# Body Mass Index (BMI) and Special History on the Event of Gestasional Preeclampsia Study in Jombang District Health Center

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# Body Mass Index (BMI) and Special History on the Event of Gestasional Preeclampsia Study in Jombang District Health Center

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## Abstract

**Background:** The most common cause of maternal death in Indonesia is direct obstetric causes, namely 28% bleeding, 24% preeclampsia-eclampsia, 11% infection, while indirect causes are obstetric trauma 5% and others 11%. Preeclampsia is hypertension that arises after 20 weeks of pregnancy accompanied by proteinuria. Preeclampsia ranks second cause of maternal death after bleeding.

**Purpose:** The study aims to analyze body mass index (BMI) and spesific history of the preeclampsia gestasional events.

**Method:** The research was conducted with Cross Sectional research type. The study was conducted in the working area of Jombang Regency in February dd July 2019. The population in this study were all pregnant women with preeclampsia who conducted examinations in independent practice midwives in February, March 2019 totaling 168 pregnant women. Total sampling technique. The research instrument used a questionnaire with the value of Cronbach's Alpha 0.862.

**Results:** The results of the analysis showed that the independent variables associated with the incidence of preeclampsia were Body Mass Index with p-value 0.003; Exp (B); 11,234, variable history of hypertension in pregnancy with p-value 0,000; Exp (B); 11,387, and diabetes variable with p-value 0,003; Exp (B); 11,334. Body mass index in the obesity category, history of hypertension and diabetes are the biggest contributing factors to the incidence of preeclampsia in pregnancy.

**Conclusion:** The study concluded that history of hypertension and diabetes are the biggest contributing factors to the incidence of preeclampsia in pregnancy.

**Keywords:** Body Mass Index, Special History, Pregnant Women, Preeclampsia.

## Introduction

The most common causes of maternal death in Indonesia are direct obstetric causes, 28% bleeding, 24% preeclampsia-eclampsia, 11% infection, while indirect causes are obstetric trauma 5% and others 11% (10). Preeclampsia is hypertension arising after 20 weeks of pregnancy accompanied by proteinuria (2).

Preeclampsia ranks second to the cause of maternal death after bleeding.

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Preeclampsia is a condition where blood pressure and protein in urine rise after 20 weeks of pregnancy. One indicator to assess the level of health services in a country, especially for pregnant, childbirth and postpartum mothers, is based on maternal mortality. Based on the Overview of Maternal Health in ASEAN Countries in 2011 by WHO, it was reported that Indonesia was ranked as the third highest in the ASEAN region, for the number of maternal deaths after the country of Laos and Cambodja (2).

Today's theory is widely suggested as the cause of preeclampsia is ischemia. However, with this theory all the things related to the disease cannot be explained. Apparently not only one factor, but many factors that cause preeclampsia and eclampsia. Among the factors found are often times difficult to say which causes and which are the results (6).

Approximately 85% of preeclampsia occurs in the first pregnancy. Parity 2-3 is the safest parity in terms of the incidence of preeclampsia and the risk of increasing grandemultravidas. (Bobak, 2005). Besides that old primi, the length of marriage> 4 years can also be at high risk of developing preeclampsia (1).

Maternal mortality in pregnant and pregnant women under the age of 20 years and after the age of 35 years increases, because women who have less than 20 years of age and over 35 years are considered more vulnerable to the occurrence of preeclampsia (2).

In addition, pregnant women aged> 35 years have had a change in the tissues of uterine devices and the birth canal is no longer flexible so that it is at risk for preeclampsia (7).

Mothers with body mass index in the obesity category have a progressive risk of preeclampsia, experiencing an increase of 43%. Obese pregnant women can be at risk of developing hypertension which results in placental hypoxia which occurs due to reduced blood flow in the spiral arteries. This occurs because of the failure of tropoblast cell invasion of the spiral artery wall in early pregnancy and the beginning of the second trimester of pregnancy so that the spiral arteries cannot widen perfectly with the result of decreased blood flow in the intervillus diplasenta room so that placental hypoxia occurs (12).

Profile of the Jombang District Health Office reports that the number of maternal deaths up to December 2018 has 28 deaths / KH. This has increased from 2017 where the number of deaths was 17 deaths / KH. 28 deaths that occurred in 2018 consisted of 5 cases due to Preeclampsia, 4 cases of HPP (Haemorrhagie Post-Partum), 3 cases of eclampsia, 2 cases of amniotic embolism, 1 case of APB (Ante Partum Blooding) and 13 cases of death due to other causes such as history of accompanying diseases. There are still many cases of maternal deaths due to Pre-eclampsia / eclampsia in Jombang Regency, there should be a real effort in the prenatal care system in conducting early detection and effective intervention in cases of pre-eclampsia / eclampsia.

