INTEGRATED NURSING JOURNAL
(Integrated Nursing Journal)
http://jkt.poltekkes-mataram.ac.id/index.php/home/index
p-ISSN: 2406-9698 (Print)
e-ISSN: 2685-0710 (Online)

RISK FACTORS AFFECTING THE INCIDENT OF PREECLAMSIA IN KLAMBU HEALTH CENTER, GROBOGAN DISTRICT

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ABSTRAK

Salah satu penyebab utama kematian ibu adalah preeklamsia yang merupakan komplikasi kehamilan akut dan dapat terjadi pada masa kehamilan, persalinan dan masa nifas meliputi hipertensi, edema dan proteinuria, gejala biasanya muncul setelah usia kehamilan 20 minggu atau lebih. Terdapat 19 kasus kunjungan ibu hamil TM III yang melakukan ANC di Puskesmas Klambu dengan preeklampsia, pada tahun 2021 terdapat 24 kasus dan pada tahun 2022 terdapat 38 kasus. Dari tahun ke tahun kunjungan ibu dengan preeklampsia mengalami peningkatan. Tujuan penelitian adalah untuk mengetahui faktor risiko yang mempengaruhi kejadian preeklampsia di Puskesmas Klambu Kabupaten Grobogan. Metode penelitian menggunakan desain case control, penelitian dilakukan pada bulan Oktober 2023 dengan populasi seluruh ibu hamil usia 35 minggu sampai 40 minggu dengan preeklampsia pada tahun 2022 sebanyak 38 orang. Sampel pada penelitian ini menggunakan perbandingan 1:1 sehingga jumlah sampel kasus sebanyak 38 dan jumlah sampel kontrol sebanyak 38, sehingga total terdapat 76 sampel. Analisis data menggunakan uji Odds Ratio. Hasil penelitian menunjukkan bahwa usia ibu sebagian besar tidak berisiko yaitu antara 20-35 tahun 75%, paritas ibu tidak berisiko atau multipara 64,5%, status gizi berdasarkan LILA tidak normal atau <23,5 cm dan >25 cm 72,4%, jarak kehamilan tidak berisiko atau >2 tahun 59,2%, tidak ada riwayat hipertensi 89,5, riwayat ANC sesuai standar 90,8% dan pendidikan ibu berisiko atau tamat SD/SMP 57,9%. Faktor risiko preeklampsia meliputi usia ibu (OR=1,528), status gizi (OR=1,487), riwayat hipertensi (OR=2,267) dan ANC (OR=1,373). Faktor protektif untuk preeklampsia termasuk paritas (OR=0.708), jarak kehamilan (OR=0.721) dan pendidikan ibu (OR=0.415). Paritas merupakan faktor protektif terhadap kejadian preeklampsia, ibu dengan paritas multipara akan terlindungi dari kejadian preeklampsia sebesar 0,708 kali dibandingkan dengan ibu dengan paritas primipara dan grandemultipara.

Kata Kunci: Faktor risiko, Kejadian preeklampsia

ABSTRACT

One of the main causes of maternal death is preeclampsia which is an acute pregnancy complication and can occur during pregnancy, childbirth and the postpartum period including hypertension, edema and proteinuria, symptoms usually appear after 20 weeks of gestation or more. There were 19 cases of visits by TM III pregnant mothers who had ANC at the Klambu Community Health Center with preeclampsia, in 2021 there were 24 cases and in 2022 there were 38 cases. From year to year visits by mothers with preeclampsia have increased. The aim of the research was to determine the risk factors that influence the incidence of preeclampsia at the Klambu Community Health Center, Grobogan Regency. The research method used a case control design, the research was conducted in October 2023 with a population of all pregnant women aged 35 weeks to 40 weeks with preeclampsia in 2022, there were 38 people. The samples in this research used a 1:1 ratio so that the number of case samples was 38 and the number of control samples was 38, so there were a total of 76 samples. Data analysis uses the Odds Ratio test. The research results show that the age of most mothers is not at risk, between 20-35 years 75%, the parity of mothers is not at risk or multipara 64.5%, the nutritional status based on LILA is not normal or <23.5cm and >25cm 72.4%, the pregnancy interval is not at risk or >2 years 59.2%, no history of hypertension 89.5, history of standardized ANC 90.8% and mother's education at risk or elementary/middle school graduate education 57.9%. Risk factors for preeclampsia include maternal age (OR=1.528), nutritional status (OR=1.487), history of hypertension (OR=2.267) and ANC (OR=1.373). Protective factors for preeclampsia include parity (OR=0.708), pregnancy spacing (OR=0.721) and maternal education (OR=0.415). Parity is a protective factor for preeclampsia, mothers

