Maternal and Neonatal Outcomes in Pregnancies with Systemic Lupus Erythematosus (SLE) from 2021 to 2023 at Hasan Sadikin Hospital, Bandung

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Abstract
Objective. To describe maternal and neonatal outcomes in pregnant women with SLE at Dr. Hasan Sadikin General Hospital, Bandung.
Methods. This descriptive study reviewed secondary data of pregnant women with SLE at RSHS from January 2021 to December 2023.
Results. A total of 41 pregnant women with SLE and 82 without SLE were included. SLE patients were younger (29.44±5.03 years) than non-SLE (33.76±7.31 years). Most SLE patients had normal (63.4%) or overweight (36.6%) nutritional status. Skin rash was the most common symptom (78%). Hypertension (14.6% vs 73.2%) and fetal death (4.9% vs 17.1%) were lower in the SLE group. Live birth rate was higher (95.1% vs 89.0%), but low birth weight incidence was higher (65.9% vs 53.7%) in SLE.
Conclusion. Pregnant women with SLE tend to be younger and overweight. Hypertension and fetal death were lower, but low birth weight and growth restriction were more frequent in SLE pregnancies, despite quality ANC. The cause of fetal growth restriction in SLE remains unclear.

Keywords: Pregnancy; Complications; Maternal outcomes; Neonatal outcomes; Systemic Lupus Erythematosus

Luaran Ibu dan Bayi pada kehamilan dengan Lupus Eritematosus Sistemik (LES) pada tahun 2021 - 2023 di Rumah Sakit Hasan Sadikin Bandung

Abstrak:
Tujuan. Penelitian ini bertujuan untuk mendeskripsikan luaran maternal dan neonatus pada wanita hamil dengan LES di RSUP Dr. Hasan Sadikin Bandung.
Metode. Penelitian ini menggunakan metode deskriptif untuk meninjau data sekunder ibu hamil dengan LES di RSHS dari Januari 2021 hingga Desember 2023.
Hasil. Sebanyak 41 wanita hamil dengan LES dan 82 tanpa LES diikutsertakan. Pasien LES lebih muda (29,44±5,03 tahun) dibanding non-LES (33,76±7,31 tahun). Mayoritas pasien LES berstatus gizi normal (63,4%) atau *overweight* (36,6%). Ruam kulit paling umum (78%). Hipertensi (14,6% vs 73,2%) dan kematian janin (4,9% vs 17,1%) lebih rendah pada LES. Kelahiran hidup lebih tinggi (95,1% vs 89,0%), tapi berat lahir rendah lebih tinggi (65,9% vs 53,7%) pada LES.
Kesimpulan. Wanita hamil dengan LES cenderung lebih muda dan *overweight*. Komplikasi hipertensi dan kematian janin lebih rendah, tetapi berat lahir rendah dan hambatan pertumbuhan janin lebih sering pada LES, meski mendapat ANC berkualitas. Penyebab hambatan pertumbuhan janin pada LES belum diketahui.

Kata kunci: Kehamilan; Komplikasi; Luaran maternal; Luaran neonatus; Lupus Eritematosus Sistemik

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Introduction

Systemic Lupus Erythematosus (SLE) is a chronic systemic autoimmune disease with varying severity and disease course, characterized by a tendency for flares followed by periods of remission and relapse. SLE diagnosis presents its own challenge as this disease often develops slowly and evolves over time, with multiorgan symptoms including skin, musculoskeletal, pulmonary, cardiovascular, hematological, renal, and nervous systems. Most SLE patients will have positive anti-nuclear antibodies and often have other autoantibodies. Diagnosis requires ANA testing and the presence of other autoantibodies and/or clinical manifestations.[1]

The global incidence of SLE ranges from 0.3 to 31.5 cases per 100,000 people per year, and there has been an increase in the last 40 years due to the identification of mild SLE. In the Asia-Pacific region, the estimated prevalence of SLE is 51.1 per 100,000 population, with Indonesia being among the countries with significant SLE burden. At the national level, Indonesia has experienced a substantial increase in SLE cases, with hospital visits by SLE patients rising from 17.9-27.2% in 2015 to 30.3-58% in 2017. The prevalence of SLE in Indonesia is considered high, approaching 100,000 cases per year, reflecting the significant public health impact of this disease in the Indonesian population.[2–5]

In the West Java region, particularly at Dr. Hasan Sadikin General Hospital Bandung as a national referral center, SLE represents a major clinical concern. Studies conducted at this institution have demonstrated the complex presentation of SLE in the Indonesian population, with findings showing that 96.2% of SLE patients are female, with a median age at diagnosis of 27 years. The hospital serves as a major referral center for SLE patients from across Indonesia, particularly from the western regions, making it an ideal setting for comprehensive studies on SLE outcomes.[6]

