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RISK FACTORS FOR THE INCIDENT OF PREECLAMPSIA IN THE DELIVERY ROOM OF SOEDONO MADIUN GENERAL HOSPITAL

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ABSTRACT

Preeclampsia is a health problem in pregnant women that needs special attention because the exact cause is still unknown, and can cause death in the mother and fetus. The purpose of this study was to determine the risk factors for the incidence of preeclampsia in pregnant women in the Maternity Room of RSUD dr. Soedono Madiun. The research design used was descriptive quantitative method and accidental sampling technique. Data collection was carried out on 7 February-16 March 2024. The research instrument used was an interview sheet. The data analysis used is descriptive analysis. The results of this study indicate that the risk factors for preeclampsia are due to hypertension (94%), ANC (antenatal care) visits (90%), age (73%), obesity (45%), pregnancy distance (30%), parity (24%), diabetes mellitus (9%), asthma attacks (9%) and anaemia (3%), twin pregnancy (0%). Based on the risk factors for preeclampsia, the dominant risk factor for hypertension was 94%. This is because the average mother has a history of hypertension before pregnancy and recurrence after pregnancy so that it hinders the delivery process. Pregnant women must continue to maintain health during pregnancy by carrying out routine pregnancy checks in a timely manner and awareness of the risk of pregnancy preeclampsia that occurs.

Keywords : Pregnancy, labour, risk factors, and pre-eclampsia

INTRODUCTION

Preeclampsia is a syndrome characterized by elevated blood pressure and proteinuria that appears in the second or third trimester of pregnancy that always resolves in the postnatal period. Preeclampsia can occur in the antenatal, intranatal, and postnatal periods of pregnancy. Some pregnant women can be affected by preeclampsia factors due to maternal age, parity, hypertension, twin pregnancy, diabetes mellitus (Mariati et al., 2022).

Pregnancy with hypertension causes high risk to the mother and her baby, and is the highest cause of maternal death and mortality high perinatal rates. Hypertension that occurs during pregnancy is most common in first child pregnancies, and can also occur in midpregnancy. Hypertension that occurs can be without significant proteinuria (preeclampsia), and can also occur in patients with a previous history of chronic hypertension, or pregnancy that affects the occurrence of hypertension (gestational hypertension) (Rosa K et al, 2023).

According to the World Health Organization (WHO), the incidence of preeclampsia ranges from 0.51% - 38.4% in the world and seven times more impact on developing countries if preeclampsia cases compared to developed countries. In addition, the number of preeclampsia cases is around 128,273 per year or about 5.3% in Indonesia. The number of deaths in pregnant women collected from the family health program records at the Ministry of Health in 2020 showed 4,627 deaths in Indonesia. This number shows that there was an increase compared to 2019 of 4,221 deaths. From the causes of maternal deaths in 2020 caused by bleeding as many as 1,330 cases, hypertension in pregnancy 1,110 cases, and circulatory system disorders as many as 230 cases (East Java Provincial Health Office, 2020).

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According to the 2017 World Health Organization (WHO) report, every day 4 mothers in Indonesia die from childbirth, or in other words, every 6 hours a mother dies. This makes Indonesia the country with the second highest maternal mortality rate (MMR) in Southeast Asia. The most common causes of maternal death in Indonesia are bleeding (28%), preeclampsia (24%) and infection (11%) (WHO, 2015).

The cause can be characterized by signs of hypertension, edema (swelling), and proteinuria levels (increased protein levels) (Putri Ariyani et al, 2022). While in the fetus causes utero placenta so that there can be O2 supply and fetal nutrition. This decrease in O2 supply results in hypoxia, prematurity and fetal death can cause fetal death. In addition, the impact of caesarean and preterm events is also a significant risk factor for recurrent preeclampsia (Wainstock & Sheiner, 2022). Preeclampsia can affect both the mother and the fetus. The impact of preeclampsia on the mother is eclampsia, and HELLP syndrome (Syndrome (H) Hemolysis, (EL) liver enzymes, (LP) low platelets) is the destruction of red blood cells, increased liver enzymes, and low platelet counts which can cause death to the mother and even the fetus.