with multiparous parity will be protected from the incidence of preeclampsia by 0.708 times than mothers with primiparous and grandemultiparous parity.

Keywords:**Risk factors, Incidence of preeclampsia**

INTRODUCTION

Maternal Mortality Rate (MMR) is an indicator that reflects the risks faced by mothers during pregnancy and childbirth. The vulnerability of maternal and child health is still marked by high maternal and child mortality rates. The causes of maternal death are caused by two factors, namely direct causes (direct obstetric) and indirect causes (indirect obstetric), direct causes such as medical factors such as bleeding, preeclampsia/eclampsia, while indirect causes of death are not easy to ascertain (Mitayani, 2019).

One of the main causes of maternal death is preeclampsia which is an acute pregnancy complication and can occur during pregnancy, childbirth and the postpartum period. Preventing maternal deaths, especially during childbirth, has become a concern both globally and nationally. Preeclampsia is a collection of symptoms that occur during pregnancy, childbirth and the postpartum period, including hypertension, edema and proteinuria, but without any signs of vascular abnormalities, while symptoms usually appear after 20 weeks of gestation or more (Prawirohardjo, 2018). High MMR due to uncontrolled development of preeclampsia contributes to high mortality rates (Dewi, 2020).

One of the targets in the Sustainable Development Goals (SDGs) is to reduce MMR to 70 deaths per 100,000 live births by 2030(BPS, 2022). The prevalence of preeclampsia in developed countries is 1.3%-6%, while in developing countries it is 1.8%-18%. The incidence of preeclampsia in Indonesia alone is 128,273/year or around 5.3%(POGI, 2018). Based on WHO data in 2018, the incidence of preeclampsia worldwide is around 31.4%. In developed countries, preeclampsia is around 6.4%, while in Indonesia in 2020 the prevalence was 9.4%.

Central Java in 2021 will reach 199/100,000 live births. Grobogan Regency was ranked second with 84 cases, the cause of maternal death was Covid at 55.2%, preeclampsia at 16%, bleeding at 10%, infection at 1.7%, blood clotting disorders at 4.4%, metabolic disorders at 0.6% (Dinkes 2021). In 2022, there will be 23 maternal deaths in Grobogan Regency caused by bleeding, preeclampsia and infection.

The cause of preeclampsia is not known for certain. The cause of preeclampsia is placental ischemia, but this theory cannot explain everything about the disease. Risk factors for preeclampsia that are related to maternal factors are age, parity, nutritional status, pregnancy spacing, history of hypertension, history of ANC, and maternal education.(Manuaba, 2019).

The results of previous research stated that age is a risk factor for the incidence of preeclampsia with a p value = 0.000. The incidence of severe preeclampsia is most often experienced by pregnant women with a risk age of <20 years or >35 years, amounting to 67.3%. Apart from that, obesity is also a risk factor for 66.3%(Peratama, 2022). Other research also states that factors associated with preeclampsia are age, high risk of 68.75 experiencing preeclampsia, high risk parity 43.94% experiencing preeclampsia and obesity experiencing preeclampsia of 84.21% with a p value of 0.000(Mariati, 2022).