The X chromosome and sex hormones are suspected to be responsible for the increased incidence among women as this has been associated with immune dysregulation. Candidate risk genes for SLE have been found on the X chromosome (e.g., Foxp3, TLR7, IRAK1, and CD40 ligand), and estrogen has effects on B cell maturation, antibody production, Th2 responses, and survival of autoreactive cells.[7] Thus, it is not surprising that pregnancy can affect SLE disease activity, and conversely, SLE can affect pregnancy outcomes due to its association with maternal and neonatal morbidity. Risks that arise include pre-eclampsia, abortion, premature birth, stillbirth, and intrauterine growth restriction.[7,8] A meta-analysis found that the incidence of pre-eclampsia and hypertension had significantly higher rates among women with SLE (relative risk (RR): 1.85, 1.91, Confidence interval 95% (CI) 1.44-2.53; P = 0.00001) and (RR: 1.99, 95% CI 1.54-2.56; P = 0.00001).[9] In addition, thromboembolic disease and abortion were also significantly higher in SLE patients. Besides the greater frequency of pregnancy complications, the course of SLE itself can be negatively affected by pregnancy, with more women experiencing SLE flares during the peripartum period.[10]

Several risk factors for adverse pregnancy outcomes have been identified, including active SLE; history or current lupus nephritis; hypertension or proteinuria more than 1 g/day; presence of serological activity or aPL antibodies; vascular morbidity and previous pregnancy; and the use of prednisone substitutes for active disease. Nevertheless, most women can have a good pregnancy, and various preparations can be made to reduce adverse pregnancy outcomes for mother and fetus.[4]

The quality of intensive and regular antenatal care (ANC) is essential in managing

pregnancy in patients with SLE.[11] Quality ANC allows early detection and management of complications such as preeclampsia, premature birth, and intrauterine growth restriction. Research shows that antenatal risk assessment systems can help identify and effectively manage high-risk pregnancies. The importance of a strong healthcare system and policies that support access to high-quality ANC services is essential to reduce maternal and neonatal mortality.[1]

Several studies have identified maternal and neonatal outcomes in women with SLE. However, factors associated with these complications seem to vary from region to region, and research in Asia is more often conducted in the Pacific region, while research in Southeast Asia, including Indonesia, is still limited.[12] Given the high prevalence of SLE in women and the importance of maternal-fetal health, this study aims to describe pregnancy outcomes and neonatal outcomes in pregnant women with SLE at Hasan Sadikin Hospital in Bandung.

Method

This cross-sectional study was conducted by reviewing medical records of all pregnant women who delivered at the Department of Obstetrics and Gynecology, Hasan Sadikin General Hospital, Bandung from January 2021 to December 2023. Inclusion criteria for the SLE group included pregnant women aged 18-45 years with confirmed SLE diagnosis according to the 2019 European League Against Rheumatism (EULAR)/ American College of Rheumatology (ACR) classification criteria, singleton pregnancy, and complete medical records with delivery outcomes at our institution. Exclusion criteria comprised multiple pregnancies, concurrent autoimmune diseases other than SLE, congenital anomalies, and incomplete outcome data. The control group (non-SLE) included pregnant women without any autoimmune diseases, matched for the same time period, with similar inclusion and exclusion criteria except for SLE diagnosis. Data collection was performed manually through systematic review of electronic medical records using a standardized data collection form. Patient characteristics, clinical manifestations, maternal outcomes, and neonatal outcomes were extracted and recorded. Statistical analysis was performed using IBM SPSS version 24.0, with descriptive statistics (means, standard deviations, frequencies, and percentages) used to describe patient characteristics and outcomes, while categorical variables were analyzed using chi-square test and continuous variables using independent t-test, with p-value <0.05 considered statistically significant.