Based on the total population of preeclampsia at RSUD dr. Soedono Madiun in January-December, data were obtained in 2023 for 70 mothers with preeclampsia. From the results of observations that have been made on February 7 - March 16, 2024 obtained a total of 33 respondents with preeclampsia, there are 11 mothers giving birth and 22 pregnant women with preeclampsia.

Seeing from the background description above, it shows that there is still a big problem of preeclampsia other than due to maternal age, parity, hypertension, diabetes, ANC visits, obesity and there are also differences in the risk factors for preeclampsia according to experts, one of which is in the journal (Apriliya et al, 2021), so the authors are interested in conducting research with the title "Risk Factors for Preeclampsia in the Maternity Room of RSUD dr. Soedono Madiun" to find out the risk factors that occur in the incidence of preeclampsia in the Maternity Room of RSUD dr. Soedono Madiun.

METHODS

The design of this research is descriptive research design. The design of this study is to describe the risk factors for the incidence of preeclampsia in pregnant women and maternity women in the Maternity Room of RSUD dr. Soedono Madiun. The study was conducted for 3 months on January 22- March 16, 2024 after receiving the ethical clearance approval for research eligibility from RSUD dr.Soedono with the number 400.14.5.4/4740/102.9/2024. The population in this study were pregnant women and laboring women who experienced preeclampsia in the Maternity Room of RSUD dr. Soedono Madiun. In this study, the total population from JanuaryDecember 2023 data was 70 mothers with preeclampsia. The samples in this study were pregnant women and laboring women who experienced the incidence of preeclampsia in the Maternity Room of RSUD dr. Soedono Madiun. Then the researcher determines the population and takes samples according to two criteria, namely inclusion criteria that consider the presence of pregnant women and maternity women in the room and exclusion criteria, namely pregnant women and maternity women with hypertension (>140/90 mmHg) in the Maternity Room of RSUD dr. Soedono Madiun. In this study, the sampling technique was Accidental Sampling, namely the process of taking respondents to be sampled based on samples that happened to meet with researchers (Sugiyono, 2013).

Data collection techniques are carried out by conducting interviews with samples at the research location by considering research permits from related agencies and the willingness of samples to participate in the research process. data is processed by checking completeness, coding and tabulating data. The results of the research obtained will be presented by the researcher in tabular form with the percentage results in each risk that appears then which will be described so that it will be easy to read and understand.

RESULTS

Table 1. Characteristics of Preeclampsia respondents in the Maternity Room of RSUD dr. Soedono Madiun

Characteristics	F	%
Age		
<20 years	1	3%
20-35 years	9	27%
>35 years old	23	70%
Parity		
1-2	25	76%
≥ 3	8	24%
Education		
Elementary School	1	3%
Junior High School	10	30%
High School	17	52%
Diploma One	1	3%
Bachelor One	4	12%
Jobs		
Self-employed	2	6%
Teacher	1	3%
Army	1	3%
Housewife	29	88%

Source: Primary Data, 2024

From the table above it can be interpreted that the age of the mother who has the most risk of preeclampsia is at the age of > 35 years as many as 23 mothers (70%) people, the number of parities or the number of births there are 8 (24%) people who are more than 3 births, known to be the most with high school level education 17 (52%) people. Then it is known that the most number of jobs is 29 (88%) mothers who do not work or as housewives.

Table 2. ANC visits and pregnancy distance of Preeclampsia patients in the delivery room of RSUD dr. Soedono Madiun

ANC Visit	F	%
Non-compliant	30	91%
Compliant	3	6%
Total	**33**	**100%**
Pregnancy Spacing	**F**	**%**
≤ 2 years	4	12%
≥ 2 years	29	88%

Source: Primary Data, 2024

In table 2, it is interpreted that out of 33 maternal respondents there are 30 (91%) people who are not compliant in ANC visits, because some mothers still do not know the importance of health services for pregnant women. While those who were compliant with ANC visits were 2 (6%) people.

