Borneo Journal of Pharmacy
Vol 8 Issue 1 February 2025
Pages 25 – 32

https://journal.umpr.ac.id/index.php/bjop/article/view/7938
DOI: https://doi.org/10.33084/bjop.v8i1.7938
e-ISSN: 2621-4814

Research Article

Antihypertension Profile During Pregnancy at a Private Hospital in Surabaya

Oktaviany Irma Wiputri *

Iftakhur Rahma

Karima Samlan

Department of Pharmacy, Universitas Muhammadiyah Surabaya, Surabaya, East Java, Indonesia

*email: oktaviany.irma.wiputri@um-surabaya.ac.id; phone: +6281381684606

Keywords:
Antihypertensive
Hospitalization
Inpatient
Pregnancy

Abstract

Hypertension during pregnancy, a significant obstetric complication, can lead to severe consequences such as preeclampsia. This study aimed to determine the pattern of antihypertensive medication use, including drug type, route of administration, dosage, and frequency, as well as investigate the relationship between clinical data, including blood pressure and proteinuria, and the use of single or combination antihypertensive therapy in pregnant women with hypertension. A retrospective observational study was conducted on 108 pregnant women with hypertension admitted to the inpatient unit of a private hospital in Surabaya, Indonesia. Data on patient demographics, comorbidities, antihypertensive medications, blood pressure, and proteinuria levels were collected and analyzed. The majority (79.65%) of patients were aged between 20 and 35 years. Common comorbidities included obesity (62.50%), pre-existing hypertension (18.75%), and a history of preeclampsia in previous pregnancies (6.25%). Nifedipine (73.26%) was the most frequently used single antihypertensive medication, followed by methyldopa (23.26%). Combination therapy, primarily nifedipine and methyldopa (92.31%), was commonly employed. Most patients (97.35%) achieved blood pressure control, and 47.79% showed improvement in proteinuria levels. Nifedipine and the combination of nifedipine and methyldopa were the most frequently used antihypertensive medications in this cohort. Most patients achieved blood pressure control, indicating effective management of hypertension during pregnancy. Further studies are warranted to investigate the long-term outcomes and optimize antihypertensive therapy strategies in this population.

Received: August 24th, 2024
1st Revised: December 18th, 2024
2nd Revised: January 8th, 2025
3rd Revised: February 6th, 2025
Accepted: February 13th, 2025
Published: February 28th, 2025

INTRODUCTION

Hypertension during pregnancy, defined as a sustained elevation of blood pressure ≥140/90 mmHg, represents a significant health concern for expectant mothers. This condition, if left untreated, can progress to severe complications, including preeclampsia and superimposed preeclampsia. These complications are characterized by the presence of proteinuria or evidence of end-organ damage, posing substantial risks to both maternal and fetal well-being[1,2]. Early detection and appropriate management of hypertensive disorders in pregnancy are therefore crucial to mitigate these potential adverse outcomes[3].

How to cite: Wiputri OI, Rahma I, Samlan K. Antihypertension Profile During Pregnancy at a Private Hospital in Surabaya. Borneo J Pharm. 2025;8(1):25-32. doi:10.33084/bjop.v8i1.7938

Maternal mortality remains a significant global health challenge, particularly in developing countries. The World Health Organization (WHO) reported approximately 287,000 maternal deaths worldwide in 2020, with 95% occurring in these regions. A substantial proportion of these deaths are attributed to complications arising during pregnancy, notably preeclampsia and eclampsia, characterized by hypertension and organ damage, accounting for 75% of maternal mortality[4]. Indonesia, a developing nation, faces a high maternal mortality rate (MMR), ranking third highest in Southeast Asia. While the "Inter-Census Population Survey" indicated a reduction in MMR from 305/100,000 live births in 2015 to 189/100,000 live births in 2020, the national target of 70/100,000 live births by 2030 remains a critical objective. In 2022 alone, 801 maternal deaths in Indonesia were linked to hypertensive disorders of pregnancy[5]. These statistics underscore the urgent need for effective interventions to address pregnancy-related hypertension and reduce maternal mortality in Indonesia.

East Java, Indonesia, continues to struggle with high MMR, posing a serious public health challenge. Data from the Provincial Health Office of East Java reveal a concerning trend of increasing MMR between 2019 and 2021. Specifically, the MMR rose from 89 per 100,000 live births in 2019 to 234.7 per 100,000 live births in 2021[6,7]. Furthermore, complications related to preeclampsia and eclampsia contribute substantially to this burden. In Surabaya alone, 1,265 cases of preeclampsia/eclampsia complications were reported in 2022[8].

