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# Maternal Complications of Severe Preeclampsia at Tugurejo Hospital, Semarang, 2016-2020

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**Abstract:**

Preeclampsia is a condition accompanied by hypertension and proteinuria in pregnancy. Preeclampsia is divided into mild preeclampsia, severe preeclampsia, and superimposed preeclampsia on chronic hypertension. Severe preeclampsia is characterized by systolic pressure ≥160 mmHg and/or diastolic ≥110 mmHg, thrombocytopenia (<100,000 µL), and serum creatinine level >1.1 mg/dl or creatinine level increased from normal levels without coexisting kidney disease. Severe preeclampsia can cause several complications for the mother and fetus. Descriptive research with cross sectional design and retrospective approach. Sampling was in the form of medical records; this study used a total sampling method with a population from 1 January 2016 to 31 December 2020. This research was conducted in February 2022 - March 2022 at Tugurejo Hospital, Semarang. Obtained the results of normal delivery as much as 89.5% and severe preeclampsia as much as 588 10.5%, ideal maternal age as much as 73% and risky maternal age as many as 159 cases 27%. In severe preeclampsia with the ideal age, vaginal delivery 51.0%, multigravidas 64.1%, term delivery age 62.5%, no history of hypertension or severe preeclampsia in previous pregnancies 86.7%, and the most complications was pulmonary edema (2.3%). In severe preeclampsia at risk age, vaginal delivery was 52.8%, multigravida was 86.8%, term delivery was 63.5%, had no history of hypertension or severe preeclampsia in previous pregnancies was 64.2%, and complications the most was pulmonary edema (5.7%). The ratio of normal births to severe preeclampsia is 8:1, severe preeclampsia occurs mostly in women of ideal age,At the ideal age and at risk, the majority are abdominal, multigravida, term deliveries, have no history of hypertension and preeclampsia, and the complications found includepulmonary edema, eclampsia, postpartum hemorrhage, placental abruption, HELLP syndrome, heart failure, thrombocytopenia, acute renal failure, hepatic rupture, and maternal death.

**Keywords:** Childbirth; Complications; Severe Preeclampsia

## Introduction

Preeclampsia is a condition accompanied by high blood pressure and high protein levels in pregnancy. The etiology of preeclampsia itself is still unclear, but several studies suggest that the etiology of preeclampsia includes placental ischemia, hemostatic abnormalities, vascular endothelial damage, general vasospasm, leukocyte activation, abnormalities of nitric oxide and lipid metabolism, and altered cytokine conditions associated with insulin resistance.[1]

Preeclampsia generally occurs at gestational age ≥ 20 weeks or third trimester of pregnancy. Preeclampsia generally occurs at 37 weeks of gestation and can occur after delivery.[2] Severe preeclampsia is a state of preeclampsia with pressure value-blood-systolic ≥ 160-mm Hg and-pressure-blood-diastolic ≥ 110 mm Hg-accompanied-proteinuria > 5g/24-O'clock.[3]

The incidence of preeclampsia in pregnancy reaches 2-8%, an estimated 50,000 maternal deaths due to preeclampsia worldwide. Severe preeclampsia is a major cause of maternal mortality. The mortality rate for babies born to patients with severe preeclampsia reaches 1 death in 14 live births.[2]

The incidence of preeclampsia has increased by 25% in the last 20 years and is generally associated with maternal and fetal death.[4] In Central Java, the incidence of preeclampsia has increased from 2014-2016.

The etiology of preeclampsia itself is still unclear, but several studies suggest that the etiology of preeclampsia includes placental ischemia, hemostatic abnormalities, vascular endothelial damage, general vasospasm, leukocyte activation, abnormalities of nitric oxide and lipid metabolism, and altered cytokine conditions associated with insulin resistance[1]

There are several causal factors in preeclampsia, these factors include other nulliparity, gemli, history of preeclampsia in previous pregnancy, chronic hypertension, history of diabetes, thrombophilia, obesity before pregnancy, maternal age 35 years or more, hydatidiform mole, hydrops fetalis, large fetus, kidney disease, and family history of preeclampsia or eclampsia.[3,5]

Severe preeclampsia can cause several complications for the mother and fetus. In the mother, these complications include eclampsia, acute renal failure, HELLP syndrome, pulmonary edema, heart failure, hepatic rupture, postpartum hemorrhage, thrombocytopenia, and maternal death. In the fetus, severe preeclampsia can cause placental abruption, LBW, neonatal asphyxia, and prematurity.[3,4]

Based on the description above, researchers are interested in conducting a study on maternal complications of severe preeclampsia because the rate of severe preeclampsia is high and there are several complications that can occur due to severe preeclampsia.

