# Medical History of Pregnant Women with Preeclampsia 

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#### Abstract

Background: The four most significant causes of maternal death in Indonesia are bleeding $30.3 \%$, hypertension in pregnancy (HDK) $27.1 \%$, infection $7.3 \%$, and indirect conditions such as cancer, kidney, heart, or other diseases suffered by the mother $35.3 \%$. Medical history is one of the risk factors for early screening of pregnancy to prevent eclampsia. Aim: This study aims to determine the relationship between medical history and the incidence of preeclampsia. Method: This research is a quantitative study applying a descriptive correlation method with a retrospective casecontrol approach. The sampling technique in the case group eventually used the total sample technique of 77 preeclamptic pregnant women. Meanwhile, in the control group, the sampling technique was a systematically random sampling of 77 pregnant women who did not experience preeclampsia. Result: The chi-square statistical test results resulted in a p-value $0.009<0.05$, which means that there is a significant relationship between medical history and the occurrence of preeclampsia


Keyword: Medical History, Pregnant, Preeclampsia

## INTRODUCTION

The maternal mortality rate is an essential issue to concern in global development. Maternal mortality rates are included in the third target to reduce achieving Sustainable Development Goals (SDGs). The SDGs target requires the national health system to reduce maternal mortality rates to below 70 per 100,000 maternal births by 2023. It is noteworthy that the four most significant causes of maternal death in Indonesia are respectively bleeding $30.3 \%$, hypertension in pregnancy (HDK) 27.1\%, infection $7.3 \%$, and indirect conditions such as cancer, kidney, heart, or other diseases suffered by the mother by $353 \%$ [1]. The maternal mortality cases in the Special Region of Yogyakarta in 2014 amounted to 40 cases, which decreased in 2015 to 29 cases [2]. Cases of maternal mortality in Sleman were second compared to regencies/cities in DIY with 12 cases. The most common cause of maternal mortality is bleeding, and the second cause is eclampsia. Other causes that also contribute to causes of maternal mortality are infection, heart disease, and shock [3]. Preeclampsia is a specific pregnancy condition characterized by placental dysfunction and maternal response to systemic inflammation with endothelial activation and coagulation. Preeclampsia diagnosis is based on specific hypertension caused by pregnancy accompanied by other organ system disorders at over 20 weeks of gestation [4].

The Indonesian Obstetrics and Gynecology Association classifies risks to assess at the first antenatal visit into 2 , namely high risk: the history of preeclampsia, multiple pregnancies, chronic hypertension, type 1 or 2 diabetes mellitus, kidney disease, autoimmune disease; and moderate risks including nullipara, obesity (body mass index> $30 \mathrm{~kg} / \mathrm{m} 2$ ), history of preeclampsia in the mother or sister, age $\geq 35$ years, remarkable patient history (pregnancy interval> 10 years). Complications that can occur in severe preeclampsia and eclampsia are Placental abruption, Hipofibrinogenemia, Hemilisi, Brain hemorrhage, Pulmonary edema, Liver necrosis, HELLP syndrome, Kidney abnormalities, Fetal complications, Prematurity,
dysmaturity, and intra fetal uterine death [5]. Medical history is one of the risk factors for early screening of pregnancy to prevent eclampsia. Chappell et al. studied 861 women with chronic hypertension and revealed the incidence of superimposed preeclampsia by $22 \%$ ( $n=180$ ), and almost half were early-onset ( $<34$ weeks) preeclampsia with worse maternal and perinatal output. The possibility of preeclampsia also increases nearly 4 -fold if pregnant women have diabetes since before pregnancy. Based on the preliminary study on December 7, 2017, at PKU Muhammadiyah Gamping Hospital, according to the mothers' medical records, it is unveiled that of 1184 pregnant women, 77 (6.5\%) suffered from preeclampsia cases. This study aims to determine the relationship between medical history and the incidence of preeclampsia.

## METHOD

This research is a quantitative study applying a descriptive correlation method with a retrospective case-control approach. This study population was 1184 pregnant women who had either preeclampsia or not and had pregnancy examinations at PKU Muhammadiyah Gamping Hospital in 2017. The sampling technique in the case group eventually used the total sample technique of 77 preeclamptic pregnant women. Meanwhile, in the control group, the sampling technique was a systematic random sampling of 77 pregnant women who did not experience preeclampsia. Data were derived from the patient's medical records, which were processed by computer. They were analyzed using univariate and bivariate analysis with ChiSquare analysis.