Based on research conducted by Puspitasari (2015) in the General Hospital of Kariadi Semarang, it was mentioned that factors related to the incidence of preeclampsia were mothers with family history of hypertension, history of hypertension in previous pregnancies, obesity, and age at pregnancy. Judging from the description above, it can be understood that excessive weight gain or obesity in pregnant women can trigger hypertension, and hypertension can cause damage to the kidneys so that proteinuria can occur. The purpose of this study was to determine specific history factors and body mass index that influence the incidence of preeclampsia.

## Material and Method

This type of research is Cross Sectional research, where researchers study the dynamics of the correlation between risk factors and effects by approaching,

observing and collecting data at one time. The study was conducted in the Jombang Agency work area in February, July 2019. The population in this study were all pregnant women with preeclampsia who came to do an examination in an independent midwife practice area in Jombang Regency in February, March 2019 with 168 pregnant women. The sampling technique in this study was total sampling. The research instrument used a questionnaire with the value of Cronbach's Alpha 0.862. For data collection, the questionnaire form is ready. After determining the appropriate patient exclusion criteria, and who agrees to participate study and sign an informed agreement form, information collected and filled in the form. That data entered in a specific database, using SPSS 16 statistical program. Data analysis is conducted by regression analysis at the 5% significance level. The research population is pregnant women with preeclampsia.

## Result

**Table 1. Characteristics of respondents**

| **Age** | **n** | **Total** |
|---|---|---|
| 18 - 35 years old | 112 (67%) | 112 |
| > 35 years old | 56 (33%) | 56 |
| **Total** | **168 (100%)** | **168** |
| **Work** | **n** | **Total** |
| housewife | 54(32%) | 54 |
| Factory workers | 53(31%) | 53 |
| Teacher | 61(36%) | 61 |
| **Total** | **168(100%)** | **168** |
| **Education** | **n** | **Total** |
| High school | 138 (82%) | 138 |
| PT | 30 (17%) | 30 |
| **Total** | **168(100%)** | **168** |
| **Preeclampsia** | **n** | **Total** |
| Yes | 19 (11%) | 138 |
| No | 149 (89%) | 30 |
| **Total** | **168(100%)** | **168** |
| **Pregnancy** | **n** | **Total** |
| Primigravida | 98 (58%) | 98 |
| Multigravida | 70 (42%) | 70 |
| **Total** | **168 (100%)** | **168** |
| **History of the disease** | **n** | **Total** |
| Yes | 99 (58%) | 99 |
| No | 69 (42%) | 69 |
| **Total** | **168(100%)** | **168** |
| **IMT** | **n** | **Total** |
| 18.4 down | 48 | 28% |
| 18,5 - 24,9 | 25 | 14% |
| 25 – 29,9 | 19 | 11% |
| 30 – 39,9 | 20 | 11% |
| 40 Upwards | 56 | 33% |
| **Total** | **168** | **100%** |

Primary data source 2019

Based on the table above it can be seen that most of the respondents were aged 18-35 years (67%), most respondents work as teachers (36%), most of the respondents had high school education (82%), in the family did not have a history of preeclampsia (89%), majority of respondents with Primigravida pregnancy (58%), respondents with a history of hypertension in pregnancy (58%), most respondents with chronic hypertension

(88%), most of the respondents were IMT 40 and above (33%).

**Table 2. Results of logistic regression analysis**

| Variable | B | S.E. | Sig. | Exp (B) | 95% CI |
|---|---|---|---|---|---|
| Body mass index | 2,897 | 0,432 | 0,003 | 11,234 | 2,899< OR < 43,587 |
| History of Hypertension in Pregnancy | 1,143 | 0,458 | 0,000 | 11,387 | 1,897< OR < 23,426 |
| Diabetes | 1,267 | 0,423 | 0.003 | 11,334 | 1,897< OR < 23,426 |

Table 2. shows that the independent variables associated with the incidence of preeclampsia are the Body Mass Index with p-value 0.003; Exp (B); 11,234, variable history of hypertension in pregnancy with p-value 0,000; Exp (B); 11,387, and diabetes variables with p-value 0,003; Exp (B); 11,334

