

Preeclampsia in Pregnancy: Analysis of Sociodemographic and Risk Profiles Based on Multiyear Observations

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ABSTRACT

Preeclampsia is a pregnancy-related hypertensive disorder that occurs in 2-8% of pregnancy complications and causes 9-26% of maternal deaths in low-income countries. This study aims to determine the characteristics of Pregnancy with Preeclampsia at the dr. Rubini Regional General Hospital, Mempawah Regency in 2021-2023. This study is a descriptive study with a cross-sectional approach. Data retrieval was taken from medical records in the form of data on the characteristics of pregnancy with preeclampsia at the dr. Rubini Regional General Hospital, Mempawah Regency based on maternal age, education, occupation, gravida, gestational age, body mass index status, previous medical history, history of miscarriage, hemoglobin status, and leukocyte status since 2021-2023. The data collects on March to April 2024. The samples are 302 samples. The researchers conducted univariate analysis using SPSS 25 computer software. The data obtained from the data collection will be presented in the form of frequency distribution tables and accompanied by data interpretation with explanations in narrative form. The results showed that pregnant women with preeclampsia were more at high-risk age (48%), low education with elementary school graduates (42.7%), work as housewives (94%), had obesity nutritional status (86.1%), no history of disease (61.3%), no history of miscarriage (81.5%), multiparous pregnancy (75.8%), had a gestational age of aterm (67.2%), had normal hemoglobin 57.6% and pregnant women with preeclampsia experienced leukocytosis (59.3%).

Keywords: Preeclampsia; Pregnancy

INTRODUCTION

Preeclampsia is a pregnancy-related hypertensive disorder that occurs in 2-8% of pregnancy complications. Preeclampsia causes 9-26% of maternal deaths in low-income countries. Pregnancy-induced hypertensive disorders are one of the leading causes of maternal morbidity and mortality worldwide (Aini, et al., 2023). Preeclampsia has varied clinical features and its complications are very dangerous during pregnancy, labor and the postpartum period. By the middle of this century, the incidence of preeclampsia and maternal mortality had declined in developed countries. Although in developing countries, the incidence of preeclampsia and maternal mortality remains high. Based on a meta-analysis, the global incidence of preeclampsia is 4.6% (Dewie, et al., 2020). The World Health Organization (WHO) estimates the incidence of pre-eclampsia to be seven times higher in developing countries (0.51%-38.4%) than in developed countries (6-7%) (Tessema, et al., 2015).

Data from WHO (World Health Organization) more than 585,000 mothers per year die during pregnancy. As many as 99% of maternal deaths due to labor problems or referred births occur in developing countries (Saputri & Fransiska, 2023). Maternal Mortality Rate (MMR) in the world reaches 529,000 per year, with a ratio of 400 maternal deaths per 100,000 live births, where 12% of maternal deaths are caused by preeclampsia (WHO, 2015). Globally, every two minutes

somewhere in the world, a woman dies from pregnancy complications and her newborn baby has very little chance of survival. For every woman who dies, 20 to 30 suffer significant and sometimes lifelong problems because of their pregnancy (Handayani & Nurjanah, 2021).

Data from the Mempawah Regency Health Office showed that the number of maternal deaths in 2021-2023 was 26 cases. The causes of maternal death are bleeding, infection and sepsis, preeclampsia, eclampsia, covid-19. RSUD dr. Rubini works synergistically with the Mempawah Regency Health Office in overcoming the maternal mortality rate. RSUD dr. Rubini of Mempawah Regency is a type C hospital under the Mempawah Regency Government, which is the first level referral hospital for the community in the region. The incidence of Preeclampsia in 2021 at RSUD dr. Rubini is known to be 86 cases of women with Preeclampsia out of 1510 pregnant women, the incidence of Preeclampsia in 2022 at RSUD dr. Rubini is known to be 126 cases of women with Preeclampsia out of 1560 pregnant women, and the incidence of Preeclampsia in 2023 at RSUD dr. Rubini is known to be 204 cases of women with Preeclampsia out of 1967 pregnant women, which means there is an increase every year from 2021 to 2023. This study aims to examine the sociodemographic and clinical characteristics of pregnant women with preeclampsia at RSUD Dr. Rubini Mempawah Regency between 2021 and 2023.

