - 2	7.33	4.950	6.33	5.339			
Avoidant attachment							
MBCP	11.45	6.330	13.36	3.931	1.626	.214	.061
TAU - 1	10.75	5.418	13.13	2.232			
TAU - 2	12.89	2.759	11.44	2.351			
Anxious attachment							
MBCP	20.18	7.291	19.27	4.541	1.054	.314	.040
TAU - 1	20.25	2.964	19.50	4.751			
TAU - 2	21.22	4.055	19.78	4.410			
Prenatal attachment							
MBCP	77.36	4.925	80.82	3.573	4.892	.036*	.164
TAU - 1	72.38	9.288	74.50	6.188			
TAU - 2	76.00	5.916	78.22	5.761			
Dispositional mindfulness							
MBCP	48.36	4.843	50.36	5.714	.309	.583	.012
TAU - 1	48.75	6.018	48.25	3.454			
TAU - 2	50.22	5.263	47.11	4.595			
Observing							
MBCP	8.45	2.162	10.00	1.000	4.660	.041*	.157
TAU - 1	7.50	2.878	8.63	2.326			
TAU - 2	6.22	2.587	5.89	2.713			
Describing							
MBCP	10.36	1.629	10.64	2.157	1.421	.244	.054
TAU - 1	9.75	1.832	9.63	1.923			
TAU - 2	10.33	2.236	9.22	1.787			
Acting with awareness							
MBCP	10.45	1.695	10.73	2.005	.423	.521	.017
TAU - 1	12.25	2.765	11.63	2.615			
TAU - 2	13.33	1.658	13.11	2.421			
Non-judging							
MBCP	10.45	1.864	10.82	1.940	2.247	.146	.082
TAU - 1	12.00	2.777	10.75	2.765			
TAU - 2	13.00	2.784	12.33	2.062			
Non-reactivity							
MBCP	8.64	1.629	8.18	1.250	.550	.465	.022
TAU - 1	7.25	3.196	7.63	2.774			
TAU - 2	7.33	2.179	6.56	2.833			

Note. $N = 28$. MBCP: $n = 11$; TAU 1 = Control group who attended birthing class: $n = 8$; TAU 2 = Control group who did not attend a birthing class; $n = 9$. M= Mean; SD = Standard deviations.

* $p < .05$. ** $p < .01$.

Figure 4.1. The CONSORT flow chart of study participants.



Chapter 5: Conclusions

The goal of my dissertation was to expand upon previous research and literature related to the relationship between romantic attachment, prenatal attachment, dispositional mindfulness, and depressive symptoms in pregnant women, along with an examination of the feasibility and acceptability of an online MBCP program for pregnant women with depression and their partners, and pregnant women in general in Indonesia. Particularly, I emphasized the Indonesian collectivist and patriarchal cultural context as an essential factor broadly impacting pregnant women' well-being. In a series of three studies, I examined the interrelationships of the above variables and the potential for MBCP to improve well-being.

The first study examined the association between avoidant and anxious romantic attachment, prenatal attachment, dispositional mindfulness, and depressive symptoms among pregnant women in Indonesia. We found that depressive symptoms in pregnant women were associated with higher avoidant and anxious attachment and lower prenatal attachment and dispositional mindfulness. Prenatal attachment partially mediated the association between avoidant romantic attachment, but not anxious attachment, and depressive symptoms. This association was not moderated by overall dispositional mindfulness. However, we found that the non-judging facet of dispositional mindfulness moderated prenatal attachment's mediation of avoidant attachment and depressive symptoms. Home ownership and perceived level of support of partners were important covariates in these analyses.

Related to the results above, previous studies supported these findings and suggests links with risks to child development. Alhusen et al. (2013) found that women with higher avoidant attachment styles and greater depressive symptomatology tended to have children with early childhood developmental delays. Related to postpartum well-being, a study by Flykt et al. (2010)

showed that the autonomous attachment style of the mother protected the relationship between mother and child from the negative influence of postpartum depression, while dyads with preoccupied mothers were likely to suffer interaction problems when mothers had depressive symptoms postpartum. Future research could move beyond the cross-sectional approach of this study and examine these processes longitudinally, along with more nuanced aspects of attachment.

Prenatal attachment also has been shown to influence postnatal attachment and the child's attachment stability in the future (Bowlby, 1982; Fonagy et al., 1991; Muller, 1996). Maintaining better health practices during pregnancy is essential for maternal and fetal well-being and the newborn's health (Lindgren, 2001). Lower prenatal attachment may put the fetus at more risk through maternal eating disorders, smoking, and drinking alcohol during pregnancy (Condon & Corkindale, 1997). In addition, studies of dispositional mindfulness indicate that it is related to lower depressive symptoms and despite us not finding this relationship in the current study, perhaps due to measurement issues, it may indeed moderate the relationships between romantic attachment, prenatal attachment, and depressive symptoms and (Davis et al. 2016; Hicks, Dayton, Brown et al., 2018). In the current set of studies, there is some concern about the psychometric properties of the short form of the FFMQ and additional measurement work could be done in Indonesia to develop a well-functioning self-report mindfulness measure with low participant burden to better test these relationships in Indonesian samples.