The results of a literature study show factors related to the occurrence of preeclampsia, namely the age of pregnant women at risk, nulliparity, primigravida, obesity, diabetes mellitus, chronic hypertension, history of kidney disease, history of preeclampsia, multiple pregnancies, family history of preeclampsia, distance between pregnancies, socioeconomic level. , and autoimmune diseases(Sudarman, 2021). The research results showed that 60% of mothers were at low risk (20-35 years), education level was 86.6% (high school/vocational school), occupation was 70% (housewife), ANC examination was 100%, gravida status was 73.3% (multigravida), twin pregnancy 0%, regular eating lifestyle 100%, fruit and vegetable consumption 50%, regular exercise in the third trimester (43.3%), history of hypertension 30%, obesity 10%(Ernawan, 2021).

One way to prevent the onset of preeclampsia is to reduce the risk factors for preeclampsia. Risk factors that influence the increase in the incidence of preeclampsia are age less than 20 years or age more than 35 years, the first parity has a higher risk of preeclampsia, poor nutritional status and obesity, pregnancy spacing of less than 2 years, a history of maternal hypertension, a history of ANC that is less than standard less than 6 times, namely TM 1 (2 times) TM II (1 time) TMIII (3 times) and low maternal education are risk factors for increasing the incidence of preeclampsia, this is the importance of antenatal counseling to reduce risk factors for preeclampsia(Manuaba, 2019).

Klambu Community Health Center is one of the community health centers in Grobogan Regency. In 2022, the Klambu Community Health Center had the highest number of deaths in Grobogan Regency, namely number one with 3 cases of maternal death, 2 of which were caused by eclampsia and 1 was caused by bleeding. There were 19 cases of visits by TM III pregnant mothers who had ANC at the Klambu Community Health Center with preeclampsia, in 2021 there were 24 cases and in 2022 there were 38 cases. From year to year visits by mothers with preeclampsia have increased. Based on this, researchers are interested in conducting research on "Risk factors that influence the incidence of preeclampsia at the Klambu Community Health Center, Grobogan Regency".

METHODS

This research uses quantitative research, analytical observational or analytical survey with a case control research approach. The independent variables in this study were age, parity, nutritional status, pregnancy spacing, history of hypertension, history of ANC, and maternal education. The dependent variable is the incidence of preeclampsia. The population in this study is all pregnant women aged 35 weeks to 40 weeks with preeclampsia in 2022 there are 38 people at the Klambu Community Health Center, Grobogan Regency. With a sampling technique using a total case sampling of 38 respondents and 38 controls with Odd Ratio analysis. In this study, the research instrument used a checklist containing: age, parity, nutritional status, pregnancy spacing, history of hypertension, ANC history, and maternal education as well as the incidence of preeclampsia.

RESULTS

1. Univariate Analysis

Table 1.1. Frequency Distribution and Percentage of Preeclampsia Incidents in Klambu Community Health Center, Grobogan Regency.

No	Variable	Category	Frequency	Percentage (%)
1	The incidence of preeclampsia	Case	38	50.0
		Control	38	50.0
		Amount	76	100

Based on table 4.1, it is known that in the case group there were 38 people (50%) and in the control group there were 38 people (50%)

Table 1.1. Frequency Distribution and Percentage of Variables Risk Factors that Influence the Incidence of Preeclampsia at the Klambu Community Health Center, Grobogan Regency.

No	Variable	Category	Frequency	Percentage (%)
1	Maternal age	Risky	19	25.0
		No risk	57	75.0
		Amount	76	100
2	Parity	Risky	27	35.5
		No risk	49	64.5
		Amount	76	100
3	Nutritional status (LILA)	Abnormal	55	72.4
		Normal	21	27.6
		Amount	76	100
4	Pregnancy spacing	Risky	31	40.8
		No risk	45	59.2
		Amount	76	100
5	History of hypertension	There's History	8	10.5
		No History	68	89.5
		Amount	76	100
6	ANC	Not standardized	7	9.2
		Standardized	69	90.8
		Amount	76	100
7	Mother's Education	Risky	44	57.9
		No risk	32	42.1
		Amount	76	100