METHOD

This study is a descriptive study with a cross sectional approach. Data were collected from medical recors in the form of data on the characteristics of pregnancy with preeclampsia at dr.Rubini Regional General Hospitals, Mempawah Regency based on maternal age, education, occupation, gravida, gestation period, body mass index status, previous history of disease, history of miscarriage, hemoglobin status, and leukocyte status since 2021-2023. Maternal age, education, occupation, body mass index status, previous history of disease, and history of miscarriage are variables that use a nominal scale. Gravida, gestation period, hemoglobin status, and leukocyte are variables that use an ordinal scale. The samples taken were samples that met the inclusion criteria of 302 samples. The inclusion criteria include having preeclampsia during pregnancy, recorded in medical records and in medical records recorded completely regarding: maternal age, gravida, education, occupation, gestation period, body mass index status, previous history of disease, history of miscarriage, hemoglobin status, and leukocyte status. For exclusion criteria, there was one of the respondent's characteristic data that was not recorded in the medical record or the medical record was incomplete. The analysis used was univariate analysis to describe the characteristics of pregnancy with preeclampsia based on maternal age, education, occupation, parity and gestation period.

RESULTS AND DISCUSSION

Univariate Analysis

Table 1. Characteristics of Pregnant Women

Subject Characteristic	n	%
Age		
High Risk	146	48.3
Low Risk	156	51.7
Education		
Elementary School	129	42.7
Middle School	79	26.2
High School	72	23.8
Higher Education	22	7.3
Jobs		
Housewife	284	94.0

Working	18	6.0
Body Mass Index		
Normal	42	13.9
Obesity	260	86.1
Disease History		
None	185	61.3
There is	117	38.7
Miscarriage History		
Never	246	81.5
Ever	56	18.5
Parity		
Primiparous	69	22.8
Multiparous	229	75.8
Grandepara	4	1.3
Pregnancy Age		
Preterm	86	28.5
Aterm	203	67.2
Postterm	13	4.3
Hemoglobin Level		
Normal	174	57.6
Anemia	128	42.4
Leukocyte Count		
Normal	123	40.7
Leukositis	179	59.3

The results of the study in the table above show the characteristics of high-risk age amounted to 146 mothers (48.3%), and 156 mothers (51.7%) had a low risk of preeclampsia at RSUD Dr. Rubini Mempawah Regency described in the table. The incidence of preeclampsia occurs more at the age of pregnant women with low risk. In line with the results of research by Yuliasari, D., et al (2024), cases of preeclampsia are more prevalent at the age of 20-35 years with a prevalence of 67.5%. The number of preeclampsia that occurs in the age range with low risk is likely due to the process of pregnancy and childbirth mostly occurs at reproductive age (20-35 years). Pregnancy at the age of over 35 years and under 20 years is often considered dangerous (Cavazos-Rehg, et al., 2015). Respondents with high-risk age experience preeclampsia in pregnancy because at the age of <20 years physically the reproductive organs are still not optimal to accept a pregnancy process, this allows pregnancy disorders, namely preeclampsia. While mothers with age > 35 years' experience preeclampsia during pregnancy because physiologically and psychologically, the mother's anxiety and stress levels are higher in the pregnancy process, triggering preeclampsia (Coussons-Read, 2013).

The results showed that the characteristics of maternal education who graduated from elementary school amounted to 129 mothers (42.7%), junior high school amounted to 79 mothers (26.2%), high school amounted to 72 mothers (23.8%) and college 22 mothers (7.3%) contained in RSUD dr Rubini Mempawah Regency described in the table. Most of the pregnant women in RSUD Dr. Rubini Mempawah Regency have low education status. Education is the process of acquiring knowledge to change positive behavior for the better. The advancement of science and technology along with the emancipation of women in Indonesia to obtain equal rights and obligations in all fields, especially in the field of education, led to an increase in maternal education (Lwamba, et al., 2022). Mothers with low education experience preeclampsia in pregnancy due to the busy activities of the mother so that the mother does not have insight into the development of maternal health during pregnancy, while mothers with low education experience preeclampsia in

pregnancy due to the lack of maternal interest in seeking information about pregnancy health and their desire to conduct antenatal care checks (Yuliasari, et al., 2024).

The results showed the characteristics of the work of pregnant women who were housewives amounted to 284 mothers (94.0%), and 18 mothers (6.0%) had jobs at RSUD Dr. Rubini Mempawah Regency described in the table. The results of this study are also supported by research conducted by Fauziah (2019), namely with the results of his research the majority of maternal work variables occurred in the group of mothers who did not work or housewives as much as (80.0%) (Fauziah, 2020). According to Yuliasari, D., et al., (2024) pregnant women who do not work have a risk of experiencing preeclampsia in pregnancy because as housewives can also experience stress and due to this stress the mother can experience high blood pressure and anxiety in her pregnancy, therefore mothers who do not work are also likely to experience preeclampsia. If the mother does not work and has a low income level, the frequency of Antenatal Care will be reduced and the quality of nutrition will be worse. In addition, mothers from this group usually have a lower level of education, so knowledge about antenatal care is still not good.

