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Effectiveness of Online Mindfulness-Based Intervention on Depression in Pregnancy

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Abstract

The high prevalence of depression in developed and developing countries requires a relevant intervention to suppress its incidence. Mindfulness-based intervention is given online as a new complementary intervention that can help reduce symptoms of depression. This study aimed to determine the effectiveness of online mindfulness-based interventions in reducing depressive symptoms in pregnancy. This research method used a randomized control trial, with 66 participants consisting of the mindfulness-based Intervention (MBI) group of 33 participants and the control group of 33 participants. The MBI intervention was provided for eight weeks online. The study uses simple random sampling. Depression was assessed using DASS 42. Data were tested using the Mann-Whitney U Test and t-test and processed with SPSS version 23. The results showed that there was a significant decrease in depression levels in the online MBI group after being given intervention compared to the control group (7.55 ± 2.181 vs 11.00 ± 2.345) p=0.000. Mindfulness-based intervention online can reduce depressive symptoms in pregnant women, so that the intervention becomes a feasible, cheap and easy intervention for pregnant women in improving mental health. In the future, this research can develop other types of complementary interventions to improve maternal and fetal health.

Keywords: Online, Mindfulness, Depression, Pregnancy.

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1. INTRODUCTION

World statistics in 2017 show that depressive disorders are among the top three causes of disability (James et al., 2018). The prevalence of prenatal depression in developed countries is smaller than in developing countries, which ranges from 10%–15%, and in developing countries, it is around 20% (Pereira et al., 2011). Compared to men, women have a higher prevalence and incidence of depression (Kuehner, 2017; Labaka et al., 2018; Lim et al., 2018). A study shows that groups of women are very vulnerable to anxiety and depression, 39-44% (Tsakiridis et al., 2019; Toscano et al., 2021). The prevalence of antenatal depression ranges from 15% to 65% worldwide (Dadi et al., 2020). Estimates of the prevalence of depressive symptoms increased by 8.1%, 10.1%, and 11.3% at 3, 6, and 18 months postpartum (Woolhouse et al., 2014). During pregnancy, depressive symptoms are 55%-78% prevalent (Liddle and Pennick, 2015; Dadi et al., 2020).

High stress can exacerbate symptoms of depression and anxiety (Biaggi et al., 2016). Some of the signs of perinatal depression are tiredness, anxiety for a long time, having difficulty concentrating, and difficulty sleeping (Moore, Ayers, & Drey, 2016). Classic symptoms of depression include feelings of sadness, anhedonia or lack of interest, and fatigue (O'Connor et al., 2021). Approximately 44.2% of women with severe illness report moderate to severe depressive symptoms during the third trimester of pregnancy (Vignato et al., 2020). A study states that depressive symptoms increase from 24 weeks of gestation to puerperium, Stress, anxiety, and depressive symptoms are correlated. In particular, women in late pregnancy and postpartum are prone to stress, anxiety, and depression. Prenatal anxiety can predict symptoms of postpartum depression. Active assessment and management of stress, anxiety, and depression is necessary and should begin early in pregnancy and continue postpartum (Cheng et al., 2021).

A systematic review and meta-analysis reported that the prevalence of depression was 7.4%, 12.8%, and 12.0% in the first, second, and third trimesters of pregnancy and 17.7% postpartum (Hahn-Holbrook, Cornwell-Hinrichs & Anaya, 2018). However, perinatal depression may not be recognized because of the physical and psychological changes during pregnancy and postpartum (ACOG Committee, 2018).