## RESULTS AND DISCUSSION

Table 1. describes that the majority of respondents aged between 20-35 years (not at risk) amounted to 79 respondents (51.3\%), with 23 respondents (14.9\%) in the case group and 56 respondents (36.4\%) in the control group. Pregnant women between ages <20 and> 35 years are considered at risk of developing preeclampsia. This is
because, at the age of <20 years, the development of reproductive organs and physiological functions is not optimal. The emotional and psychological achievements are not mature enough and will eventually affect the fetus they contain. This will increase pregnancy disorders such as preeclampsia or eclampsia due to more significant endothelial cells [6]. At the age of> 35 years, there will be a degenerative process that increases chronic hypertension due to increasing age. Women with chronic hypertension will have a greater risk of developing preeclampsia [7]. The majority of respondents totaling 129 people were educated with high education (SMA / PT) (83.8\%), with 62 respondents ( $40.3 \%$ ) in the case group and 67 respondents ( $43.5 \%$ ) in the control group. The education level of pregnant women, childbirth, and postpartum will influence the reception of information about preeclampsia prevention. It will be limited and have the effect of causing preeclampsia [8]. Mothers with low education had 3,548 more than preeclampsia [9]. Most respondents, 79 people ( $51.3 \%$ ), are employed, with 46 respondents (29.9\%) in the case group and 33 respondents (21.4\%) in the control group. The parity of most respondents is in Multipara (2-3 times), amounting to 87 respondents (56.5\%) with 33 respondents ( $21.4 \%$ ) in the case group and 54 respondents (35.1\%) in the control group. The work level affects a person's stress level, affecting blood pressure, especially in patients who have experienced hypertension. Work affects a person's physical activity. The effects of stress will stimulate the kidneys or adrenals to release adrenal hormones. The adrenaline hormone will work and accelerate heart rate faster, impacting increasing blood pressure [10]. Characteristics of respondents were presented in table 1.

Table 1. Frequency Distribution of Respondents' Characteristics

| Respondents' Characteristics | Cases |  | Control |  |  | Total |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | F |  | \% | F | \% | F | \% |
| $\begin{aligned} & \text { Age Risky } \\ & <20 \mathrm{Th} \&>35 \mathrm{Th} \\ & \hline \end{aligned}$ | 54 | 35,1 | 21 |  | 13,6 | 75 | 48,7 |
| Not Risky (20-35Th) | 23 | 14,9 | 56 |  | 36,4 | 79 | 51,3 |
| Education <br> Low <br> (Unschooled, <br> Elementary, Junior High) | 15 | 9,7 | 10 |  | 6,5 | 25 | 16,2 |
| High (High School, Higher Education) | 62 | 40,3 | 67 |  | 43,5 | 129 | 83,8 |
| Occupation |  |  |  |  |  |  |  |
| Working | 46 | 29,9 | 33 |  | 21,4 | 79 | 51,3 |
| Not Working | 31 | 20,1 | 44 |  | 28,6 | 75 | 48,7 |
| Total 77 50 77 <br>  50 154 100 | 77 | 50 | 77 |  | 50 | 154 | 100 |

Table 2. Frequency Distribution of Medical History in case groups and control groups

| Medical <br> History | Case |  | Control |  |  | Total |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
|  | F | $\%$ | F | $\%$ | F | $\%$ |
| There is | 39 | 25,3 | 23 | 14,9 | 62 | 40,3 |
| None | 38 | 24,7 | 54 | 35,1 | 92 | 59,7 |

Based on Table 2. medical history (hypertension and diabetes mellitus), most of the respondents without a medical history (hypertension and diabetes mellitus) amounted to 92
respondents (59.7\%) with 38 respondents (24.7\%) in the case group and 54 respondents (35,1\%) in the control group. The following are data on types of diseases in the case and control groups.