The results of table 1.2 show that the age of most mothers is not at risk, between 20-35 years, 57 people (75%), the parity of most mothers is not at risk or multiparous, 49 people (64.5%), the nutritional status based on LILA is mostly abnormal. or < 23.5cm and > 25cm in the number of 55 people (72.4%), most of the pregnancy intervals were not at risk or > 2 years in the number of 45 people (59.2%), the majority had no history of hypertension in the number of 68 people (89 .5), ANC history was mostly standardized in the number of 69 people (90.8%) and the mother's education was mostly at risk or elementary/middle school graduate education in the number of 44 people (57.9%).

2. Bivariate Analysis

a. Age risk factors for the incidence of preeclampsia at the Klambu Community Health Center, Grobogan Regency

Table 2.1 Age risk factors for the incidence of preeclampsia at the Klambu Community Health Center, Grobogan Regency

Maternal age	The incidence of preeclampsia						OR
	Case		Control		Amount		
	f	%	f	%	f	%	
Risky	11	57.9	8	42.1	19	100	
No risk	27	47.4	30	52.6	57	100	1,528
Amount	38	50.0	38	50.0	76	100	

95% Confident Interval (CI): 0.535-4.360

The results of the table above show that the age with the incidence of preeclampsia at the Klambu Community Health Center, Grobogan Regency, obtained an OR value of 1.528 (OR>1), so the maternal age variable studied is a risk factor for preeclampsia. Mothers of at-risk age (<20 years and >35 years) are 1.528 times more likely to experience preeclampsia than mothers who are not at risk (20-35 years).

b. Parity Risk Factors with the Incident of Preeclampsia at the Klambu Community Health Center, Grobogan Regency

Table 2.2. Parity risk factors for the incidence of preeclampsia at the Klambu Community Health Center, Grobogan Regency

Parity	The incidence of preeclampsia						OR
	Case		Control		Amount		
	f	%	f	%	f	%	
Risky	12	44.4	15	55.6	27	100	
No risk	26	53.1	23	46.9	49	100	0.708
Amount	38	50.0	38	50.0	76	100	

95% Confident Interval (CI): 0.275-1.819

Based on the table above, it is known that parity with the incidence of preeclampsia at the Klambu Health Center, Grobogan Regency, obtained an OR value of 0.708 (OR<1), so the parity variable studied is a protective factor for preeclampsia. Mothers with multiparous parity will be protected from the incidence of preeclampsia by 0.708 times than mothers with primiparous and grandemultiparous parity.

c. Risk Factors for Nutritional Status and Preeclampsia at the Klambu Community Health Center, Grobogan Regency

Table 2.3 Risk Factors for Nutritional Status and Preeclampsia at the Klambu Community Health Center, Grobogan Regency

Nutritional status (LILA)	The incidence of preeclampsia						OR
	Case		Control		Amount		
	f	%	f	%	f	%	
Abnormal	29	52.7	26	47.3	55	100	
Normal	9	42.9	12	57.1	21	100	1,487
Amount	38	50.0	38	50.0	76	100	

95% Confident Interval (CI): 0.540-4.097

Based on table 2.3, it is known that the nutritional status with the incidence of preeclampsia at the Klambu Community Health Center, Grobogan Regency, obtained an OR value of 1.487 (OR>1), so the nutritional status variable studied is a risk factor for preeclampsia. Mothers with abnormal nutritional status (LILA) are at risk of developing preeclampsia 1.487 times that of mothers with normal nutritional status.

d. Risk Factors for Pregnancy Interval with Preeclampsia at Klambu Community Health Center, Grobogan Regency

Table 2.4 Risk factors between pregnancy and the incidence of preeclampsia at the Klambu Community Health Center, Grobogan Regency

Pregnancy spacing	The incidence of preeclampsia				Amount		OR
	Case		Control				
	f	%	f	%	f	%	
Risky	14	45.2	17	54.8	31	100	
No risk	24	53.3	21	46.7	45	100	0.721
Amount	38	50.0	38	50.0	76	100	