Depression and anxiety during pregnancy are associated with negative outcomes for both mother and child (Stein et al., 2014; Grigoriadis et al., 2018). Antenatal depression is linked to low birth weight babies and premature births (Szegda et al., 2014; Ding et al., 2014; Goodman et al., 2014; Zietlow et al., 2014; Jarde et al., 2016; Dadi et al., 2020; Li et al., 2020; Dowse et al., 2020; Nisar et al., 2020; Miller et al., 2022). Prenatal depression is associated with negative affective experiences with the fetus, premature, low Apgar scores, NICU admission, and postpartum maternal acceptance (Zhang et al., 2021; Hu et al., 2015; Dowse et al., 2020; Clapp et al., 2016). Children of mothers with postpartum depression are at risk for abuse and social, emotional, and behavioral problems (Choi et al., 2020). In particular, mothers who experience depressed mood during the first trimester or during pregnancy have higher levels of postpartum psychosocial difficulties (Zohsel et al., 2017), and those with postpartum depression have problems bonding with the baby (Rogers et al., 2020). In addition, maternal psychological distress has been associated with impaired mother-child interaction, childhood regulatory dysfunction, and impaired cognitive and psychomotor development. (Ding et al., 2014; Goodman et al., 2014; Zietlow et al., 2014). Untreated prenatal depression can devastate women, their babies, and their families (Taylor, Cavanagh, and Strauss, 2016; ACOG Committee, 2018)

A series of mindfulness-based interventions have shown evidence of treating perinatal

depression for mothers and babies. A meta-analysis of 17 studies with mindfulness-based interventions during the perinatal period found significant reductions in symptoms in the depression group from pre to post-intervention (ACOG Committee, 2018). MBSR and Mindfulness-based interventions (MBIs) are effective in reducing symptoms of depression and anxiety in pregnancy and postpartum (Dimidjian et al., 2015) and prevent relapse of depression (Duncan et al., 2017). Cognitive behavioral therapy integrated with mindfulness interventions is very useful for reducing depressive symptoms (Yazdanimehr et al., 2016). So mindfulness programs have effectively reduced stress, anxiety, and depression (Nejad et al., 2021).

Psychotherapy interventions, such as interpersonal psychotherapy and cognitive behavioral therapy (CBT), have proven effective in treating perinatal depression and anxiety (Van Ravesteyn et al., 2017). CBT is the intervention of choice for dealing with mental problems (Marchesi et al., 2016). Mindfulness-based interventions (MBIs) have recently become the focus of attention as an effective treatment for reducing symptoms of depression, anxiety, and stress in the general population (Lee et al., 2021) and pregnant women (Goodman et al., 2014; Dimidjian et al., 2015; Miklowitz et al., 2015; Dhillon, Sparkes, & Duarte, 2017), which combines elements of CBT and psychoeducation. According to a meta-analysis, there is no significant difference between MBI and CBT in treatment success for anxiety and depression (Lee et al., 2021). This is a motivation to conduct further research.

A study states that mindfulness-based interventions can be delivered online with the same efficacy as face-to-face classes in reducing stress, depression, and anxiety ((Spijkerman, Pots, & Bohlmeijer, 2016; Fish, Brimson ,& Lynch, 2016). Innovation with online mindfulness meditation for 6 weeks of pregnancy is a cost-effective intervention for a large number of pregnant women (Kantrowitz-Gordon et al., 2020)

Given the increasing Internet presence, MBI can also be offered electronically. The results of a meta-analysis show that electronic MBI (eMBI) positively impacts mental health (Spijkerman, Pots, & Bohlmeijer, 2016). However, there are few pregnancy-specific eMBI studies with small samples and a lack of randomized control trial approaches (Hall et al., 2016; Taylor, Cavanagh ,& Strauss, 2016; Dhillon, Sparkes & Duarte, 2017; Krusche, Crane, & Dymond, 2019). However, women have expressed interest and desire to participate in electronic MBI interventions in the perinatal period (Maloni, Przeworski, & Damato, 2013). Evidence supporting the effectiveness of eMBI has so far been lacking (Krusche, Crane and Dymond, 2019). The utility and acceptance of smartphone applications as a tool for delivering MBIs has not been well studied in the pregnant population. This is the basis for researchers interested in proving the effectiveness of eMBI interventions in overcoming depression in pregnancy. Taking into account the increasing presence of the internet everywhere, MBI can also be offered electronically which is cost-effective via computers (tablets) or smartphones (electronic-based MBI = eMBI). The study aimed to determine the effectiveness of online MBI in reducing depressive symptoms during pregnancy.

