

The Correlation Between Pregnancy Spacing and The Incidence of Preeclampsia on Pregnant Women

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ABSTRACT

Background: In Indonesia, preeclampsia data is still limited, especially at the national level. The incidence of preeclampsia in Indonesia is between 3-10%, 39.5% of maternal deaths in 2001, and 55.56% in the 2012 Demographic Health Survey data explained the three major causes of death were 28% childbirth, preeclampsia 24%, and the third infection 11%.

Aim: These three diseases could be prevented if the quality of antenatal examinations was carried out by preeclampsia screening on every pregnant woman >20 weeks, with or without predisposing factors.

Methods: This quantitative research used a case-control approach, using data analysis of the Medical Record of PKU Muhammadiyah Bantul Hospital in January 2015-December 2017. Data analysis used Chi-Square.

Results: It showed the value of χ^2 (23,384) significance value ($p = 0,000 < 0,05$) and 95% CI. There was a correlation between pregnancy spacing and preeclampsia incidence on pregnant women at PKU Muhammadiyah Bantul Hospital.

Conclusion: Assessment Health Technology can urge pregnant women for antenatal care (Integrated ANC) at least four times during pregnancy. Antenatal care, according to standards, can detect growing symptoms and signs during pregnancy.

Keywords: Pregnancy, Spacing, Preeclampsia

INTRODUCTION

Preeclampsia incidence in the world reaches 2% to 8% of all pregnancies. The prevalence of preeclampsia in the United States increased from 3.4% in 1980 to 3.8% in 2010. Eight prevalence of preeclampsia in the United States in 1998 was estimated at 1/3250 births [1]. In Canada from 1994-2008, the results showed that 1,010,068 pregnant women, including 22,993 people, had preeclampsia [2]. According to the World Health Organization, three factors cause maternal mortality: hemorrhage, hypertension during pregnancy or preeclampsia, and infection. Preeclampsia incidence increased to seven times higher in developing countries (2.8% of live births) than in developed countries (0.4%) [3]. In Indonesia, preeclampsia data is still limited, especially at the national level. The incidence of preeclampsia in Indonesia ranged from 3-10%, 39.5% maternal deaths in 2001, and 55.56% in 2002 [4]. Indonesian Demographic Health Survey Data in 2012 explained that the three leading causes of death were labor hemorrhage 28%, preeclampsia 24% and infections 11% which these three diseases could be prevented if the quality of antenatal examinations was carried out by preeclampsia screening on every pregnant woman >20 weeks with or without predisposing factors [5]. Preeclampsia is a disease that occurs during pregnancy, signed by hypertension, proteinuria, and edema. Abnormalities often occur in primigravid women, related to geographical/ demographic/ ethnicity [6]. Mild preeclampsia syndrome is often not diagnosed or ignored by targeted women, so it is unrealized quickly to arise severe preeclampsia, even eclampsia [7]. One of the preeclampsia factors is the pregnancy spacing that is too close.

The mother is unable to recover her health to restore the function of normal reproductive organs. The spacing between the two short births can result in an unfavorable pregnancy and shorter time between a child's birth and higher morbidity and mortality complications for the mother and child [8]. Based on the research, labor spacing is a risk factor for preeclampsia development in women without preeclampsia history [9]. This is supported by other studies that state that the spacing of pregnancy that is too long > 5 years and too close \leq 5 years will increase the risk of preeclampsia and eclampsia [10]. Based on data from the Health Office in Yogyakarta in 2015, there was no sign of a significant reduction in maternal mortality. In 2012, the maternal mortality rate reached 46 cases, and in 2014, it reached 40 cases. The Maternal Perinatal Audit report reported that in 2014 the prevalence of preeclampsia and severe preeclampsia were as high as 14%. The cause of maternal deaths in Bantul district occurred in several sub-districts with the highest number of cases reported at sedayu Public Health Center II, Banguntapan I, and Jetis (2 cases) with the results of preliminary studies conducted at PKU Muhammadiyah Bantul Yogyakarta Hospital in 2015-2017 found 40 preeclampsia cases.