Effective antihypertensive therapy is crucial for mitigating these risks, with the primary goals of achieving blood pressure control (≤140/90 mmHg) and minimizing proteinuria[9]. Nifedipine is frequently recommended as a first-line antihypertensive agent during pregnancy, with alternatives including methyldopa, hydralazine, and labetalol[10,11]. Clinical practice often involves nifedipine monotherapy[12,13], although combination regimens, such as methyldopa and nifedipine, are employed in cases of severe hypertension[14-16].

Given the critical role of blood pressure management in preventing complications, this study aimed to investigate the profile of antihypertensive drug utilization in pregnant women with hypertension at PKU Muhammadiyah Surabaya Hospital. This hospital, a referral center for obstetric care with a substantial patient volume (139 hypertensive pregnancies in 2023), provided a unique opportunity to examine the relationship between antihypertensive drug use, blood pressure control, and proteinuria levels in this specific population. This unicenter study focused on providing valuable insights into the current clinical practices and patient outcomes within this institution. The study provides an overview of antihypertensive medication use during pregnancy and analyzes the connection between blood pressure, proteinuria, and hypertensive pregnancies.

MATERIALS AND METHODS

Materials

This retrospective cohort study examined patients with hypertension during pregnancy who received antihypertensive therapy at the inpatient unit of PKU Muhammadiyah Surabaya Hospital between January and December 2023. The study population encompassed all pregnant patients diagnosed with hypertension during this period. The sample consisted of those patients who specifically received antihypertensive medication. Inclusion criteria, detailed in **Figure 1**, outlined the specific clinical parameters required for inclusion in the study. Patients who did not meet these criteria were excluded. Data collection and analysis were conducted from January to March 2024 at PKU Muhammadiyah Surabaya Hospital.

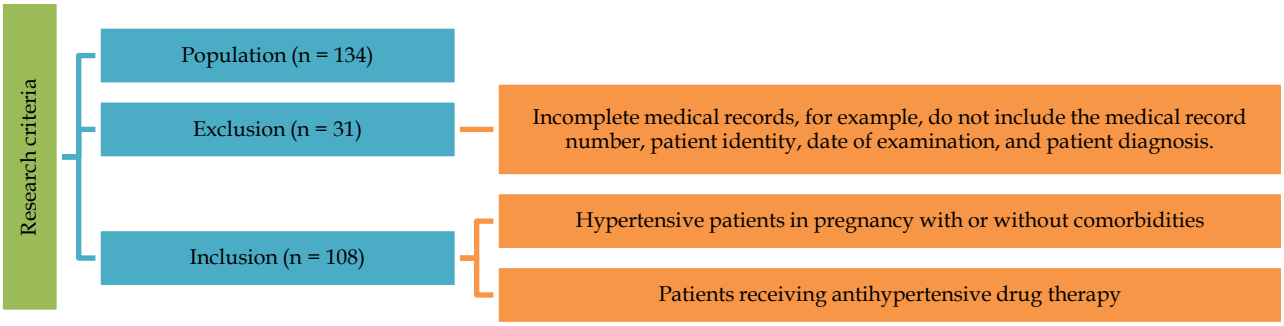

Figure 1. Research criteria.

Methods

Study design

This study employed a retrospective, descriptive-observational design, utilizing existing medical record data from PKU Muhammadiyah Hospital spanning January to December 2023. As this study relied on archived data and did not involve direct patient intervention or observation of variables, it was exempt from prospective data collection. Ethical approval was obtained from both PKU Muhammadiyah Surabaya Hospital and the Research Ethics Committee of Universitas Muhammadiyah Surabaya (Approval Number: 007/KET/II.3/AU/F/2024), ensuring adherence to ethical guidelines and patient confidentiality.

