

Age, parity and birth spacing to the incidence of preeclampsia

Reza Kartikadewi, Endah Marianingsih Theresia, Niken Meilani

Midwifery Department, Poltekkes Kemenkes Yogyakarta, Indonesia

Article Info

Article history:

Received Nov 23, 2018

Revised Jan 11, 2019

Accepted Jan 28, 2019

Keywords:

Age

Birth spacing

Preeclampsia

Pregnancy complications

ABSTRACT

Preeclampsia is complication in pregnancy characterized by various symptoms as clinical hypertension and protein urine and usually occurs after the age of 20 weeks of pregnancy until 48 hours after be in labor. Highest Incidence of preeclampsia in DIY was in Sleman (22%-30%). Preeclampsia was caused by multy factoral.Goal of this research aimed to know the the correlation between age, parity and birth spacing to the preeclampsia. The research used Cross sectional design with purposive sampling technique. The subject of this research was 381 labor patiens in RSUD Sleman in 2016. The data were collected from register book and medic record of labor in 2016. The data were analyzed using Chi square and Logistic regression. The analysis showed of most subjects aged ≥ 30 years, had parity 2, had a gestational distance of 2-5, and did not have preeclampsia. As the result showed age ≥ 30 years had a significant association with preeclampsia *p value* of 0.023 Exp (β) 10.630 95% CI=1.378 to 82.005. Distance pregnancy<2 years had a significant association with preeclampsia *p value* 0.000 Exp (β) 3,201 95% CI=1.862 to 5.503, and the distance Pregnancy>5 years had a *p-value* 0.013 with Exp (β) 3,622 95% CI=1.308 to 10.026. There is a relationship between age and the incidence of preeclampsia pregnancy spacing.

Copyright © 2019 Institute of Advanced Engineering and Science.

All rights reserved.

Corresponding Author:

Niken Meilani,
Midwifery Department,
Poltekkes Kemenkes Yogyakarta,
Jl Mangkuyudan MJIII/304 Yogyakarta.
Email: nikenbundaqueena@gmail.com

1. INTRODUCTION

The Maternal Mortality Rate (MMR) in Indonesia reaches 359 per 100,000 live births. The direct causes of maternal mortality were bleeding, infection, and preeclampsia/eclampsia [1]. Preeclampsia is a complication in pregnancy that can occur acute and antepartum, intrapartum, and postpartum. Generally preeclampsia has symptoms of oedema, hypertension, and proteinuria [1]. Preeclampsia is a direct cause of maternal mortality in addition to bleeding and sepsis [1-2]. MMR in Indonesia reached 359/100,000 live birth far from the target of the fifth Millennium Development Goals(MDGs), namely in 2015 maternal mortality rate in Indonesia reached 102 per 100,000 live births [3].

Risk factors for preeclampsia are the maternal age>35 years, parity 2-3, and birth spacing >5 years [4-6]. Risk factors for preeclampsia are the mother's educational status and a history of hypertension, while factors not related, employment, examination Antenatal Care, parity, spacing pregnancies, history of pregnancy complications and a history of Diabetes mellitus [7]. Birth Spacing is a risk factor for preeclampsia and high-risk pregnancies. The risk of maternal mortality is increased when the distance between two pregnancies<2 years or >5 years and a safe distance is 2-5 years. Birth Spacing<2 years, uterus or reproductive mother has not returned to normal. Meanwhile, if the spacing of pregnancy>5-year risk of preeclampsia increased due to the degenerative process or weakening the strength of uterine muscle function and pelvic muscles are very influential in the birth process when

pregnancy occurs again [8]. Women with birth spacing >5 years into a spiral arteries muscle layer remains rigid and hard. Lumen spiral arteries do not allow distends and vasodilatation resulting in hypoxia and ischemia underlying placental preeclampsia [1].

Maternal Mortality in the province amounted to 87.3 per 100,000 live births; with the main causes are haemorrhage, eclampsia and sepsis [9]. In 2013, there were as much as 28% or 13 cases of maternal mortality due to preeclampsia. Sleman regency becomes the highest contributor as many as four cases. In 2014, eight of 40 maternal mortalities in the province is also caused by preeclampsia and eclampsia. Sleman regency is still accounted for the highest, five cases compared to other districts in the province [10].

