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Study of Antihypertensive and Antiplatelet Use in Outpatient Preeclampsia Patients at Siti Khodijah Sepanjang Hospital

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ABSTRACT

Background: Preeclampsia is a complication of pregnancy characterized by increased blood pressure and the presence of proteinuria after reaching 20 weeks of gestation. Besides that, the diagnosis of preeclampsia can be reinforced by other symptoms such as edema, impaired liver and kidney function.

Objectives: This study aims to investigate the usage of antihypertensive and antiplatelet medications in outpatient preeclampsia patients at Siti Khodijah Sepanjang Hospital from January 2022 to December 2023.

Methods: Data collection method is retrospective, obtained from medical records of 70 preeclampsia patients. The sampling technique using purposive sampling method according to the inclusion research criteria. Data was analyzed using Microsoft Excel 2021.

Results: Data on drug usage profiles obtained during the treatment, shows that the most common combination is a combination of two antihypertensive drugs and an antiplatelet, namely metildopa (category B) + aspirin (category C), with a dosage of 500 mg + 80 mg per day. The medication regimen is S2dd1 + S1dd1, and the average duration of treatment ranges from 7 to 30 days. With this treatment, the blood pressure of preeclampsia patients experienced a change in the patient's blood pressure which decreased in 65 patients with the initial classification of mild preeclampsia being 54 patients to normal in the final preeclampsia classification of 56 patients

Conclusion: This study provides several important implications for health workers in Indonesia in the management of preeclampsia disease with the use of antihypertensive and antiplatelet drugs, so that they can provide services that are in accordance with the medical needs of patients.

Keywords: Pregnancy; Preeclampsia; Antihypertensive; Antiplatelet

INTRODUCTION

High blood pressure is one of the most common health problems during pregnancy and can lead to complications in about 2-3% of pregnancies. Complications that may arise in pregnant women with hypertension include cerebral hemorrhage, acute renal failure, increased blood viscosity, placental abruption.[1] Hypertension during pregnancy occurs in about 10% of pregnancies and is a major cause of high rates of maternal and fetal morbidity and mortality.[2] It is important to control blood pressure in pregnant women within the normal range to reduce the incidence of cerebral hemorrhage and prevent stroke and cerebrovascular complications.[3] The World Health Organization (WHO) reported that the global maternal mortality rate (MMR) in 2019 reached 303,000.[4] On a national scale, hypertension is one of the leading causes of maternal death in Indonesia in 2021, with a total of 1,077 cases.[5] In East Java Province, the MMR in 2021 reached 235 people per 100,000 live births, and the main cause of death was hypertension in pregnancy, which reached 9.62% or around 123 cases.[6] The Sidoarjo District health profile in 2021 reported an estimated number of MMR of 21 cases, with hypertension in pregnancy causing 6 cases.[7] In the treatment of preeclampsia in pregnant women, antihypertensive therapy is used to reduce blood pressure.[8] POGI recommends the administration of antihypertensives in preeclampsia.[9]

Based on research conducted by Ferdy in 2021 regarding the Evaluation of the Use of Antihypertensive Drugs in Hospitalized Preeclampsia Patients at Rsud Datu Sanggul which is guided by the Indonesian Obstetrics and Gynecology Association (POGI), 60 patients experienced a decrease in blood pressure with an average decrease in systolic blood pressure of 35.54 mmHg and diastolic blood pressure of 21.04 mmHg. The antihypertensive drugs used were nifedipine as many as 42 patients (70%), a combination of nifedipine and methyldopa as many as 18 patients (30%). These results indicate that antihypertensive drugs based on POGI are effective in lowering blood pressure.[10] Based on research conductes by Lelia Duley in 2019 regarding Antiplatelet agents for preventing pre-eclampsia and its complications, Administering low-dose aspirin to pregnant women led to small-to-moderate benefits, including reductions in pre-eclampsia (16 fewer per 1000 women treated), preterm birth (16 fewer per 1000 treated), the baby being born small-for-gestational age (seven fewer per 1000 treated) and fetal or neonatal death (five fewer per 1000 treated). Overall, administering antiplatelet agents to 1000 women led to 20 fewer pregnancies with serious adverse outcomes. The quality of evidence for all these outcomes was high.Aspirin probably slightly increasedthe risk of postpartum haemorrhage of more than 500 mL, however,the quality of evidence forthis outcomewas downgraded to moderate, due to concerns of clinical heterogeneity in measurements of blood loss. Antiplatelet agents probably marginally increase placental abruption, but the quality of the evidence was downgraded to moderate due to low event numbers and thus wide 95% CI

The purpose of this study was to determine how the use of antihypertensive and antiplatelet drugs in outpatient preeclampsia patients at Siti Khodijah Sepanjang Hospital. This study is expected to provide information related to how to use drugs in preeclampsia patients and reduce the risk of preeclampsia and prevent complications of preeclampsia.