The chi-square statistical test results resulted in a $p$ value $0.009<0.05$, which means a significant relationship between medical history and preeclampsia occurrence. From the OR value, it can be concluded that pregnant women with one / more history of the disease (hypertension, diabetes mellitus) have a risk of preeclampsia 2.410 times greater than those who do not have one / more history of the disease (hypertension, diabetes mellitus). The following table 3 shows a description of the frequency of disease types in the case and control groups.

Table 3. Relationship between Medical History Factors and Preeclampsia

| Medical <br> History <br> (MH) | Case of Preeclampsia |  |  |  | p-value <br> $e$ | OR |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Case |  | control |  |  |  |  |
| Having | 39 | 25,3 | 23 | 14,9 | 62 | 0,009 | 2,410 |
| MH |  |  |  |  |  |  |  |
| Not |  |  |  |  |  |  |  |
| having | 38 | 24,7 | 54 | 35,1 | 92 |  |  |
| MH |  |  |  |  |  |  |  |
| Total | 77 | 50 | 77 | 50 | 154 |  |  |

A total of 34 respondents (44.1\%) in the control case had a history of hypertension before pregnancy, and five respondents (6.5\%) had a history of diabetes mellitus (Table 4). A history of existing hypertension before pregnancy is closely related to the incidence of preeclampsia. A woman who has a history of severe illness will be more harmful to her condition while pregnant. Therefore, pregnant women who have a history of illness during pregnancy have a greater risk of developing preeclampsia than pregnant women who do not have a history of the disease [11]. According to Dempsey (2005), preeclampsia occurrence occurred in $9.9 \%$ of pregnant women with diabetes mellitus, while $4 \%$ of preeclampsia incidence occurred in pregnant women who did not have diabetes mellitus [12]. The incidence increased to $30 \%$ if diabetes had complications with hypertension. Type 1 and type 2 diabetes mellitus are risk factors for gestational hypertension and preeclampsia with a $p$-value of 0.01 [13]. During pregnancy, the placenta plays a role in meeting all fetal needs. Hormones from the placenta support fetal growth, but these hormones also prevent insulin in the body of pregnant women, known as insulin resistance. Insulin resistance makes it a pregnant woman's body challenging to regulate blood sugar levels so that glucose cannot be converted into energy and accumulate in the blood. This situation causes high blood sugar levels [14]. In line with Sibai's research, mothers with diabetes mellitus had a 14.37 times chance of experiencing preeclampsia than those who did not have diabetes mellitus [15]. Pregnant women with chronic hypertension risk developing preeclampsia at about $10 \%-25 \%$, and the number increase to $31 \%$ in women with severe hypertension at least four years or more [16]. This is based on the results of the ChiSquare analysis, which resulted in $p$-value $=0,000$. One factor for superimposed preeclampsia is when the mothers have a history of diastolic blood pressure> 80 mmHg and systolic> 130 mmHg [17].

Table 4. Frequency Distribution of Disease Types in case groups and control groups

| Medical <br> History | Case |  | Control |  | Total |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | F | $\%$ | F | $\%$ | F | $\%$ |
| Hypertension | 34 | 44,1 | 21 | 27,3 | 61 | 39,6 |
| DM | 5 | 6,5 | 2 | 2,6 | 7 | 4,5 |

Pregnant women with a history of hypertension were 6.7 times more likely to have severe preeclampsia [18]. One predisposing factor for severe preeclampsia is hypertension, previous vascular hypertensive disease, or essential hypertension [19]. Hypertension is already suffered before essential organs of the body. The pregnancy itself makes rising in the bodyweight to lead to more severe damage, which is shown by proteinuria and odem [20]. Preeclampsia/eclampsia incidence will increase in chronic hypertension because the placental vein has been disturbed. One of the predisposing factors for preeclampsia is chronic hypertension. If the mother had previously suffered from hypertension, this condition would aggravate the mother's condition [21]. Preeclampsia disease initially comes with no symptoms and signs, but at one time, it can deteriorate quickly. Primary prevention is the best option, but it can only be done if the cause is known to avoid or control these causes. However, until now, the exact cause of preeclampsia is still unknown.

## CONCLUSION

Medical history (hypertension and diabetes mellitus) is associated with the incidence of preeclampsia. The Result suggests that screening for the risk of preeclampsia is highly required for every pregnant woman since the beginning of her pregnancy.

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