Table 3. Concomitant diseases in Preeclampsia mothers in the delivery room of RSUD dr. Soedono Madiun

Concomitant Diseases	Total	%
Diabetes Mellitus and Hypertension	1	3%
Diabetes Mellitus and Anemia	1	3%
Diabetes mellitus and asthma attacks	1	3%
Hypertension and asthma attacks	2	6%
Hypertension	28	85%
Total Respondents	**33**	**100%**

Source: Primary Data, 2024

Based on table 3, it can be interpreted that there is 1 patient with risk factors for preeclampsia, namely diabetes mellitus and hypertension, then there is 1 patient with risk factors for preeclampsia with diabetes mellitus and anemia, there is 1 patient with risk factors for preeclampsia with diabetes mellitus and shortness of breath. Then there are 2 patients who have risk factors for preeclampsia with hypertension and shortness of breath. While 28 patients with risk factors for preeclampsia with hypertension.

Table 4. Results of Supporting Examination of Preeclamptic Women in the Maternity Room of RSUD dr. Soedono Madiun

Supporting Examination Results	Total	%
Hypertension		
Pre Hypertension	1	3%
Stage 1	11	33%
Stage 2	21	64%
EKG		
Sinus Rhythm	33	100%
Abnormal	0	0%
Cholesterol		
≥ 200 mg/dL	1	3%
≤ 200 mg/dL	32	97%

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Supporting Examination Results	Total	%
Glucose		
≥ 140 mg/dL	5	15%
≤ 140 mg/dL	28	85%
Proteinuria		
Proteinuria +1	20	61%
Proteinuria +2	5	15%
Proteinuria +3	5	15%
Proteinuria +4	1	3%
Proteinuria negatif	2	6%
BMI (Body Mass Index) Before Pregnancy		
Underweight (< 18,5)	0	0%
Normal body weight (18,5-22,9)	13	39%
Overweight (23-24,9)	3	9%
Obese Grade 1 (25-29,9)	11	33%
Obese Grade 2 (≥ 30)	6	18%
BMI (Body Mass Index) After Pregnancy		
Underweight (< 18,5)	0	0%
Normal body weight (18,5-22,9)	0	0%
Overweight (23-24,9)	0	0%
Obese Grade 1 (25-29,9)	13	39%
Obese Grade 2 (≥ 30)	20	61%

Source: Primary Data, 2024

Based on table 4, it can be interpreted that the results of the supporting examination of pregnant women with preeclampsia were 21 (64%) people with Stage 2 hypertension, the results of ECG examination were 33 (100%) people with sinus rhythm or normal, while the results of cholesterol examination were 32 (97%) people with cholesterol ≤ 200 mg/dl, There were 28 (85%) people with glucose ≤ 140 mg/dl, then there were 20 (61%) people with positive proteinuria test results, there were 13 (39%) people with BMI (Body Mass Index) before pregnancy in the normal weight category (18.5-22.9), while there were 20 (61%) people with BMI (Body Mass Index) after pregnancy in the obesity grade 2 category (≥ 30).

Table 5. Risk Factors for Preeclampsia that Occur in Pregnant Women in the Maternity Room of RSUD dr. Soedono Madiun

Risk Factors for Preeclampsia	N	%
Hypertension	31	94%
ANC Visit	30	91%
Age	24	73%
Obesity	15	45%
Pregnancy Spacing	10	30%
Parity	8	24%
Diabetes Mellitus	3	9%
Asthma Attack	3	9%
Anemia	1	3%
Pregnant with Twins	0	0%

Source: Primary Data, 2024

Based on table 5, it can be interpreted that the risk factors for preeclampsia with hypertension were 31 (94%), ANC visits were 30 (91%), age was 24 (73%), obesity was 15 (45%), pregnancy distance was 10 (30%), parity was 8 (24%), diabetes mellitus was 3 (9%), asthma attacks were 3 (9%), anemia was 1 (3%), and twin pregnancy was 0 (0%).