95% Confident Interval (CI): 0.288-1.805

The table shows that the distance between pregnancies and the incidence of preeclampsia at the Klambu Community Health Center, Grobogan Regency, obtained an OR value of 0.721 (OR<1), so the pregnancy distance variable studied is a protective factor that can reduce the occurrence of preeclampsia by 0.721 times compared to mothers with risky pregnancy distances.

e. Risk factors for history of hypertension and preeclampsia at Klambu Community Health Center, Grobogan Regency

Table 2.5 Risk Factors for History of Hypertension and Preeclampsia at Klambu Health Center, Grobogan Regency

History of hypertension	The incidence of preeclampsia				Amount		OR
	Case		Control				
	f	%	f	%	f	%	
There's a history	8	100.0	0	0.0	8	100	2,267
No history	30	44.1	38	55.9	68	100	
Amount	38	50.0	38	50.0	76	100	

95% Confident Interval (CI): 1.735-2.962

Based on table 2.5, it is known that a history of hypertension with the occurrence of preeclampsia at the Klambu Community Health Center, Grobogan Regency, obtained an OR value of 2.267 (OR>1), so the variable history of hypertension studied is a risk factor for preeclampsia that is 2.267 times that of mothers with a history of hypertension.

f. ANC Risk Factors with Preeclampsia Incidents at Klambu Community Health Center, Grobogan Regency

Table 2.6 Risk Factors for ANC with the Incidence of Preeclampsia at the Klambu Community Health Center, Grobogan Regency

	The incidence of preeclampsia						
	Case		Control		Amount		OR
ANC	f	%	f	%	f	%	
Not standardized	4	57.1	3	42.9	7	100	1,373
Standardized	34	49.3	35	50.7	69	100	
Amount	38	50.0	38	50.0	76	100	

95% Confident Interval (CI): 0.286-6.595

The results of table 2.6 show that ANC with the incidence of preeclampsia at the Klambu Community Health Center, Grobogan Regency obtained an OR value of 1.373 (OR>1), so the ANC variable studied is a risk factor for preeclampsia that is 1.373 times that of mothers with non-standardized ANC.

g. Risk Factors for Maternal Education and Preeclampsia at the Klambu Community Health Center, Grobogan Regency

Table 2.7 Risk Factors for Maternal Education with the Incident of Preeclampsia at the Klambu Community Health Center, Grobogan Regency

	The incidence of preeclampsia						
Mother's	Case		Control		Amount		OR
Education	f	%	f	%	f	%	
Risky	18	40.9	26	59.1	44	100	0.415
No risk	20	62.5	12	37.5	32	100	
Amount	38	50.0	38	50.0	76	100	

95% Confident Interval (CI): 0.163-1.058

The results of the table above show that the mother's education with the incidence of preeclampsia at the Klambu Community Health Center, Grobogan Regency obtained an OR value of 0.415 (OR<1) so the maternal education variable studied was a protective factor for the occurrence of preeclampsia of 0.415 times that of mothers with at-risk maternal education (primary and junior high school). .

DISCUSSION

1. Age Risk Factors for Preeclampsia at the Klambu Community Health Center, Grobogan Regency

The maternal age variable studied is a risk factor for preeclampsia. Mothers of at-risk age (<20 years and >35 years) are 1.528 times more likely to experience preeclampsia than mothers who are not at risk (20-35 years). The largest proportion was mothers who were not at risk, namely 57 respondents, with 30 respondents (52.6%) without preeclampsia and 27 respondents (47.4%) with preeclampsia. Pregnant women aged <20 years old have immature ways of thinking, such as starting from planning or preparing for pregnancy and not knowing about standardized pregnancy checks. In theory, age is

the length of a person's life from birth until now. Age is the age calculated from the time of birth until the birthday, the older one is, the level of maturity and strength a person will be in thinking and working, in terms of trust, people who are more mature will be more trusted than people who are not yet mature enough. . This is as a result of experience and maturity of his soul. The more mature a person is, the more mature their way of thinking becomes(Manuaba, 2019).

