

Mindfulness training for pregnant women with high blood pressure

Ady Irawan. AM^{1*}, Anggie Pradana Putri², Lilik Hanifah³,
Jutharat Thongsalab⁴

¹Universitas Duta Bangsa Surakarta : KH. Samanhudi, Sondakan, Laweyan,
Surakarta, Indonesia

^{2,3}Stikes Mamba'ul 'Ulum Surakarta : Ringroad Utara Tawang Sari KM 0.3,
Jebres, Surakarta, Indonesia

⁴Boromarajonani College of Nursing Surin :

¹ady_irawan@udb.ac.id*, ²anggie.pradana.putri@stikesmus.ac.id,
³lilik_hanifah@stikesmus.ac.id, ⁴jutharat.thongsalab24@gmail.com

Abstract

Background: Hypertension during pregnancy is a prevalent complication in Indonesia. This condition heightens the risk of adverse outcomes such as preterm birth and preeclampsia. Mindfulness therapy, known for managing stress and anxiety, has shown promise in reducing blood pressure. However, studies focusing on its effects on pregnant women are limited. **Objective:** This study aims to evaluate the effectiveness of mindfulness interventions in reducing blood pressure among pregnant women with hypertension. **Methods:** A quasi-experimental study was conducted with 24 pregnant women from community centers in Central Java. Participants received weekly 30-minute mindfulness sessions over eight weeks, modeled after the Mindfulness training. Blood pressure was measured before and after the intervention, and data were analyzed using independent t-tests. **Results:** The intervention led to a significant reduction in both systolic and diastolic blood pressure. The mean systolic blood pressure decreased from 133 mmHg to 124 mmHg ($p < .001$, Cohen's $d = 5.96$), while the mean diastolic blood pressure decreased from 86.4 mmHg to 81.7 mmHg ($p < .001$, Cohen's $d = 1.77$), indicating large effects of mindfulness therapy on reducing blood pressure. The large effect sizes observed suggest that mindfulness therapy could be a powerful intervention for managing blood pressure during pregnancy, potentially reducing risks associated with hypertensive disorders. **Conclusion:** Mindfulness therapy is an effective non-pharmacological approach for lowering blood pressure in pregnant women with hypertension. This study supports the integration of mindfulness practices into prenatal care for improving maternal health outcomes. Future research should involve larger and more diverse populations and explore the long-term effects of mindfulness on maternal and fetal health.

Keywords: mindfulness; pregnant women; prenatal; high blood pressure; hypertension

Abstrak

Latar Belakang: Hipertensi selama kehamilan adalah komplikasi umum di Indonesia. Kondisi ini meningkatkan risiko hasil buruk seperti kelahiran prematur dan preeklampsia. Terapi mindfulness, yang dikenal untuk mengelola stres dan kecemasan, telah menunjukkan potensi dalam menurunkan tekanan darah. Namun, penelitian yang berfokus pada efeknya pada wanita hamil masih terbatas. **Tujuan:** Penelitian ini bertujuan untuk mengevaluasi efektivitas intervensi mindfulness dalam menurunkan tekanan darah pada wanita hamil dengan hipertensi. **Metode:** Sebuah studi kuasi-eksperimental dilakukan dengan 24 wanita hamil dari pusat-pusat komunitas di Jawa Tengah. Peserta menerima sesi mindfulness selama 30 menit setiap minggu selama delapan minggu, yang dimodelkan berdasarkan program Mindfulness training. Tekanan darah diukur sebelum dan sesudah intervensi, dan data dianalisis menggunakan uji t-independen. **Hasil:** Intervensi tersebut mengakibatkan penurunan yang signifikan pada tekanan darah sistolik dan diastolik. Rata-rata tekanan darah sistolik menurun dari 133 mmHg menjadi 124 mmHg ($p < .001$, d Cohen = 5,96), sementara rata-rata tekanan darah diastolik menurun dari 86,4 mmHg menjadi 81,7 mmHg ($p < .001$, d Cohen = 1,77), yang menunjukkan efek besar terapi mindfulness dalam menurunkan tekanan darah. Besarnya ukuran efek yang diamati menunjukkan bahwa terapi mindfulness bisa menjadi intervensi yang kuat dalam mengelola tekanan darah selama kehamilan, yang berpotensi mengurangi risiko yang terkait dengan gangguan hipertensi. **Kesimpulan:** Terapi mindfulness adalah pendekatan non-farmakologis yang efektif untuk menurunkan tekanan darah pada wanita hamil dengan hipertensi. Penelitian ini mendukung integrasi praktik mindfulness ke dalam perawatan prenatal untuk meningkatkan hasil kesehatan ibu. Penelitian di masa depan sebaiknya melibatkan populasi yang lebih besar dan lebih beragam serta mengeksplorasi efek jangka panjang dari mindfulness pada kesehatan ibu dan janin.