Patient characteristics are described as means with standard deviations for normally distributed numerical data and percentages for categorical variables. Patient characteristics observed in this study were age, nutritional status, and parity. Clinical characteristics of SLE observed in patients consisted of lupus nephritis, chronic hypertension, rash, arthritis, serositis, neurological signs, flare during pregnancy, hematological disorders, vasculitis, myositis, and positive anti-DNA. Maternal outcomes observed in this study were hypertension in pregnancy, Intrauterine Fetal Death (IUFD), delivery method, cerebrovascular complications[13] (stroke, cerebral venous thrombosis, posterior reversible encephalopathy syndrome), kidney complications[14] (acute kidney failure, hemolytic uremic syndrome, IgA nephropathy, diabetic nephropathy, nephrotic syndrome, chronic kidney disease), cardiovascular complications[15]including 95% confidence intervals, were calculated using sample weights from the NIS dataset. RESULTS: Among the 40 million delivery-related admissions, 51 161 patients were reported to have SLE. Patients with SLE had a

higher risk of fetal morbidity, including IUGR (8.0% vs 2.7% (acute myocardial infarction, aneurysm, amniotic fluid embolism, cardiac arrest/ventricular fibrillation, heart failure, pulmonary edema/acute heart failure, sickle cell disease with crisis, air and thrombotic embolism, and cardiac rhythm changes), postpartum hemorrhage, preterm delivery, length of hospital stay, and maternal mortality. Neonatal outcomes observed in this study were live births, prematurity, early neonatal death, low birth weight, asphyxia, and Small for Gestational Age (SGA) status.

Results

Data collection resulted in 41 pregnant women with Systemic Lupus Erythematosus (SLE) during the period of January 2021 to December 2023 at Hasan Sadikin Hospital Bandung. Additionally, there were 82 pregnant women without SLE (non-SLE) during the same period. A total of 41 SLE patients and 82 non-SLE patients who met the inclusion and exclusion criteria were included in the study.

The SLE group had a younger maternal age (29.44±5.025 years) compared to NON-SLE (33.76±7.31 years), with average weight 61.66±9.054 kg, height 156.63±4.933 cm, and BMI 25.13±3.511. Nutritional status in SLE showed 63.4% normal and 36.6% overweight, with no underweight cases. Parity distribution included 29.3% primiparous, 36.6% multiparous, and 34.1% grand multiparous

Table 2 Explains the Description of Clinical Characteristics of Systemic Lupus Erythematosus Patients. For patients with clinical characteristics of Lupus Nephritis as many as 2 or 4.9%, Chronic Hypertension as many as 4 or 9.8%, Rash as many as 32 or 78.0%, Arthritis as many as 10 or 24.4%, Neurological as many as 1 or 2.4%, Flare as many as 0 or 0.0%, Vasculitis as many as 3 or 7.3%, Hematological as many as 11 or 26.8%, and Serositis as many as 2 or 4.9%.

Based on table 2, it can be found that rash is the most common clinical symptom in SLE patients, experienced by 78.0% of patients.

Table 3 demonstrates that at Hasan Sadikin Hospital Bandung, patients with SLE had a much lower rate of hypertension complications (14.6%) compared to NON-SLE patients (73.2%), while the percentage of preterm labor was nearly the same (43.9% vs. 42.7%). The rate of IUFD was higher in the NON-SLE group (17.1%) than in the SLE group (4.9%), and both groups showed no

Table 1 Description of Patient Characteristics in SLE and Non-SLE Groups

Variable	Group	SLE (N=41)	NON SLE (N=82)
Mother's Age (years)		30.00 [21.00–42.00]	31.46 [16.00–48.00]
Body Weight (kg)		60.00 [42.00–88.00]	-
Height (cm)		156.00 [146.00–175.00]	-
BMI (kg/m²)		24.61 [19.10–36.98]	-
Nutritional Status	Overweight	15 (36.6%)	-
	Normal	26 (63.4%)	-
	Underweight	0 (0%)	-
Parity	Primipara	12 (29.3%)	-
	Multipara	15 (36.6%)	-
	Grandemultipara	14 (34.1%)	

Table 2 Description of Clinical Characteristics of Systemic Lupus Erythematosus Patients

Variable	N=41
Clinical Characteristics	
Lupus Nephritis	2(4.9%)
Chronic Hypertension	4(9.8%)
Rash	32(78.0%)
Arthritis	10(24.4%)
Neurological	1(2.4%)
Flare	0(0.0%)
Vasculitis	3(7.3%)
Hematologic	11(26.8%)
Serositis	2(4.9%)

Note: Categorical data are presented as frequency and percentage, while numerical data are presented as mean, median, standard deviation, and range.