## Discussion

**Age:**Characteristics of respondents based on age indicate that the majority of respondents aged 18-35. Age is one of the factors that determine the health status of pregnant women. However, in the case of preeclampsia, maternal age is not one of the risk factors for the emergence of preeclampsia, but there are other factors such as the environment, history of disease, parity, metabolic disorders, psychological and socio-economic conditions. The number of occurrences of preeclampsia at a healthy age is due to the process of pregnancy and childbirth most occurring at the age of 18-35 years. According to the Indonesian Ministry of Health (2013), the age of high-risk pregnant women is the age of the mother who is too young (<20 years) and the age of the mother who is too old (> 35 years). **Work:** Characteristics of respondents based on work indicate that most pregnant women work as teachers or teaching staff. States that the risk factors for preeclampsia are nullipara, environment, socio-economic conditions, seasonal influences, obesity, gemelli pregnancy, maternal age, metabolic disorders and a family history of preeclampsia or a history of previous preeclampsia. In socio-economic factors, one of the supporting factors is work, where most respondents work as teachers or teaching staff. Job as a teacher is an activity that uses physical activity and the ability to think well in every activity in providing information to its students, does not require the possibility of sometimes working under pressure to be able to complete their tasks and responsibilities. Conditions that are sometimes under pressure are the factors that cause psychological disorders that have an impact on maternal pregnancy. Padila (2014), mentions mothers with higher education and those who work in the formal sector have better access to information about health, are more active in determining attitudes and are more independent in taking care actions.

**Education:** The characteristics of respondents based on the education of most of the respondents were high school education. The level of one's education influences how a person makes decisions about the health problems they experience. The lower the mother's education, the less the mother's desire to use health services. Padila (2014) states that mothers with higher education and those who work in the formal sector have better access to information about health, are more active in determining attitudes and are more independent in taking care actions.

**Family history with preeclampsia:** The results showed that most of the respondents in the family had no history of preeclampsia (89%) and as much as (11%) mothers had families with a history of preeclampsia. History Family preeclampsia is a disease associated with high blood pressure with proteinuria during

the past pregnancy in the family, significant in the mother or sister (Wheeler, 2003). Hereditary factors have a very significant relationship with the occurrence of severe preeclampsia and have a risk of 7.11 times for severe preeclampsia to occur in those who have offspring compared to those who do not have offspring. Pregnant women who experience preeclampsia have a tendency to be inherited. This factor is proven by some researchers that severe preeclampsia is a disease that tends to occur in one offspring (daughter or sister), preeclampsia is a hereditary disease, this disease is more commonly found in girls of preeclamptic mothers, or has a history of preeclampsia / eclampicia in the family (Tabersr B, 1994).From the results of the study showed that respondents with a history of preeclampsia in the family were more likely to experience preeclampsia in pregnancy, according to the theory which states that the history of preeclampsia in the family affects the occurrence of preeclampsia. The theory also states that preeclampsia in pregnancy is declining.

**Pregnancy:** The results showed that the majority of respondents with Primigravida pregnancy (58%). Factors affecting preeclampsia include a higher frequency of primigravida compared with multigravida, especially young primigravidas. Repeated labor will have many risks for pregnancy, it has been proven that the second and third deliveries are the safest delivery. In The New England Journal of Medicine it was noted that in the first pregnancy the risk of preeclampsia was 3.9%, the second pregnancy was 1.7%, and the third pregnancy was 1.8%. (Rozhikan, 2007). Women who are first pregnant while under the age of 20 are called young pimigravida. The best age for a pregnant woman between the ages of 20 and 35 years. While women who are first pregnant at the age above 35 years are called old primigravidas. Young primigravidas are included in high-risk pregnancies (KRT) where the soul and health of the mother and / or baby can be threatened. The risk of maternal death in young primigravidas is rarely found in older primigravidas. Because the young primigravidas are considered to be of good strength. Whereas in older primigravidas the risk of pregnancy increases for the mother who can be affected by pre-eclampsia-eclampsia.

**History of Hypertension in Pregnancy:** The results showed that the majority of respondents with a history of hypertension in pregnancy (58%). One of the predisposing factors for preeclampsia or eclampsia is a history of chronic hypertension, or previous hypertensive vascular disease, or essential hypertension. Most pregnancies with essential hypertension last normally until enough months. In about one third of women with high blood pressure after 30 weeks of pregnancy without other symptoms. Approximately 20% show a more striking increase and can be accompanied by one symptom of preeclampsia or more, such as edema, proteinuria, headache, epigastric pain, vomiting, visual impairment (Supperimposed to preeclampsia), and even eclampsia and cerebral hemorrhage. (Prawirohardjo, 2017). The results showed that respondents with a history of hypertension tended to have preeclampsia in pregnancy, according to the statement that mothers with chronic hypertension would have an increased incidence of preeclampsia by 20%.