The second paper evaluated the acceptability, feasibility, and effectiveness of the MBCP program for improving depressive symptoms in pregnant women with depression who participated with their partners. Self-reported data on depressive symptoms, romantic attachment style, prenatal attachment, and dispositional mindfulness were measured at baseline, post-

intervention, and after the birth. The results revealed that participating in an MBCP program that was offered online was acceptable and alleviated depression symptoms, improved participants' romantic attachment and prenatal attachment to their unborn child and raised participants' dispositional levels of mindfulness. This is the first study to our knowledge that investigated the efficacy of an online MBCP program in reducing depressive symptoms in pregnant women in Indonesia. There were also important benefits for partners, however it was quite challenging to recruit for this study suggesting caution about feasibility. The use of mixed methods provided valuable information for evaluating nuances regarding feasibility. The study emphasizes flexibility by utilizing the Zoom application, which has become a widely adopted and enhanced platform for virtual intervention, particularly since the COVID-19 pandemic.

The third paper evaluated the feasibility and acceptability of delivering the MBCP program to pregnant women in general in Indonesia; it also determined the preliminary efficacy of the intervention for reducing depressive symptoms and increasing mindfulness, prenatal attachment, and romantic attachment. Implementing the MBCP program for pregnant women in Indonesia without their partners appeared to be much more feasible, however fewer effects were seen with only a post-test follow up during pregnancy. The program did, however, demonstrate enhancements in variables that were anticipated to be responsive to Mindfulness-Based Childbirth and Parenting (MBCP), including prenatal attachment and a facet of dispositional mindfulness. Longer term follow up is needed to determine if postpartum depression might be prevented through this approach, as has been seen in other studies of MBCP around the world.

To our knowledge, this was the first study that assessed all the above variables in pregnant women simultaneously. Furthermore, this online MBCP program was the first to be conducted for pregnant women in Indonesia, both for pregnant women in general and for those

with elevated depressive symptoms. Therefore, understanding the results of these 3 studies in relation to the specific cultural context of Indonesia may add more perspective to the field that has mostly consisted of research from predominantly white and English-speaking samples. Overall, these papers contribute to studies on romantic attachment, prenatal attachment, dispositional mindfulness, depression, pregnant women, and the MBCP program.

In the first study, home ownership and perceived level of support of partners were found to be important covariates. Those factors were revealed in the second and third studies to be related to stressful experiences during pregnancy. Pregnant women reported many challenges, especially financial, because they had limited income and a sense of responsibility to other extended family members in their household. Despite support from extended families for pregnant couples, it is difficult to retain independence (Litwak, 1960). A study by Szabo et al. (2018) also supported this finding on home ownership, showing it to be related with better psychological outcomes such as decreased levels of depressive symptoms and higher levels of quality of life.

Study 1 showed the important role of perceived level supports of partners (as a covariate in that cross-sectional study), and it was again found to be an essential factor in Study 2 which included partners in the intervention program for pregnant women. The significant impact of the MBCP program for couples in Study 2 revealed that partners' attendance may build a sense of safety in pregnant women that may be beneficial for reducing depression. While it is important for pregnant couples to build understanding and more positive attachment to support each other in terms of interaction with extended family, patriarchal systems and imbalanced power dynamics can also influence the relationship and make it harder for pregnant women to rely on

their partners for support. However, it was challenging to recruit enough participants with depression whose partners would also participate.

The results of Study 3 with a broader sampling strategy, suggest the benefits of an online MBCP program to build women's prenatal attachment with their baby. Increased prenatal attachment can promote parents' responsibility to the fetus, which encourages the mothers to protect the fetus and engage in recommended health practices during the pregnancy (Laxton-Kane & Slade, 2002; Lindgren, 2001). Pregnant women will practice healthy behaviors when they know the benefit of the health practice to their baby's health (Higgins et al., 1995; Higgins & Woods, 1999) as we saw here with mindfulness practice.

In sum, understanding protective and risk factors in pregnant women with depression is essential. The collective cultural background and patriarchal system in Indonesia tends to put pressure on women in terms of maintaining social order and conforming to traditional social systems. With the natural vulnerability of their pregnancy, participating in an MBCP program by themselves or with their partners may support both the baby and their own health during pregnancy and in the long run. Despite limitations regarding sampling and measurement, these findings from a large survey and two small RCTs offer some insight into how each factor may contribute to depressive symptoms or well-being of pregnant women, and the potential for prevention and intervention approaches to support pregnant women. Particularly, the implementation of mindfulness-based interventions online can be a potential approach. Future studies may recruit larger samples of expectant couples or pregnant women with a broader population samples strategy in Indonesia to gain better understanding of how best to support pregnant women's well-being, ultimately benefiting the entire family system.

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