2. RESEARCH METHOD

The study used a randomized control trial pretest-posttest with a control group. The research subjects were 66 pregnant women at the Kediri City Health Center from March to April 2023, which were divided into 2 groups. MBI online group (33 participants) and control group (33 participants). The MBI online intervention was provided for 8 weeks. Inclusion criteria: gestational age between 18-28 weeks, minimum age of 18 years and a maximum of 35 years, who have signed informed consent, who agree to use the application, who have pregnancies without problems. Exclusion criteria: multiple pregnancies, previous severe psychiatric problems, history of side effects, or missed effects of mindfulness practice. Depression assessment was carried out two times, namely pretest (initial data collection) and

posttest (week 8). Sampling technique using simple random sampling. Data analysis using t-test and Mann-Whitney U Test. The collected data was processed using SPSS version 23. Ethical clearance was obtained from the Malang Ministry of Health Poltekkes with No.303/V/KEPK POLKESMA/2023.

Table 1. Program online mindfulness-based intervention.

No	Module	Content	Mindfulness practices
1	Introduction	• Facts about pregnancy depression • Mental health in pregnancy • Introduction mindfulness programme	Mindfulness eating a raisin Awareness breathing
2	Depression in pregnancy	• Mindfulness and Depression	Body scan
3	Activity	• Mindful movement • Physical activity in pregnancy	Sitting meditation
4	Self-control	• Choices and control in labor • Accepting and letting go	Being with baby
5	Self-compassion	• Self-care and self-compassion	Loving-kindness meditation
6	Labour	• Mindfulness and labour • Pain in labour	Mindful walking
7	Postpartum	• Postpartum mindfulness	Being with baby

3. RESULTS AND DISCUSSION

Interviews were conducted with 66 participants. The next researcher collects data and answers to each question in the questionnaire. The characteristics of the respondents are described in Table 1, and the level of depression in the two groups is described in Tables 2 and 3.

Table 2. Characteristics at baseline in the MBI and control group.

Characteristics of respondents	Group						p-value
	MBI group			Control group			
	n	Mean / %	SD	n	Mean / %	SD	
Age	33	26,45	3,751	33	25,70	3,026	0,370
Gestational age	33	21,79	3,140	33	22,88	3,664	0,199
Parity							
Primigravida	16	48,5		18	54,5		0,625
Multigravida	17	51,5		15	45,5		
Marital status							

Not married yet	1	3,0		0	0	0,317
Marry	32	97,0		33	100,0	
Education						
Elementary school	10	30.3		5	15.2	0,541
Secondary school	16	48.5		23	69.7	
High School	7	21.2		5	15.2	
Work						
Doesn't work	14	42,4		18	54,5	0,328
Work	19	57,6		15	45,5	
Income						
Low	14	42.4		13	39.4	0,640
Medium	15	45.5		14	42.4	
High	4	12.1		6	18.2	
Depression (DASS)	33	12,24	3,27	33	11,88	3,27(0,648

Note: non-parametric tests (Mann-Whitney U Test)

Subject characteristics of each group (n=33) included the age of the MBI respondents (26.45±3.751) years, control (25.70±3.026) years p=0.370, and MBI gestational age (21.79±3.140), control (22.88±3.664) p=0.199, primigravida and multigravida parity in the MBI group (48.5 vs. 51.5), in the control group (54.5 vs. 45.5) p=0.625, marital status in the MBI group (12.24 ± 3.275) and control group (11.88 ± 3.270) education (p = 0.541), occupation (p = 0.328), income (p = 0.640), mean depression in the MBI group (12.24 ± 3.275), control group (12188 ± 3.270) p = 0.648, this shows that the research data is homogeneous.

