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ORIGINAL RESEARCH

Trends in the initial management of severe preeclampsia and eclampsia in Indonesia: A medical record study (2018–2021)

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Abstract
Hypertension during pregnancy, particularly preeclampsia and eclampsia, is a leading cause of maternal morbidity and mortality. Timely and appropriate management is crucial in preventing serious complications, including maternal death. This study aimed to describe the initial management of severe preeclampsia and eclampsia at RS PKU Muhammadiyah Palembang, Indonesia, during the period 2018–2021. This descriptive study employed a cross-sectional design. A total of 110 cases were randomly selected from medical records of patients diagnosed with severe preeclampsia and eclampsia. Data were analyzed based on the POGI 2016 guidelines. Among the 110 cases, 108 (98%) were diagnosed with severe preeclampsia, while 2 (2%) were cases of eclampsia. Of these, 65 patients (60.2%) received management that adhered to the POGI guidelines, whereas 43 patients (39.8%) did not. Both cases of eclampsia were managed in full compliance with the guidelines (100%). This study highlights that while the initial management of severe preeclampsia and eclampsia generally aligns with established standards, there remains room for improvement in procedural adherence. To further reduce maternal morbidity and mortality associated with these conditions, it is recommended that the hospital strengthen efforts to ensure full compliance with clinical guidelines.

Keywords: Eclampsia; hypertension; initial treatment; mortality prevention; preeclampsia

Introduction

Hypertension during pregnancy is a leading cause of maternal morbidity and mortality, with a prevalence of approximately 10% worldwide (Cífková, 2023). According to a 2019 WHO report, an estimated 295.000 pregnant women died globally in 2017 due to pregnancy and childbirth-related complications, of which 94% were preventable (Dol et al., 2022). Most of these deaths occurred in low- or lower-middle-income countries, particularly in South Asia and Sub-Saharan Africa, which accounted for approximately 254.000 (86%) of the world's total maternal deaths that year (Nwagbara et al., 2022). Maternal mortality is often caused by complications during pregnancy and childbirth that can be prevented or treated, such as severe bleeding (especially postpartum hemorrhage), infections, and hypertension in pregnancy (including preeclampsia and eclampsia) (Collier & Molina, 2019). In Indonesia, The maternal mortality ratio (MMR) in Indonesia is among the highest in Southeast Asia (Syairaji et al., 2024). However, hemorrhage remained the leading cause of maternal mortality (1.280 cases), followed by hypertension in pregnancy (1.066 cases) and infection (207 cases). In South Sumatra alone, 28 maternal deaths were attributed to hypertension in pregnancy, a figure significantly higher than other provinces like Bengkulu (6 cases) and the Bangka Belitung Islands (9 cases) (Kementerian Kesehatan RI, 2020).

The American College of Obstetricians and Gynecologists (ACOG) classifies hypertension in pregnancy into four categories: chronic hypertension, preeclampsia-eclampsia, chronic hypertension with superimposed preeclampsia, and gestational hypertension (Braunthal & Brateanu, 2019). In 2020, ACOG updated its classification of preeclampsia to include preeclampsia with or without severe features (Gestational Hypertension and Preeclampsia: ACOG Practice Bulletin, Number 222, 2020). Severe preeclampsia is characterized by a systolic blood pressure of ≥160 mmHg or a diastolic blood pressure of ≥110 mmHg (Narkhede & Karnad, 2021). Both severe

preeclampsia and eclampsia are medical emergencies requiring prompt and appropriate treatment to prevent maternal deaths (Sharma et al., 2024). Delayed or improper referrals often lead to complications that increase the risk of mortality (Sium, Getachew, & Gudu, 2024). Despite established standards for managing severe preeclampsia and eclampsia, challenges persist in their implementation. Effective management requires a multidisciplinary approach and complex pharmacological interventions, including understanding the cardiovascular, hematological, and renin-angiotensin systems (Oppong et al., 2019). Preventive pharmacological treatments include calcium and aspirin, while magnesium sulfate is used for seizure prophylaxis, and nifedipine is the first-line antihypertensive (Sharma et al., 2024). Corticosteroids are administered to promote fetal lung maturity in cases of preterm pregnancy (McGoldrick, Stewart, Parker, & Dalziel, 2020). Timely and appropriate management of severe preeclampsia is essential to reducing maternal and fetal morbidity and mortality (Overton, Tobes, & Lee, 2022). However, these management of maternity practices are not uniformly applied, and the quality of care in healthcare facilities across Indonesia remains inconsistent **(Figure 1)**.

