

## Factors Related to The Incident of Preeclampsia in Pregnant Women in Banjar District

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### ABSTRACT

Preeclampsia is high blood pressure that often occurs at 20 weeks of gestation until the end of the first week after pregnancy, which is the second highest factor after bleeding which is the cause of maternal death. This study analyzes variables related to factors related to the incidence of preeclampsia in pregnant women in Banjar Regency, South Kalimantan Province. This study used a cross-sectional research design and used the Fisher exact test with a CI of 0.05 (95%). The sampling technique uses random sampling. The results obtained were that 12 pregnant women who experienced preeclampsia out of 50 respondents. In addition, the results of the study showed that there was no relationship between age (1,000), parity (0.490), and anxiety (1,000) on the incidence of preeclampsia in pregnant women in Banjar Regency. Many factors that may influence whether a pregnant woman will experience preeclampsia or not, this is why all the factors studied are not related to the incidence of preeclampsia.

**Keywords:** Preeclampsia, female, gestational age, parity, anxiety

### INTRODUCTION

Maternal Mortality Rate (MMR) is an important indicator in determining the level of public health. The Sustainable Development Goals (SDGs) target in Indonesia by 2030 is to reduce MMR to 70 per 100,000 live births.<sup>1</sup> Based on data from the South Kalimantan Provincial Health Service, the MMR for the last three years has experienced a significant increase every year. Preeclampsia is one of the causes of maternal death in South Kalimantan Province.<sup>2,3,4</sup> Preeclampsia is high blood pressure accompanied by proteinuria (protein in urine) or edema (fluid accumulation), which occurs at 20 weeks of pregnancy until the end of the first week after delivery.<sup>5</sup>

Factors in the reproductive status of pregnant women that have a risk of preeclampsia are age and parity. According to

Cunningham, women aged <20 years or >35 years are at risk of experiencing preeclampsia. At age < 20 the reproductive state is not ready to accept pregnancy. This will increase the occurrence of poisoning in the form of preeclampsia. Meanwhile, those aged > 35 years are more susceptible to various diseases in the form of hypertension and preeclampsia. Parity is a risk factor for preeclampsia. According to Wiknjasatro (2009), mothers with parity 1 and > 3 are at risk of experiencing preeclampsia. This is because the formation of blocking antibodies against antigens is incomplete.<sup>6</sup>

Anxiety is a risk factor for preeclampsia during pregnancy. Pregnant women with preeclampsia can experience increased anxiety due to the complications they experience. According to Anggraeni and Lubis (2022),

anxiety during pregnancy if not treated will have physical and psychological effects on both the mother and fetus.<sup>7,8,9</sup>

It is hoped that this research will provide a real picture of the condition of preeclampsia in pregnant women in South Kalimantan and how it relates to the age of the pregnant woman, parity, and the anxiety experienced.

## METHOD

This study used an observational method with a cross sectional approach with a comparative test using chi square / fishcer exact with a confidence level of 95% to determine the relationship between the variables age, parity and anxiety and the incidence of preeclampsia. The population in this study were all pregnant women who had entered the second trimester who had been domiciled for the last 1 year in Banjar Regency, South Kalimantan Province. The sampling technique used in this research is random sampling. There were 53 respondents as samples in this research. The determination of

the sample size is based on Frankel & Wallen's theory (1993) which makes a reference in determining the minimum sample size of 50 for correlation research.<sup>10</sup> The research instrument uses a questionnaire, In this study, the validity and reliability of the questionnaire was not tested, because the questionnaire used was a respondent characteristics questionnaire and a standard questionnaire related to anxiety and stress. This research has passed the ethics commission of the Faculty of Medicine, Lambung Mangkurat University with no 123/KEPK-FK ULM/EC/VI/2023 The limitation of this research is the control of confounding variables, the researcher did not collect data on other factors that were not included in the research, so this could be a suggestion for future researchers.

## RESULT AND DISCUSSION

### Respondent characteristics

Based on the research results, the following characteristics of respondents were obtained.