## Research Method

This research is a descriptive study with a cross sectional design and a retrospective approach. The population of this study was the patients with severe preeclampsia with complications at Tugurejo Hospital, Semarang in 2016-2020.The sampling method in this study was total sampling, namely the number of samples equal to the total population from 1 January 2016 to 31 December 2020 with inclusion and exclusion criteria.

Inclusion criteria included respondents having complications, complete written medical records, respondents giving birth and receiving treatment at Tugurejo Hospital in Semarang, gestational age ≥ 20 weeks, history of preeclampsia in previous pregnancies, and history of hypertension in respondents. Exclusion criteria included a history of cardiovascular, neurologic, kidney, liver disease, and diabetes in the respondents.

This research was carried out from 7 February 2022 to 9 March 2022 in patients with severe preeclampsia at Tugurejo Hospital, Semarang. The data collected is secondary data. This study uses medical records from 2016-2020. This research has obtained Ethical Clearance from the Health Research Ethics Commission (KEPK) Tugurejo

Hospital Semarang with ethical clearance number: No. 001/KEPK.EC/I/2022.

## Results

Based on Table 1, the results show that out of 5576 deliveries at Tugurejo Hospital Semarang in 2016-2020, 4988 normal deliveries (89.5) were obtained and 588 severe preeclampsia (10.5). From these results, the ratio between normal delivery and the incidence of severe preeclampsia is 8:1. Based on Table 2, the results showed that of the 588 cases of severe preeclampsia, the ideal age of the mother was 429 cases (73%) and the age of the mother at risk was 159 cases (27%). Based on Table 3, the results showed that of the 429 cases of severe preeclampsia with the ideal age, there were 219 cases of vaginal delivery (51.0%) and 210 cases of vaginal delivery (49.0%).

Based on Table 4, the results show that of the 429 cases of severe preeclampsia with the ideal age, there were 154 cases (35.9%) of primigravidas and 275 cases of multigravidas (64.1%). Based on Table 5, the results showed that out of 429 cases of severe preeclampsia with an ideal age, there were 161 cases (37.5%) of preterm birth and 268 cases of term delivery (62.5%). Based on Table 6, the results showed that out of 429 cases of severe preeclampsia with an ideal age, 37 cases (37.5%) had a history of hypertension, 20 cases (4.7%) had a history of preeclampsia in a previous pregnancy, and 372 cases (86, 7%) had no history of hypertension or preeclampsia in a previous pregnancy.

Based on Table 7, 10 cases (2.3%) of cases of severe preeclampsia with ideal age had pulmonary edema, 8 cases of eclampsia (1.9%), 5 cases of postpartum hemorrhage (1.2%), 5 cases of placental abruption 6 cases (1.4%), HELLP syndrome 5 cases (1.2%), heart failure 1 case (0.2%), thrombocytopenia 1 case (0.2%), acute kidney failure 1 case (0.2%), hepatic rupture in 1 case (0.2%), and no complications in 391 cases (91.9%). From these data, there were no complications in the form of maternal death. Based on Table 8, the results showed that out of 159 cases of severe preeclampsia at a risky age, there were 75 cases of vaginal delivery (47.2%) and 84 cases of vaginal delivery (52.8%).

Based on Table 9, the results showed that out of 159 cases of severe preeclampsia with an age at risk, there were 21 cases (13.2%) of primigravidas and 138 cases of multigravidas (86.8%). Based on Table 10, the results show that out of 159 cases of severe preeclampsia with an age at risk, there were 58 cases of preterm delivery (36.5%) and 101 cases of term delivery (63.5%).

Based on Table 11, the results showed that out of 159 cases of severe preeclampsia with an ideal age, 30 cases (18.9%) had a history of hypertension, 27 cases (17%) had a history of preeclampsia in a previous pregnancy, and 102 cases (64.2%) ) had no history of hypertension or preeclampsia in previous pregnancies. Based on Table 12, 9 cases (5.7%) of cases of severe preeclampsia with at-risk ages experienced pulmonary edema, 4 cases of eclampsia (2.5%), 3 cases of postpartum hemorrhage (1.9%), 3 cases of placental abruption 2 cases (1.3%), HELLP syndrome 3 cases (1.9%), heart failure 4 cases (2.5%), thrombocytopenia 2 cases (1.3%), and maternal death 1 case (0.6%), and did not experience complications in 131 cases (82.4%). From these data, no complications were found in the form of acute renal failure and hepatic rupture.

