

## LITERATURE STUDY ON ANTIHYPERTENSIVE THERAPY IN PREGNANCY

Junaedi<sup>1)</sup>, Nanang Kurnia Achmadi<sup>2)</sup>, Yetri Elisya<sup>3)</sup>, Dwi Yunita Rizki Fajarsari<sup>4)</sup>

<sup>1),2),3),4)</sup>Politeknik Kesehatan Kemenkes Jakarta II, Jakarta, Indonesia

Email<sup>1)</sup>: [junaedi@poltekkesjkt2.ac.id](mailto:junaedi@poltekkesjkt2.ac.id)  
E-mail<sup>2)</sup>: [nanang.kurnia@poltekkesjkt2.ac.id](mailto:nanang.kurnia@poltekkesjkt2.ac.id)  
Email<sup>3)</sup>: [yeti.elisya@poltekkesjkt2.ac.id](mailto:yeti.elisya@poltekkesjkt2.ac.id)

### ABSTRACT

Hypertension is one of the leading causes of maternal and fetal mortality and has more serious repercussions during childbirth. The three foremost causes of maternal mortality in obstetrics are hemorrhages (45%), infection (15%), and preeclampsia (13%). In pregnancy, hypertension is referred to as systolic blood pressure above 140 mmHg or diastolic blood pressure higher over 90 mmHg. Due to the risk of teratogenic effects of medication and mother physiologic changes in response to pregnancy, treatment during pregnancy requires special consideration. Methyldopa and Nifedipine are antihypertensive medications that can be performed during pregnancy. Antihypertensive therapy in pregnancy should be determined based on the pregnant patient's age, the class of antihypertensive drugs, single medications, and antihypertensive therapy combinations. As stated by results of this study, more pregnant women had hypertension between the ages of 26 and 30. When compared to other antihypertensive groups, nifedipine plus calcium blockers (CCB) is the safest and most effective type of antihypertensive therapy for pregnant women. Furthermore, some patients with hypertension in pregnancy require a combination of therapies to meet blood pressure targets; the use of a combination of nifedipine and methyldopa has been shown to overcome hypertension in pregnancy.

**Keywords:** Antihypertensives, Hypertension, Therapy, Pregnancy

## INTRODUCTION

Hypertension is a leading cause of maternal and fetal death, as well as having major consequences during childbirth. Pregnancy hypertension has numerous effects for both the mother and the fetus. Preeclampsia/eclampsia, which can be life-threatening and endanger the pregnancy, can also occur. Since high blood pressure impairs the passage of nutrients to the fetus through the placenta, the infant is frequently born underweight. Baby is typically born with a low birth weight (1). According to the World Health Organization, pregnancy hypertension is one of the leading causes of illness and mortality for both the mother and the fetus globally. Globally, 80% of maternal deaths are classed as direct causes of maternal mortality, which are caused by bleeding (25%) mainly postpartum hemorrhage, hypertension in pregnant women (12%), partus stuck (8%), abortion (13%), and other causes (7%) to (13%), along with other factors (7%) (2).

According to the 2019 health profile data, the major causes of maternal mortality were hemorrhage (1,280 cases), hypertension in pregnancy (1,066 cases), and infection (207 occurrences) (3). These deaths are frequently preventable if pregnancy-related issues and other high risks are recognized early and treated appropriately and adequately during the most important period, namely the period around childbirth (4).

In pregnancy, hypertension is referred to as systolic blood pressure over 140 mmHg or diastolic blood pressure above over 90 mmHg. A 15 mmHg increase in systolic blood pressure compared to pre-pregnancy or early pregnancy blood pressure (5). When a human being's blood pressure impacts when the blood pressure is 140/90 mmHg and the proteinuria or edema results are negative, the use of therapy for hypertension in pregnancy can be deemed successful and effective. Thus, it is crucial to examine the success of hypertension medications in pregnant women through assessing treatment outcomes in the study, such as blood pressure, proteinuria, and edema (6).

Due to the risk of teratogenic effects of therapy and maternal physiological changes in the interaction to pregnancy, treatment during pregnancy requires extra care. Anti-hypertensives are able to penetrate the placental barrier and raise the fetal bloodstream. And it can be said to be successful and effective in the use of hypertension therapies during pregnancy when blood pressure accomplishes an ideal reading of 140/90 mmHg, including negative proteinuria and edema values (7).