Table 1. Respondent characteristics

Respondent Characteristics	Frequency (n)	Percentage (%)
<b>Age</b>		
Ideal Age	44	83%
Age Not Ideal	9	17%
<b>Education</b>		
Elementary School/Equivalent	4	7,5%
Middle School/Equivalent	10	18,9%
High School/Equivalent	21	39,6%
College	18	34%
<b>Job</b>		
Work	10	18,9%
Don't's Work	43	81,1%
<b>Parity</b>		
Risky (1 or >3)	36	67,9%
No Risk (2 or 3)	17	32,1%
<b>Anxiety Level</b>		
Anxious	8	15,1%
Not Anxious	45	84,9%
<b>Stress Level</b>		
Not Stress	53	53%
<b>Preeclampsia</b>		
Preeclampsia	12	22,6%
Not Preeclampsia	41	77,4%

Based on table 1 above, it is known that the respondents who had the ideal age for pregnancy were 43 respondents (81.1%) while the respondents who had the ideal age for pregnancy were 10 respondents (18.9%). The ideal age for pregnancy or non-risky pregnancy is between 21-35 years, while the non-ideal age for pregnancy or risky pregnancy is <20 years and >35 years<sup>10</sup>. Apart from that, 4 respondents had primary school/equivalent education (7.5%), 10 respondents had SMP/SLTP equivalent (18.9%), 21 respondents had SMA/Senior high school (39.6%) and many as 18 respondents (34%) had college.

Table 1 above also shows that the majority of respondents do not work. This is indicated by the number of respondents who do not work as many as 43 respondents (81.1%) while there are 10 respondents who work (18.9%). Respondents who do not work are housewives. Apart from that, the highest number of parity respondents were at-risk parities (1 or >3 children) as indicated by the number of at-risk parities being 36 respondents (67.9%) and 17 respondents at risk parities (32.1%). Parity is the number of children a mother has from her first child to her last child. Parity includes primipara, namely mothers who have given birth for the first time, multipara, namely mothers who have given birth several times, and grandemultipara, namely mothers who have given birth more than 5 times.<sup>11</sup>

Table 1 also shows that 8 respondents experienced anxiety (15.1%), while 45 respondents did not experience anxiety (84.9%). Anxiety is a psychological element that describes the feelings, emotional states that a person has when facing reality or events in their life. The anxiety felt by pregnant women will have an impact on the fetus they are carrying<sup>12</sup>. Apart from that, all respondents did not experience stress (100%). All respondents did not experience stress (100%). Stress is the body's reaction or response to psychosocial stressors or mental pressure/life burdens<sup>13</sup>. Stress is a non-specific human response to every demand that exists within his and 41 respondents (77.4%) did not experience preeclampsia during their pregnancy and 12 respondents (22.6%) experienced preeclampsia during their pregnancy. Preeclampsia is an increase in blood pressure that only appears after the gestational age reaches 20 weeks accompanied by weight gain in the mother who gets tired quickly due to swollen body and if a laboratory examination is carried out protein is found in the mother's urine.<sup>14</sup>

#### Relationship between Maternal Age of First Pregnancy and Preeclampsia

Based on the Fisher Exact statistical test carried out, the research results obtained are shown in the following table.

**Table 2. The Relationship Between Age at First Pregnancy and Preeclampsia in Pregnant Women in Banjar Regency**

Preeclampsia	First Pregnancy Age				Total		p-value
	Ideal Age		Age is Not Ideal		n	%	
	N	%	N	%			
Yes	10	18.9	2	3.8	12	22.6	1.000
No	34	64.1	7	13.2	41	77.4	
Total	44	83	9	17	53	100	

Based on table 2 above, it is known that the ideal age of respondents who experienced preeclampsia was 10 respondents (22.7%), the ideal age of respondents who did not experience preeclampsia was 34 respondents (77.3%), the ideal age of respondents who did not experience preeclampsia was 34 respondents (77.3%). 2 respondents (22.2%) experienced preeclampsia and 7 respondents (77.8%) did not experience preeclampsia. This shows that the majority of respondents were of the ideal age who did not experience preeclampsia during their pregnancy. In the table above it is also known that the p-value of this variable is 1.000 ( $p > 0.05$ ), which means there is no relationship between the age of the

mother's first pregnancy and the incidence of preeclampsia.

