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ORIGINAL RESEARCH

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## FACTORS INFLUENCING MATERNAL LABOR COMPLICATION IN KUTAI KARTANEGARA REGION

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### Abstract

**Background:** To decrease maternal mortality rate until 70 per 100,000 living birth in 2030 (SDG's) has become the health priority. In fact, the maternal mortality rate in Indonesia is still very high, and almost two-third maternal mortality is caused by maternal labor complications.

**Objective:** The objective of the study was to investigate the factors influencing maternal labor complications in Kutai Kartanegara Region Indonesia in 2017.

**Methods:** This was a correlational study with cross sectional design. The populations in the study were women who had labor process in the area of Kutai Kartanegara Region. There were 95 respondents selected using purposive sampling. Data were collected using questionnaires and medical records. Chi-square and logistic regression were used for data analysis.

**Results:** Most of the respondents had maternal labor complication (53.7%). The highest complication occurred was prolonged labor (58.9%). Factors influencing maternal labor complication were antenatal care, mother's age, education level, parity, and distance of pregnancy. Age was identified as the most dominant variable influencing maternal complication, with the value of OR was 5.837, which indicated that high-risk-age mothers have 5.837 times of labor complication than mothers with no risk age.

**Conclusion:** Antenatal care, age, education, parity and distance of pregnancy had correlation with maternal labor complications, and its most dominant variable was age.

**Keywords:** antenatal care; maternal labor complication; pregnancy; prolonged labor

## INTRODUCTION

Every pregnant woman is expected to have a healthy pregnancy, safe childbirth and bear a healthy infant; therefore, all women must obtain standard service. The service provider must serve qualified standard of healthy reproduction service by noticing the need of patience ([Hulton, Matthews, & Stones, 2000](#)). The number of maternal mortalities in Indonesia is relatively high 305/100.000 of life birth in 2015. The death of mother in the Kutai Kartanegara Region was 29 deaths in 2015 and

increased to be 32 deaths in 2016 that caused by obstetric complication (56.25%) ([Dinkes, 2016](#)). Almost maternal mortality caused by labor complication. The result of data analysis showed that labor without complication reached 54% in 2012 ([BKKBN, 2013](#)).

A third of death of mother in the world happened due to childbirth, WHO predicts that mother is globally correlated to childbirth and birth ([Buchmann, Stones, & Thomas, 2016](#)).

The 72.5 % of maternal death in the world was caused by direct cause and 27.5% by indirect cause. The direct cause is bleeding, hypertension, abortion, embolism and other cause of direct death ([Say et al., 2014](#)). Antenatal Care (ANC) is approved measurement that is able to decrease the number of death of mother and infant ([Moller, Lushino, Meirik, Gebre-Medhin, & Lindmark, 1989](#)). ANC becomes one of the intervention that is significantly able to decrease the morbidity and mortality of mother when given appropriately ([Akhan, Nadirgil, Tecer, & Yüksel, 2003](#)).

Maternal labor complications are condition of woman during childbirth with obstetric complication, such as pre-eclampsia, hemorrhagic, infection, and prolonged labor. It has a strong effect over perinatal death, about 53% of perinatal death happened due to poor ANC services such as ANC low scope, entry and less ability of midwife in detecting the complication during visit of ANC ([Kusiako, Ronsmans, & Van der Paal, 2000](#)). The other factors that affect the complication are the history of obstetric complication ([Gebre, Gebremariam, & Abebe, 2015](#)), antenatal care visit, age and parity ([Bintabara, Mohamed, Mghamba, Wasswa, & Mpembeni, 2015](#); [Markos & Bogale, 2014](#)), and education level ([Ekabua et al., 2011](#)). Another research shows that qualified ANC may present direct effect to the better management of preventing complication and also present the indirect effect in improving childbirth ([Afulani, 2016](#)). Despite ANC has been applied, the reality shows that maternal mortality rate is still relatively high. Therefore, this study aimed to identify factors related to maternal labor complication in the Regency of Kutai Kartanegara, Indonesia.

## METHODS

### *Study design*

This was a correlational research with cross sectional design to analyze the factors influencing maternal labor complication in Kutai Kartanegara Region, Indonesia.

### *Setting*

The study was conducted from 31 August 2017 to 24 September 2017 in Aji Muhammad Parikesit Hospital of Kutai Kartanegara Region, East Borneo, Indonesia.

### *Sample*

The population was postpartum mothers in Kutai Kartanegara Region, Indonesia. The number of samples in this study was 95 respondents selected using purposive sampling. The inclusion criteria were postpartum mothers staying in Kutai Kartanegara, and doing antenatal care in Kutai Kartanegara and willing to be respondents.