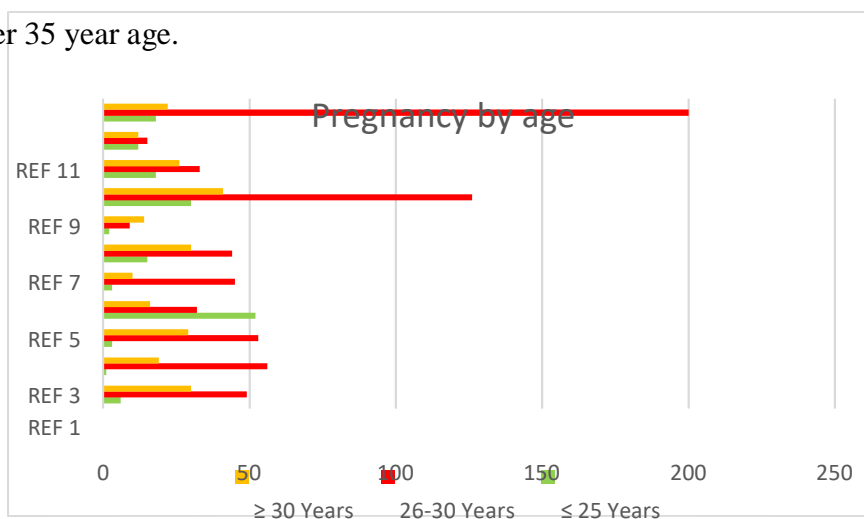
Pregnancy hypertension must be carefully controlled in order to reduce maternal/fetal morbidity and death by safeguarding women from the risk of high blood pressure, preventing disease development, preventing seizures, and considering pregnancy termination if the mother or fetus is in danger (8). Some of the therapies frequently prescribed for managing hypertension in women include labetalol, methyldopa, nifedipine, clonidine, diuretics, and hydralazine. Labetalol is the most secure medication. Diuretics and CCBs (nifedipine) are safe despite a lack of data and use as first-line medications (9). With this in mind, the researcher is interested in conducting a literature study to learn more about antihypertensive therapy in pregnancy.

### RESEARCH METHODS

This is library research, which is composed of studies relating to library data collection methods, or research whose research objects are examined through extensive library information (science journals, books, and other materials). These are the inclusion criteria for this study: literature on antihypertensive treatment therapy in pregnant women/pregnancy, published among the years 2012 and 2022, taken in full text or complete, explaining hypertension medications in pregnancy, explaining the characteristics of pregnant women with hypertension, in Indonesian or English. Whereas the exclusion criteria were as follows: literature that was incomplete or could not be opened in full text, material that did not provide age, and literature that was duplicated.

### RESULTS

Graph 1 illustrates that the majority of pregnant women patients are within the ages of 26 and 30. A mother's health is affected by her age; the mother is defined to be at high risk if she is under 20 and over 35 year age.



Mortality in pregnant women under the age of 20 is 2-5 times higher than in those aged 20-29 years, and it will be higher in those over the age of 35 (10). Because first-time mothers (primigravida) are young at the age of 20-29, when more than 50% of women are at risk of hypertension during pregnancy. Pregnancy hypertension will rise at a young age due to pathological changes, including the spasm of arteriole blood vessels to vital organs, while the mother's body is not appropriate for pregnancy since the organs that support the woman's pregnancy are not in an ideal state. The mother's body is not ready for pregnancy because the organs that support a woman's pregnancy are not yet ideal, causing tissue abnormalities in metabolism including blood circulation disorders to the retroplacenter (11).

Age remains a risk factor for hypertension in pregnant women, due to the fact that hypertension is more prevalent within adolescence and after the age of 35, which corresponds to the early and late periods of reproductive age. Age above 35 is another risk factor for hypertension. Pregnancy under the age of 25 raises the risk of hypertension and produces seizures more quickly. As a result, pregnant women nearing or at the conclusion of their reproductive cycle are more likely to develop hypertension (2).

Table 1

Reference	Class of drug
Ref 1	Antagonis kalsium (CCB), Agonis reseptor $\alpha$ -2 adrenergik
Ref 2	Antagonis kalsium (CCB), Agonis reseptor $\alpha$ -2 adrenergik
Ref 3	Diuretik, Antagonis kalsium (CCB), Agonis reseptor $\alpha$ -2 adrenergik
Ref 4	Diuretik, Antagonis kalsium (CCB)
Ref 5	Antagonis kalsium (CCB)
Ref 6	Antagonis kalsium (CCB), Agonis reseptor $\alpha$ -2 adrenergik
Ref 7	Diuretik, Penghambat Angiotensin Coverting Enzym (ACE-Inhibitor), Antagonis reseptor angiotensin II (ARB), Antagonis kalsium (CCB), Agonis reseptor $\alpha$ -2 adrenergik
Ref 8	Antagonis kalsium (CCB), Agonis reseptor $\alpha$ -2 adrenergik
Ref 9	Diuretik, Antagonis kalsium (CCB), Agonis reseptor $\alpha$ -2 adrenergik
Ref 10	Antagonis kalsium (CCB), Agonis reseptor $\alpha$ -2 adrenergik
Ref 11	<del>Penghambat adreno reseptor (<math>\beta</math>-blocker), Antagonis kalsium (CCB), Agonis reseptor <math>\alpha</math>-2 adrenergik</del>