Kata Kunci: mindfulness; wanita hamil; prenatal; tekanan darah tinggi; hipertensi

INTRODUCTION

Hypertension during pregnancy is a common complication that can increase risks for both the mother and the fetus. In Indonesia, the prevalence of hypertension among pregnant women is relatively high, ranging from 12% to 22% of all pregnancies, making it one of the leading causes of maternal mortality (Kementerian Kesehatan RI, 2022). Hypertension in pregnancy contributes to a higher incidence of preterm births, low birth weight, and preeclampsia (Kementerian Kesehatan RI, 2020). This aligns with global findings, where hypertension during pregnancy accounts for up to 14% of all maternal deaths worldwide (World Health Organization, 2021). Given the significant risks, effective interventions to reduce blood pressure in pregnant women are urgently needed.

Mindfulness, a form of psychological intervention, has been shown to be effective in managing stress and anxiety, which are important risk factors for the development of hypertension (Bublitz et al., 2023; Conversano et al., 2021). Mindfulness involves paying full attention to the present moment without

judgment, which can, in turn, reduce physiological responses to stress (Ghahari et al., 2020). Several studies have demonstrated that mindfulness can also play a role in lowering blood pressure, both in the general population and in high-risk groups (Bublitz et al., 2023; Irawan Am et al., 2023; Li et al., 2021).

Previous research has reviewed the effects of mindfulness on hypertensive patients, but studies focusing specifically on pregnant women are still limited. Given the potential benefits, this study aims to evaluate the effectiveness of mindfulness interventions in reducing blood pressure among pregnant women with hypertension. The results of this study are expected to provide new insights into holistic approaches that can be implemented in clinical practice to improve maternal health.

METHOD

Materials and methods

This was a quasi-experimental study with pre (T0) and post (T1) measurement. Participants were eligible for the study if they were 18 years or older, had a singleton pregnancy, spoke English, were at or before 20 weeks of gestation at the time of enrollment, had a history of hypertensive disorders (such as chronic hypertension, gestational hypertension, and/or preeclampsia), and engaged in mind-body practices (like yoga, mindfulness exercises, or meditation) less than once per week. 24 pregnant women participated in this study collected from two community center in Sukoharjo and Gatak, Central Java. Participants were excluded for the study if they were under 18 years old at the time of enrollment, if they were not proficient in speaking or reading Indonesian, or if they were experiencing severe depression (indicated by an Edinburgh Postnatal Depression Scale score above 19) or currently joined a weekly mindfulness-based practice.

Mindfulness intervention

Participants assigned to the MT group received 30-minute phone sessions of MT once a week for 8 weeks. The MT intervention was modeled after the Mindfulness-Based Stress Reduction (MBSR) program, incorporating practices like breath awareness, attention to sensations, sounds, emotions, and thoughts, as well as open awareness and the development of mindfulness in daily activities, referring to Bublitz et al. (2023), combined with Irawan AM et al. (2023).

The intervention was led by a certified mindfulness instructor, who also recorded weekly session attendance to assess feasibility. Participants were encouraged to practice the body scan and breath awareness meditations for 15 minutes daily using audio recordings provided at the start of the intervention. They were also asked to maintain a diary of their independent mindfulness practice.

Statistical analysis

We utilized descriptive statistics and independent t-tests from IBM SPSS Statistics 22.0 as data analysis strategy. We compared the blood pressure (systolic and diastolic) before and after the intervention (T1).

RESULT AND DISCUSSION

Results

Table 1 presented the participant characteristics. The average age of the pregnant women participated in this study was 24.7 years and had mean gestational age of 14.9±1.05 weeks. Most of the pregnant women were graduated from college and above. Seventy five participants had hypertension prior the pregnancy and under medication (low dose aspirin) during the pregnancy.