DISCUSSION

Hypertension

Based on the results of this study, it shows that the risk factors for the incidence of preeclampsia in pregnant women in the Maternity Room of RSUD Dr. Soedono Madiun are obtained risk factors with blood pressure included in the Stage 2 hypertension category of 21 (64%). Hypertension can occur because the heart pumps blood more strongly so that it flows more fluid every second so that large arteries lose their flexibility and become stiff, so they cannot expand when the heart pumps blood through the arteries. The blood pumped by the heart ends up passing through narrow blood vessels. And cause an increase in blood pressure in a person. The occurrence of blood pressure can also be caused by vasoconstriction, which occurs when small arteries temporarily shrink due to nerve or hormone stimulation in the blood. This then causes fluid in the circulation to increase which can lead to increased blood pressure. This can

be due to abnormalities in kidney function, which is unable to remove a certain amount of salt and water from the body. So the volume of blood in the body increases resulting in increased blood pressure. Based on Hairuddin Safa'at (2018) which states that people with hypertension have a higher chance of experiencing preeclampsia in a longer period of time than people who do not have hypertension. From Hairuddin Safa'at's 6 research (2018), it was proven that out of 55 pregnant women respondents, almost all mothers had a history of high blood pressure or had experienced high blood pressure, namely 27 respondents (49.1%). While the other 28 respondents (50.9%) did not have hypertension.

ANC (Antenatal Care) Visit

Based on Hanifa et al, (2023) stated that mothers with incomplete antenatall care visits have a risk of preeclampsia 4.4 times higher than mothers who make complete antenatall care visits. Antenatal care visits that are said to be complete are at least carried out 4 times during pregnancy, namely 1 time in the first trimester, 1 time in the second trimester and 2 times in the third trimester. Therefore, increasing community compliance in carrying out antenatal care visits requires health promotion about the importance of carrying out routine antenatal care visits. So that health workers can take action and assess the diagnosis as early as possible related to the symptoms of preeclampsia in mothers so as to reduce the risk of complications during pregnancy until delivery (Ningsih, 2020). Supported by research by Daeli et al., (2023) from a total of 160 respondents, 86 (53.8%) mothers with incomplete ANC (at risk) were found while 74 (46.3%) mothers with complete ANC (not at risk). The study says that there is a relationship between antenatal care visits and the incidence of preeclampsia. Pregnant women should regularly visit Antenatal Care to avoid disorders during pregnancy and can reduce the possibility of complications during labor.

Age Factor

Based on Latipah (2023) in the age factor section associated with the incidence of preeclampsia in pregnant women, which states that the age of the mother is grouped based on the age range of women who are healthy to reproduce, namely 20-35 years and the age group of mothers who are at risk of reproducing in the age group 35 years. Based on Latipah (2023) getting dominant results where it states that the maternal age factor is a factor associated with the incidence of preeclampsia. It is proven by pregnant women who experience pregnancy before the age of 20 years and above 35 years have a 7.3-fold risk of experiencing severe preeclampsia compared to mothers who experience pregnancy in the age range of 20 to 35 years. At the age of the mother < 20 years, preeclampsia can occur due to the readiness of the reproductive organs which are still not growing and developing optimally until they are said to be normal enough and ready to experience pregnancy. Whereas mothers aged> 35 years are more prone to preeclampsia risks such as the incidence of hypertension.