METHODS

Study design and ethical aproval

This study is a descriptive observational study with data collection carried out retrospectively obtained from secondary data, namely medical records of outpatient at Siti Khodijah Sepanjang Hospital. This study was conducted after obtaining a research permit from Siti Khodijah Sepanjang Hospital. The sample studied included all patients with a diagnosis of preeclampsia on an outpatient basis at Siti Khodijah Sepanjang Hospital for the period January 2022-December 2023

Population and samples

The population studied included all patients with a diagnosis of preeclampsia on an outpatient basis at Siti Khodijah Sepanjang Hospital for the period January 2022-December 2023. In this study, samples were taken using a non-random sampling method with a purposive sample approach, which considered the inclusion criteria and did not meet the exclusion criteria. The sample size of this study was 70 patients with a diagnosis of preeclampsia who received antihypertensive and or antiplatelet therapy was based on the inclusion and exclusion criteria.

Inclusion criteria :

1. Outpatients with gestational age >20 weeks who were diagnosed with preeclampsia.
2. Outpatient preeclampsia patients who received antihypertensive and or antiplatelet therapy in the period January 2022-December 2023.
3. Preeclampsia patients whose medical records contained patient demographic data, disease history and classification of early preeclampsia, drug use profile; blood pressure profile, and laboratory data profile.
4. Outpatient preeclampsia patients who had regular monthly control visits during the study period.

Exclusion criteria :

Preeclampsia patients who were not routinely controlled and referred to other health facilities during the study period.

Study instruments

The data collection tool was a laptop. The materials used were patient medical record data containing patient demographic data; disease history and classification of early preeclampsia; drug use profile; blood pressure profile; and laboratory data profile, data collection sheets and the Indonesian Obstetrics and Gynecology Society (POGI) guideline standards on Diagnosis and Management of Pre-Eclampsia.

Data collection

Data collection was based this research uses a non-random sampling technique, where samples are taken from the population not at random but based on the researcher's considerations, namely by using a purposive sampling method according to the research inclusion criteria and not included in the exclusion criteria.

Data Analysis

Data was analyzed using Microsoft Excel 2021. The results of the analysis will be presented in tables and percentages accompanied by narrative explanations to conclude and evaluate the results.

RESULTS AND DISCUSSION

Patient Demographics

The demographic characteristics of the patients were classified according to the patient's age, trimester of gestation, obsessional status (GPA), medical history and classification of early preeclampsia. The description of patient data can be seen in Table I**.** Based on the results of patient age demographic data showed the most frequent results in patients aged between 21 to 35 years as many as 49 patients (70%). Research by Yanna and colleagues in 2023 found that preeclampsia patients were most common in the age range of 21-35 years as many as 132 patients (68.21%).[11] However, this finding is not in accordance with the theory of risk factors for preeclampsia according to the POGI guidelines, which emphasize that the risk of preeclampsia is higher in pregnant women over 35 years of age. However, preeclampsia can also occur in the normal reproductive age range, which is between 21 and 35 years old. POGI emphasizes that preeclampsia is influenced by various factors such as heredity, lifestyle, obsterics, previous history of preeclampsia, comorbidities, not just age.[9] Demographic data of patients of terimester gestational age showed the most results occurred in trisemester III as many as 59 patients (84.29%). This study supports the POGI theory, that with increasing gestational age, almost all organs of the body experience an increase in workload due to the increasing burden of pregnancy, which often causes an increase in blood pressure. This causes the risk of complications such as preeclampsia in pregnant women to also increase.[9]

Patient demographic data on the patient's obsteri gravida status, preeclampsia most often occurs in the 1st pregnancy or primigravida with a total of 29 patients (41.43%). According to Aisyah in 2018, women who experience pregnancy for the first time or primigravida tend to experience increased stress during labor.[12] This emotional stress can result in a high release of corticotropic-releasing hormone (CRH) from the hypothalamus, which in turn stimulates the production of cortisol. Cortisol plays a role in preparing the body to respond to various stressors by increasing sympathetic nervous system activity, which includes responses to increase cardiac output and maintain blood pressure.[12,13,14]