Sampling technique

This study employed purposive sampling, wherein participants were selected based on predefined inclusion and exclusion criteria. To determine the minimum required sample size, the Slovin's formula was utilized (**Equation 1**). This formula allowed for the calculation of an appropriate sample size, ensuring adequate representation of the study population while adhering to statistical rigor. The specific inclusion and exclusion criteria were established to ensure that the selected participants met the necessary requirements for the research objectives, thereby enhancing the validity and generalizability of the findings[17].

$$n = \frac{N}{1+Ne^2} \quad [1]$$
$$n = \frac{N}{1+134(5\%)^2}$$
$$n = 100\ patients$$

Data analysis

Following sample collection, data were meticulously recorded on standardized data collection sheets and subsequently compiled into a master table. Descriptive statistical analysis was then performed to characterize patient demographics and antihypertensive medication usage. Specifically, the analysis focused on detailing patient demographics, including age and gender, as well as the comprehensive documentation of antihypertensive drug regimens. This included the specific type of drug prescribed, the administered dosage, the route of administration, and the frequency of drug administration. Data were processed using Microsoft Excel, and findings are presented in the form of descriptive diagrams and percentages to facilitate clear interpretation of the results.

RESULTS AND DISCUSSION

Table I presents the demographic and clinical characteristics of the pregnant women included in this study. The majority of participants (80.56%) were within the age range of 20-35 years, and a significant proportion (98.15%) were at term gestation. In terms of comorbidities, a small percentage of participants had a history of preeclampsia (0.88%), hypertension (2.65%), or obesity (7.96%), while the majority (88.50%) presented without any reported comorbidities. Regarding obstetric history, 69.23% of participants were multigravida, with 34.26% being either nulliparous or multiparous. Notably, 86.92% of the study population was diagnosed with preeclampsia. These findings suggest that preeclampsia was the predominant condition within this cohort. The observed age distribution aligns with the typical age range for pregnancy in many populations. The low prevalence of comorbidities, despite the high incidence of preeclampsia, warrants further investigation into potential underlying factors contributing to the development of preeclampsia in this population[18,19].

Figure 2 illustrates the distribution of antihypertensive medications prescribed to pregnant patients in this study. Nifedipine emerged as the most frequently prescribed single agent, accounting for 75.90% of prescriptions. This finding suggests a strong preference for nifedipine in managing hypertension during pregnancy within this cohort. Methyldopa, a historically common antihypertensive in pregnancy, was prescribed in 24.10% of cases, indicating its continued, though less prevalent, use. This distribution may reflect evolving clinical guidelines and physician preferences, potentially influenced by updated safety profiles and efficacy data for nifedipine[20]. The predominance of nifedipine could also be attributed to its favorable tolerability and rapid onset of action, which are critical considerations in managing pregnancy-induced hypertension[21].

Table I. Patient characteristics.

Characteristics	Patient count	
	n (108)	%
Age (Years)		
20-35	87	80.56
>35	21	19.44
Pregnancy age		
First Trimester	1	0.93
Second Trimester	1	0.93
Third Trimester	106	98.15
Comorbidities		
History of pre-eclampsia	1	0.88
Pre-existing hypertension	3	2.65
Obesity	9	7.96
No comorbidities	100	88.50
Gravidity		
Primigravida	33	30.56
Multigravida	75	69.44
Parity		
Nulliparous	37	34.26
Primiparous	34	31.48
Multiparous	37	34.26
Hypertension type		
Chronic hypertension	1	0.93
Gestational hypertension	11	10.28
Preeclampsia	93	86.92
Superimposed preeclampsia	2	1.87

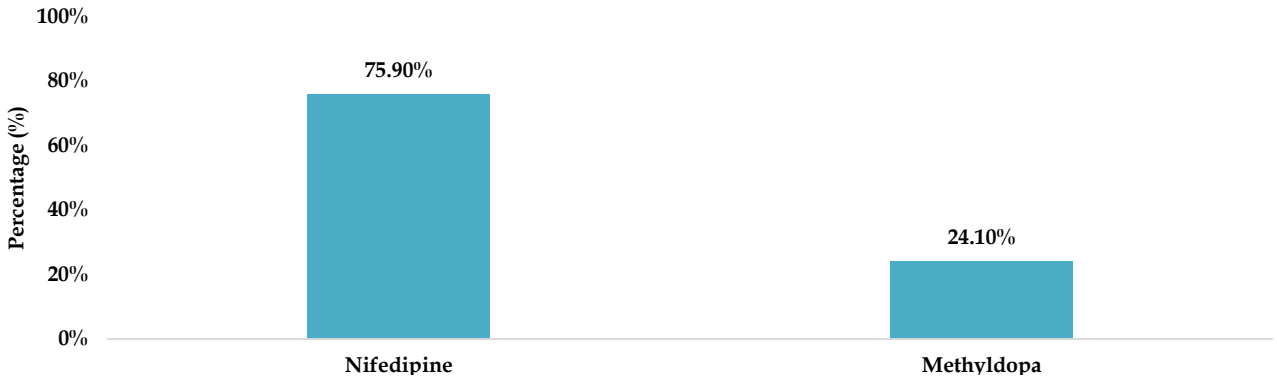

Figure 2. Single antihypertensive use.