Obesity

Based on the results of this study, there were 20 (61%) mothers who experienced BMI (Body Mass Index) ≥ 30 kg/m2. In obese pregnant women, preeclampsia can manifest as a mechanism of hyperleptinemia, metabolic syndrome, inflammatory response, and increased oxidative stress that causes damage to endothelial dysfunction (Yuniarti et al, 2023). The risk of preeclampsia can double with each weight gain of 5-7 kg/m2, and the risk of preeclampsia also increases with increasing BMI (Body Mass Index). Pregnant women with BMI > 35 before pregnancy, can be four times more likely to experience preeclampsia compared to those with BMI 19-27. Some other studies have also found that pregnant women with BMI < 35 have no risk of preeclampsia. Whereas pregnant women with a risk of preeclampsia are characterized by a body mass index of pregnant women > 35, where there is an association with an increased risk of high blood pressure (Ehrenthal, et al, 2011; Ekaidem, et al, 2011; Robinson, et al, 2010; Widiyanto, 2018). Obesity can also impair placental function and blood flow through various obesity-related metabolic changes such as hyperlipidemia, hyperinsulinemia, or hyperleptinemia. These

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metabolic markers are known to increase in plasma in obese pregnant women, and especially in women with preeclampsia (Lopez-Jaramillo et al., 2018).

Pregnancy Spacing

Pregnant women with a birth spacing of ≤ 2 years have twice the risk of death compared to those with a longer birth spacing. If pregnancy occurs before 2 years during postpartum, it can risk the mother's health progressively. While the distance of maternal pregnancy is above 2 years, it can make the mother have enough time to restore the condition of her uterus so that it can return to a good condition physically, emotionally and economically and if the next pregnancy occurs it can reduce the incidence of various complications during pregnancy, one of which is preeclampsia. Supported by research (Juniarty, et al, 2023) shows the results that of the 326 respondents there were 57 (17.5%) who had a high risk pregnancy distance, while a total of 269 (82.5%) respondents with low risk pregnancy distance. In his research, he said that there was a relationship between the distance of maternal pregnancy < 2 years with the incidence of preeclampsia.

Parity

The more mothers who experience labor will make the reproductive organs weaken and lose their flexibility. So that the condition of function and reproductive organs that are not optimal will cause the function of the endothelium to be disrupted due to decreased blood, oxygen, and nutrients flowing to the placenta so that it can cause toxic or sensitive substances to affect the endothelium. So that it can result in pregnant women who often experience labor are likely to experience complications during the next pregnancy which results in the risk of preeclampsia.

The factors of parity and age of pregnant women become risk factors in pregnancy. Where the age of the mother is too young or < 20 years and > 35 years related to the readiness of the reproductive readiness organs that are still undergoing development at a young age and can decrease the function of these organs in old age which can cause complications such as preeclampsia in pregnancy (Astuti, et al, 2017). Childbirth more than 5 times has a high risk for pregnant women because the reproductive organs, especially the mother's uterine muscles, will experience weakness which will cause obstruction of the delivery process. In Rahmawati and Fauziah's research (2019) proves that mothers with parity > 3 can be at risk of preeclampsia and while mothers with parity > 5 times will be at higher risk of preeclampsia or up to the incidence of eclampsia characterized by seizures in pregnant women.

Asthma Attack

The trigger factor for asthma is because the mother has a history of asthma before pregnancy and arises again during pregnancy so that the trigger of preeclampsia. Asthma is a disease caused by inflammation of the respiratory tract that involves the role of other inflammatory cells that will produce certain pathophysiological changes characteristic. Uncontrolled asthma in pregnancy can cause complications in the fetus and mother in the form of perinatal death, stunted fetal growth, premature birth, low birth weight, preeclampsia, post partum hemorrhage, and increased incidence of cesarean section, depending on the severity of asthma. In severe asthma, fetal hypoxia may precede maternal hypoxia. Fetal hypoxia will cause fetal distress as a result of decreased uteroplacental circulation and maternal return blood flow. Maternal hypoxemia causes decreased blood flow to the umbilical cord, increased pulmonary and systemic vascular resistance, and decreased cardiac output (I.Tantri, 2016).