In obsteri parity status, the most patients occurred in pregnant women who had not experienced childbirth as many as 30 patients (42.86%). According to Pratiwi in 2015, nulliparous pregnancy is one of the main risk factors for developing preeclampsia. Some factors that may contribute to the increased risk of preeclampsia in nulliparous pregnancy include the body's physical adaptation to first-time pregnancy, the body's inability to adjust to the hormonal changes that occur, as well as uncertainty about the body's response to pregnancy. In addition, lack of experience with the pregnancy process may also be a factor.[15] In obsteri status abortion most often occurs in pregnant women who have not previously experienced abortion, namely 67 patients (95.71%). This shows that preeclampsia does not only affect mothers with a previous history of abortion. Each pregnancy has different factors that affect the risk of preeclampsia. To prevent complications during pregnancy, it is important for pregnant women to undergo regular antenatal check-ups. Demographics of medical history showed frequent results in patients with no medical history as many as 60 patients (85.71%).

Distribution of antihypertensive and antiplatelet drug use

Data on the distribution of antihypertensive and antiplatelet drug use (monotherapy and drug combinations) obtained during the patient treatment process can be seen in Table II. shows the results of the use of the most monotherapy drugs, namely antihypertensives as many as 16 patients (22.85%). The most common combination of 2 drugs is antihypertensive + antiplatelet drugs as many as 30 patients (42.86%). As for the combination of 3 drugs, namely antihypertensive + antiplatelet drugs as many as 4 patients (5.71%).

Table I. Demographics of Preeclampsia Patients

Patien Characteristics	Total (n=70)	Percentage (%)
Patient Age (Year)		
≤ 20 Years	0	0
21-35 Years	49	70
> 35 years	21	30
Terimester Gestational Age		
Second Trimester	11	15,71
Third Trimester	59	84,29
Obsteri Status (Gravida)		
1	29	41,43
2	16	22,86
≥ 3	25	35,71
Obsteri Status (Parity)		
Number not yet in childbirth	30	42,86
Number of childbirths 1 times	19	27,14
Number of childbirths 2-3 times	20	28,57
Number of births ≥ 4 times	1	1,43
Obstetric Status (Abortion)		
No	67	95,71
Ever	3	4,29
Disease History		
None	60	85,71
Preeclampsia	4	5,71
Hypertension	3	4,29
Diabetes Mellitus	3	4,29
Classification of Preeclampsia Initial		
Mild Preeclampsia	54	77,14
Severe Preeclampsia	16	22,86

Tabel II. Distribution of Antihypertensive and Antiplatelet Drug Use

Type of Therapy		Total (n=70)	Percentage (%)
	MONOTERAPY		
Antihypertensives	Methyldopa Nifedipine	16	22,85
Antiplatelet	Aspirin	10	14,29
	COMBINATION OF 2 DRUGS		
Antihypertensives + Antihypertensives	Methyldopa + Nifedipine	10	14,29
Antihypertensives + Antiplatelet	Methyldopa + Aspirin Nifedipine + Aspirin	30	42,86
	COMBINATION OF 3 DRUGS		
Antihypertensives + Antihypertensives + Antiplatelet	Methyldopa + Nifedipine + Aspirin	4	5,71

Antihypertensive and Antiplatelet Drug Use Profile

The profile of the use of antihypertensive and antiplatelet drugs for preeclampsia patients grouped by drug name, drug class, dose, usage rules, duration of treatment and drug safety category can be seen in Table III. In the category of antihypertensive drug monotherapy showed the most results in the drug nifedipine (category C) with a dose of 30 mg / day which has a rule of use of S3dd1 drugs and an average duration of treatment of 7-30 days, namely 9 patients (12.86%) while antiplatelet drug monotherapy showed the most results in the drug aspirin (category C) with a drug dose of 80 mg / day which has a rule of use of S1dd1 drugs and an average duration of treatment of 7-30 days, namely 10 patients (14.29%).