Table 3. Depression level pretest and posttest in the MBI group after being given the intervention.

	Pretest		**Posttest**	
	Frequency	**%**	**Frequency**	**%**
Mild	24	72.7	5	15.2
Moderate	7	21.2	0	0,0
Normal	2	6.1	28	84.8
Total	33	100,0	33	100,0

Description: descriptive statistics test

The results of the analysis showed that there were differences in the levels of pretest and posttest depression after the intervention, mild (72.7% vs 15.2%), moderate (21.2% vs 0%), and normal (6.1% vs. 84.8%). The results of this study showed that the majority of depression at the pretest was at a mild level. After being given the intervention, the majority were at a normal level.

Table 4. Depression level pre-post pada control group

	Pretest		**Posttest**	
	Frequency	**%**	**Frequency**	**%**
Mild	25	75.7	24	72.7
Moderate	5	15.2	3	9.1
Normal	3	9.1	6	18.2
Total	33	100,0	33	100,0

Description: descriptive statistics test

The results of the analysis showed that there were differences in the levels of pretest and posttest depression after the intervention, namely mild (75.7% vs. %), moderate (15.2% vs 6.1%), normal (9.1% vs 18.2%). This shows that the majority of depression at the pretest was mild, and after eight weeks, the majority remained mild.

Table 5. Differences in depression before and after the intervention in the mindfulness-based intervention group.

Variable	Pretest	Posttest	p-value
	Mean (SD)	Mean (SD)	
Depression (DASS)	12.24 (3.279)	7.55 (2.181)	0,000

Description: Paired T-Statistics

The analysis showed a significant decrease in symptoms and levels of depression in the MBI group after being given intervention for eight weeks (12.24 ± 3.279 vs. 7.55 ± 2.181) p = 0.000.

Table 6. Differences in depression before and after mindfulness-based intervention in the control group

Variable	**Pretest**	**Posttest**	**p-value**
	Mean (SD)	**Mean (SD)**	
Depression (DASS)	11.88 (3.170)	11.24 (2,610)	0,153

Description: Paired T-Statistics

The analysis showed no significant reduction in symptoms and levels of depression in the control group for eight weeks (11.88 ± 3.170 vs. 11.24 ± 2.610) p=0.153.

Table 7. Differences in posttest depression levels in the MBI group and the control group

Variable	**Posttest**	**p-value**
	Mean (SD)	
Depression (DASS)	7.55 (2.181)	0,000
Depression (Kontrol)	11.24 (2.610)	

Description: Independent T- Statistics

The analysis results showed significant differences in symptoms and levels of depression in the intervention group and the control group after the MBI intervention (7.55 ± 2.181 vs 11.24 ± 2.610) p=0.000. This shows that the reduction in symptoms and levels of depression was greater in the intervention group than in the control group.

The online MBI intervention given for eight weeks greatly reduced symptoms and levels of depression during pregnancy. Depression levels decreased significantly in the MBI group compared to the control group. This is in line with some evidence showing that practicing mindfulness skills during pregnancy can reduce depressive symptoms in mothers (Nyklíček et al., 2018). Prenatal mindfulness training has long-term benefits for dealing with depressive symptoms during the transition to parenthood (Felder et al., 2018). Meditation that is taught

formally and informally provides the benefit of reducing depression in pregnant women. This is in line with other research that mindfulness meditation interventions can improve the prevention, remission, and reduction of depression during pregnancy and can be used as an adjunct measure for the clinical treatment of depression in pregnancy (Cai et al., 2022). Providing mindfulness exercises makes pregnant women more confident in carrying out their pregnancies because these exercises provide space for women to practice their independence in doing meditation at home. This is in line with research that conducted mindfulness interventions correlated with self-management components, including self-efficacy (Turner et al., 2016). In the past few years, mindfulness-based interventions (MBIs) have increasingly been the focus of attention because of their efficacy and low cost. By combining elements of cognitive behavioral therapy and psychoeducational content, MBI supports an effective approach to enhancing physical and mental well-being (Goldberg et al., 2018). Another program, namely mindfulness-based stress reduction (MBSR) is also suggested to promote women's mental health (Nasrollahi et al., 2022).