In previous studies preeclampsia increases the risk of maternal age <20 years and >35 years [11-15] among primiparous mother [12-17], also among women with risk pregnancies distance <2 years and >5 years [3-18]. In the district of Sleman preeclampsia increases and remains a major ratings compared to other districts. Mothers with healthy reproductive age, parity >1, and 2-5 years pregnancy spacing are also allows preeclampsia. Therefore, a healthy reproductive age, parity, and spacing pregnancies need to be re-analyzed to describe the low-risk mothers who develop preeclampsia. The purpose of this study is showed The relationship between Age, Parity and Birth Spacing to the Incidence of Preeclampsia in Sleman Regional Hospital 2016.

2. RESEARCH METHOD

This research was observational analytic with Cross sectional approach. It was carried out on the population of all women labour in Sleman Regional Hospital in 2016 amounted to 1317 people. The samples were obtained by purposive sampling. There are 381 people were obtained from patient records. Samples taken are mothers by the age of 20-35 years, parity >1, the number of single foetus, without a history of preeclampsia, hypertension, diabetes mellitus, renal failure, pregnancy Obesity and never be a combination pill acceptors.

This survey begins with preparatory phases, which takes care of etichal clearance from the Ministry of Health polytechnic ethics commite of Yogyakarta and complete the research permit. The researcher submitted the manuscript to the Ministry of Health polytechnic ethics committee of Yogyakarta to see whether the research would be conducted in accordance with the professional code of ethics and still maintain the privacy of the research subjects.

This study was conducted after the issuance of decent ethical No. LB.01.01/KE-02/XX/419/2017 issued by the Ministry of Health polytechnic ethics committee of Yogyakarta on 18 April 2017. After received a proper letter of ethics, the researcher submitted a permit to the Sleman Regional Government and Sleman Regional Hospital to obtain research permission.

The independent variable is the birth spacing is the time interval between deliveries prior to pregnancy is calculated from the date of birth of children prior to HPMT (First Day of Menstruation Newsletter) expressed in year. Maternal age calculated from the date of birth of up to date check is expressed in years. The parity was seen from mothers labour unless the abortion. Dependent variable is the incidence of preeclampsia is an increase in blood pressure accompanied by urine protein in pregnant women with a gestational age of 24 to delivery based on the doctor's diagnosis.

To control the confounding variable the researcher takes a sample that meets the inclusion and exclusion criteria. Of the 1317 mothers be in labor in Sleman Regional Hospital in 2016, samples were taken with parity criteria 2-4, maternal age 20-35 years, number of single fetuses, and having complete medical records. In order for the results of the analysis to be unaffected by other variables, the sample who had a history of preeclampsia, a history of hypertension, a history of Diabetes Mellitus, a history of kidney failure, obese pregnancy, and combined oral contraceptive acceptors were excluded. The scale of the data used are nominal and ordinal. Data analysis included frequency distribution, analysis and calculation of the relationship with the prevalence ratio, analysis Chi Square, and Logistic regression.

3. RESULTS AND DISCUSSION

3.1. Result

The focus of the research is age, parity, birth spacing, preeclampsia of women is in labor in Sleman Regional Hospital in 2016 shows in Table 1 The table reveals the majority of subjects aged ≥ 30 years (59.3%), having parity 2 (73.8%), a pregnancy 2-5 years (55.1%), and did not develop preeclampsia (78%). Most women who develop preeclampsia aged ≥ 30 years (76.2%), having parity 2. The analysis of age to the incidence of preeclampsia of women be in labor in Sleman Regional Hospital in 2016 was divided into 3, maternal age ≥ 30 years, 20-24 years, and 25-29 years as stated in Table 2.