METHOD

This research was quantitative research with a case-control approach. This study's independent variable was the spacing of pregnancy, and the dependent variable of this study was preeclampsia on pregnant women. This study's data collection method used secondary data, namely medical records of PKU Muhammadiyah Bantul Hospital 2015-2017 with the study population of all pregnant women at PKU Muhammadiyah Bantul Hospital visit in January 2015-December 2017. Case groups were pregnant women

who had preeclampsia during pregnancy, and the control groups were pregnant women who did not have preeclampsia. In the case group, the samples of this study were 40 people, and in the control group were 40 people were taken in total sampling by 80 people. This study's inclusion criteria were pregnant women with preeclampsia and no preeclampsia and pregnant women living in Bantul Regency. Univariate analysis was carried out with descriptive statistics to describe each research variable's characteristics, and bivariate analysis was performed by the Chi-square correlation test technique to determine the correlation of two variables with a 95% confidence level and $p = 0.05$.

RESULT

Table 1 Univariate analysis showed that most of the pregnant women at PKU Muhammadiyah Bantul Hospital had a risky pregnancy spacing, namely 47 people (58.8%) by this prevalence, pregnant women with preeclampsia and the risky pregnancy spacing in the case group were found in 37 people (78.7%) and the control group of pregnant women who did not experience preeclampsia and did not have risky pregnancy spacing were 25 people (75.8%). Table 1 showed that preeclampsia risk age was found in 49 people (61.3%). This proved that at the age of 20, the uterus and pelvis had not grown to adult size. As a result, pregnant women at an age who were at risk of experiencing pregnancy complications were due to the reproductive organs' unpreparedness. Table 2 bivariate analysis with chi-square test results were obtained by calculating χ^2 value of (23,384) with a value of significance ($p = 0,000 < 0,05$) and 95% confidence level. These results indicate that there is a correlation between pregnancy spacing and preeclampsia in pregnant women.

Table 1. Distribution of Variable Frequency

Variables	Category	N	%
Pregnancy spacing	Risky	47	58.8
	Not Risky	33	41.3
Preeclampsia	Yes	45	56.3
	No	35	43.8
Preeclampsia History	Risky	51	63.7
	Not Risky	29	36.3
Age	Risky	49	61.3
	Not Risky	31	38.8

Table 2. Results of Correlation between Pregnancy Spacing and Preeclampsia on Pregnant Women

		Preeclampsia on Pregnant Women						χ^2 (95%)	P-value
		No		Yes		Total			
Variables	Category	N	%	N	%	N	%		
Pregnancy Spacing	Not Risky	25	75.8	8	24.2	33	100		
	Risky	10	21.3	37	78.7	47	100		

DISCUSSION

Generally, preeclampsia is usually accompanied by proteinuria, excessive edema, or both that occur at gestational age after 20 weeks [11]. Preeclampsia is a specific syndrome in pregnancy with clinical symptoms of decreased organ perfusion due to vasospasm and endothelial activation. —one of the dangerous

complications and is often found in women with preeclampsia is the HELLP syndrome caused by syncytiotrophoblast particles and substances from the placenta that interact with the maternal immune system and vascular endothelial cells. Preeclampsia is a severe complication of pregnancy, and its pathophysiology is still uncertain [12]. The mechanism of preeclampsia is related to low secondary placental perfusion to abnormal calcification.

In normal placentation, trophoblasts invade the myometrium and the spiral arteries, destroying the tunica muscularis media. This causes the spiral arteries to widen and not contract, give pregnancy with high flow circulation and low resistance [13]. Preeclampsia is an unpredictable disease and can occur in pregnant women who do not have a predisposing factor [14]. During pregnancy, biological resources in pregnant women's bodies are systematically used for subsequent pregnancies that take 2-4 years so that mothers' condition returns to the previous condition [15]. Regular blood pressure checks can help detect preeclampsia due to a drastic increase in blood pressure after a gestational age of over 20 weeks (systolic above 140 mmHg and diastolic 90 mmHg, or an increase of 30 mmHg for systolic and 15 mmHg for diastolic) [16]. Preeclampsia occurs mostly in the third trimester. Research in Vietnam reported that mothers with a gestational age of > 28 weeks had a 26.270 times chance of having a pregnancy with preeclampsia compared to mothers whose gestational age was < 28 weeks [17], and the incidence of preeclampsia 70% occurred at 38-40 weeks [18].