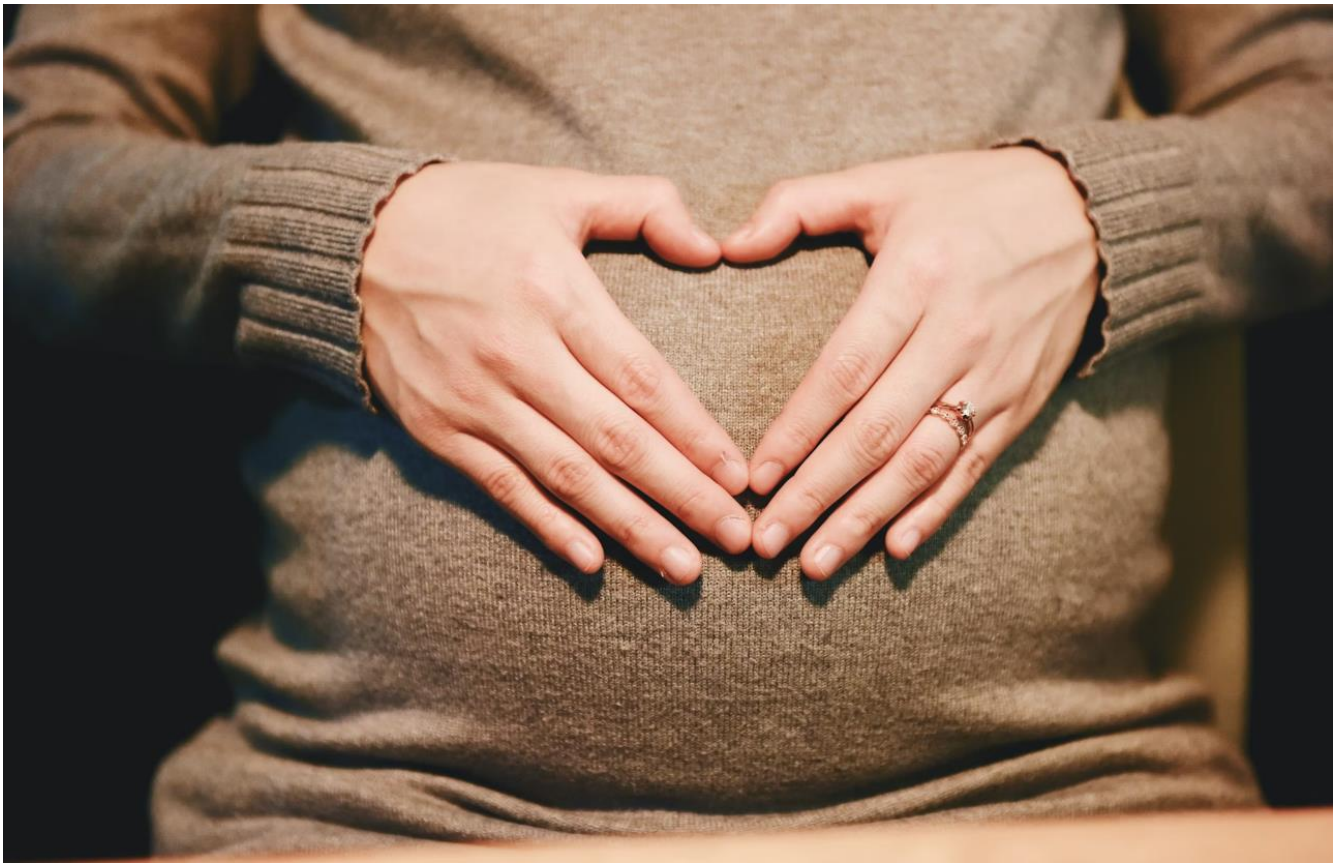

Figure 1. Illustration of maternity context (Courtesy of www.unsplash.com).