Previous research stated that gestational ages <20 years and >35 years are more at risk of peelampsia, this is because at <20 years of age it is thought to be immunological in addition to endocrine and genetic, while preeclampsia at >35 years of age is thought to be due to hypertension which is aggravated by pregnancy.(Cuningham, 2016). Related research states that there is a relationship between maternal age and the incidence of preeclampsia in pregnant women (p=0.041)(Minarti, 2019). Pregnant women of at-risk age have a 1.596 times risk of experiencing preeclampsia(Umaroh, 2018).

At the age of 35 years and older, the aging process will occur, where basically the aging process occurs from birth to the time of death. The main manifestation of this process is a decrease in the functional ability of the body's organs and systems, including muscles, nerves, cardiovascular, endocrine and reproductive. However, in general, signs of aging begin to appear from the age of 35 years, there is a decrease in cardiac output caused by reduced myocardial contractions, whereas during pregnancy cardiac output increases by 40% to increase blood flow to organs such as the kidneys and uterus. An increase in cardiac output can increase peripheral resistance which results in increased heart pumping power resulting in contractions which cause high blood pressure(Cuningham, 2016).

2. Parity Risk Factors with the Incident of Preeclampsia at the Klambu Community Health Center, Grobogan Regency

The parity variable studied is a protective factor for preeclampsia. Mothers with multiparous parity will be protected from the incidence of preeclampsia by 0.708 times than mothers with primiparous and grandemultiparous parity. The largest proportion was mothers with no risk parity, namely 49 respondents with preeclampsia 26 respondents (53.1%) and without preeclampsia 23 respondents (46.9%).

The parities at risk are primiparous and grandemultiparous mothers. Primipara or low parity is a woman who has given birth to a child. Grandemultiparous or high parity is a pregnancy that is delivered at more than 5 times parity, high parity is vulnerable parity because high parity has many obstetric events which cause higher mortality rates. Parity is a woman who has given birth to a term baby or a woman who has given birth to a viable baby. Parity is the number of pregnancies that produce fetuses capable of living in the outside world(Manuaba, 2019).

Parity 2-3 is the safest parity in terms of the incidence of preeclampsia and the risk increases again in grandemultigravida.(Bobak, 2018). There is a relationship between parity and preeclampsia, apart

from that, older women with a marriage duration of ≥4 years can also be at high risk of developing preeclampsia.(Darmawati, 2018).

Respondent characteristics that are risk factors for preeclampsia are a history of hypertension, obesity and nullipara(Yuliani, 2018). Women who are pregnant for the first time are found to be 6-8 times more susceptible to suffering from preeclampsia/eclampsia(Bobak, 2018). The incidence of preeclampsia/eclampsia is more common in primiparas than multiparas and the frequency of preeclampsia/eclampsia increases in primiparas. Preeclampsia is sometimes also called a primigravida's disease because the frequency of primigravida is higher when compared to multigravida, especially in young primigravida. This occurs because in primigravida the formation of immune blocking is not as numerous and perfect as in multigravida, whereas in grandemulti para because the function of organ systems has decreased. In multigravida this disease can be found in the following conditions: renal vascular disease, multifetal, hydrocephalus, vascular disease renal disease(Wiknjosastro, 2018).

3. **Risk factors for nutritional status and the incidence of preeclampsia at the Klambu Community Health Center, Grobogan Regency**

   The nutritional status studied is a risk factor for preeclampsia. Mothers with abnormal nutritional status (LILA) are at risk of developing preeclampsia 1.487 times that of mothers with normal nutritional status. Abnormal nutritional status is characterized by LILA <23.5 cm and >25cm. The largest proportion was mothers with abnormal nutritional status, namely 55 respondents, with 29 respondents (52.7%) preeclampsia and 26 respondents without preeclampsia (47.3%).