Table 3 Comparison of Maternal Outcomes in SLE and Non-SLE Patients

Variable	Group	
	SLE N=41	NON SLE N=82
Hypertension Complication		
Yes	6(14.6%)	60 (73.2%)
No	35(85.4%)	22 (26.8%)
IUFD		
Yes	2(4.9%)	14 (17.1%)
No	39(95.1%)	68 (82.9%)
Delivery Method		
Vaginal	15(36.6%)	39 (47.6%)
Cesarean Section (SC)	26(63.4%)	43 (52.4%)
Premature Delivery		
Yes	18(43.9%)	35 (42.7%)
No	23(56.1%)	47 (57.3%)
Postpartum Hemorrhage		
Yes	0(0.0%)	0 (0.0%)
No	41(100.0%)	82 (100.0%)
Maternal Death		
Yes	0(0.0%)	0 (0.0%)
No	41(100.0%)	82 (100.0%)

Table 4 Comparison of Neonatal Outcomes in SLE and Non-SLE Patients

Variable	Group	
	SLE	NON SLE
	N=41	N=44
Live Birth		
Yes	39(95.1%)	73 (89.0%)
No	2(4.9%)	9 (11.0%)
Premature		
Yes	18(43.9%)	35 (42.7%)
No	23(56.1%)	47 (57.3%)
Early Neonatal Death		
Yes	0(0.0%)	0 (0.0%)
No	41(100.0%)	82 (100.0%)
Low Birth Weight		
Yes	27(65.9%)	44 (53.7%)
No	14(34.1%)	38 (46.3%)

cases of postpartum hemorrhage or maternal death.

Table 4 shows that in the SLE group, 95.1% of babies were born alive, 43.9% of babies were born preterm, there were no early neonatal deaths, and 65.9% of babies had low birth weight. In the NON-SLE group, 89.0% of babies were born alive, 42.7% of babies were born preterm, there were no early neonatal deaths, and 53.7% of babies had low birth weight. In conclusion, although the live birth rate was slightly higher in the SLE group, both groups showed similar rates of prematurity, and the incidence of low birth weight was higher in the SLE group.

Discussion

In this study, it was found that the mean age of mothers with SLE was 29.44±5.025 years, while in the NON-SLE group, the mean age of mothers was 33.76±7.31 years. According to research conducted by Wen Rong He and Hua Wei (2020), the average age of pregnant women with SLE is approximately 31.0 years, while in the non-SLE group it is 29.0 years. This indicates that in this study, the age of mothers in the SLE group was slightly younger compared to previous studies. Pregnant women with SLE tend to be younger than women without SLE because they are often diagnosed earlier and receive rapid specialist referral, allowing them to plan pregnancies more carefully to reduce the risk of complications. This earlier pregnancy planning is also encouraged by the increased risk of pregnancy complications with advancing age and advancements in the management of SLE, which allow for better disease control at a younger age.[16,17]

In addition, in this study, the mean body weight was 61.66±9.054 kg, the mean height was 156.63±4.933 cm, and the mean BMI was 25.13±3.511. Another study conducted in Indonesia also showed that the average BMI of pregnant women with SLE was around 27.04 ± 5.06. Nutritional status in this study showed that most pregnant women with SLE were in the normal or overweight category. Research by Wen Rong He and Hua Wei also demonstrated that pregnancy complications such as preeclampsia occur more frequently in mothers with SLE who have higher body weight or are obese. Pregnant women with

SLE tend to have an overweight or obese BMI due to several factors. SLE is often associated with the use of medications such as prednisolone, which can cause weight gain. In addition, high SLE disease activity and pregnancy complications such as preeclampsia, hypertension, and gestational diabetes also contribute to increased BMI. These factors, along with the influence of pregnancy hormones and metabolic changes, increase the risk for pregnant women with SLE to become overweight or obese.[16,17]

Parity in this study showed a balanced distribution among primipara, multipara, and grandmultipara. This is consistent with findings from other studies showing that pregnancies in women with SLE are often unaffected by the number of previous pregnancies. Pregnancies in women with SLE are often unaffected by parity because pregnancies with SLE are more influenced by disease activity and medical conditions than by parity factors. Active SLE disease and related complications such as preeclampsia, lupus nephritis, and hypertension during pregnancy can occur regardless of previous pregnancy history. Furthermore, strict medical care and management of pregnancy in SLE patients focus more on disease control and the prevention of complications rather than the number of previous pregnancies.[18]

This study showed that rash was the most common clinical symptom, with a prevalence of 78.0%. Other studies support these findings; for example, research by Phansenee et al. found that skin rash is often the main manifestation in SLE patients, as skin involvement is one of the main manifestations of this disease. The study by Al Rayes et al.16 found that active lupus nephritis is strongly associated with adverse pregnancy outcomes, such as preeclampsia and preterm birth. This shows that, although rash is the most common clinical symptom, other manifestations of SLE, such as nephritis and hypertension, also play a significant role in pregnancy complications in SLE patients. Overall, these findings indicate that while rash is the most frequently encountered symptom in SLE patients, variations in other clinical symptoms such as nephritis and hematological complications are also important to consider in the clinical management of patients, especially during pregnancy. Proper management and early detection of various SLE clinical manifestations can help reduce the risk of complications during pregnancy and improve pregnancy outcomes for patients with SLE.[19]