**Table 1.** Comparison of Normal Delivery with Cases of Severe Preeclampsia

| Mother's Age | Frequency | Percentage |
|---|---|---|
| Normal | 4988 | 89,5% |
| PEB | 588 | 10,5% |
| Total | 5576 | 100% |

**Table 1.** Age Group of Patients with Severe Preeclampsia

| Mother's Age | Frequency | Percentage |
|---|---|---|
| Ideal (20-35 years) | 429 | 73% |
| At risk (<20 years or >35 years) | 159 | 27% |
| Total | 588 | 100% |

**Table 2**. Types of Childbirth at the Ideal Age

| Type of Childbirth | Frequency | Percentage |
|---|---|---|
| vaginal | 210 | 49.0% |
| Abdominal | 219 | 51.0% |
| Total | 429 | 100% |

**Table 4.** Number of Pregnancies at the Ideal Age

| Gravidarum | Frequency | Percentage |
|---|---|---|
| Primigravida | 154 | 35.9% |
| Multigravida | 275 | 64.1% |
| Total | 429 | 100% |

**Table 3.** Age of Childbirth at the Ideal Age

| Childbirth Age | Frequency | Percentage |
|---|---|---|
| Preterm | 161 | 62.5% |
| term | 268 | 37.5% |
| Total | 429 | 100% |

**Table 4.** Mother's History at the Ideal Age

| History | Frequency | Percentage |
|---|---|---|
| Hypertension | 37 | 8.6% |
| Preeclampsia | 20 | 4.7% |
| No | 372 | 86.7% |
| Total | 429 | 100% |

**Table 5.** Complications of Severe Preeclampsia at the Ideal Age

| Complications | Frequency | Percentage |
|---|---|---|
| Eclampsia | 8 | 1.9% |
| Pulmonary oedema | 10 | 2.3% |
| Acute kidney failure | 1 | 0.2% |
| Heart failure | 1 | 0.2% |
| Post partum bleeding | 5 | 1.2% |
| Hepatic rupture | 1 | 0.2% |
| HELLP syndrome | 5 | 1.2% |
| Placental abruption | 6 | 1.4% |
| Thrombocytopenia | 1 | 0.2% |
| Mother's death | 0 | 0% |
| Not experiencing | 391 | 91.9% |
| Total | 429 | 100% |

**Table 6.** Types of Childbirth at Risk Ages

| Type of Childbirth | Frequency | Percentage |
|---|---|---|
| vaginal | 75 | 47.2% |
| Abdominal | 84 | 52.8% |
| Total | 159 | 100% |

**Table 7.** Number of Pregnancies at At-Risk Age

| Childbirth Age | Frequency | Percentage |
|---|---|---|
| Preterm | 58 | 36.5% |
| term | 101 | 63.5% |
| Total | 159 | 100% |

**Table 8.**Age of Childbirth at Age at Risk

| Childbirth Age | Frequency | Percentage |
|---|---|---|
| Preterm | 58 | 36.5% |
| term | 101 | 63.5% |
| Total | 159 | 100% |

**Table 9.**History of Mothers at At-Risk Ages

| History | Frequency | Percentage |
|---|---|---|
| Hypertension | 30 | 18.9% |
| Preeclampsia | 27 | 17% |
| No | 102 | 64.2% |
| Total | 159 | 100% |

**Table 10.**Complications of Severe Preeclampsia at Age at Risk

| Complications | Frequency | Percentage |
|---|---|---|
| eclampsia | 4 | 2.5% |
| Pulmonary oedema | 9 | 5.7% |
| Acute kidney failure | 0 | 0.0% |
| Heart failure | 4 | 2.5% |
| Post partum bleeding | 3 | 1.9% |
| *hepatic rupture* | 0 | 0.0% |
| HELLP syndrome | 3 | 1.9% |
| Placental abruption | 2 | 1.3% |
| thrombocytopenia | 2 | 1.3% |
| Mother's death | 1 | 0.6% |
| Not experiencing | 131 | 82.4% |
| Total | 159 | 100% |

## Discussion

This study aims to describe the characteristicsrespondentand describe the complications of severe preeclampsia at Tugurejo Hospital, Semarang in 2016-2020. Data were obtained from reading medical records that met the inclusion and exclusion criteria.