   Nutritional status is an expression of a state of balance in the form of certain variables or the manifestation of nutrition in the form of certain variables. Insufficient nutrition will cause fetal growth to be disrupted either directly or by inadequate nutrition or indirectly due to impaired placental function. Thus, there will be competition between the mother, fetus and placenta to obtain nutrition and this will affect the growth of the placenta and fetus which will have an impact on the birth weight of the baby and the weight of the placenta.(Sulistyoningsih, 2018).

   Previous supporting research stated that the cause of preeclampsia could be caused by nutritional status. Based on nutritional status, the categories are normal LILA 23.5cm-25cm and abnormal categories of malnutrition LILA<23.5 cm and fat/obese LILA>25cm. Adequate nutritional intake for pregnant women will determine the health of the pregnant mother and the fetus she is carrying. If the mother experiences malnutrition during pregnancy it will cause problems, both for the mother and the fetus.(Sulistyoningsih, 2018). According to previous research, there is a significant relationship between Body Mass Index (BMI) and the incidence of preeclampsia in pregnant women(Aini, 2023).

4. **Risk Factors for Pregnancy Interval with Preeclampsia at Klambu Community Health Center, Grobogan Regency**

   The distance between pregnancies studied is a protective factor that can reduce the occurrence of preeclampsia by 0.721 times that of mothers with at-risk pregnancy intervals. The largest proportion was mothers with a non-risk pregnancy interval, namely 45 respondents with preeclampsia 24 respondents (53.3%) and without preeclampsia 21 respondents (46.7%).

   Pregnancy interval is the time from when the mother is pregnant until the next birth occurs. The highest proportion of deaths occurs in mothers with a priority of 1-3 children and if we look at the distance between pregnancies it turns out that a distance of <2 years shows the highest proportion of deaths, the distance between pregnancies is too close causing the mother to have a short time to recover the condition of her uterus so that it can return to normal, in pregnant women If the distance is too close, there is a risk of preeclampsia during pregnancy because the condition of the uterus has not returned to normal and the most important organs of the fetus have not returned to normal.(Manuaba, 2019).

   The ideal pregnancy interval between one pregnancy and the next is 3 years. This time period is very good to give the uterus a chance to recover to its original condition. Maternal death during childbirth can be avoided, one way is by maintaining the distance between pregnancies. The results of the study stated that there was a relationship between pregnancy distance and systolic blood pressure (p 0.017) and there was no relationship between pregnancy distance and diastolic blood pressure (p 0.629).(Yuliani, 2019).

5. **Risk factors for history of hypertension and preeclampsia at Klambu Community Health Center, Grobogan Regency**

   The variable history of hypertension studied was a risk factor for preeclampsia of 2.267 times that of mothers with a history of hypertension. The largest proportion was mothers with no history of hypertension, namely 68 respondents, with 30 respondents (44.1%) having preeclampsia and 38 respondents without preeclampsia (55.9%).

   Hypertension is systolic and diastolic blood pressure ≥140/90 mmHg. A history of hypertension and the incidence of preeclampsia. Most pregnant women with a history of hypertension are at risk of experiencing preeclampsia. In pregnant women with hypertension who have resistance to angiotensin III, it can directly affect endothelial cells by making them contract. This can cause inter-endothelial cell leakage, so that through this leakage, blood-forming elements, such as platelets and fibrinogen, are deposited in the sub-endothelial layer, vascular changes accompanied by hypoxia in the local and surrounding tissue, which is thought to cause bleeding, necrosis and abnormalities. organs that are often found in preeclampsia(Bobak, 2018).

6. **ANC Risk Factors with Preeclampsia Incidents at Klambu Community Health Center, Grobogan Regency**

   The ANC variable studied was a risk factor for preeclampsia that was 1.373 times that of mothers with non-standardized ANC. The largest proportion was mothers with standardized ANC, namely 69 respondents with preeclampsia 34 respondents (49.3%) and without preeclampsia 35 respondents (50.7%).