Tabel III. Antihypertensive and Antiplatelet Drug Use Profile

Name of Medicine	Drug Category	Drug Strength	Daily Dose	Usage Rules	Long Time of Use	Total (n=70)	Percentage (%)
Monotherapy							
Methyldopa (Central α2 Receptor Agonist)	Category B	250 mg	750 mg	S3dd1	7 days	4	5,71
Nifedipine (*Calcium Channel Blocker*)	Category C	10 mg	10 mg	S1dd1	10 days	1	1,43
			20 mg	S2dd1	30 days	2	2,86
			30 mg	S3dd1	7 days	2	2,86
					10 days	1	1,43
					15 days	1	1,43
					30 days	5	7,14
Aspirin (Inhibitor COX-1**)**	Category C	80 mg	80 mg	S1dd1	7 days	1	1,43
					10 days	1	1,43
					15 days	1	1,43
					20 days	2	2,86
					30 days	5	7,14
Combination of 2 Drugs							
Methyldopa (Central α2 Receptor Agonist) + **Nifedipine** (Calcium Channel Blocker)		250 mg + 10 mg	500 mg + 30 mg	S2dd1 + S3dd1	5 days	1	1,43
				S3dd1 + S3dd1	7 days	1	1,43
					10 days	2	2,86
					15 days	1	1,43
					20 days	1	1,43
					30 days	1	1,43
			1500 mg + 30 mg	S3dd2 + S3dd1	10 days	1	1,43
					15 days	2	2,86
Methyldopa (Central α2 Receptor Agonist) + **Aspirin** (Inhibitor COX-1)	Category B + Category C	250 mg + 80 mg	500 mg + 80 mg	S2dd1 + S1dd1	5 days	1	1,43
					10 days	4	5,71
					15 days	2	2,86
					14 days	6	8,57
					30 days	7	10,00
			750 mg + 80 mg	S3dd1 + S1dd1	5 days	1	1,43
					7 days	2	2,86
					10 days	2	2,86
					30 days	3	4,29
Nifedipine (Calcium Channel Blocker) + **Aspirin** (Inhibitor COX-1)	Category C + Category C	10 mg + 80 mg	30 mg + 80 mg	S3dd1 + S1dd1	30 days	2	2,86
Combination of 3 Drugs							
Methyldopa (Central α2 Receptor Agonist) + **Nifedipine** (Calcium Channel Blocker) + **Aspirin** (Inhibitor COX-1)	Category B + Category C + Category C	250 mg + 10 mg + 80 mg	750 mg + 30 mg + 80 mg	S3dd1 + S3dd1 + S1dd1	10 days	1	1,43
					15 days	1	1,43
					30 days	2	2,86

In the category of a combination of 2 antihypertensive + antihypertensive drugs, the most results were shown in the drug methyldopa (category B) + nifedipine (category C) with a drug dose of 750 mg + 30 mg / day which has a rule of use of S3dd1 + S3dd1 drugs and an average duration of treatment of 7-30 days, namely as many as 6 patients (8,58%) while the combination category of 2 antihypertensive + antiplatelet drugs showed

the most results in methyldopa (category B) + aspirin (category C) with a drug dose of 500 mg + 80 mg / day which has the rules of use of S2dd1 + S1dd1 drugs and an average length of treatment of 7-30 days, namely 20 patients (28.57%). In the combination category 3 antihypertensive + antihypertensive + antiplatelet drugs showed the most results with the drug name methyldopa + nifedipine + aspirin given with a drug dose of 750 mg + 30 mg + 80 mg / day which has the rules of use of S3dd1 + S3dd1 + S1dd1 drugs and an average length of treatment of 10-30 days, namely as many as 4 patients (5.72%).

Nifedipine is a drug with the Calcium Chanel Blocker class. According to POGI guidelines, nifedipine is considered safe to be given to pregnant women in both oral and parenteral (short-acting) forms.[9] Nifedipine is considered an ideal drug choice to treat preeclampsia because it has a rapid onset and high bioavailability, around 84% to 89%, which allows it to be quickly absorbed and dispersed in the blood. In addition to functioning as a selective renal arteriolar vasodilator and having natriuretic effects, nifedipn can also increase urine formation. Oral administration of nifedipine is effective in lowering blood pressure without causing harmful side effects. This drug can relax blood vessel muscles thereby expanding coronary and peripheral arteries. The way nifedipine does not affect the myocardium allows it to dilate blood vessels without reducing blood flow to the uterus and placenta, and without causing abnormalities in the baby's heart.[9] Oral administration of nifedipine in preeclamptic patients is recommended with an initial dose of 10 mg repeated every 15-30 minutes with a maximum dose of up to 30 mg.[9] According to the drug safety classification based on the Food and Drug Administration (FDA), nifedipine belongs to category C.[16] Nifedipine is used more than methyldopa because methyldopa can cause hypotension in newborns. In addition, oral use of nifedipine has lower side effects compared with some other types of antihypertensives.[9]