Cases of severe preeclampsia in Tugurejo Hospital in-2016 a number of 172 cases, year-2017 number of 180 cases, year-2018 a total of 128 cases, year-2019 a total of 64 cases, and year-2020 a total of 44 cases. There were 37 cases of severe preeclampsia treated without delivery at Tugurejo Hospital in 2016, 30 cases in 2017, 24 cases in 2018, 9 cases in 2019, and 7 cases in 2020. The decline in cases in 2019-2020 was due to the COVID-19 pandemic. RSUD Tugurejo is a referral hospital for COVID-19 patients so that many patients choose or referred to other health facilities.

Maternal age affects pregnancy and childbirth, women <20 years and > 35 years are not recommended for pregnancy or childbirth.[6] (FG Cunningham, 2014). Maternal age that is too old has a high risk of disease and maternal age that is too young is related to the imbalance between the nutritional needs of the mother and the fetus, especially for mothers who are gynecologically unprepared and are growing and developing.[7] (Agung et al., 2019). The results of this study

showed that out of 588 cases of severe preeclampsia, the ideal age of the mother was 429 cases (73%) and the age of the mother at risk was 159 cases (27%). This is in line with research conducted by Imung, 2018 with the results that the most age group experiencing severe preeclampsia is the age group 20-35 years, research conducted by Siqbal et al., 2020 gave similar results to the group-The most age group with severe preeclampsia is the age group of 20-35 years. The results of this study are different from research conducted by Evi, 2017 with the results that the most age group experiencing preeclampsia is the age group of respondents with preeclampsia, most of whom are at risk. Age is one of the risk factors for severe preeclampsia, but it is not a major.[6]

Childbirth is divided into 2 types, vaginal and perabdominal. In severe preeclampsia, vaginal delivery can be done by paying attention to the condition of the mother and baby. The results of this study showed that of the 429 cases of severe preeclampsia with the ideal age, there were 219 cases of vaginal delivery (51.0%) and 210 cases of vaginal delivery (49.0%). While the 159 cases of severe preeclampsia with an age at risk, there were 75 cases (47.2%) vaginal delivery and 84 cases (52.8%) vaginal delivery. It can be concluded that the most types of birth at the ideal or risky age are abdominal. The results of this study are in line with research conducted by Nisi, 2016 with the result that the most types of delivery in patients with severe preeclampsia are abdominal. The results of this study are different from the results of research conducted by Riris, 2012 with the result that the most types of delivery are vaginal. In preeclamptic patients, labor induction is performed first. Abdominal delivery is carried out if labor induction fails, there are complications that occur, and it is not possible for the condition of the mother and fetus to be delivered vaginally.[8]

The number of pregnancies is divided into primigravida and multigravida. Primigravida is the first pregnancy while multigravida is the second pregnancy and so on.[3] The results of this study showed that out of 429 cases of severe preeclampsia with ideal age, 154 cases were primigravida (35.9%) and multigravida were 275 cases (64.1%). Of the 159 cases at risky ages, there were 21 cases (13.2%) of primigravidas and 138 cases of multigravidas (86.8%). The results of this study are in line with research by Sri, 2008 with 61.2% results in multigravidas consisting of pregnancies with G2, G3, G4, G5, G6, G7 and 38.8% occurring in primigravidas but differs from several theories. and studies which state that severe preeclampsia occurs in primigravidas but are different from studies conducted by Triatmi.[5]

The age of delivery is divided into preterm, term, and postterm. Preterm is <37 weeks of labour, term is 37-42 weeks of labour, and postm is >42 weeks of labour.[3] The results of this study showed that out of 429 cases of severe preeclampsia with ideal age, 161 cases of preterm delivery (37.5%) and term of term delivery were 268 cases (62.5%) and of 159 cases of severe preeclampsia with age at risk, age of delivery 58 cases (36.5%) were preterm and 101 cases (63.5%) were at term. The results of this study are in line with research conducted by Widya, 2017 with the highest delivery outcomes in patients with severe preeclampsia being term deliveries and in accordance with the theory which states that preeclampsia often occurs at 37 weeks of gestation. 2 The results of this study are different from studies conducted by Nurhayati, 2018 with the results of preeclampsia leading to preterm birth, with a risk 3.85 times greater than those without preeclampsia.

