

**ORIGINAL ARTICLE:****Length of marriage to pregnancy and the risk of preeclampsia****Khusnul Putri Maharani<sup>1</sup>, Atika<sup>2</sup>, Ernawati<sup>3\*</sup>**<sup>1</sup>Midwifery Study Program, Faculty of Medicine, Universitas Airlangga, Surabaya, <sup>2</sup>Department of Public Health and Preventive Medicine, Faculty of Medicine Universitas Airlangga, Surabaya, Indonesia, <sup>3</sup>Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia**ABSTRACT**

**Objective:** to analyze the relationship between the length of marriage to pregnancy with the incidence of preeclampsia.

**Materials and Methods:** This study was an observational analytic study with case control approach. Samples were 33 respondents with preeclampsia and 66 respondents with normal pregnancy, all were primigravida with age of 20-35 years old in Dr. M. Soewandhie Hospital, Surabaya, Indonesia, in January-June 2017. Data were taken from medical record.

**Results:** This study found that the length of marriage until pregnancy was 0-4 months with percentage of 39.4% and 77.3% for case and control group respectively. Chi-square test resulted in  $p = 0.00$  and contingency coefficient = 0.366, which meant there was relationship between the length of marriage to pregnancy and the incidence of preeclampsia in primigravida in Dr. M. Soewandhie Hospital Surabaya from January to June 2017 despite being in low level. The value of odd ratio (OR) was 0.191 (95% CI 0.077-0.473), which means there was a risk of protection for the length of marriage to pregnancy  $\leq 4$  months against the incidence of preeclampsia.

**Conclusion:** The shorter the length from early marriage to pregnancy in primigravida, the lower the risk for developing preeclampsia.

**Keywords:** length of marriage; preeclampsia; primigravida.

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**ABSTRAK**

**Tujuan:** menganalisis hubungan lama pernikahan sampai hamil pada preeklampsia.

**Bahan dan Metode:** Penelitian ini merupakan penelitian analitik observasional menggunakan pendekatan case control. Jumlah sampel 33 responden preeklampsia dan 66 responden hamil normal, primigravida dengan usia 20-35 tahun yang bersalin di RSUD Dr. M. Soewandhie Surabaya Januari-Juni 2017. Data diambil dari rekam medik.

**Hasil:** Lama pernikahan sampai hamil terbanyak adalah 0-4 bulan, baik pada kelompok kasus (39,4%) dan kontrol (77,3%). Uji statistik menggunakan chi-square diperoleh nilai  $p=0,001$  dan koefisien kontingensi 0,366 yang berarti ada hubungan antara lama pernikahan sampai hamil dengan kejadian preeklampsia pada primigravida dengan tingkat hubungan rendah. Besar nilai Odd Rasio (OR) 0,191 (CI 95% 0,077 - 0,473) yang artinya terdapat risiko proteksi pada responden yang lama menikah sampai hamilnya  $\leq 4$  bulan terhadap kejadian preeklampsia.

**Simpulan:** Semakin pendek rentang waktu dari awal pernikahan sampai hamil pada primigravida mengurangi risiko preeklampsia.

**Kata Kunci:** Lama menikah, preeklampsia, primigravida

## INTRODUCTION

In the world half a million women die each year from pregnancy and 99% of deaths occur in developing countries. In Indonesia the maternal mortality rate (MMR) in 2015 was 305 per 100,000 live births. The most common cause of maternal death in East Java is preeclampsia by 31% or 162 people, replacing bleeding by 25%.<sup>1</sup> In Surabaya, the incidence of preeclampsia reached 1,145 cases per 43,505 live births.<sup>2</sup>

One cause of death of pregnant women in developing countries is preeclampsia and eclampsia.<sup>3</sup> The cause of preeclampsia is not known with certainty. Many theories put forward the cause of preeclampsia. One theory states the cause of preeclampsia is the immunologic intolerance between mother and fetus.<sup>4</sup> In the first pregnancy there is a body's adaptive response that is different from that of the second pregnancy. Immunological theory states that the cause of preeclampsia in first pregnancy occurs because there is blocking antibodies to placental antigens.<sup>5</sup>