Diabetes Mellitus

Diabetes mellitus in pregnant women is caused by lipids contained in the blood with a high enough amount to trigger oxidative stress or one of the pathogenesis of preeclampsia.

One of the productions of lipid peroxidation is Hydroxy Unsaturated AlphaBetha Alkanes (HNE). HNE found in obese people and preeclampsia can cause increased oxidative stress and can also cause diabetes mellitus. Pregnant women who experience

insulin resistance before pregnancy are at risk for preeclampsia.

Pregnant women who experience insulin resistance before pregnancy may develop vascular damage mechanisms characterized by increased chronic inflammation, atherogenic facilitation, and prothrombotic processes that will affect normal vascularization and normal placentation. Both congenital and acquired diabetes mellitus during the first pregnancy can cause complications that occur in pregnancy, namely hydramnios (too much amniotic fluid), dystocia (obstructed labor), and preeclampsia (Moeloek, et al, 2019). Insulin resistance can usually occur at 22-26 weeks of gestation where it is a significant predictor of preeclampsia (Moeloek, et al, 2019).

Anemia

Based on the exposure of the results of this study, that the risk factor for preeclampsia was 1 (3%) mother who experienced anemia. Based on the research of Sutriyani T, et al (2019) states that anemia in pregnancy is a condition of pregnant women characterized by hemoglobin levels below 11% in trimesters 1 and 3 or hemoglobin levels less than 10.5% in trimester 2. In the research of Sutriyani T, et al, (2019) proves that the analysis data on the relationship between anemia and preeclampsia can cause LBW. In the incidence of LBW can be caused by preeclampsia, where in cases of LBW with preeclamptic mothers due to increased blood pressure which causes uteroplacental perfusion to decrease, causing blood circulation to the fetus to decrease so that the fetus lacks oxygen and nutrients. This can result in stunted fetal growth and development. Supported by research (Rismawati and Rohmatin 2018) got the results of 50 respondents, the incidence of mothers with preeclampsia due to anemia was 20 (57.1%) mothers with poor nutritional status while 5 (33.3%) mothers with good nutritional status.

Pregnant with Twinss

Based on the results of research conducted by (Rahayu, 2023), it shows that there is a significant relationship between the risk of preeclampsia and mothers who are pregnant with twins. The value obtained from the results of Rahayu's research (2023) shows a p value of 0.03 <0.05, while the acquisition of the ood ratio (OR) of 1.607 where there is an association between twin pregnancy and preeclampsia. Risk factors for preeclampsia, especially in mothers with twin pregnancies, have a 5.135 times greater risk of preeclampsia compared to singleton pregnancies (Saputri, 2021). In mothers who are pregnant with twins with preeclampsia, they can have a risk of complications, namely damage to vital organs, especially the kidneys and liver and other complications while in the womb such as twin fetuses having to share food intake and other needs in order to develop fully during the pregnancy process. So the mother's intake must be fulfilled during her pregnancy.

With the identification of potential risk factors for preeclampsia in pregnant women, it can be used as a preventive measure and health monitoring during pregnancy to avoid complications. Additionally, it can be applied to manage a proper and healthy lifestyle to support the development of the fetus and the health of the mother.

CONCLUSSION

The most dominant risk factor for preeclampsia was due to hypertension as many as 31 (94%). This is because on average, pregnant women and laboring women have a history of hypertension before pregnancy and the problem arises again after the delivery period. So that it resulted in a delayed labor process because the pregnant woman experienced preeclampsia. It is recommended to pregnant women that in planning the right pregnancy, namely an ideal pregnancy at the age of 20-35 years in order to prevent complications that inhibit labor, as well as to be more aware of the incidence of preeclampsia during pregnancy, and continue to monitor the health conditions of pregnant women during pregnancy.

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