**Chronic hypertension:** The results showed that the majority of respondents with chronic hypertension (88%). Pregnant women with chronic hypertension are 70% at risk of developing preeclampsia in their current or future pregnancies. Hypertension in pregnancy is of course triggered by other factors that influence it. Pregnant women with a history of hypertension are more often included in the category of mild preeclampsia, if only hypertension is suffered, but can also experience severe pre-eclampsia if it exceeds the pre-eclampsia requirements. One of the

predisposing factors for preeclampsia or eclampsia is a history of chronic hypertension, or previous hypertensive vascular disease, or essential hypertension. Most pregnancies with essential hypertension last normally until enough months. In about one third of women with high blood pressure after 30 weeks of pregnancy without other symptoms. Approximately 20% show a more striking increase and can be accompanied by one symptom of preeclampsia or more, such as edema, proteinuria, headache, epigastric pain, vomiting, visual impairment (Supperimposed to preeclampsia), and even eclampsia and cerebral hemorrhage.

**Diabetes:** The results showed that most respondents did not have diabetes (86%). The theory states that a history of pre-pregnancy maternal illness that includes kidney, asthma, heart disease, tuberculosis is one of the predisposing factors for pre-eclampsia or eclampsia, so in the study there were 20.4% of pregnancies with preeclampsia that had a history of disease. Someone with pre-pregnancy disease such as diabetes is nearly 4 times more at risk for preeclampsia, chronic hypertension also increases the risk of pre-eclampsia, kidney disease increases the risk of pre-eclampsia by 5 times, and in women with phospholipid antibody syndrome increases the risk of preeclampsia 9 times.

**Body Mass Index:** Characteristics of respondents based on the Body Mass Index of the majority of respondents BMI 40 and above (33%), in terms of BMI 40 and above is a condition of obesity. Obesity also affects the cases of preeclampsia in pregnant women, women with a body mass index greater than 30 in early pregnancy tend to suffer from preeclampsia. Estimates of the increased risk of preeclampsia before pregnancy according to Robson are 2.5-fold, whereas at the time of antenatal examination it increases 1.5-fold. In the opinion of researchers, the incidence of maternal births with preeclampsia with obesity is low. Data analysis showed that half the increased risk of developing preeclampsia was associated with a peak inflammatory response associated with high BMI and an increase in blood lipid levels associated with obesity. The condition of preeclampsia occurs because of reduced blood flow to the organs of the mother and fetus. Losing weight before pregnancy can reduce the risk of preeclampsia, but women do not have to lose weight during pregnancy.

**Analysis Result:** The results of the regression analysis showed that the independent variables associated with the incidence of preeclampsia were the Body Mass Index with p-value 0.003; Exp (B); 11,234, variable history of hypertension in pregnancy with p-value 0,000; Exp (B); 11,387, and diabetes variables with p-value 0,003; Exp (B); 11,334. The results of the analysis can be concluded that from the overall independent variables that are thought to be related to the incidence of preeclampsia are the Body Mass Index with p-value 0.003; Exp (B); 11,234, variable history of hypertension in pregnancy with p-value 0,000; Exp (B); 11,387, and diabetes variables with p-value 0,003; Exp (B); 11,334. One of the predisposing factors for preeclampsia or eclampsia is a history of chronic hypertension, a history of illness before pregnancy. Most pregnancies with hypertension history and previous history of hypertension in about one third of women with high blood pressure after pregnancy> 20 weeks without other symptoms. Approximately 20% show a more striking increase and can be accompanied by one symptom of preeclampsia or more, such as edema, proteinuria, headache, epigastric pain, vomiting, visual impairment (Supperimposed to preeclampsia), and even eclampsia and cerebral hemorrhage.

## Conclusions

Based on the results of the study showed that the factors associated with the

incidence of preeclampsia were body mass index, history of hypertension in pregnancy and diabetes. The results of the analysis show that the independent variables associated with the incidence of preeclampsia are the Body Mass Index with p-value 0.003; Exp (B); 11,234, variable history of hypertension in pregnancy with p-value 0,000; Exp (B); 11,387, and diabetes variables with p-value 0,003; Exp (B); 11,334.

**Ethical Clearance:** The original protocol for this study proposal has received approval from the STIKes Insan Cendekia Medika Jombang Ethics Committee with ethical number 097/KEPK/ICME/VI/2019

**Source of Funding:** This study is self-funded research project.

**Conflict of Interest:** None

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