Preeclampsia is an increase in blood pressure that only appears after the gestational age reaches 20 weeks accompanied by weight gain in the mother who gets tired quickly due to swelling of the body and if a laboratory examination is carried out protein is found in the mother's urine. Preeclampsia can have a wide impact on both the mother and the fetus. In pregnant women, if it is not treated immediately it can cause eclampsia/seizures, Hemolysis Syndrome, elevated liver enzymes, low platelet count, retinal detachment, kidney failure, pulmonary edema and many more which threaten the mother's life, while in the fetus

there can be stunted growth, prematurity and fetal distress. Preeclampsia is a multisystem disorder that commonly occurs in pregnant women.<sup>15</sup>

This disorder can trigger death, which appears after the 20th week of pregnancy as indicated by the presence of protein in the urine which was previously normal and also the presence of high blood pressure. Preeclampsia is not only a threat to the health of the mother and her fetus during labor and pregnancy, but also has long-term risks which can increase complications such as diabetes mellitus, stroke and preeclampsia which are considered to be one of the causes of fetal death and morbidity and contribute to a percentage of 15-20% of maternal deaths worldwide world. Meanwhile, the maternal mortality rate (MMR) is a parameter of a country's maternal health. The exact cause of preeclampsia is not yet known for certain, but one of the risk factors for preeclampsia is the mother's age during pregnancy.<sup>15</sup>

The ideal age for pregnancy is the mother's age at pregnancy which is not at risk, including ages 20-35 years. This age is considered safe for pregnancy and childbirth because at this age all reproductive organs and their functions in women are optimal and ready. Meanwhile, the non-ideal age for pregnancy is the mother's age at risk of pregnancy, including <20 years and >35 years. At <20 years of age, the reproductive organs are not ready to accept pregnancy, whereas at >35 years of age, changes occur in the tissues and uterine organs and there is a tendency for other diseases in the mother's body.<sup>14</sup>

The age range <20 years and >35 years is the risk age for pregnancy because the incidence of complications increases at that age. At <20 years of age, female reproductive organs are still immature and are still in the process of rapid development. At this age, the

uterus is still growing because it has not yet reached the normal size for pregnancy. In contrast to age >35, at that age the reproductive organs have entered a degenerative phase where this phase affects the peripheral blood vessels so that functional and structural changes occur which contribute to changes in blood pressure. Both of these things can make a woman more susceptible to preeclampsia.<sup>16</sup>

The research results showed that of the 53 respondents, 34 respondents were mothers at the ideal age for pregnancy and did not experience preeclampsia. Apart from that, the research results also showed that as many as 12 respondents experienced preeclampsia, including 10 respondents with ideal age (20-35 years) and 2 respondents with non-ideal age (<20 years and >35 years). Therefore, statistically it can be proven that there is no relationship between maternal age at the time of first pregnancy and the incidence of preeclampsia in Banjar Regency, South Kalimantan Province. The results of this research are in line with research conducted by Rista Silvana, Indri Rahmayanti, Kurniawan, Alifah Dimar Ramadhina in 2023 where there was a relationship between maternal gestational age and preeclampsia with a p-value = 0.001. In this study, there were 23 respondents who were not at risk (20-35 years) and 43 respondents who were at risk (<20 years and >35 years). These results prove that respondents who are at risk of pregnancy have a 4.5 times risk of suffering from preeclampsia compared to respondents who are not at risk of pregnancy.<sup>16</sup>

### The Relationship between Parity and Preeclampsia

Based on the Fisher Exact statistical test carried out, the following research results were obtained.

**Table 3. The Relationship Between Parity and Preeclampsia in Pregnant Women in Banjar Regency**

Preeclampsia	Parity				Total		p-value
	Risk		No Risk				
	N	%	N	%	n	%	
Yes	7	19.4	5	29.4	12	22.6	0.490
No	29	80.6	12	70.6	41	77.4	
Total	36	100	17	100	53	100	

Based on table 3 above, it is known that 7 respondents (19.4%) were mothers at risk parity and experienced preeclampsia, 29 respondents (80.6%) were mothers at risk parity and did not experience preeclampsia, 5 people respondents (29.4%) were mothers with

no risk parity and experienced preeclampsia and 12 respondents (70.6%) were mothers with no risk parity and did not experience preeclampsia. Table 6 also proves that there is no relationship between parity and the incidence of preeclampsia in pregnant women

in Banjar Regency as shown by p-value = 0.490 ( $p > 0.05$ ).