The data reveals treatment based on the most usually prescribed class for pregnant women with hypertension. According to the findings of the study, the calcium antagonist (CCB) group was the most commonly prescribed antihypertensive group when compared to other antihypertensive groups. Calcium antagonists can be identified in drugs that include nifedipine and amlodipine. CCBs have been shown to lower blood pressure during pregnancy and to control prenatal and postpartum hypertension. The mechanism of action of CCBs is to inhibit calcium entrance into cells, causing vasodilation. These effects can lower blood pressure in patients with hypertension by increasing the resistance of the peripheral vascular system (PVR) due to increased intracellular calcium, which causes a rise in arterial smooth muscle pressure (12).

Furthermore, the medication in the form of the  $\alpha_2$  adrenergic receptor agonist group is methyldopa. Methyldopa is the safest hypertension drug and has no negative effects on the mother or fetus when taken during pregnancy. The therapy crosses the placenta and is found in cord blood at levels comparable to mother blood. The therapy lowers systolic blood pressure in infants, and there have been no reports of fetal injury. Methyldopa has a vasodilation effect by decreasing the rise in norepinephrine at smooth muscle receptors (13). Diuretics are commonly used to treat non-pregnancy hypertension. Diuretics can lower blood pressure and edema, which is why obstetricians prescribe them during pregnancy (14). Women with pre-eclampsia may be given furosemide postpartum.

## **CONCLUSION**

In accordance to the findings from the literature review, the age range of pregnant women with hypertension is generally 26-30 years old, and the majority of antihypertensive groups utilize calcium blockers (CCBs). Because the mechanism of action of CCBs is to inhibit calcium entry into cells, causing vasodilation. It is necessary to conduct research on the classification of antihypertensive therapy in pregnant women based on the diagnosis of preeclampsia.

## **ACKNOWLEDGMENT**

For the Director of Poltekkes Kemenkes Jakarta 2, the team of writers who have collaborated for the publication of this research.

## BIBLIOGRAPHY

1. Ima Mariama. Gambaran Penatalaksanaan Hipertensi Dalam Kehamilan Dan Faktor Predisposisi Pada Ny. D G6p3a2 Di Puskesmas Telagasari Kabupaten Karawang Tahun 2020. 0;000(1):2–8.
2. World Health Organization. World Statistics 2015
3. Prabhakara G. Health Statistics (Health Information System). Short Textbook of Preventive and Social Medicine. 2010. 28–28 p.
4. Maryunani A, Yulianingsih. Asuhan Kegawatdaruratan dalam Kebidanan . Jakarta; 2009.
5. Yesi A. Hipertensi Dalam Kehamilan. BidanKita. 2018. 38 p.
6. Sidani M, Siddik-sayyid SM. Preeclampsia, A New Perspective In 2011 I-Introduction Definitions. J Anesth. 2011;21(2):2011.
7. Dyah B, Perwitasari A, Goyena R, Ibrahim SS, Bougalambou ASI, Rahmawati F, et al. Studi Eksplorasi Penatalaksanaan Hipertensi Pada Wanita Hamil. J Chem Inf Model. 2018;1(2):281–5.
8. Mudjari NS, Samsu N. Management of hypertension in pregnancy . 2015 [cited 2022 Jul 26];78–86. Available from: <https://pubmed.ncbi.nlm.nih.gov/25948773/>
9. Moore BA, Barnett JE. Hypertension in pregnancy. Case Stud Clin Psychol Sci Bridg Gap from Sci to Pract [Internet]. 2015 [cited 2022 Jul 26];(August):1–7. Available from: <https://academic.oup.com/book/24370/chapter/187252657>
10. Prawirohardjo S. Ilmu Kandungan. 2nd ed. Wiknjosastro H, Saifuddin BA, Rachimhadhi T, editors. 2007.
11. Sukfitrianty, Aswadi, Lagu AMHR. Faktor Risiko Hipertensi Pada Ibu Hamil Di Rumah Sakit Hikmah Kota Makassar. Al-Sihah Public Heal Sci J [Internet]. 2016;8(1):79–88. Available from: <http://journal.uin-alauddin.ac.id/index.php/Al-Sihah/article/view/2086>
12. Dipiro JT, Wells BG, Schwinghammer TL, Dipiro C V. Pharmacotherapy Handbook Seventh Edition. Vol. 7. USA : McGraw-Hill Company; 2008.
13. Ghanem FA, Movahed A, Assad Movahed C. Use of Antihypertensive Drugs during Pregnancy and Lactation.
14. Alatas H. Hipertensi pada Kehamilan. Herb-Medicine J. 2019;2(2):27.