Table 1. Characteristics of responden by age, parity, distance pregnancy and preeclampsia

Characteristics	Total (n)	Percent (%)
Age		
≥30 years	226	59.3
25-29 years	120	31.5
20-24 years	35	9.2
Total	381	100
Parity		
2	281	73.8
3	83	21.8
4	17	4.4
Total	381	100
Birth spacing		
<2 years	24	6.3
2-5 years	210	55.1
>5 years	147	38.6
Total	381	
Preeclampsia		
Yes	84	22
No	297	78
Total	381	100

Source: Secondary data Sleman Regional Hospital in 2016

Table 2. Analysis of the relationship age and preeclampsia

No	Age	Preeclampsia		Total		<i>P value</i>
		Yes	No	N	%	
1	≥ 30 years	64	28.3	162	71.7	0.00
2	20-24 years	19	15.8	101	84.2	
3	25-29 years	1	2.9	34	97.1	
	Total	84	22	297	78	

Source: Secondary data Sleman Regional Hospital in 2016

Table 2 shows that the *p-value* of age on the incidence of preeclampsia was $0.00 < 0.05$. This means that age has a significant relationship with the incidence of preeclampsia in labor women in Sleman Regional Hospital 2016. The analysis of to the incidence of preeclampsia of women in Sleman Regional Hospital in 2016 was divided into 2, namely maternal parity 3-4 and 2 as stated in Table 3.

Tabel 3. Analysis of the relationship parity and preeclampsia in Sleman Regional Hospital 2016

No	Parity	Preeclampsia		Total		<i>p-value</i>
		Yes	No	N	%	
1	3-4	22	22	78	78	0.989
2	2	62	22.1	219	77.9	
	Total	84	22	297	78	

Source: Secondary data Sleman Regional Hospital in 2016

Tabel 3. shows that the *p-value* parity with preeclampsia were $0.989 > 0.05$. This means that parity does not have a significant association with the incidence of preeclampsia among be in labor women in Sleman Regional Hospital 2016. The analysis of birth spacing to the incidence of preeclampsia of women be in labor in Sleman Regional Hospital in 2016 was divided into 3, namely mothers with a birth spacing <2 years, >5 years, and 2-5 years as stated in Table 4.

Tabel 4. Analysis of the relationship birth spacing and preeclampsia in Sleman Regional Hospital 2016

No	Birth Spacing	Preeclampsia		Total		<i>p-value</i>
		Yes	No	N	%	
1	<2 tahun	7	29.2	17	70.8	0.00
2	>5 tahun	51	34.7	96	65.3	
3	2-5 tahun	26	12.4	184	87.6	
	Total	84	22	297	78	

Source: Secondary data Sleman Regional Hospital in 2016

Table 4 shows that the *p-value* of Birth Spacing and incidence of preeclampsia was $0.00 < 0.05$. This means that the Birth Spacing had a significant association with the incidence of preeclampsia among be in labor women in Sleman Regional Hospital 2016. The relationship and strength of the relationship of the three independent variables, namely age, parity and birth spacing to the occurrence of the dependent variable namely preeclampsia among be in labor women at the Sleman Regional Hospital in 2016 are showed in Table 5.

Table 5. Multivariate analysis age, birth spacing and preeclampsia

Variable	Koef β	p-value	Exp (β)	95% CI
Age ≥ 30 years	2.364	0.023	10.630	1.378-82.005
Birth Spacing				
- <2 years	1.164	0.000	3.201	1.862-5.503
- >5 years	1.287	0.013	3.622	1.308-10.026
Constan	-3.961	0.000	0.124	

Source: Secondary data Sleman Regional Hospital in 2016

Tabel 5 shows there are two risk variables that have a relationship ($p < 0.05$ and $p < 0.025$). Both of these variables are then tested with multivariate statistical test by using logistic regression. The statistical test used in logistic regression with a significance level of 0.01. Regression test results obtained by Age ≥ 30 years had a *p-value* of 0.023, Exp (β) 10.630 95% CI=1.378 to 82.005. Distance pregnancy <2 years had a *p-value* of 0.000 with Exp (β) 3.201 95% CI: 1.862 to 5.503. Distance Pregnancy >5 years had a *p-value* 0.013 with Exp (β) 3.622 95% CI: 1.308 to 10.026.

3.2 Discussion

The results of 381 subjects showed 22% of women develop preeclampsia and 78% of women do not develop preeclampsia. 55.1% of mothers in Sleman regional hospitals have a pregnancy within 2-5 years, 38.6% of mothers had pregnancy spacing >5 years and 6.3% of women had a pregnancy spacing <2 years. Meanwhile there were 84 (22%) of mothers experienced preeclampsia and 297 (78%) of mothers did not develop preeclampsia. Close birth spacing is determinant in the incidence of preeclampsia [19].