The maternal immune response on the part of the father causes abnormal placentation that is genetically determined against fetal antigens and expressed in normal placental tissue. The supporting immune response theory is the high incidence of hypertension in primigravida and a decrease in prevalence after long-term exposure to paternal sperm.<sup>6</sup> The longer the period of sex until pregnancy, the smaller the risk of hypertension in pregnancy.<sup>4</sup> Preeclampsia appears after 20 weeks of pregnancy marked by blood pressure of  $\geq 140/90$  mmHg and accompanied by one or more organ damage.<sup>7</sup> If not detected and treated properly, the long-term effects of preeclampsia can occur in babies born to mothers who have preeclampsia.<sup>6</sup> In the end, this research was expected to be able to identify relationship between the length of marriage to pregnancy with the incidence of preeclampsia in primigravida at Dr. M. Soewandhie Hospital, Surabaya, Indonesia.

## MATERIALS AND METHODS

This study was an observational analytic study with case control design. The population in this study was primigravida mothers who gave birth at Dr. M. Soewandhie Hospital, Surabaya, Indonesia, from January to June 2017. The sample in this study was divided into two, the case group of mothers who experienced preeclampsia and the control group of mothers who did not experience preeclampsia.

Sampling technique used was total sampling for the case group and systematic random sampling for the control group in a ratio of 1: 2. Samples who met the inclusion and exclusion criteria were 33 respondents in case group and 66 respondents in control group. Inclusion criteria in the sampling of this study were single pregnant women, maternal age 20-35 years old and had a complete medical record. Respondents who had extramarital pregnancy, using contraception, and had a history of chronic hypertension, chronic kidney disease, prenatal diabetes mellitus, gestational diabetes, obesity, and SLE, as seen from the maternal medical record, were exclusion criteria for the study sample. Data collection was carried out for 3 weeks from 27 February to 17 March 2018. Data in this study used secondary data from maternity register and medical records, then recorded in data collection sheets. Analysis of the data in this study used chi-square test ( $X^2$ ) with a significance level of  $p = 0.05$  to determine the relationship between the length of marriage to pregnancy with the incidence of preeclampsia in primigravidas, and contingency coefficient (C) to identify the strength of relationship with SPSS 22 software. The risk of preeclampsia was measured using OR.

## RESULTS AND DISCUSSION

Table 1 shows that age, ethnicity, education, site of ANC, mode of delivery, and gestational age between preeclamptic and non-preeclamptic mothers have similar distribution rates. Table 2 shows the value of  $p = 0.001$  ( $p < 0.05$ ) which indicates relationship between the length of marriage to pregnancy and the incidence of preeclampsia in primigravida. The strength of the relationship was calculated using contingency coefficient, with the result (C) = 0.366 which means that the relationship between the length of marriage to pregnancy and the incidence of preeclampsia in primigravida is low. The risk of the length of marriage to pregnancy and the incidence of preeclampsia was calculated using OR by grouping the length of marriage to pregnancy into 2 groups.

Table 3 shows an OR of 0.191 (95% CI 0.077-0.473) or OR  $< 1$ , meaning that there is a protective risk in respondents with length of marriage to pregnancy  $\leq 4$  months. Respondents with a length of marriage to pregnancy of  $> 4$  months had a risk of preeclampsia 5,236 times greater than those with a length of marriage to pregnancy  $\leq 4$  months.

Table 1. Characteristics of respondents

Characteristics	Preeclampsia	No Preeclampsia
Age (20-35 years)		
Mean $\pm$ SD	26 $\pm$ 4.252	25 $\pm$ 3.347
Median (min-max)	25 (20-35)	24 (20-34)
Ethnicity (n(%))		
Javanese	22 (66.7)	50 (75.8)
Madurese	8 (24.2)	12 (18.2)
Others	3 (9.1)	4 (6.1)
Education (n(%))		
Primary	13 (39.4)	24 (36.3)
Secondary	17 (51.5)	32 (48.5)
High	3 (9.1)	10 (15.2)
Site of ANC (n(%))		
Soewandhie	12 (36.4)	22 (33.3)
Other	21 (63.6)	44 (66.7)
Mode of delivery (n(%))		
Pervaginam	21 (63.6)	53 (80.3)
Caesarean Section	12 (36.4)	13 (19.7)
Age of Pregnancy (n(%))		
Preterm	1 (3)	5 (7.6)
Aterm	32 (97)	61 (92.4)