Table 1. Participant characteristics for the mindfulness intervention

Characteristic	Mean (SD)	N (%)
Age (year)	24.7 (1.24)	
Maternal age (week)	14.9 (1.05)	
Education		
Senior high school		10 (41.6%)
College and above		14 (58.4%)
Hypertension problem prior the pregnancy		
Yes		18 (75%)
No		6 (25%)
On going hypertension medication		
Yes		18 (75%)
No		6 (25%)

Table 2. Mindfulness Training for Systolic and Diastolic Blood Pressure

Blood pressure	Mean (SD)	Mean difference (95% CI)	P value	Cohen's d
Systolic (mmHg)				
T0	133 (4.9)	2.06 (2.87 – 1.27)	<.001	5.96
T1	124 (4.35)			
Diastolic (mmHg)				
T0	86.4 (4.22)	4.7 (3.71 – 5.69)	<.001	1.77
T1	81.7 (3.55)			

The mindfulness therapy demonstrated a significant reduction in systolic blood pressure among pregnant women. The mean (SD) systolic blood pressure before the intervention was 133 mmHg (SD = 4.9), which decreased to 124 mmHg (SD = 4.35) after the intervention. The mean difference (95% CI) was 2.06 (2.87 – 1.27), with a p-value of <.001, indicating statistical significance. Additionally, the effect size measured by Cohen's d was 5.96, suggesting a very large effect of the mindfulness therapy on reducing systolic blood pressure.

The mindfulness therapy also led to a significant reduction in diastolic blood pressure among pregnant women. The mean (SD) diastolic blood pressure before the intervention was 86.4 mmHg (SD = 4.22), which decreased to 81.7 mmHg (SD = 3.55) after the intervention. The mean difference (95% CI) was 4.7 (3.71 – 5.69), with a p-value of <.001, indicating a statistically significant change. Furthermore, the effect size, represented by Cohen's d, was 1.77, demonstrating a large impact of the therapy on lowering diastolic blood pressure.

Discussion

The present study demonstrates that mindfulness therapy effectively reduces both systolic and diastolic blood pressure among pregnant women with

high blood pressure. Specifically, the mean systolic blood pressure decreased from 133 mmHg to 124 mmHg, with a statistically significant mean difference (95% CI) of 2.06 (2.87 – 1.27) and a Cohen's *d* effect size of 5.96, indicating a very large impact. Similarly, diastolic blood pressure showed a significant reduction from 86.4 mmHg to 81.7 mmHg, with a mean difference of 4.7 (95% CI: 3.71 – 5.69) and a large effect size of 1.77. These findings align with previous research on mindfulness-based interventions (MBIs), which have consistently shown promise in reducing blood pressure in both pregnant and non-pregnant populations.

In a recent systematic review and meta-analysis of MBIs for hypertensive and prehypertensive individuals, MBIs were found to significantly lower both systolic and diastolic blood pressure, reinforcing the current study's findings (Bublitz et al., 2023; Ghahari et al., 2020; Li et al., 2021). However, the impact of MBIs on pregnant women, particularly in terms of blood pressure reduction, has been less consistently reported in literature. Some studies have noted mixed results, with certain interventions showing limited effects on maternal blood pressure but beneficial outcomes in other areas, such as reducing psychological stress or improving glycemic control (Conversano et al., 2021; Irawan Am et al., 2023; Lindsay et al., 2024). This highlights the need for further research focusing on well-designed, large-scale studies specifically targeting pregnant populations to confirm and expand upon these findings.

Furthermore, the large effect size observed in the current study underscores the potential of mindfulness therapy as a powerful intervention for managing blood pressure during pregnancy. This is particularly relevant considering the increased cardiovascular risks associated with hypertensive disorders in pregnancy, which can lead to complications such as preeclampsia (Cladder-Micus et al., 2018; Lindsay et al., 2024). While the current study adds to the growing body of evidence supporting the benefits of mindfulness interventions, future research should continue to explore the mechanisms behind these effects and investigate the long-term outcomes for both maternal and fetal health.

CONCLUSION

In conclusion, the findings of this study suggest that mindfulness therapy may serve as an effective non-pharmacological approach for reducing blood pressure in pregnant women, offering a valuable tool for improving maternal health outcomes. These results contribute to the growing interest in integrating mindfulness practices into prenatal care, particularly for high-risk populations such as those with hypertension.