Maternal age is a risk factor for preeclampsia [11, 20-23]. In this study, maternal age 20-35 years is taken. This study showed that age has a significant relationship with the occurrence of preeclampsia $p < 0.005$. Healthy reproductive age have a vulnerable age 20-35 years is quite long. Mothers who develop preeclampsia most have aged ≥ 30 years (76.2%). By the time 30-year-old mother's mother started to increased the chances of having preeclampsia. Healthy reproduction age was 20-30 years, if pregnancy occurs below or above that age the risk of causing the death of more than 2-4x healthy reproduction [24].

Subject taken in this research is maternal parity 2, 3, and 4. Parity is one risk factor for preeclampsia [25-26]. In this study showed no significant relationship between parity with preeclampsia. Preeclampsia is more common in primipara mothers [25]. Researchers want to see the significance of parity with the incidence of preeclampsia in maternal multipara but the results did not show significance.

Birth spacing is closed determinant in the incidence of preeclampsia [19]. The results of the analysis showed a significant correlation between the birth spacing with preeclampsia *p-value* of 0.00, it relates to research that said that birth spacing <2 years of appliance pregnancy the mother has not returned to its previous state [8]. Meanwhile, there are 34.7% of mothers with birth spacing >5 years of preeclampsia.

In multivariate analysis shown significant correlation between age *p-value* of 0.023 with Exp (β) 10.630 95% CI=1.378 to 82.005 and birth spacing <2 years had a *p-value* 0.000 with Exp (β) 3.201 95% CI=1.862 to 5.503. Birth spacing >5 years had a *p-value* 0.013 with Exp (β) 3.622 95% CI=1.308 to 10.026 with preeclampsia. Maternal age taken on a healthy reproductive age range of 30-35 years, but during the 30-year-old mother had already indicated their maternal complications of pregnancy including preeclampsia. There is a phenomenon of age with preeclampsia, but the graph shows increased incidence of preeclampsia in maternal age of 30 years [27]. This theory could describe that moment maternal age over 30 years of pregnancy complications included preeclampsia started to increase.

Results of the analysis showed birth spacing <2 years have Exp (β) 3.201 95% CI=1.862 to 5.503 means that women with Birth spacing <2 years have a chance of preeclampsia 3.201 times greater than women with pregnancy within 2-5 years. Birth spacing <2 years of appliance pregnancy the mother has not been returned to its previous state [8]. While women with birth spacing >5 years have Exp (β) 3.622 95% CI=1.308 to 10.026 means that women with pregnancy spacing >5 years likely to develop preeclampsia 3.622 times larger in comparison with mothers who had a pregnancy within 2-5 years. In previous studies have described that spacing is too long gestation resulted in the degenerative process or weakening the function of

the uterus and the pelvic floor muscles [8]. Mother with long distance pregnancies will result in a pregnant mother's age at the time of re getting older.

Placental Vascularization theory mention in normal pregnancy trophoblast invasion into the muscular layer of the artery lumen causes the lining spirallis distended and dilated. Distension and dilatation of the artery lumen improves blood flow to the placenta, so blood flow well [1]. At a distance of pregnancy <2 years of reproductive mother not return so it will affect the process of muscle dilatation and lumen so that blood flow is reduced cause hypoxia and ischemia of the placenta and ended in preeclampsia. At a distance of pregnancy >5 years of the uterus and pelvic muscles undergo a degenerative process that muscle to dilate too weak to undergo the process of preeclampsia.

There are several variables that can actually be reached but not yet participated analyzed in this study. As well as marital status, the patient record is written clearly that the current pregnancy, what kind of marital status. Marital status is a determinant near preeclampsia [8]. In addition, the psychological state of the mother also affects the occurrence of preeclampsia, the support of her husband, family and health professionals is important for the mother in the process of pregnancy and childbirth are healthy so it will be better if the marital status and psychological state of the mother can be in control or participate analyzed so that the effects on research actually occur due to exposure.