Table 2. Relationship between marriage to pregnancy and the incidence of preeclampsia

Marriage to pregnancy	Preeclampsia		No Preeclampsia		Total		Nilai <i>p</i>	<i>C</i>
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)		
0-4 months	13 (39.4)	51 (77.3)	64 (64.6)				0.001	0.366
5-8 months	10 (30.3)	5 (7.6)	15 (15.2)					
9-12 months	1 (3)	2 (3)	3 (3)					
>12 months	9 (27.3)	8 (12.1)	17 (17.2)					
Total	33 (100)	66 (100)	99 (100)					

Table 3. Relationship between length of marriage to pregnancy with the incidence of preeclampsia in primigravida at Dr. M. Soewandhie Hospital for the period of January - June 2017

Marriage to pregnancy	Preeclampsia		No Preeclampsia		Total		Nilai <i>p</i>	OR
	n	%	n	%	n	%		
$\leq$ 4 months	13	39.4	51	77.3	64	64.6	<0.0001	0.191
>4 months	20	60.6	15	22.7	35	35.4		
Total	33	100	66	100	99	100		

Data on the length of marriage to pregnancy in this study were seen from the date of marriage reduced by the first day of Last Menstrual Period (LMP). The population of the case group sample was around 127 respondents, but only 33 respondents met the inclusion and exclusion criteria. Respondents who belonged to the exclusion criteria were 30-40% due to obesity.

A study by Einarsson, Sangi-Haghpeyker and Gardner (2003) reported that women exposed to sperm <4 months and using barrier methods had a greater risk of developing preeclampsia. The barrier methods in the study of Einarsson et al. were condom, diaphragm and interrupted intercourse. These methods prevent women

from being exposed to sperm in any intercourse, thereby causing them to be exposed to a few sperm and increasing the risk of preeclampsia.<sup>9</sup> Decreased preeclampsia occurs when there is increased exposure to semen through the vagina. Nulliparous women are also advised to reduce the use of barrier contraception and increase vaginal coitus before conception or pregnancy to reduce the risk of preeclampsia.<sup>10</sup>

Women who are exposed to sperm <6 months are more at risk of developing preeclampsia. This was found by using a mixture of parity due to lack of sample and 20-40% of samples had experienced abortion and some had fertility problems.<sup>11</sup> A study conducted in Padang to

observe individual risk factors in preeclampsia shows that nullipara with an short interval between marriage and pregnancy had a 33.6 times greater risk of developing preeclampsia than multipara.<sup>12</sup>

In theory, preeclamptic immune response often occurs in the first conception.<sup>13</sup> In normal pregnant women, the immune response does not reject the existence of foreign "conception results". This is due to the presence of human leukocyte antigen G (HLA-G) protein which plays an important role in modulating the immune response so that the mother does not reject the results of conception (placenta).<sup>4</sup> In the pathophysiology of preeclampsia maladaptation of immunity occurs early in pregnancy.

According to the authors, the study conducted at Dr. M. Soewandhie Hospital, Surabaya, in January - July 2017 only observed the length of marriage to pregnancy, not the duration of first sexual intercourse until pregnancy or first sperm exposure. This has caused differences in the results of this study from other ones. In this study direct interviews with the patients were not carried out so that the time of the first intercourse or frequency of intercourse before and during pregnancy could not be observed, so that it could become a bias in this study. Respondents in this study were all primigravida mothers who did not use contraception. The types of preeclampsia of early onset or late onset were also not examined. Preeclampsia that occurs during early onset may be due to immunological and placental factors.

Judging from the gestational age of the respondents, who were mostly at term, the likelihood of preeclampsia in Dr. M. Soewandhie Hospital Surabaya was late onset. The main factor of late onset itself is probably due to infection or inflammation, so that immunological factors are not dominant. In Indonesia itself, the infection factor is very high, while infection was not observed in this study, so it might also have been a confounding factor. Other typical factors that caused the incidence of preeclampsia in Dr. M. Soewandhie Hospital were different from those as in the studies that had been done in other countries. There are cultural differences in culture, stress and race in the local society.

## CONCLUSION

The length of marriage until the onset of pregnancy is associated with the incidence of preeclampsia in primigravida. The shorter the length of the marriage until the onset of pregnancy, the lower the risk of developing preeclampsia.

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