The comparison between the SLE and NON-SLE groups in this study showed that SLE patients had lower rates of hypertension complications and lower rates of IUFD compared to the NON-SLE group. The study by He and Wei showed that in pregnancies with SLE, the prevalence of preeclampsia/eclampsia is significantly higher (RR: 3.38) compared to pregnant women without SLE, as well as the risks of IUFD and fetal loss which are also higher. Other studies, such as those by Chen YJ et al., also noted that pregnancies in SLE patients are often accompanied by a higher risk of obstetric complications, including hypertension and preeclampsia. However, data from Hasan Sadikin Hospital showed otherwise, which may be due to differences in clinical management and early detection of complications in SLE patients.[19]

The similarity in the percentage of preterm births between the two groups suggests that SLE may not significantly affect the timing of delivery compared to other factors impacting prematurity in the general population. The study by Li et al. also supports the finding that preterm birth is a common complication in pregnancies with SLE, but does not show a large difference between the SLE and non-SLE groups in this regard.[19]

Comparison between the SLE and NON-SLE groups shows that although the live birth rate is higher in the SLE group,

both groups have similar rates of prematurity. The incidence of low birth weight is higher in the SLE group. These results are in line with several other studies. According to research by He and Wei,[16] babies born to mothers with SLE are at higher risk of being born with low birth weight (RR: 4.78) and being admitted to the NICU (RR: 2.79). This indicates that, despite advances in the medical management of SLE during pregnancy, the risk of neonatal complications remains high. Another study by Bundhun et al.[21] shows that pregnancies with SLE are often associated with worse neonatal outcomes, including low birth weight and prematurity. The reasons for these outcomes may include factors such as active lupus nephritis, the use of immunosuppressive drugs, and pregnancy complications such as preeclampsia, which may affect fetal growth and trigger preterm birth. The higher incidence of low birth weight in the SLE group may also be due to the direct influence of SLE on the placenta and nutrient supply to the fetus. The study by Mehta et al.[22] shows that high SLE disease activity and the use of steroids during pregnancy may contribute to restricted fetal growth. Overall, although the higher live birth rate in the SLE group may indicate improvements in pregnancy management, complications such as low birth weight and the need for neonatal intensive care remain major concerns.[23]

In the non-SLE group, fetal growth restriction was rare, while in the SLE group, fetal growth restriction was more commonly found, even with quality ANC at RSHS. It is very important for patients with SLE to undergo intensive and regular antenatal care (ANC) because pregnancies with SLE are at high risk for serious complications for both mother and fetus. Regular ANC allows early detection and management of complications such as preeclampsia, preterm birth, and fetal growth restriction. ANC in high-risk pregnancies involves a more intensive and specialized approach to ensure the health of the mother and fetus. Pregnancies are considered high-risk if there are one or more risk factors that can affect the health of the mother or fetus, such as maternal age, pre-existing medical conditions, a poor obstetric history, or complications in the current pregnancy. ANC services include early identification of risks through routine examinations, close monitoring, and appropriate medical interventions to prevent adverse outcomes such as preterm birth, low birth weight, and neonatal death. Studies show that the use of antenatal risk assessment systems can help identify and manage high-risk pregnancies effectively. These systems typically involve assessing various risk factors and providing more intensive care to women with high risk scores. The importance of a strong health system and policies that support access to high-quality ANC services is essential to reduce maternal and neonatal mortality rates.[1]

Further research and better management strategies are needed to reduce the risk of these complications and improve the long-term health outcomes for babies born to mothers with SLE.

Conclusion

This study examined pregnancy and neonatal outcomes in pregnant women with Systemic Lupus Erythematosus (SLE) at Hasan Sadikin Hospital Bandung during the period 2021-2023. The results showed that pregnant women with SLE tended to be younger and have a higher body mass index (BMI) compared to the non-SLE group. The most common clinical symptom in SLE patients was skin rash. Although the percentage of preterm births was almost the same between the two groups, the SLE group showed a higher incidence of low birth weight. However, hypertensive complications and intrauterine fetal death (IUFD) were lower in the SLE group compared to the non-SLE

group. This study highlights the importance of strict clinical management and early detection of complications to improve pregnancy outcomes in patients with SLE.

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