SUGGESTIONS

Based on the findings of this study, it is recommended that future research expands the sample size and includes diverse populations to enhance generalizability. Longitudinal studies should be conducted to assess the long-term effects of mindfulness on maternal and fetal health. Investigating the biological mechanisms behind blood pressure reduction and comparing mindfulness with other non-pharmacological interventions like exercise or diet modifications would provide valuable insights. Additionally, adapting mindfulness programs to be more accessible and integrating them into standard prenatal care could improve adherence and outcomes, while also exploring psychological benefits such as reduced stress and anxiety during pregnancy.

REFERENCES

- Bublitz, M. H., Salmoirago-Blotcher, E., Sanapo, L., Ayala, N., Mehta, N., & Bourjeily, G. (2023). Feasibility, acceptability, and preliminary effects of mindfulness training on antenatal blood pressure. *Journal of Psychosomatic Research, 165*, 111146. <https://doi.org/10.1016/j.jpsychores.2023.111146>
- Cladder-Micus, M. B., Speckens, A. E. M., Vrijzen, J. N., T. Donders, A. R., Becker, E. S., & Spijker, J. (2018). Mindfulness-based cognitive therapy for patients with chronic, treatment-resistant depression: A pragmatic randomized controlled trial. *Depression and Anxiety, 35*(10), 914–924. <https://doi.org/10.1002/da.22788>
- Conversano, C., Orrù, G., Pozza, A., Miccoli, M., Ciacchini, R., Marchi, L., & Gemignani, A. (2021). Is Mindfulness-Based Stress Reduction Effective for People with Hypertension? A Systematic Review and Meta-Analysis of 30 Years of Evidence. *International Journal of Environmental Research and Public Health, 18*(6), 2882. <https://doi.org/10.3390/ijerph18062882>
- Ghahari, S., Mohammadi-Hasel, K., Malakouti, S., & Roshanpajouh, M. (2020). Mindfulness-based Cognitive Therapy for Generalised Anxiety Disorder: A Systematic Review and Meta-analysis. *East Asian Archives of Psychiatry, 30*(2), 52–56. <https://doi.org/10.12809/eaap1885>
- Irawan Am, A., Janmabhumi, A., Wulandari, Z. A., Putri, A. P., & Santoso, A. P. A. (2023). Effect Of Mindfulness Based Cognitive Therapy (MBCT) on Anxiety and Blood Pressure for Hypertension: A scoping review. *Citra Delima Scientific Journal of Citra Internasional Institute, 7*(2), 120–127. <https://doi.org/10.33862/citradelima.v7i2.379>
- Irawan AM, A., Janmabhumi, A., Wulandari, Z. A., Santoso, A. P. A., & Putri, A. P. (2023). *A Delphi Consensus of Mindfulness-Based Cognitive Therapy for managing anxiety and blood pressure in hypertensive patient. 6*(5).
- Kementerian Kesehatan RI. (2020). *Buku Kesehatan Ibu dan Anak: Revisi 2020*. Kementerian Kesehatan RI & Japan International Cooperation Agency. <https://kesga.kemkes.go.id/assets/file/pedoman/BUKU%20KIA%20REVISI%202020%20LENGKAP.pdf>
-

- Kementerian Kesehatan RI. (2022). *Laporan Kinerja Kementerian Kesehatan Tahun 2021*. Kementerian Kesehatan RI.
- Li, J., Cai, Z., Li, X., Du, R., Shi, Z., Hua, Q., Zhang, M., Zhu, C., Zhang, L., & Zhan, X. (2021). Mindfulness-based therapy versus cognitive behavioral therapy for people with anxiety symptoms: A systematic review and meta-analysis of random controlled trials. *Annals of Palliative Medicine*, *10*(7), 7596–7612. <https://doi.org/10.21037/apm-21-1212>
- Lindsay, K. L., Guo, Y., & Gyllenhammer, L. E. (2024). Mindfulness and Cardiometabolic Health During Pregnancy: An Integrative Review. *Mindfulness*, *15*(5), 995–1013. <https://doi.org/10.1007/s12671-024-02337-2>
- World Health Organization. (2021). *Sustainable Development Goals.html*. Health Topics: Sustainable Development Goals. https://www.who.int/health-topics/sustainable-development-goals#tab=tab_2