The results showed that the characteristics of the nutritional status of obese pregnant women amounted to 260 mothers (86.1%), and 42 mothers (13.9%) had normal BMI at RSUD Dr. Rubini Mempawah Regency described in the table. Most of the respondents in this study were obese. In line with previous studies showing that pregnant women with excessive weight or obesity are twice as much preeclampsia than pregnant women with normal nutritional status (Lopez-Jaramillo, et al., 2018). Being overweight before pregnancy is a risk factor for preeclampsia in pregnancy. This is in line with other studies conducted in the United States showing 56% of women with overweight and obesity experience preeclampsia. An increase in BMI is equal to 2 times the risk of preeclampsia. Pregnant women with normal BMI values have a moderate risk of preeclampsia, while pregnant women with more BMI values have a high risk of preeclampsia (Motedayen, et al., 2019). The incidence of preeclampsia in pregnant women is due to Body Mass Index is one of the factors that cause preeclampsia where excessive BMI is associated with reduced organ perfusion due to vasospasm and endothelial activation. In pregnant women there is endothelial dysfunction triggered by excessive BMI or obesity, which will cause damage to the endothelium and cause preeclampsia (Marasing, et al., 2021).

The results showed the characteristics of pregnant women who had a history of disease amounted to 117 mothers (38.7%), and 185 mothers (61.3%) did not have a history of disease at RSUD Dr. Rubini Mempawah Regency described in the table. Based on the results of the study, the characteristics of preeclampsia were dominated by pregnancies without a history of disease, but there were also pregnant women who experienced preeclampsia with a history of disease. In line with the research of Utami, B. S., et al., (2020) with the results of factor analysis of the incidence of preeclampsia in pregnancies with a history of 37.5% disease and respondents who did not have a history of disease 62.5% (Utami, et al., 2020). A history of previous illness can be a risk factor for preeclampsia. A history of hypertension being the strongest risk factor is supported by Kartasurya's research (2019) which states that a history of previous illness is one of the diseases that results in high morbidity which is closely related to vital organs in the cardiovascular system such as stroke, kidney failure, and kidney damage. The data means that mothers who experience preeclampsia are influenced by a history of hypertension.

The results showed the characteristics of pregnant women who had a history of miscarriage amounted to 56 mothers (18.5%), and 246 mothers (81.5%) did not have a history of miscarriage at RSUD Dr. Rubini Mempawah Regency described in the table. The incidence of preeclampsia also occurs in mothers with a history of abortion although the number is not so much. The results of research by Sitohang, Y. M. R., et al., (2023) state that the history of abortion can lead to preeclampsia. According to Prawirohardjo's theory (2018), the result of conception will

not be accepted as a normal pregnancy due to the presence of human leukocyte antigen protein G (HLA-G), which will protect the trophoblast from natural killer (NK) cell lysis in the uterus. Fetal or neonatal alloimmune thrombocytopenia, which is a maternal response to fetal platelet antigens by targeting integrin 3 made on platelets, endothelial cells and placental trophoblasts, may contribute to abortion (Deer, et al., 2023). Placental implantation and subsequent development consist of changes in the uterine spiral arteries, which can lead to preeclampsia, IUGR, and miscarriage if not met (Sitohang, et al., 2023).

The results showed the characteristics of Mother's Parity which primi amounted to 69 mothers (22.8%), multi amounted to 229 mothers (75.8%), and grande 4 mothers (1.3%) found at RSUD Dr. Rubini Mempawah Regency described in the table. In this study, the incidence of preeclampsia mostly occurred in multiparous pregnant women. In line with the research of Latipah, S., et al., (2023) with the incidence of preeclampsia mostly occurred in multiparous mothers 81.1% (Latipah, et al., 2023). From these results, it means that pregnant women with multiparous parity status are at risk of preeclampsia higher than pregnant women with other parity status. Because mothers with more than three parities experience changes in the uterine wall (uterus) which is weaker as a result of repeated pregnancies, the mother's blood flow decreases, which results in damage to the endothelial tissue in the blood vessels, resulting in preeclampsia in pregnancy. In multiparity, the endometrial environment around the implantation site is imperfect and unprepared to receive the products of conception. As a result, the fetus does not receive sufficient nutrients and oxygen and the growth of the fetus is inhibited, which increases the risk of preeclampsia (Daryanti, 2020).