If pregnancy occurs before two years, maternal health will not progressively be good. A safe spacing for women who give birth is at least two years. This is for women's recovery after pregnancy and lactation. Mothers who are pregnant two years after the last child's birth often experience pregnancy and childbirth complications. This is consistent with Cambodia's research, which reported that pregnancy spacing was the spacing interval between two consecutive pregnancies of a woman [19]. The spacing of pregnancy that is too fast will directly affect the women and the fetus's health.

The ideal pregnancy spacing for pregnant women is 2-5 years because the spacing is very safe for subsequent pregnancy and childbirth for a woman and at five years of gestation is at high risk of preeclampsia and eclampsia, a degenerative process causes it or weakening the strength of the functions of the uterine and pelvic muscles which are very influential in the delivery process of a subsequent pregnancy.

In addition, the history of preeclampsia in previous pregnancies dramatically affects the risk of subsequent preeclampsia. This is supported by a study in Laos, which reported that 40% -50% of patients with preeclampsia had the same incidence in subsequent pregnancies caused by permanent hypertension in 30% -50% of patients.

CONCLUSION

Most pregnant women at PKU Muhammadiyah Bantul Hospital have a risky pregnancy spacing, namely 29 people (72.5%), and pregnant women with preeclampsia are 26 people (65.0%), and women with a history of

preeclampsia are 32 people (80.0 %). So that the chi-square test results obtain calculated χ^2 value of (23,384) with a value of significance ($p = 0,000 < 0,05$) and 95% confidence level. These results indicate that there is a correlation between the spacing of pregnancy with preeclampsia in pregnant women. The spacing of pregnancy that is too close causes the decrease functions of the uterine and pelvic muscles, which are very influential in the subsequent labor. The uterus with close pregnancy spacing is not ready to accommodate and become a place for new fetal growth and development. It is feared that the placenta from birth has not previously decayed or peeled completely, increasing the risk of complications in subsequent pregnancies.

Maternal health efforts are expected to be manifested in antenatal care (ANC) at least four times during pregnancy. Antenatal services with quality standards can detect symptoms and signs that develop during pregnancy. An antenatal visit that is less than four times will increase preeclampsia patients. Providing health services and counseling, including nutrition, pregnancy can be healthy, early detection of diseases and complications/ pregnancy complications, preparing clean and safe deliveries, planning anticipation, and early preparation for a referral if complications. Occur, and counseling including contraceptive postpartum, the prevalence of preeclampsia on pregnant women can be reduced.