4. CONCLUSION

Most respondents had ≥ 30 years of age, parity 2, birth spacing 2-5 years, and did not develop preeclampsia. There is a significant relationship between age p-value of 0.023, spacing pregnancies <2 years of p-value of 0.000, and spacing pregnancies >5 years p-value of 0.013 with preeclampsia.

REFERENCES

- [1] Prawirohardjo, S. Midwifery (in Bahasa: Ilmu Kebidanan), Jakarta: Yayasan Bina Pustaka Sarwono Prawirohardjo, 2011.
- [2] Muhani, N; Besral, B. Severe Preeclampsia and Maternal Mortality, Vol. 10 No.2 November 2015, Doi: <http://dx.doi.org/10.21109/kesmas.v10i2.884>, 2015.
- [3] 2012 Population Demographic Survey (IDHS) 2012, Maternal Mortality Rate (in Bahasa: Survei Demografi Kependudukan Indonesia (SDKI) 2012, Jakarta. chnrl.org/pelatihan-demografi/SDKI-2012.pdf; 2012.
- [4] Conde, A; Rosas, B; Kafury, G. Effects of birth spacing on maternal health: a systematic review. PMID:17403398; DOI:10.1016/j.ajog.2006.05.055. 2017.
- [5] Aeni, N. Risk Factors of Maternal Mortality. Vol. 7 No 10 Mei 2013. Doi: <http://dx.doi.org/10.21109/kesmas.v7i10.4>; 2013.
- [6] Pipkin, FB; Phil, D; F.R.C.O.G. Risk Factors of Preeclampsia. N Engl J Med 2001; 334: 925-926. Doi: 10.1056/NEJM200103223441209.
- [7] Yulianti, E; Fikawati, S. Preeclampsia (in Bahasa: Pre-Eklampsia) at Bayu Asih Purwakarta Regional Hospital. Vol.3 No.1 Agustus 2008. DOI: <http://dx.doi.org/10.21109/kesmas.v3i1.241>; 2008.
- [8] Maharani, R., Noor., Musafah. Relationship of Pregnancy Distance with Preeclampsia at Ulin Banjarmasin Regional Hospital period March-June 2012. Doi: IOS3504.libra-C01301329, 2012.
- [9] DIY Health Profile. Maternal Mortality Rate due to Preeclampsia (in Bahasa: Profil Kesehatan DIY. Angka Kematian Ibu akibat Preeclampsia. Yogyakarta. www.depkes.go.id/resources/.../profil/PROFIL.../3471_DIY_Kota_Yogyakarta_2014.pdf; 2015.
- [10] DIY Health Office. 2015. Maternal Mortality Rate (in Bahasa: Dinkes DIY. 2015. Angka Kematian Ibu. Yogyakarta. www.dinkes.jogjapro.go.id/ accessed December 12, 2016.
- [11] Yerebasmaz, Akdag, Ozdemirci, Erturk, Kayikcioglu. Does Advanced Maternal Age Increase the Risk of Adverse Perinatal Outcomes? Acta Medica; 2016; 5: 23-29; doi: [http://www.tip.hacettepe.edu.tr/actamedica/2016/Acta16\(5\).pdf](http://www.tip.hacettepe.edu.tr/actamedica/2016/Acta16(5).pdf)
- [12] Sutrimah; Mifbakhudin; Wahyuni, D. Related Factors With Responsibility Preeclampsia In Pregnant Woman In Roemani Muhammadiyah Semarang Hospital. Midwifery Journal (in Bahasa: Jurnal Kebidanan)- Vol. 4 No. 1 (2015). Doi: http://jurnal.unimus.ac.id/index.php/jur_bid/article/view/1383/1437; 2015.
- [13] Danantika, O; Serudji, J; Revilla, G. Relationship between Gravida and Age of Mother to Occurrence of Preeclampsia at Dr. M. Djamil Padang Hospitalin 2012-2013. *Jurnal Kesehatan Andalas*- Vol.4 No.1 (2015). Doi: <http://jurnal.fk.unand.ac.id/index.php/jka/article/view/224>; 2013.
- [14] Quan, LM; Xu, QL; Zhang, GQ; Wu, LL; Xu, H. An Analysis of the Risk Factors of Preeclampsia and Prediction on Combined Biochemical Indexes. *Khoasium J Med Sci*. 2018 Feb; 34(2):109-112. Doi: 10.1016/j.kjms.2017.10.001. Epub 2017 Nov 6.
- [15] Berhe, AK; Kassa, GM; Fakadu, GA; Muche, AA. Prevalence of Hypertensive Disorder of Pregnancy in Ethiopia: A Systemic Review and Meta-analysis. *BMC Pregnancy Childbirth*. 2018 Jan 18;18(1):34. Doi: 10.1186/s12884-018-1667-7.