Figure 3 illustrates the prevalence of antihypertensive medication combinations prescribed to pregnant women in the study population. Notably, the combination of nifedipine and methyldopa was the most frequently observed, with a reported occurrence of 100.00%. The consistent use of nifedipine and methyldopa may reflect their perceived safety and efficacy profiles for both maternal and fetal well-being[22].

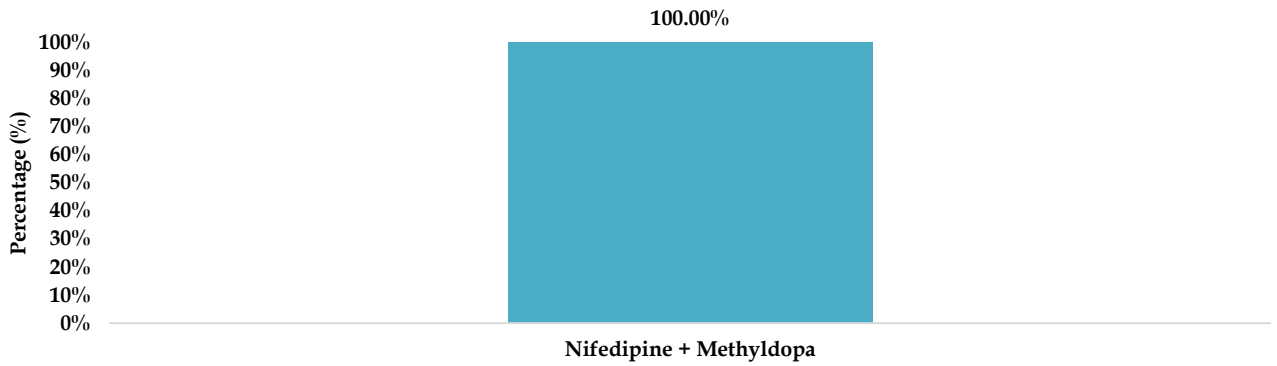

Figure 3. Use of combination antihypertensives.

Table II presents the distribution of blood pressure attainment among pregnant patients during their 2-3 day hospitalization period. Notably, a significant majority (98.15%) of the patients achieved the desired blood pressure target within this timeframe. Conversely, a small subset (1.85%) of patients did not reach the target. This high percentage of successful blood pressure management suggests the effectiveness of the implemented clinical protocols during hospitalization. However, further analysis of the 1.85% of patients who did not achieve target blood pressure is warranted.

Table II. Blood pressure outcome distribution.

Blood pressure	Patient count	
	n (108)	%
Achieve the target (≤140/90 mmHg and ≤170/105 mmHg)	106	98.15
Did not reach the target	2	1.85
Total	**108**	**100**

Table III details the changes in proteinuria levels following antihypertensive administration. The data revealed that 49.07% of patients exhibited no significant improvement in proteinuria. Conversely, a substantial 48.15% of patients demonstrated a reduction in proteinuria after receiving antihypertensive therapy, indicating a positive response to treatment. Notably, three patient records (2.78%) lacked complete laboratory data, precluding their inclusion in the analysis. This finding underscores the importance of consistent and thorough documentation in clinical settings to ensure comprehensive data analysis. The near-equal distribution between patients showing improvement and those without suggests a complex interplay of factors influencing proteinuria reduction, potentially including the specific antihypertensive agent used, underlying comorbidities, or individual patient responses[23].

Table III. Profile of proteinuria levels.

Proteinuria change	Patient count	
	n (108)	%
Proteinuria remains	53	49.07
Proteinuria decreased	52	48.15
Laboratory data not recorded	3	2.78
Total	**108**	**100**

Consistent with previous research in Padang, a significant proportion (80.56%) of hypertensive pregnant women were in the 20-35 age range, indicating that age is a contributing factor[24]. Furthermore, the majority (98.15%) of patients presented with hypertension in the third trimester (28-42 weeks), supporting the established association between advancing gestational age and increased risk of preeclampsia[25]. The physiological stress of late pregnancy, as evidenced by increased cardiovascular workload, likely contributes to this heightened risk. The observation that many patients only seek prenatal care in the third trimester suggests a need for improved early detection and management of hypertension[26].