The variability in preeclampsia management may stem from ongoing debates regarding the pathophysiology of hypertension in pregnancy, inadequate healthcare infrastructure, and resource limitations in some regions. These issues not only pose a public health challenge but also have economic implications for the country. To address this, the Indonesian Ministry of Health issued the National Guidelines for Medical Services for the Management of Preeclampsia (Direktorat Jenderal Pelayanan Kesehatan, 2017). To date, no studies have investigated the initial management of severe preeclampsia and eclampsia at RS PKU Muhammadiyah Palembang, Indonesia. As a type C hospital, it frequently receives referrals from various primary healthcare facilities. A study documented that 50% of the 108 pregnant women treated at RS PKU Muhammadiyah Palembang, Indonesia experienced severe preeclampsia (Atina, 2020). Additionally, a documentation found that 9.8% of the 348 pregnant women treated at the hospital were diagnosed with eclampsia (Hipson & Musriah, 2020). The initial management of severe preeclampsia and eclampsia is critically important in Indonesia due to the country's high maternal and infant mortality rates, particularly in rural areas where access to healthcare is limited. Severe preeclampsia and eclampsia can lead to life-threatening complications such as acute renal failure, liver rupture, and cerebrovascular accidents, which can result in significant morbidity and mortality for both the mother and the fetus. Prompt recognition and management of these conditions are essential to stabilize the patient, prevent progression to severe complications,

and ensure better outcomes. In Indonesia, where healthcare resources may be constrained, effective initial management—including the administration of antihypertensive medications, magnesium sulfate for seizure prophylaxis, and timely delivery—can significantly reduce the risk of adverse outcomes. Furthermore, enhancing the capacity of healthcare providers to identify and manage these conditions is vital for improving maternal health services, promoting safe motherhood, and ultimately reducing the burden of maternal mortality in the country. Given this context, this study aims to describe the initial management of severe preeclampsia and eclampsia at RS PKU Muhammadiyah Palembang, Indonesia.

Method

This study employs a descriptive approach with a cross-sectional design to investigate the initial management of severe preeclampsia and eclampsia cases at Muhammadiyah Palembang Hospital. Conducted from October to December 2021, the research targets a specific population of pregnant women experiencing severe preeclampsia and eclampsia within the Palembang area. The study focuses on an accessible population, comprising pregnant women treated at Muhammadiyah Palembang Hospital over a five-year period from 2017 to 2021. This timeframe offers a comprehensive view of the management practices and outcomes associated with these critical conditions, providing valuable insights into the healthcare delivery system for pregnant women in the region. The sample for this study was carefully selected based on defined inclusion and exclusion criteria to ensure the validity of the findings. The inclusion criteria consisted of pregnant women who had been diagnosed with severe preeclampsia or eclampsia, conditions characterized by high blood pressure and potential organ dysfunction, which can lead to serious complications if not managed promptly. Conversely, the exclusion criteria involved pregnant women with significant comorbidities, such as kidney failure or peripartum heart disease, as these conditions could confound the results and complicate the management of preeclampsia and eclampsia. Additionally, participants with incomplete medical records were excluded to maintain the integrity of the data collected **(Figure 2)**.