Methyldopa is an alpha receptor agonist which acts in the central nervous system and is the most commonly used antihypertensive drug to treat hypertension during pregnancy including preeclampsia.[9] The mode of action of methyldopa involves stimulation of α-2 adrenergic receptors in the brain, decreasing the activity of the sympathetic nervous system. This results in a reduction in heart rate, peripheral resistance, and blood pressure.[17] Methyldopa is recommended at a dose of 250-500 mg administered 2-3 times daily with a maximum dose of up to 3000 mg orally. The combination of nifedipine and methyldopa causes synergistic interactions that increase drug effectiveness, so that the expected therapy is achieved and the incidence of resistance to antihypertensive drugs can be reduced.[9] According to the FDA drug safety classification, methyldopa is categorized as category B.[16]

According to the pathophysiological process of preeclampsia, this condition involves thrombosis, hypertension and impaired placental development associated with an imbalance between thromboxane A2 and prostacyclin in pregnant women. Typically, the levels of thromboxane A2 synthase in the placenta of pregnant women experiencing preeclampsia are higher compared to normal conditions. This results in an increased function of thromboxane in constricting blood vessels, while the effect of prostacyclin to dilate blood vessels is reduced. The increase in thromboxane A2 can also trigger thrombosis due to its ability to stimulate platelet activation and clumping so that the increase in thromboxane A2 levels can cause the main cause of clinical signs of preeclampsia, including hypertension, platelet clumping, and decreased blood flow to the placenta.[18,19]

Aspirin is an antiplatelet drug that belongs to the COX-1 inhibitor class. Aspirin works by inhibiting cyclocxyenase, an enzyme responsible for converting arachidonic acid into prostaglandins. COX-1 plays a role in the production of thromboxane which regulates antiplatelet aggregation and blood vessel constriction, thus preventing preeclampsia.[18] According to POGI recommendations, aspirin with low dosage (75 mg/day) is recommended for prevention in women at high risk of preeclampsia which should be started at 20 weeks gestation.[9] The results of Arminda's research in 2020, showed that the administration of low-dose aspirin can be continued in patients with preeclampsia until 36 weeks of gestation.[19] According to the FDA drug safety classification, aspirin is categorized as category C.[16]

Blood pressure profile of preeclampsia patient

The profile of blood pressure in preeclampsia patients grouped by changes in blood pressure and the classification of late preeclampsia can be seen in Tabel IV. and Tabel V. In the category of changes in blood pressure, patients on antihypertensive drug monotherapy showed the most results with the drug name nifedipine with blood pressure dropping as many as 12 patients (17.15%) with an average decrease of 22.83/16 mmHg. In antiplatelet drug monotherapy, the most with the drug name aspirin with a decrease in blood pressure as many as 8 patients (11.42%) with an average decrease of 18.13/11.88 mmHg.

Tabel IV. Patient's Blood Pressure Profile

Type of Therapy	Variables	Average Blood Pressure Pre Test (mmHg)		Average Blood Pressure Post Test (mmHg)		Average Blood Pressure Change (mmHg)		Total (n=70)	Percentage (%)
		Systole	Diastole	Systole	Diastole	Systole	Diastole		
Monotherapy									
Methyldopa	High	152,5	92,5	130	80	-22,5	-12,5	4	5,71
	Normal	0	0	0	0	0	0	0	0
	Low	0	0	0	0	0	0	0	0
Nifedipine	High	149,25	93,75	126,42	77,75	-22,83	-16	12	17,15
	Normal	0	0	0	0	0	0	0	0
	Low	0	0	0	0	0	0	0	0
Aspirin	High	140,63	90,63	122,5	78,75	-18,13	-11,88	8	11,43
	Normal	140	95	140	95	0	0	2	2,86
	Low	0	0	0	0	0	0	0	0
Combination of 2 Drugs									
Methyldopa + Nifedipine	High	153,75	95	126,25	78,75	-27,5	-16,25	8	11,43
	Normal	150	90	150	90	0	0	1	1,43
	Low	160	100	196	110	+36	+10	1	1,43
Methyldopa + Aspirin	High	143,15	91,35	117,31	76	-25,84	-15,35	26	37,14
	Normal	0	0	0	0	0	0	0	0
	Low	150	90	157	93	+7	+3	1	1,43
Nifedipine + Aspirin	High	155	100	140	90	-15	-10	2	2,86
	Normal	0	0	0	0	0	0	0	0
	Low	0	0	0	0	0	0	0	0
Combination of 3 Drugs									
Methyldopa + Nifedipine + Aspirin	High	168,5	95,75	148,75	89,25	-19,75	-6,5	4	5,71
	Normal	140	90	140	90	0	0	1	1,43
	Low	0	0	0	0	0	0	0	0