   Antenatal Care/ANC is often referred to as pregnancy care. Pregnancy is a processmaintenance of the fetus in the womb caused by fertilization of the egg cell by sperm cells. In the pregnancy process there is a continuous chain, consisting of ovulation, release of the ovum, migration of spermatozoa and ovum, conception and growth of the zygote, nidation (implantation) in the uterus, formation of the placenta, growth and development of the products of conception until the pregnancy reaches maturity or term.(Kuspriyanto & Susilowati, 2016).

   Minimum service standardsThe most recent Antenatal Care examination is a minimum of 6 examinations during pregnancy, and a minimum of 2 examinations by a doctor in the first and third trimesters. 2 times in the first trimester (pregnancy up to 12 weeks), 1 time in the second trimester (pregnancy over 12 weeks to 26 weeks), 3 times in the third trimester (pregnancy over 24 weeks to 40 weeks)(Kemenkes, 2021).

7. **Risk Factors for Maternal Education and Preeclampsia at the Klambu Community Health Center, Grobogan Regency**

   The maternal education variable studied was a protective factor for the occurrence of preeclampsia at 0.415 times that of mothers with at-risk maternal education (elementary school and junior high school). The largest proportion was mothers with at-risk maternal education, namely 44 respondents with preeclampsia 18 respondents (40.9%) and without preeclampsia 26 respondents (59.1%).

   Education as a learning process means that in education there is a process of growth, development, or change in a more mature direction. Learning activities or processes can occur anywhere, anytime, and by anyone. Education comes from the word "didik" which means maintaining and providing training (teaching, leadership) regarding morals and intelligence of the mind(Notoatmodjo, 2015).

   A sufficient level of education will make it easier to identify stressors within oneself and from outside oneself. The level of education also influences awareness and understanding of the stimulus. A person's level of education has an influence on responding to something that comes from both inside and outside. People who have higher education will give more rational responses than those who have no education(Notoatmodjo, 2015).

   Maternal education influences preeclampsia, because less educated mothers do not understand the importance of pregnancy check-ups and if there are abnormalities in pregnancy they cannot be detected early and if the mother is diligent in having pregnancy check-ups then the mother will know whether the mother has health problems, for example, blood pressure. height and so on. That is why it is important for a mother to be highly educated. Pregnant women who experienced preeclampsia

had high education (43.5%) and (66.5%) had low education. The results of the analysis showed a significant age relationship between education and the incidence of severe preeclampsia (ρ = 0.03).(Permadi & Deliana, 2019).

CONCLUSION

Based on the research results, conclusions can be drawn that are in accordance with the objectives of the research, namely as follows: Most of the mothers' age is not at risk between 20-35 years 75%, maternal parity is not at risk or multiparous 64.5%, nutritional status based on LILA is abnormal or <23.5cm and >25cm 72.4%, pregnancy spacing is not at risk or > 2 years 59.2%, no history of hypertension 89.5, history of standardized ANC 90.8% and mother's education at risk or elementary/middle school graduate education 57.9%. Maternal age is a risk factor for preeclampsia, mothers at risk (<20 years and >35 years) are at risk of experiencing preeclampsia 1.528 times greater than mothers not at risk (20-35 years). Parity is a protective factor for preeclampsia, mothers with multiparous parity will be protected from the incidence of preeclampsia by 0.708 times than mothers with primiparous and grandemultiparous parity. Nutritional status is a risk factor for preeclampsia, mothers with abnormal nutritional status (LILA) have a risk of developing preeclampsia 1.487 times that of mothers with normal nutritional status. Pregnancy spacing is a protective factor that can reduce the occurrence of preeclampsia by 0.721 times compared to mothers with risky pregnancy spacing. A history of hypertension is a risk factor for preeclampsia 2.267 times that of mothers with a history of hypertension. ANC is a risk factor for preeclampsia 1.373 times that of mothers with non-standard ANC. Maternal education is a protective factor for the occurrence of preeclampsia at 0.415 times that of mothers with at-risk maternal education (primary and junior high school).

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