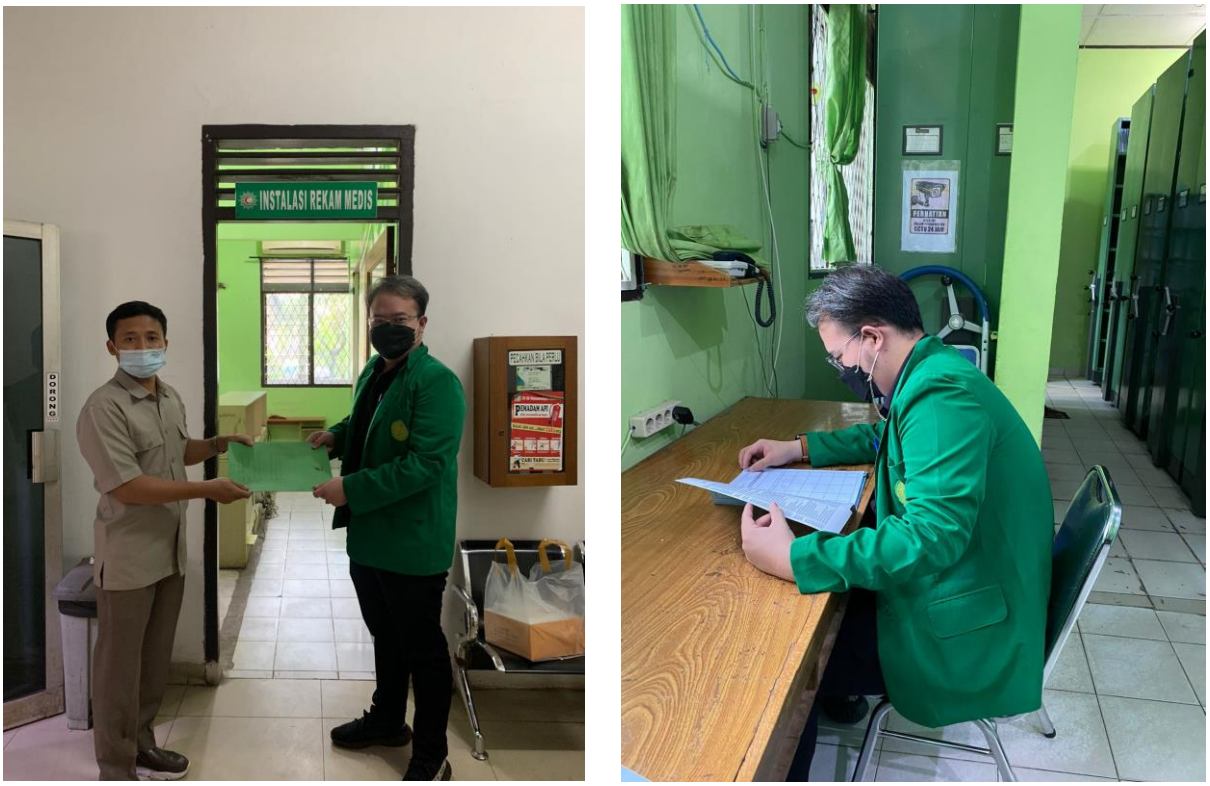

Figure 2. Data collection process (Documented by authors).

The determination of the sample size was guided by the Lemeshow formula, which indicated a minimum requirement of 92 respondents for adequate statistical power. Ultimately, data were collected from 110 respondents, surpassing the minimum sample size to enhance the reliability of the study's conclusions. The sampling technique employed was simple random sampling, ensuring that each eligible participant had an equal chance of being included in the study. This method helps to eliminate selection bias and allows for a more representative sample of the population. The instruments used in this study were validated by experts in the field

prior to their application in the data collection process. This validation ensures that the tools employed are reliable and accurately measure the intended variables, thereby enhancing the credibility of the study's findings. Data collection was conducted through a review of secondary data obtained from medical records, facilitating a systematic approach to gathering relevant information. The research team, consisting of the lead researcher and trained assistants, collaborated to extract data from the medical records efficiently. The variables analyzed in this study encompassed essential patient characteristics, including the age of respondents, gestational age, and gravida (the number of pregnancies). Furthermore, the initial management provided to patients was aligned with the guidelines established by the Perhimpunan Obstetri dan Ginekologi Indonesia (POGI) 2016, ensuring that the care delivered was consistent with national standards. This adherence to established protocols is crucial for optimizing patient outcomes and ensuring that the management strategies employed are evidence-based and effective.