Parity is the safest number of deliveries in terms of maternal mortality. Parity 1 and parity  $>3$  have higher maternal mortality rates than parity 2 and parity 3. Preeclampsia often occurs in first pregnancies and women who have a hereditary history of preeclampsia. Mothers with parity  $>3$  will tend to experience complications in their pregnancies which ultimately affect the outcome of the birth. Preeclampsia can occur due to excessive stretching of the uterus causing excessive ischemia, resulting in failure of trophoblast cell invasion of the spiral artery walls which cannot dilate completely. Failure of this cell invasion can cause blood flow in the intervillous space of the placenta. This blood flow will cause oxidative stress where the balance of peroxides is disturbed and peroxidants are more dominant than oxidants. This of course stimulates damage to the blood vessel endothelium.<sup>14</sup>

Parity is a status which states that the number of births a woman has given birth to babies who are able to survive. Parity is achieved at 20 weeks of gestation or around 5 months of pregnancy with a fetus weighing 500 grams. In theory, there is a possibility that a woman who has given birth for the first time could experience a stress reaction resulting in an increase in the hormone cortisol, where the effect of this cortisol can result in an increase in blood pressure. Meanwhile, in women who have given birth several times, there may be a risk of developing an immune response, such as a decrease in HLA-G, which functions to modulate the mother so that she does not reject conception. In preeclampsia, there is a decrease in HLA-G, resulting in inhibition of trophoblast invasion into the mother's decidual tissue. Reduced HLA-G levels in the decidua of the placenta can cause a decrease in spiral artery dilatation, causing ischemic conditions and triggering oxidative stress which results in the release of endothelial-damaging radicals, nitric oxide, and dysfunction of prostaglandin production.<sup>17</sup>

In accordance with the theory that in the first pregnancy there is the formation of "Human Leucocyte Antigen Protein G (HLA)" which plays an important role in modulating the immune response, so that the mother rejects the product of conception (the placenta) or there is maternal intolerance towards the placenta resulting in preeclampsia. Parity 2 to 3 is the safest parity in terms of maternal mortality. The first parity is related to the mother's lack of experience and knowledge in

pregnancy care. Parity 2-3 is the safest parity. Parity one and high parity (more than three) are parities at risk for preeclampsia. Mothers with high parity (more than 4) have experienced a decline in the function of the reproductive system, besides that mothers are usually too busy taking care of the household so they often experience fatigue and pay less attention to fulfilling their nutrition.<sup>18</sup>

At first parity, mothers often experience stress when facing childbirth. Emotional stress that occurs in primigravidas causes an increase in the release of corticotrophic releasing hormone (CRH) by the hypothalamus, which then causes an increase in cortisol. The effect of cortisol is to prepare the body to respond to all stressors by increasing sympathetic responses, 4 including responses aimed at increasing cardiac output and maintaining blood pressure. In women with preeclampsia/eclampsia, there is no decrease in sensitivity to these vasoactive peptides, so that a large increase in blood volume directly increases cardiac output and blood pressure.<sup>18</sup>

Based on the research results, it is known that the majority of respondents were mothers with parity 1 or  $>3$  but did not experience preeclampsia (80.6%). The results of the study found that as many as 12 mothers (22.6%) experienced preeclampsia with 7 mothers (19.4%) being mothers at risk parity (1 or  $>3$ ) and 5 mothers (29.4%) being mothers with parity is not at risk (2 or 3). This can occur due to other factors that can influence the incidence of preeclampsia, such as a hereditary history of preeclampsia in mothers with at-risk parity (1 or  $>3$ ). The results of the study only know how the incidence of preeclampsia experienced by mothers and their current pregnancy is experienced.

These results are in line with research conducted by Vistra Veftisia and Yulia Nur Khayati in 2018 which stated that there was no relationship between parity and the incidence of preeclampsia in pregnant women in the Semarang Regency area with a p-value = 0.702. This is because the majority of primiparous mothers do not experience preeclampsia, 48 respondents (43.6%) and a small number of multiparous mothers experience preeclampsia, 11 respondents (10%).<sup>18</sup>

### **Relationship between Anxiety Level and Preeclampsia**

Based on the Fisher Exact statistical test carried out, the following research results were obtained.

**Table 4. The Relationship Between Anxiety and Preeclampsia in Pregnant Women in Banjar Regency**

Preeclampsia	Anxiety				Total		p-value
	Anxious		Not Anxious		N	%	
	N	%	N	%			
Yes	2	3.8	10	18.9	12	22.6	1.000
No	6	11.3	35	66.1	41	77.4	
Total	8	15	45	85%	53	100	

Based on table 4 above, it is known that 35 (66.1%) respondents were pregnant women who were not anxious and did not experience preeclampsia, 10 (18.9%) respondents were pregnant women who were not anxious and experienced preeclampsia, 6 (11.3%) respondents were pregnant women who were anxious and did not experience preeclampsia and 2 (3.8%) respondents were pregnant women who were anxious and experienced preeclampsia. In table 3 it is also known that the p-value = 1.000 ( $p > 0.05$ ) which means there is no relationship between the level of anxiety and the incidence of preeclampsia in pregnant women in Banjar Regency.