A history of preeclampsia in previous pregnancies was observed in a small percentage (7.69%) of patients. However, this finding aligns with established literature indicating a significantly increased risk of recurrent preeclampsia[27]. Similarly, a history of pre-existing hypertension was present in 23.08% of patients, reinforcing its role as a major risk factor. Obesity was also prevalent (69.23%), supporting its association with increased preeclampsia risk. Notably, a significant portion of patients (69.44%) were multigravida, contradicting some reports that suggest primigravida status is a stronger risk factor. This discrepancy may be attributed to variations in study populations or other confounding variables[28]. Furthermore, 34.26% of patients were nulliparous, reflecting the complex interplay between parity and hypertension risk.

The study found a high prevalence of preeclampsia (86.92%), highlighting the severity of hypertension in this patient population. Nifedipine was the most commonly used antihypertensive (75.9%), consistent with national guidelines and previous research[29,30]. Its efficacy and safety profile, including its rapid onset of action, make it a preferred choice. Methyldopa was used as a second-line treatment or in combination with nifedipine, reflecting its established role in managing hypertension during pregnancy. The combination of nifedipine and methyldopa was frequently used, suggesting a strategy to optimize blood pressure control[31].

A high percentage (98.15%) of patients achieved target blood pressure levels, demonstrating the effectiveness of the chosen antihypertensive regimens. However, the study also revealed that proteinuria improvement was observed in 48.15% of

patients, indicating that blood pressure control does not always correlate with proteinuria resolution[32]. This highlights the complexity of preeclampsia and the need for comprehensive patient management.

This descriptive study provides valuable insights into the clinical profile of hypertensive pregnant women at a single center. However, it has limitations, including the lack of a control group and the inability to assess the long-term effects of treatment. Future research should include comparative studies and explore the relationship between antihypertensive use and clinical outcomes, including laboratory parameters and fetal outcomes. Further studies should also explore the effectiveness of alternative antihypertensive regimens and investigate the underlying mechanisms of proteinuria in preeclampsia.

CONCLUSION

This study revealed that nifedipine is the predominant single antihypertensive agent utilized in pregnant women within Surabaya hospitals. In cases requiring combination therapy, nifedipine was most frequently paired with methyldopa. Notably, both single and combination therapies effectively achieved target blood pressure levels in these patients. The selection of drug, dosage, frequency, and route of administration adhered to established clinical guidelines. These findings suggest that current antihypertensive management practices in Surabaya hospitals are effective in controlling hypertension during pregnancy and align with recommended standards.

ACKNOWLEDGMENT

The authors extend their sincere gratitude to all individuals who contributed to the successful completion of this research. We are particularly thankful to PKU Muhammadiyah Hospital Surabaya for granting the necessary research permit, which enabled us to conduct this study.

AUTHORS' CONTRIBUTION

Conceptualization: Oktaviany Irma Wiputri, Iftakhur Rahma, Karima Samlan
Data curation: Oktaviany Irma Wiputri, Iftakhur Rahma, Karima Samlan
Formal analysis: Oktaviany Irma Wiputri, Iftakhur Rahma, Karima Samlan
Funding acquisition: -
Investigation: Oktaviany Irma Wiputri, Iftakhur Rahma, Karima Samlan
Methodology: Oktaviany Irma Wiputri
Project administration: Oktaviany Irma Wiputri
Resources: -
Software: -
Supervision: Oktaviany Irma Wiputri, Karima Samlan
Validation: Oktaviany Irma Wiputri, Karima Samlan
Visualization: Oktaviany Irma Wiputri
Writing - original draft: Iftakhur Rahma
Writing - review & editing: Oktaviany Irma Wiputri, Karima Samlan

DATA AVAILABILITY

The datasets generated and analyzed during the current study are available from the corresponding author upon request.

CONFLICT OF INTEREST

The authors declare no conflicts of interest related to this study.

REFERENCES

1. Lukito AA, Harmeiwaty E, Hustrini NM. Konsensus penatalaksanaan hipertensi 2019. Jakarta: Indonesian Society of Hypertension; 2019.