Data analysis was conducted using descriptive statistics, which allowed for a clear depiction of the characteristics of the medical records as well as the distribution and percentage of each variable studied. This analytical approach provides a comprehensive overview of the initial management practices for severe preeclampsia and eclampsia at RS PKU Muhammadiyah Palembang Indonesia, highlighting trends and areas for improvement. Importantly, the study received ethical approval from the Institutional Review Board of Universitas Muhammadiyah Palembang (032/EC/KBHKI/FK-UMP/XI/2021), ensuring that the research adhered to ethical standards and protected the rights of participants throughout the study.

Results

The data collection for this study utilized secondary data in the form of medical records obtained from the medical record center of Muhammadiyah Palembang Hospital. This hospital is classified as a type C facility, serving as a second-level health center that frequently receives referrals from first-level health facilities (FKTP), such as polyclinics, private doctors' practices, and health centers. As a result, a significant number of severe preeclampsia and eclampsia cases are detected at this institution. Between 2018 and 2021, there were 595 pregnant women diagnosed with severe preeclampsia out of a total of 10,966 deliveries, resulting in an incidence rate of 5.42% at Muhammadiyah Palembang Hospital. In contrast, only 8 mothers experienced eclampsia during the same period, yielding an incidence rate of 0.07%. The study revealed that the ages of the respondents varied, with the majority falling within the 21–34 year age group. The average age of the respondents was 34 years. Regarding gestational age, respondents ranged from 22 to 42 weeks, with an average gestational age of 37 weeks, indicating a term pregnancy. Additionally, 25 of the participants were primigravida, representing 22.7% of the sample **(Table 1)**.

Of the 110 respondents, 108 (98%) were diagnosed with severe preeclampsia, while 2 (2%) had eclampsia. In terms of initial management, 65 respondents (60.2%) received care in accordance with the POGI guidelines (2016), whereas 43 respondents (39.8%) did not receive appropriate management. Notably, all patients with eclampsia (100%) received treatment aligned with the POGI guidelines. All respondents were hospitalized, advised to rest, and underwent laboratory examinations **(Table 2)**. Among the 43 respondents who did not receive initial management according to the POGI guidelines for severe preeclampsia, several deficiencies were identified. Specifically, 24 respondents (55.8%) were not administered magnesium sulfate (MgSO4), 5 respondents (11.6%) did not receive antihypertensive medications, and 14 respondents (32.6%) were not given either MgSO4 or antihypertensive drugs. Despite these discrepancies, all subjects were hospitalized, and laboratory examinations were conducted **(Table 3)**.

Table 1. Frequency distribution of participants.

No	Variables	*n*	Percentage (%)
1	Age group (years)		
	≤ 20	2	1.8
	21–34	63	57.3
	≥ 35	45	40.9
2	Gestational Age (weeks)		
	Preterm (<37)	26	28.3
	Aterm (37-41)	64	69.5
	Post term (>41)	2	2.2
3	Number of Pregnancies (gravida)		
	Primigravida	25	22.7
	Multigravida	85	77.3
	Total	**110**	**100**

Table 2. Initial diagnosis and management.

No	Variables	*n*	Percentage (%)
1	Severe preeclampsia	108	98
	Eclampsia	2	2
2	Severe preeclampsia		
	In accordance with the POGI administration (2016)	65	60.2
	Not in accordance with POGI management (2016)	43	39.8
3	Eclampsia		
	In accordance with the POGI administration (2016)	2	100
	Not in accordance with POGI management (2016)	0	0