Tabel V. Classification of Late Preeclampsia

Type of Therapy		Variables	Total (n=70)	Percentage (%)
Monotherapy	**Methyldopa**	Normal[a]	4	5,71
		Mild Preeclampsia[b]	0	0
		Severe Preeclampsia[c]	0	0
	Nifedipine	Normal[a]	11	15,72
		Mild Preeclampsia[b]	1	1,43
		Severe Preeclampsia[c]	0	0
	Aspirin	Normal[a]	8	11,42
		Mild Preeclampsia[b]	2	2,86
		Severe Preeclampsia[c]	0	0
Combination of 2 Drugs	**Methyldopa + Nifedipine**	Normal[a]	6	8,57
		Mild Preeclampsia[b]	2	2,86
		Severe Preeclampsia[c]	2	2,86
	Methyldopa + Aspirin	Normal[a]	25	35,70
		Mild Preeclampsia[b]	2	2,86
		Severe Preeclampsia[c]	0	0
	Nifedipine + Aspirin	Normal[a]	0	0
		Mild Preeclampsia[b]	2	2,86
		Severe Preeclampsia[c]	0	0
Combination of 3 Drugs	**Methyldopa + Nifedipine + Aspirin**	Normal[a]	1	1,43
		Mild Preeclampsia[b]	3	4,29
		Severe Preeclampsia[c]	1	1,43

Description :
a(Blood Pressure < 140/90mmHg);
b(Blood Pressure ≥ 140/90 mmHg);
c(Blood Pressure ≥ 160/160 mmHg)

In the combination of 2 antihypertensive + antihypertensive drugs, the most with the drug name methyldopa + nifedipine with a blood pressure drop of 8 patients (11.42%) with an average decrease of 27.5/16.25 mmHg. In the combination of 2 antihypertensive + antiplatelet drugs, the most with the drug name methyldopa + aspirin with a blood pressure drop of 26 patients (37.14%) with an average decrease of 25.84/15.35 mmHg. In the combination of 3 antihypertensive + antihypertensive + antiplatelet drugs, the most with the drug name methyldopa + nifedipine + aspirin with a blood pressure drop of 3 patients (4.29%) with an average decrease of 19.75 / 6.5 mmHg In the classification category of late preeclampsia in antihypertensive drug monotherapy, the most with the drug name nifedipine with normal results as many as 11 patients (15.72%). In antiplatelet drug monotherapy the most with the drug name aspirin with normal results as many as 8 patients (11.42%). In the combination of 2 antihypertensive + antihypertensive drugs, the most with the drug name methyldopa + nifedipine with normal results as many as 6 patients (8.57%). Combination of 2 antihypertensive + antiplatelet drugs, the most with the drug name methyldopa + aspirin with normal results were 25 patients (35.70%).

In the combination of 3 antihypertensive + antihypertensive + antiplatelet drugs, many with the drug name methyldopa + nifedipine + aspirin with mild preeclampsia results as many as 3 patients (4.29%). This shows that preeclampsia patients who underwent treatment at Siti Khodijah Sepanjang Hospital during the period January 2022 to December 2023 the majority experienced a decrease in blood pressure in each type of therapy given. Meanwhile, in the classification of late preeclampsia, the majority of patients were found to have blood pressure in the normal range. This suggests that in the treatment of preeclampsia, lowering blood pressure is the main goal in managing the condition. However, the majority of patients may have shown a positive response to the therapy or intervention, resulting in the patient's blood pressure being within the normal range. The blood pressure reduction goal for mild preeclampsia is less than 130/80 mmHg, while for severe preeclampsia is less than 150/90 mmHg.[20]