Anxiety is a sensation of constant fear but is only a feeling and is not real. Symptoms of anxiety are different for each person, but the symptoms most often felt when anxious are restlessness, dizziness, chest pounding and tremors or shaking. The anxiety that is felt when experiencing pressure or deep feelings can cause psychiatric problems and can increase over a long period of time. Based on these symptoms, of course pregnant women who experience anxiety will feel the same symptoms. Pregnant women who experience anxiety will cause the mother's heartbeat to race faster. A baby in the womb can feel and respond to what the mother is feeling so that if the mother's heartbeat races faster, the baby will also experience rapid movements in the womb.<sup>19</sup>

Pregnant women will feel higher anxiety, especially in the third trimester. This anxiety arises from feelings of courage to bear all burdens, fear, horror, love, hate, anxiety, a sense of calm, and joyful hope. Apart from that, the feelings that arise in the third trimester are real fears such as fear of the baby being born with defects, anxiety about childbirth, fear of death, birth trauma and feelings of guilt. Pregnant women's thoughts about the birth process and the condition of the baby they are carrying can also contribute to feelings of anxiety in the third trimester. The mother will be negatively affected by excessive anxiety, which can cause uterine contractions.<sup>20</sup>

In addition, pregnant women with high anxiety during pregnancy will increase the risk

of hypertension during pregnancy. The risk of hypertension can include stroke, seizures, and even death in the mother and fetus. In response to anxiety, certain neurons in the hypothalamus secrete a substance called corticotrophin releasing factor (CRF). CRF stimulates the pituitary to release adrenocorticotrophic hormone (ACTH), which is the body's main stress hormone. ACTH is then carried by the bloodstream to the adrenal glands. The adrenal glands will secrete epinephrine (adrenaline) and cortisol which will increase blood pressure.<sup>21</sup>

Based on the research results, it is known that the majority of respondents were pregnant women who were not anxious and did not experience preeclampsia 35 respondents (66.1%). However, there were 12 mothers with preeclampsia, including 2 preeclampsia mothers who experienced anxiety and 10 preeclampsia mothers who did not experience anxiety. This proves that preeclampsia does not only occur due to the mother's feelings of anxiety, but there are other factors that influence the incidence of preeclampsia in the mother, such as the mother's stress level. Anxiety is an emotion and experience that is subjective to each individual. Anxiety is a condition that makes a person uncomfortable and is divided into several levels. Anxiety is certainly related to feelings of uncertainty and a state of helplessness.

During pregnancy, there is an increase in the hormone progesterone which causes emotional disturbances and makes pregnant women feel tired quickly. The hormone adrenaline also increases, causing biochemical dysregulation in the body and causing physical tension in pregnant women such as being quick to anger, easily restless, unable to concentrate and ultimately experiencing anxiety.<sup>22</sup> There are also other factors that can increase the risk of preeclampsia, namely a history of hypertension and nutritional status. This is based on the results of a literature review research by Utami (2020). It was found that a history of hypertension suffered by a woman before pregnancy can induce pregnancy, causing preeclampsia and obese mothers are at high risk of experiencing preeclampsia.<sup>23</sup>

## CONCLUSION

The conclusion from the results of this study is that from a total of 53 respondents, 12 respondents experienced preeclampsia. The results of the study also stated that there was no relationship between maternal age at the time of first pregnancy and the incidence of preeclampsia ( $p=1.000$ ), there was no relationship between parity and the incidence of preeclampsia ( $p=0.490$ ) and there was no relationship between the level of anxiety and the incidence of preeclampsia ( $p= 1.000$ ). There are many factors that may influence whether a pregnant woman will experience preeclampsia or not, this is why all the factors studied are not related to the incidence of preeclampsia

## ACKNOWLEDGMENT

The researcher would like to thank the university of Gastric Mangkurat for assisting with funding requirements for the research process. The researcher would also like to thank the Banjar District Health Service for granting permission to be the target area for this research.

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