Discussion

The study reveals that the ages of respondents experiencing severe preeclampsia and eclampsia at RS PKU Muhammadiyah Palembang Indonesia range from 19 to 47 years, with the predominant age group being 21–34 years. The average age of the patients in this study was 34 years. This finding aligns with a study that reported that most severe preeclampsia cases occurred in individuals aged 20–35 years (Novara, Harini, & Sutrisno, 2017). Theoretically, age is a significant risk factor for preeclampsia and eclampsia; ages between 20 and 30 years are considered safer for pregnant women, while those under 20 or over 35 face increased risks of pregnancy and childbirth complications (Cunningham, 2014). This condition, characterized by hypertension and organ dysfunction during pregnancy, can have severe complications if not managed promptly. Healthcare professionals play a crucial role in preventing and managing preeclampsia through early identification of risk factors, regular prenatal monitoring, and timely interventions (Adu-Bonsaffoh, Tamma, Nwameme, & Browne, 2022). Their responsibilities include educating patients about symptoms, administering medications such as antihypertensives and magnesium sulfate, and coordinating multidisciplinary care to ensure both maternal and fetal safety (Pallangyo & Seif, 2023). The proactive involvement of healthcare professionals is vital in reducing the morbidity and mortality associated with preeclampsia. Based on the onset of symptoms, preeclampsia is categorized into two types: Early Onset Preeclampsia (PEAD), which occurs before 34 weeks of pregnancy, and Delayed Preeclampsia (PEAL), which appears after 34 weeks. PEAD is generally caused by incomplete trophoblast invasion and failure of spiral artery remodeling, leading to more severe maternal conditions and poorer pregnancy outcomes. Conversely, PEAL is associated with increased maternal vascular susceptibility to normal inflammatory conditions during pregnancy or placental atherosis (Park et al., 2014).

Table 3. Management of preeclampsia.

No	Variables	*n*	Percentage (%)
1	Not given MgSO4	24	55.8
2	Not given antihypertensive drugs (nifedipine)	5	11.6
3	Not given MgSO4 and antihypertensive drugs	14	32.6
4	Lab tested	43	100
5	Hospitalized	43	100

Among the respondents, 22.7% were primigravidas which remains a significant risk factor for preeclampsia. Immunologically, this is attributed to the absence of protective antibodies against fetal antigens during the first pregnancy, which increases the risk of preeclampsia (Cunningham, 2014). More than half of the respondents, specifically 60.2%, received initial management in accordance with POGI 2016 standards, indicating that RS PKU Muhammadiyah Palembang Indonesia is implementing recommended procedures for treating severe preeclampsia and eclampsia. However, 39.8% of respondents did not receive standard management, which may be attributed to factors such as limited facilities, human resources, or the knowledge of medical personnel. A study found that resource constraints often hinder optimal implementation of standards (Williams et al., 2019). The administration of magnesium sulfate is crucial for preventing seizures in severe preeclampsia (Padda et al., 2021). In this study, both cases of eclampsia received management according to POGI 2016 standards, which is vital as eclampsia can lead to serious complications that endanger both the mother and fetus. Most patients with severe hypertension also received antihypertensive medications, particularly nifedipine, following POGI (2016) guidelines. The use of antihypertensive drugs aims to prevent organ damage, especially to the kidneys and brain **(Figure 3)**.