2. Unger T, Borghi C, Charchar F, Khan NA, Poulter NR, Prabhakaran D, et al. 2020 International Society of Hypertension global hypertension practice guidelines. Hypertension, 75(6):1334-57. DOI: 10.1161/hypertensionaha.120.15026; PMID: 32370572

3. Bajpai D, Popa C, Verma P, Dumanski S, Shah S. Evaluation and Management of Hypertensive Disorders of Pregnancy. Kidney360. 2023;4(10):1512-25. DOI: 10.34067/kid.0000000000000228; PMCID: PMC10617800; PMID: 37526641

4. Ekwuazi EK, Chigbu CO, Ngene NC. Reducing maternal mortality in low- and middle-income countries. Case Rep Womens Health. 2023;39:e00542. DOI: 10.1016/j.crwh.2023.e00542; PMCID: PMC10636262; PMID: 37954228

5. Suparji S, Nugroho HSW, Sunarto S, Prayogi AS. High maternal mortality rate in Indonesia: a challenge to be addressed immediately. PAMJ-One Health. 2024;14:13. DOI: 10.11604/pamj-oh.2024.14.13.44464

6. Febriyanto EC, Indawati R, Mahmudah, Ama F, Ashari FY. Modeling of Maternal Mortality (MMR) in East Java 2017-2019 Using Panel Regression Approach. J Biometrika Kependudukan. 2023;12(2):177-85. DOI: 10.20473/jbk.v12i2.2023.177-185

7. Sulistyono A, Joewono HT, Yustinasari, Aditiawarman. Maternal mortality from eclampsia at tertiary referral hospital, Surabaya, Indonesia. Eurasia J Biosci. 2020;14:1709-13.

8. Ernawaty E, Sri D. Health Expenditure Analysis in Patients with Pregnancy-Labor Complications in Surabaya. Indones J Health Adm. 2022;10(1):3-13. DOI: 10.20473/jaki.v10i1.2022.3-13

9. Oparil S, Acelajado MC, Bakris GL, Berlowitz DR, Cífková R, Dominiczak AF, et al. Hypertension. Nat Rev Dis Primers. 2018;4:18014. DOI: 10.1038/nrdp.2018.14; PMCID: PMC6477925; PMID: 29565029

10. Awaludin A, Rahayu C, Daud NAA, Zakiyah N. Antihypertensive Medications for Severe Hypertension in Pregnancy: A Systematic Review and Meta-Analysis. Healthcare. 2022;10(2):325. DOI: 10.3390/healthcare10020325; PMCID: PMC8872490; PMID: 35206939

11. Donel S, Novri DA, Hamidy Y, Savira M. Effectiveness of nifedipine, labetalol, and hydralazine as emergency antihypertension in severe preeclampsia: a randomized control trial. F1000Res. 2023;11:1287. DOI: 10.12688/f1000research.125944.2; PMCID: PMC10238817; PMID: 37273965

12. Hazra PK, Mehta A, Desai B, Pandey U, Mehta KD, Bajpai S, et al. Long-acting nifedipine in the management of essential hypertension: a review for cardiologists. Am J Cardiovasc Dis. 2024;14(6):396-413. DOI: 10.62347/rpmz6407; PMCID: PMC11744219; PMID: 39839565

13. Snider ME, Nuzum DS, Veverka A. Long-acting nifedipine in the management of the hypertensive patient. Vasc Health Risk Manag. 2008;4(6):1249-57. DOI: 10.2147/vhrm.s3661; PMCID: PMC2663456; PMID: 19337538

14. Easterling T, Mundle S, Bracken H, Parvekar S, Mool S, Magee LA, et al. Oral antihypertensive regimens (nifedipine retard, labetalol, and methyldopa) for management of severe hypertension in pregnancy: an open-label, randomised controlled trial. Lancet. 2019;394(10203):1011-21. DOI: 10.1016/S0140-6736(19)31282-6; PMCID: PMC6857437; PMID: 31378394

15. Gradman AH, Basile JN, Carter BL, Bakris GL. Combination Therapy in Hypertension. J Clin Hypertens. 2010;13(3):146-54. DOI: 10.1111/j.1751-7176.2010.00397.x; PMCID: PMC8673364; PMID: 21366845

16. Brown CM, Garovic VD. Drug Treatment of Hypertension in Pregnancy. Drugs. 2014;74(3):283-96. DOI: 10.1007/s40265-014-0187-7; PMCID: PMC4558097; PMID: 24554373