The participants accepted the mindfulness intervention provided in this online study as an intervention that was easy, cheap, accessible at any time, and effective. This is in line with study that mobile or web-based interventions are very well received in women with postpartum depression (PPD). Mindfulness interventions are well-received among women with moderate to moderate PPD symptoms. In the study, 69% of participants were very satisfied with the app, and all participants planned to continue their mindfulness practices after the study ended (Avalos et al., 2020). A meta-analysis with electronic awareness-based interventions (eMBI), including 97 RCTs, demonstrated increasing interest in implementing eMBI. This meta-analysis shows that eMBI significantly improve mental health (Spijkerman, Pots & Bohlmeijer, 2016). Other studies highlight the need for eMBI to support pregnant women, especially if hospitalized because of severe obstetric risk, and point to the need for larger randomized trials to demonstrate the efficacy and effectiveness of eMBI. The women reported positive experiences and indicated that they benefited from the program. A meta-analysis including 65 randomized controlled trials showed that online mindfulness interventions directly and significantly reduced depression, stress, and anxiety in nonclinical and clinical samples (Schumer, Lindsay & Creswell, 2018).

Mindfulness-based electronics can help improve mothers' physical and mental health with geographic, financial, and psychological problems. Therefore, Mindfulness-based electronic is a promising approach to providing effective and cost-effective assistance to pregnant women with psychological distress and reducing the negative impact on perinatal health. Several existing studies suggest that eMBI is useful (Krusche et al., 2018), feasible, and acceptable (Mendelson et al., 2018; Avalos et al., 2020) in the treatment of depression and anxiety in the perinatal period. There is evidence that women with high levels of depression, anxiety, or stress over time benefit more from MBI than the universal perinatal population (Taylor, Cavanagh & Strauss, 2016)

A study with smartphone-based MBI is a feasible, acceptable, and perceived intervention that benefits pregnant women with obesity (Ward et al., 2023). The research findings indicate a high MBA acceptance rate. Most of the respondents were satisfied with the usability and considered the eMBI program to help with problems during pregnancy (Schiele, et al., 2022)

Another thing to note is that psychotherapy, pharmacotherapy, physical exercise, and meditation interventions can also cause harm, it is important to consider negative effects such as increased anxiety and unpleasant experiences through the use of MBI (Baer et al., 2019). So this research requires further research to test the safety of the intervention. The strength of this study is that the mindfulness intervention was given online for eight weeks using a randomized control trial. The weakness of this research is the direct observation of the participants' meditation practice at home which cannot be seen directly by all the participants.

The online MBI research provides users with convenience and easy access to practice daily meditation and mindfulness exercises. This mindfulness training practice differs from traditional mindfulness interventions because it can be done alone and is inexpensive. To improve the quality of implementing online-based mindfulness programs, ongoing efforts are needed to assess the effectiveness of the application, satisfaction, and usefulness for users, increase the types of services that can be reached online to maximize services, for example, by using artificial intelligence and paying attention to the privacy of patient data storage properly.

4. CONCLUSION

Mindfulness-based interventions provided online provide the same benefits as face-to-face mindfulness interventions. MBI for eight weeks can reduce symptoms of depression during pregnancy. This intervention is effective for pregnant women who experience geographical, occupational, and other technical problems. Future research is needed to optimize and effectively implement prevention, screening, and treatment protocols for antenatal depressive symptoms as a strategy to prevent preterm birth. The implication of this research is to be applied in improving the primary health care system, especially midwifery, to improve mother and baby outcomes after giving this intervention.

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