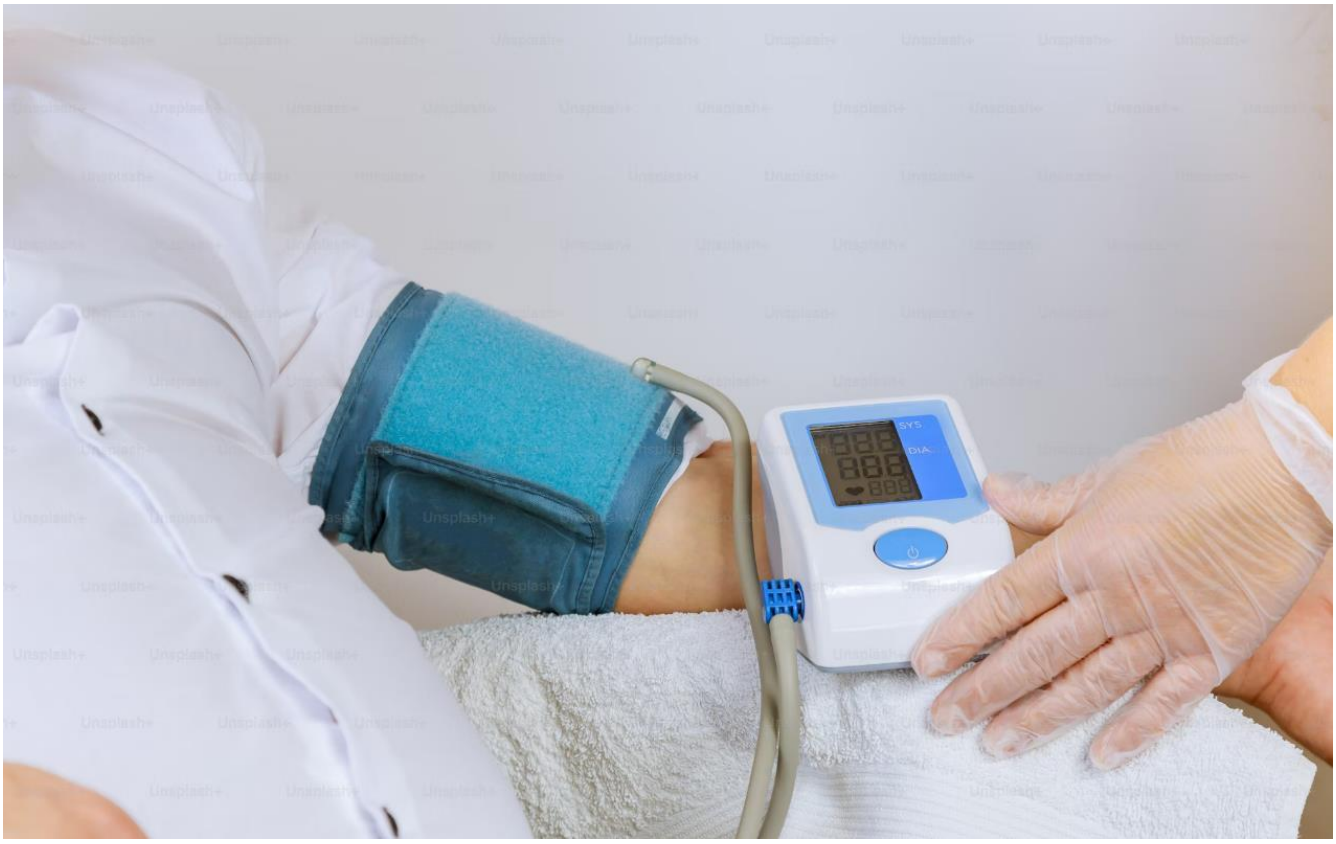

Figure 3. Illustration of hypertension management among pregnant women (Courtesy of www.unsplash.com).

According to a study in Italy, the administration of antihypertensives is based on the patient's hemodynamic profile. Patients with a low hemodynamic profile (hypodynamic) are treated with oral nifedipine or methyl dopa, while those with a high hemodynamic profile (hyperdynamic), characterized by normal or high cardiac output (>5L/min) and low systemic vascular resistance (SVR) (<1300 dynes/sec/cm^2), are given oral labetalol (di Pasquo et al., 2024). However, the study also identified some gaps in management, particularly regarding fluid monitoring and laboratory examinations, which are essential for monitoring patient conditions. Insufficient monitoring can increase the risk of complications such as acute kidney failure or pulmonary edema (Pankiewicz, Szczerba, Maciejewski, & Fijałkowska, 2019). Obstetricians and gynecologists must emphasize the importance of close observation of patients' vital signs and fluid balance. Midwives and nurses should diligently track both incoming fluids (infusions or rehydration) and outgoing fluids (e.g., urine). Complications of severe preeclampsia and eclampsia can lead to HELLP syndrome, characterized by hemolysis, elevated liver enzyme levels, and decreased platelet counts (Haram, Svendsen, & Abildgaard, 2009). These complications can be identified through laboratory tests measuring hemoglobin, bilirubin, SGOT, SGPT, LDH, and platelets. If not addressed promptly, these complications can significantly increase morbidity and mortality rates. Therefore, it is critical for the attending physician to conduct blood tests to detect complications and implement immediate and appropriate management. The findings of this study are expected to serve as a foundation for improving services for severe preeclampsia and eclampsia cases at RS PKU Muhammadiyah Palembang Indonesia. Improving case management is expected to prevent complications and reduce maternal morbidity and mortality, particularly at RS PKU Muhammadiyah Palembang Indonesia. Hospitals and other policymakers should consider conducting further training and socialization for medical personnel on the management of severe preeclampsia and eclampsia, with the goal of increasing compliance with established management standards.