REFERENCES

- [1] S. Ebrahim, "Pregnancy-related substance use in the United States during 1996–1998," *Obstet. Gynecol.*, vol. 101, no. 2, pp. 374–379, Feb. 2003, doi: 10.1016/S0029-7844(02)02588-7.
- [2] P. von Dadelszen and L. Magee, "What matters in preeclampsia are the associated adverse outcomes: the view from Canada," *Curr. Opin. Obstet. Gynecol.*, vol. 20, no. 2, pp. 110–115, Apr. 2008, doi: 10.1097/GCO.0b013e3282f733a2.
- [3] S. Beck et al., "The worldwide incidence of preterm birth: a systematic review of maternal mortality and morbidity," *Bull. World Health Organ.*, vol. 88, no. 1, pp. 31–38, Jan. 2010, doi: 10.2471/BLT.08.062554.
- [4] M. P. Wardhana, E. G. Dachlan, and G. Dekker, "Pulmonary edema in preeclampsia: an Indonesian case-control study," *J. Matern. Neonatal Med.*, vol. 31, no. 6, pp. 689–695, Mar. 2018, doi: 10.1080/14767058.2017.1295442.
- [5] C. R. Titaley, M. J. Dibley, and C. L. Roberts, "Type of delivery attendant, place of delivery and risk of early neonatal mortality: analyses of the 1994–2007 Indonesia Demographic and Health Surveys," *Health Policy Plan.*, vol. 27, no. 5, pp. 405–416, Aug. 2012, doi: 10.1093/heapol/czr053.
- [6] S. A. Longo, C. P. Dola, and G. Pridjian, "Preeclampsia and Eclampsia Revisited," *South. Med. J.*, vol. 96, no. 9, pp. 891–899, Sep. 2003, doi: 10.1097/01.SMJ.0000084385.85123.08.
- [7] F. G. Cunningham, J. M. Roberts, and M. D. Lindheimer, "The Clinical Spectrum of Preeclampsia," in *Chesley's Hypertensive Disorders in Pregnancy*, Elsevier, 2009, pp. 25–35.
- [8] S. D. Kim, S. J. Park, D. H. Lee, and D. L. Jee, "Risk factors of morbidity and mortality following hip fracture surgery," *Korean J. Anesthesiol.*, vol. 64, no. 6, p. 505, 2013, doi: 10.4097/kjae.2013.64.6.505.
- [9] A. Conde-Agudelo, A. Rosas-Bermúdez, and A. C. Kafury-Goeta, "Effects of birth spacing on maternal health: a systematic review," *Am. J. Obstet. Gynecol.*, vol. 196, no. 4, pp. 297–308, Apr. 2007, doi: 10.1016/j.ajog.2006.05.055.
- [10] K. O. Osungbade and O. K. Ige, "Public Health Perspectives of Preeclampsia in Developing Countries: Implication for Health System Strengthening," *J. Pregnancy*, vol. 2011, pp. 1–6, 2011, doi: 10.1155/2011/481095.
- [11] W. J. Ledger, "Prophylactic antibiotics in obstetrics—gynecology: a current asset, a future liability?," *Expert Rev. Anti. Infect. Ther.*, vol. 4, no. 6, pp. 957–964, Dec. 2006, doi: 10.1586/14787210.4.6.957.
- [12] I. Irminger-Finger, N. Jastrow, and O. Irion, "Preeclampsia: A danger growing in disguise," *Int. J. Biochem. Cell Biol.*, vol. 40, no. 10, pp. 1979–1983, Jan. 2008, doi: 10.1016/j.biocel.2008.04.006.
- [13] A. Conde-Agudelo, J. Villar, and M. Lindheimer, "World Health Organization Systematic Review of Screening Tests for Preeclampsia," *Obstet. Gynecol.*, vol. 104, no. 6, pp. 1367–1391, Dec. 2004, doi: 10.1097/01.AOG.0000147599.47713.5d.
- [14] P. Boyle and B. Levin, *World cancer report 2008*. IARC Press, International Agency for Research on Cancer, 2008.
- [15] Y. et al Sherf, "47: Like mother like daughter- low birthweight and preeclampsia tend to re-occur at the next generation," *Am. J. Obstet. Gynecol.*, 2015, doi: 10.1016/j.ajog.2014.10.093.
- [16] L. R. Chen, K. H., Seow, K. M. and Chen, "Progression of gestational hypertension to pre-eclampsia: A cohort study of 20,103 pregnancies," *Pregnancy Hypertens.*, vol. 10, no. 289, pp. 230–237, 2017, doi: 10.1016/j.preghy.2017.10.001.
- [17] L. M. et al Quan, "An analysis of the risk factors of preeclampsia and prediction based on combined biochemical indexes," *Kaohsiung J. Med. Sci.*, vol. 2, no. 34, pp. 109–112, 2018, doi: 10.1016/j.kjms.2017.10.001.
- [18] A. et al Boutin, "Maternal Characteristics for the Prediction of Preeclampsia in Nulliparous Women: The Great Obstetrical Syndromes (GOS) Study," *J. Obstet. Gynaecol. Canada*, vol. 5, no. 40, pp. 572–578, 2018, doi: 10.1016/j.jogc.2017.07.025.
- [19] D. et al Wright, "Aspirin for Evidence-Based Preeclampsia Prevention trial: influence of compliance on beneficial effect of aspirin in prevention of preterm preeclampsia," *Am. J. Obstet. Gynecol.*, vol. 6, no. 217, pp. 685.e1–685.e5, 2017, doi: 10.1016/j.ajog.2017.08.110.