17. Campbell S, Greenwood M, Prior S, Shearer T, Walkem K, Young S, et al. Purposive sampling: complex or simple? Research case examples. J Res Nurs. 2020;25(8):652-61. DOI: 10.1177/1744987120927206; PMCID: PMC7932468; PMID: 34394687

18. Chang KJ, Seow KM, Chen KH. Preeclampsia: Recent Advances in Predicting, Preventing, and Managing the Maternal and Fetal Life-Threatening Condition. Int J Environ Res Public Health. 2023;20(4):2994. DOI: 10.3390/ijerph20042994; PMCID: PMC9962022; PMID: 36833689

19. Karrar SA, Martingano DJ, Hong PL. Preeclampsia. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025. PMID: 34033373

20. Ernawati, Aditiwarman, Rifdah SN, Sulistyono A. Antihypertensive Choices during Pregnancy in Limited Setting. Pharmacogn J. 2023;15(2):315-8. DOI: 10.5530/pj.2023.15.46

21. Stason WB, Schmid CH, Niedzwiecki D, Whiting GW, Caubet JF, Luo D, et al. Safety of nifedipine in patients with hypertension: a meta-analysis. Hypertension. 1997;30(1 Pt 1):7-14. DOI: 10.1161/01.hyp.30.1.7; PMID: 9231814

22. Cífková R. Hypertension in Pregnancy: A Diagnostic and Therapeutic Overview. High Blood Press Cardiovasc Prev. 2023;30(4):289-303. DOI: 10.1007/s40292-023-00582-5; PMCID: PMC10403432; PMID: 37308715

23. Sarafidis PA, Khosla N, Bakris GL. Antihypertensive therapy in the presence of proteinuria. Am J Kidney Dis. 2007;49(1):12-26. DOI: 10.1053/j.ajkd.2006.10.014; PMID: 17185142

24. Marlina Y, Santoso H, Sirait A. Faktor-Faktor Yang Berhubungan Dengan Hipertensi Pada Ibu Hamil di Wilayah Kerja Puskesmas Padang Panyang Kecamatan Kuala Pesisir Kabupaten Nagan Raya. J Healthc Technol Med. 2022; 7(2):1512-25. DOI: 10.33143/jhtm.v7i2.1734

25. Dewie A, Pont AV, Purwanti A. Hubungan Umur Kehamilan dan Obesitas Ibu Hamil dengan Kejadian Preeklampsia di Wilayah Kerja Puskesmas Kampung Baru Kota Luwuk. Promotif J Kesehatan Masyarakat. 2020;10(1):21–7. DOI: 10.56338/pjkm.v10i1.616

26. Kepley JM, Bates K, Mohiuddin SS. Physiology, Maternal Changes. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025. PMID: 30969588

27. Bardja S. Faktor Risiko Kejadian Preeklampsia Berat/Eklampsia pada Ibu Hamil. EMBRIO J Kebidanan. 2020;12(1):18–30. DOI: 10.36456/embrio.v12i1.2351

28. Silvana R, Ramayanti I, Kurniawan, Ramadhina AD. Hubungan Antara Usia Ibu, Status Gravida, dan Riwayat Hipertensi dengan Terjadinya Preeklampsia. ULIL ALBAB J Ilmiah Multidisiplin. 2023;2(4):1370–5.

29. Perkumpulan Obstetri dan Ginekologi Indonesia. Pedoman Nasional Pelayanan Kedokteran Diagnosis dan Tata Laksana Preeklamsia. Jakarta: Perkumpulan Obstetri dan Ginekologi Indonesia; 2016.

30. Hidayati SF, Andarini YD, Marfu'ah N. Evaluasi Penggunaan Obat Antihipertensi pada Pasien Ibu Hamil di Instalasi Rawat Inap RSIA Muslimat Jombang Tahun 2018. Pharmasipha Pharm J Islam Pharm. 2020;4(2):66-73. DOI: 10.21111/pharmasipha.v4i2.4959

31. Kernaghan D, Duncan AC, McKay GA. Hypertension in pregnancy: a review of therapeutic options. Obstet Med. 2012;5(2):44-9. DOI: 10.1258/om.2011.110061; PMCID: PMC4989617; PMID: 27579135

32. Lee H, Park MS, Kang MK, Song TJ. Association between Proteinuria Status and Risk of Hypertension: A Nationwide Population-Based Cohort Study. J Pers Med. 2023;13(9):1414. DOI: 10.3390/jpm13091414; PMCID: PMC10533010; PMID: 37763181