Furthermore, healthcare professionals serve an essential function in the initial management of preeclampsia, which is vital for ensuring the safety of both the mother and the fetus. Early identification of preeclampsia symptoms, such as hypertension and proteinuria, is essential, and healthcare providers must be vigilant during routine prenatal check-ups. Once preeclampsia is diagnosed, the healthcare team must develop a comprehensive management plan that includes patient education about the condition, potential complications, and the importance of adherence to treatment protocols (Rodriguez & Vellisca, 2007). This collaborative approach ensures that patients receive timely interventions, such as antihypertensive medications and magnesium sulfate for seizure prophylaxis, which are critical in reducing maternal morbidity and mortality. In addition to medical management, healthcare

professionals also should provide emotional support and counseling to patients diagnosed with preeclampsia (Umamah, Santoso, Yunitasari, Nisa, & Wulandari, 2022). The diagnosis can be overwhelming and anxiety-inducing, so effective communication is essential. Healthcare providers should engage in open discussions about the implications of the diagnosis, treatment options, and the importance of follow-up care. Furthermore, they must coordinate with other specialists, such as anesthesiologists for potential delivery planning and neonatologists for neonatal care, to ensure a multidisciplinary approach to managing both maternal and fetal health (Machado et al., 2020). Fostering a supportive environment and ensuring clear communication can significantly improve patient outcomes and enhance the overall management of preeclampsia.

Conclusion

This study on the trends in the initial management of severe preeclampsia and eclampsia at Muhammadiyah Palembang Hospital from 2018 to 2021 reveals significant insights into current practices. While a majority of patients received treatment in accordance with POGI 2016 guidelines, a concerning percentage did not, indicating a need for improved adherence to established protocols. The findings also highlight the predominance of younger, primigravida patients, suggesting that this demographic may require targeted interventions to mitigate risks. Additionally, gaps in fluid monitoring and laboratory examinations were identified, emphasizing the importance of comprehensive care in preventing complications associated with these conditions. For future research, it is recommended to conduct larger, multicenter studies across Indonesia to capture a more representative picture of management practices. Longitudinal studies could provide insights into patient outcomes over time, while qualitative research may uncover barriers faced by healthcare providers in adhering to guidelines. Comparative studies between urban and rural healthcare settings could identify disparities in management practices. Addressing these areas will contribute to improving the quality of care for pregnant women facing severe preeclampsia and eclampsia in Indonesia.

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Author's perspective

Key points

- Hypertension during pregnancy is a leading cause of maternal morbidity and mortality.
- Enhancing the capacity of healthcare providers to manage eclampsia is vital for maternal health.
- Effective initial management can significantly reduce the risk of adverse outcomes.

Potential areas of interest

- What trends have been observed in the initial management of severe preeclampsia and eclampsia in Indonesia during the 2018–2021 period?
- How do healthcare facilities in Indonesia adhere to established guidelines for managing severe preeclampsia and eclampsia based on medical records from 2018–2021?
- What factors influenced changes or consistency in the initial management of severe preeclampsia and eclampsia during the study period?

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