The results showed the characteristics of gestational age preterm amounted to 86 mothers (28.5%), aterm 203 mothers (67.2%) and postern 13 mothers (4.3%) at RSUD Dr. Rubini Mempawah Regency described in the table. Most of the incidence of preeclampsia occurred at aterm gestational age. This is in line with the research of Dewie, A., et al., (2020) that the incidence of preeclampsia based on gestational age is highly dominated by the group of mothers who have aterm gestational age 76.2%. This study is in accordance with the theory of Prawirohardjo (2018) which states that third quarter gestational age is a risk factor that can cause obstetric complications, one of which is the occurrence of preeclampsia. One of the risk factors for preeclampsia is gestational age. Preeclampsia can occur in the third trimester of pregnancy or close to birth, and negatively affects the immune system, including the placenta, which provides nutrients to the fetus. This is in accordance with the placental implantation ischemia theory, which states that the incidence of preeclampsia increases with gestational age. As the risk of preeclampsia increases at gestational ages above 28 weeks, it is important to undergo regular health checks (Ives, et al., 2020).

The results showed the characteristics of hemoglobin anemia of pregnant women amounted to 128 mothers (42.4%), and 174 mothers (57.6%) had normal hemoglobin at RSUD Dr. Rubini Mempawah Regency described in the table. Most pregnant women with preeclampsia have normal hemoglobin levels > 11 mmHg. In line with Rizki's research, H. I. N. (2021) that there are differences in pregnant women with preeclampsia and normal pregnant women shown in higher hemoglobin levels in pregnant women with preeclampsia (Rizki, 2021). Research by Wang et al (2018) revealed hyperviscosity which directly reduces blood flow in microvascular with decreased kinetic force resulting in worsening hypoxia in the placenta due to the impact of lack of oxygen and decreased circulation and vasospasm caused will increase preeclampsia Hb. According to literature reviews from six journals or research articles, research conducted by Triseptinora (2020), hemoglobin can increase in preeclamptic pregnant women due to hemoconcentration, which causes an increase in leukocytes and neutrophils, which causes inflation, or due to hemolysis or rupture of the erythrocyte membrane in secondary anemia

(Triseptinora, 2020). The nutritional needs of pregnant women can also be met through daily meals and tablets. Erythrocyte and hemoglobin levels can also be related to the consumption of iron supplements given to pregnant women in Indonesia to prevent iron deficiency anemia.

The results showed the characteristics of leukocytosis of pregnant women amounted to 179 mothers (59.3%), and 123 mothers (40.7%) had normal leukocytes at RSUD Dr. Rubini Mempawah Regency described in the table. Most of the pregnant women with preeclampsia had leukocytosis. In line with the research of Aouache (2018), in pregnant women with preeclampsia will experience an increase in leukocyte levels. The difference in the number of leukocytes is because in preeclampsia there is a reduction in the diameter of the lumen of the spiral artery, thus disrupting blood flow to the placenta. Reduced perfusion and a hypoxic environment will result in the release of placental debris, resulting in systemic inflammation. These materials are foreign materials that then stimulate the onset of the inflammatory process, resulting in an increase in the number of leukocytes. Whereas in normal conditions, the number of trophoblastic debris is still within reasonable limits so that the inflammatory reaction is also still within normal limits (Saifuddin, 2016). The increase in RNL in preeclampsia is thought to occur due to endothelial dysfunction which will activate leukocytes to release proinflammatory substances, neutrophil activation according to Elhossamy H, et al is a major component of the excess inflammatory response in preeclampsia (Qedi, et al., 2022). This study did not show any relationship between variables because it was a descriptive study, which is a limitation of this study. Therefore, the researchers hope that the data in this study can be used as material for further research.

CONCLUSION

Characteristics of Pregnancy with Preeclampsia at RSUD Dr. Rubini Mempawah Regency in 2021-2023 concluded that pregnant women who suffer from preeclampsia are more with highrisk age (48%), low education with elementary school graduates (42.7%), work as housewives (94%), a picture of obese nutritional status (86. 1%), pregnant women who suffer from preeclampsia have characteristics of no history of disease (61.3%), no history of miscarriage (81.5%), multiparous pregnancies (75.8%), have aterm gestational age 67.2%, have normal hemoglobin 57.6% and pregnant women who suffer from preeclampsia, experience leukocytosis (59.3%)..

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