Laboratory data profile of preeclampsia patients

The laboratory profile of preeclampsia patients grouped by proteinuria, hemoglobin, erythrocytes, leukocytes and platelets can be seen in Table VI. Laboratory data on proteinuria levels showed the most results in patients with proteinurin levels 1+ as many as 21 patients (30%). The dipstick test results show that patients who have results ≥ 1+ have mild preeclampsia, while results ≥ 3+ have severe preeclampsia. In the state of preeclampsia, there is a change in the increase in renal afferent arterial resistance and changes in the shape of the glomerular endothelium. A significant decrease in glomerular filtration rate results in an increase in serum creatinine levels. Reduced blood flow to the kidney leads to decreased renal perfusion and filtration, resulting in oliguria. Damaged glomerular blood vessels occur in the form of “gromerulo-capillary endhotel” causing proteinuria.[21]

In the hemoglobin laboratory test data, most patients with normal hemoglobin levels (11-16 g/dL) were 48 patients (68.57%). In the erythrocyte laboratory test, the most patients with normal erythrocyte levels (4.2-5.2 10^6/µL) were 31 patients (44.29%). The study results showed that the majority of pregnant women with preeclampsia did not experience anemia. As found in the study of Restiana, et al (2023) found that the majority of respondents, both in the case group and control group, had normal hemoglobin and erythrocyte levels, which were around 50% and 61% respectively, with a p value = 0.133. The findings indicated that there was no significant association between hemoglobin and erythrocyte counts and the occurrence of preeclampsia.[22]

In the leukocyte laboratory test, the most patients with normal leukocyte levels (5-15 10^3/µL) were 57 patients (81.43%). This finding is in accordance with the research of Kibas, et al in 2021, in preeclampsia patients showed an increase in the number of leukocytes, but still within the normal rangel[23]. Leukocyte counts, especially neutrophils, often increase during the inflammatory process that occurs in preeclampsia. Research suggests that the increased leukocyte count in preeclampsia may be the body's response to the inflammation that occurs in the blood vessels. Elevated leukocyte counts can also occur in a variety of other conditions, so leukocyte counts are not sufficient to diagnose preeclampsia.[23]

In platelet laboratory tests, the most patients with normal platelet levels (150-450 10^3/µL) were 62 patients (88.57%). Platelet levels are an important parameter in the diagnosis of preeclampsia, Increased hemoglobin can occur due to hemoconcentration or anemia, which can affect hemolysis in preeclamptic patients. Increased platelet activity can lead to thrombocytopenia, as well as coagulation triggered by injury to blood vessels.[9]

Tabel VI. Patient laboratory data profile

Laboratory Test	Total (n=70)	Percentage (%)
Proteinurea		
No Lab Tests Performed	17	24,29
Negative	19	27,14
1+	21	30,00
2+	7	10,00
3+	6	8,57
Hemoglobin		
No Lab Tests Performed	8	11,43
Low (< 11 g/dL)	14	20,00
Normal (11 - 16 g/dL)	48	68,57
High (>16 g/dL)	0	0
Erythrocytes		
No Lab Tests Performed	8	11,43
Low (< 4.2 10^6 /µL)	30	42,86
Normal (4.2 - 5.2 10^6 /µL)	31	44,29
High (>5.2 10^6 /µL)	1	1,43
Leukocytes		
No Lab Tests Performed	8	11,43
Low (< 5 10^3 /µL)	0	0
Normal (5-15 10^3 /µL)	57	81,43
High (< 15 10^3 /µL)	5	7,14
Platelets		
No Lab Tests Performed	8	11,43
Low (< 150 10^3 /µL)	0	0
Normal (150-450 10^3 /µL)	62	88,57
High (>450 10^3 /µL)	0	0

CONCLUSION

Preeclampsia patients are generally 21-35 years old, in the third trimester of pregnancy, primigravida, have never given birth, have no history of disease and experience mild preeclampsia. The antihypertensive and antiplatelet treatment profile was mostly monotherapy of nifedipine drug dose 30 mg/day and aspirin drug dose 80 mg/day, in the combination of 2 drugs methyldopa + nifedipine drug dose 750 mg + 30 mg/day and methyldopa + aspirin drug dose 500 mg + 80 mg/day and in the combination of 3 drugs methyldopa + nifedipine + aspirin drug dose 750 mg + 30 mg + 80 mg/day.

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STATEMENT OF ETHICS

Ethical approval to conduct this study was obtained from the Ethics Institute of Siti Khodijah Sepanjang Hospital with ethical permission (No: 019/KET-KEPK/6-2023).

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