The results of this study showed that out of 429 cases of severe preeclampsia with an ideal age, 37 cases (37.5%) had a history of hypertension, 20 cases (4.7%) had a history of preeclampsia in a previous pregnancy, and 372 cases (86.7%) had no history of hypertension or preeclampsia in previous pregnancies and of 159 cases of severe preeclampsia at risky age, 30 cases (18.9%) had a history of hypertension, 27 cases (17%) had a history of preeclampsia in a previous pregnancy, and 102 cases (64 .2%) had no history of hypertension or preeclampsia in

previous pregnancies. The results of this study are in line with research conducted by Kartasurya, 2019 with the results of 40 preeclamptic pregnant women, 15 (37.5%) had a history of hypertension and 25 (62.5%) mothers had no history of hypertension. The results of this study differed from a study conducted by Rozikhan, 2007 with the results of cases with a history of hypertension and severe preeclampsia in previous pregnancies more than those without a history and had a greater risk of experiencing severe preeclampsia. A history of hypertension and a history of preeclampsia in a previous pregnancy are not the only risk factors for severe preeclampsia.

Severe preeclampsia can cause complications for both mother and fetus. The results of this study show10 cases (2.3%) of severe preeclampsia with ideal age, 10 cases (2.3%) of pulmonary edema, 8 cases of eclampsia (1.9%), 5 cases of postpartum hemorrhage (1.2%), 6 cases of placental abruption (1 .4%), HELLP syndrome 5 cases (1.2%), heart failure 1 case (0.2%), thrombocytopenia 1 case (0.2%), acute kidney failure 1 case (0.2%) %), hepatic rupture in 1 case (0.2%), 391 cases (91.9%) did not experience complications, and there were no maternal deaths. There were 9 cases (5.7%) of cases of severe preeclampsia with at-risk ages who experienced pulmonary edema, 4 cases of eclampsia (2.5%), 3 cases of postpartum hemorrhage (1.9%), 2 cases of placental abruption ( 1.3%), HELLP syndrome in 3 cases (1.9%), heart failure in 4 cases (2.5%), thrombocytopenia in 2 cases (1.3%),The results of this study are in accordance with the theory of (Sarwono, 2016) which states that complications from severe preeclampsia in the mother can be eclampsia, acute renal failure, HELLP syndrome, pulmonary edema, heart failure, hepatic rupture, postpartum hemorrhage, thrombocytopenia, and maternal death. The results of this study are also similar to a study conducted by Nankali, 2012 with the results showing severe preeclampsia can cause eclampsia, complications in the liver, kidney damage, HELLP syndrome, and respiratory problems. From the data of this study, those at risk of developing complications are higher than the ideal age.

## Conclusions

The main conclusion of the study may be presented in a short Conclusions section, which may stand-alone. It should not repeat the Results, instead provide significant findings and contribution of the study. Then conclusions are presented in narrative style, without number or bullets points.

The second paragraf provides some recocmendation for the future research related to this research.

Based on the results of the research that has been done, several things can be concluded, including the ratio of normal births to severe preeclampsia is 8: 1, severe preeclampsia occurs mostly in women aged 20-35 years, the type of delivery that is mostly done at the ideal age and is at risk is abdominal , the large number of pregnancies found at the ideal age and at risk are multigravidas, the age of delivery is at the ideal age and most are at risk at term, most of the patients with severe preeclampsia at the ideal age and at risk have no history of hypertension and a history of severe preeclampsia in previous pregnancies, Complications of severe preeclampsia at the ideal age include pulmonary edema, eclampsia, postpartum hemorrhage, placental abruption, HELLP syndrome, heart failure, thrombocytopenia, acute kidney failure,and hepatic rupture, and complications of severe preeclampsia at at-risk ages in the form of pulmonary edema, eclampsia, postpartum hemorrhage, placental abruption, HELLP syndrome, heart failure, thrombocytopenia, and maternal death.

Researchers' suggestions for the community and health workers, among othersprovide education for prospective mothers to pay attention to the condition of their pregnancy by carrying out routine checks and ANC 4 times through several media such as posters, brochures, and social media, the

next researcher is expected to be able to use the results of this study as the best possible basis for research, and the hospital should do visits to the assisted health centers to review the completeness and feasibility of examination tools and the competence of health workers regarding severe preeclampsia.

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