- [16] Danantika, O; Serudji, J; Revilla, G. Relationship between Gravida and Age of Mother to Occurrence of Preeclampsia at Dr. M. Djamil Padang Hospital in 2012-2013. *Jurnal kesehatan Andalas*- Vol.4 No.1 (2015). Doi: <http://jurnal.fk.unand.ac.id/index.php/jka/article/view/224>; 2013.
- [17] Annie, S Y; Hui, D S; Sahota; Leung, T Y. Maternal Height and Risk of Hypertensive disorder in Pregnancy. *J Matern Fetal Neonatal Med*. 2017 Dec 17: 1-6. Doi: 10.1080/14767058.2017.1410786; 2017.
- [18] Exavery et al. 2012. Levels and correlates of non-adherence to WHO recommended inter-birth intervals in Rufiji, Tanzania. *BMC Pregnancy and Childbirth*; 2012; 12:152; doi: 10.1186/1471-2393-12-152.
- [19] McCarthy, J, Meade. A Framework for Analyzing the Determinants of Maternal Mortality. *Studies in Family Planning*; 1992; Vol. 23, No. 1 (Jan. - Feb., 1992), pp. 23-33. PMID: 1557792 (PubMed-indexed for MEDLINE)
- [20] Cunningham, G, Gant, L, Leveno, K, Gilstrap III, H, Hauth, J, Wenstrom. *Obstetri Williams*. Edisi 21. Jakarta: EGC; 2005.
- [21] Duckitt, K; Harrington, D; Risk factors for pre-eclampsia at antenatal booking: systematic review of controlled studies. *BMJ* 2005; 330:565 doi: <https://doi.org/10.1136/bmj.38380.674340.E0> (Published 10 March 2005).
- [22] Lamminpää, J, Julkunen, G, Gissler, M, Heinonen. Preeclampsia complicated by advanced maternal age: a registry-based study on primiparous women in Finland 1997-2008. *BMC Pregnancy and Childbirth*; 2012; 12:47; doi: 10.1186/1471-2393-12-47.
- [23] Utama, Y, Yun, S. The Risk Factors Associated with the Incidence of Severe Preeclampsia in Pregnant Women in Raden Mattaher Regional Public Hospital in Tahin 2007. *Jurnal Ilmiah Universitas Batanghari Jambi* Vol 8. No 2 (2008). Doi: <http://ji.unbari.ac.id/index.php/ilmiah/article/view/251>
- [24] Manuaba, I. Midwifery, Gynecology, and Family Planning for Midwife Education (in Bahasa: Ilmu Kebidanan, Penyakit Kandungan, dan Keluarga Berencana untuk Pendidikan Bidan. Jakarta, EGC, 2006.
- [25] Hutcheon, JA; Lisonkova, S; Joseph, KS. Best Pract Res Clin Obstet Gynaecol, 2011 Aug;25(4):391-403. doi: 10.1016/j.bpobgyn.2011.01.006. *Epub* 2011 Feb 18
- [26] Afridasari, Nur, Sitti, S, Saimin, J, Juminten, S, Sulastrianah. Analysis of Risk Factor for Preeclampsia. *Medula* Vol 1 No 1 (2013). Doi: <http://ojs.uho.ac.id/index.php/medula/article/view/187>
- [27] Ananth, K, Keyes, W. Pre-eclampsia rates in the United States, 1980-2010: age-period-cohort analysis. *BMJ*; 2013;347:f6564 doi: 10.1136/bmj.f6564 (Published 7 November, 2013).