### *Instrument*

A questionnaire was used to measure the characteristics of the respondents consisting mother's age, education level, parity status, distance of pregnancy, antenatal visit, and antenatal care based on standard. Instrument for measuring labor complication was medical record of respondents (secondary data). Medical record is record of mother's condition that showed childbirth process whether mothers got prolonged labor, pre-eclampsia, hemorrhagic, infection (rupture of membranes), and dystocia. ANC standard was based on WHO and Department of Health's antenatal care standard. Validity and reliability by Winarni ([Winarni & Wilopo, 2009](#)) with Cronbach's alpha 0.9437. The operational definition of each variable was defined as following: 1) Antenatal care: Standardized ANC is when mothers have minimal antenatal care (4 times) visits with good quality services based on WHO and Department of Health standard; Unstandardized ANC is when mothers have minimal antenatal care visits and did not get quality services, or mothers did not have minimal antenatal care (less than 4 times) visits and got quality services, or mother did not have minimal antenatal care (less than 4 times) visits nor got quality services; 2) Mother's age: Risk age (<20 years old and >35 years old) and not risk (20-35 years old); 3) Level education: Low ( $\leq$  senior high school) and High (> senior high school); 4) Parity: Risk ( $\geq$  4 times childbirth) and Not risk (< 4 times childbirth); and 5) Distance of

pregnancy: Risk (< 2 years interval) and Not risk ( $\geq$  2 years interval).

#### *Ethical consideration*

This research had been approved by the Committee ethics of the University of Aisyiyah Yogyakarta, with number: 05/KEP-UNISA/VIII/2017.

#### *Data analysis*

The univariate analysis was conducted to describe the characteristics of the respondents including the mother's age, educational level, parity, and distance of pregnancy. Bivariate analysis was done to identify factors influencing labor complication. Bivariate

analysis used Chi square test. Multivariate analysis was done to identify dominant factor influencing labor complication. Multivariate analysis used logistic regression test.

## RESULTS

Table 1 presents data on the characteristics of respondents, the majority of mother's age were at risk (69.5%), and 55.8% were had high education level. Of 63.6% of the mothers had at risk parity, and 72.6% of them had no risk distance of pregnancy.

**Table 1** Frequency distribution of the characteristics of the respondents (n=95)

Characteristics	f	n
Mother's age	29	30.5
At risk	66	69.5
No risk		
Education level	42	44.2
Low	53	55.8
High		
Parity	35	36.8
At risk	60	63.2
No risk		
Distance of Pregnancy	26	27.4
At risk	69	72.6
No risk		

**Table 2** Frequency distribution of antenatal care (n=95)

Antenatal Care	f	(%)
Unstandardized	39	41.1
Standardized	56	58.9

Table 2 shows that most of the respondents (58.9%) showed that the mothers did not get standardize antenatal care, while Table 3 shows that 51 mothers (53.7%) got labor complication during childbirth. And the results of bivariate analysis in the Table 4 showed the labor complication influenced by antenatal care (p-value 0.000), mother's age (p-value

0.000), distance of pregnancy (p-value 0.020), education level (p-value 0.024), and parity (p-value 0.026). While the results of bivariate in the Table 5 showed the antenatal care was influenced by the mother's age (p-value 0.021), parity (p-value 0.015), and education level (p-value 0.115)

**Table 3** Frequency distribution of labor complication (n=95)

Labor complication	f	(%)
Having complication	51	53.7
No complication	44	46.3

**Table 4** Relationship between ANC, mother's age, education level, parity, and distance of pregnancy with labor complication using Chi-Square test (n=95)

Variable	Maternal Labor Complication			
	Complication	No Complication	p-value	PR 95% CI
	f (%)	f (%)		
ANC				
Unstandardized	30 (76.9)	9 (23.1)	0.000	2.051 (1.404-2.997)
Standardized	21 (37.5)	35 (62.5)		
Age				
Risk	24 (82.8)	51 (7.2)	0.000	2.023 (1.448-2.826)
No Risk	27 (40.9)	39 (59.1)		
Education				
Low	28 (66.7)	14 (33.3)	0.024	1.536 (1.056-2.234)
High	23 (43.4)	30 (56.6)		
Parity				
Risk	24 (68.6)	11 (31.4)	0.026	1.524 (1.065-2.181)
No Risk	27 (45.0)	33 (55.5)		
Distance of pregnancy				
Risk	19 (73.1)	7 (26.9)	0.020	1.576 (1.116-2.224)
No Risk	32 (46.4)	37 (53.6)		

**Table 5** Relationship between the mother's age, education level, parity, and distance of pregnancy, with antenatal care using Chi-Square test (n=95)

Variable	Antenatal Care				p-value	PR 95% CI
	Unstandardized	Standardized				
	f (%)	f (%)				
Mother's age						
Risk	17 (58.6)	12 (41.4)	0.021	1.759 (1.112-2.781)	1	
No Risk	22 (33.3)	44 (66.7)				
Educational level	21 (50.0)					
Low	18 (34.0)	21 (50.0)	0.115	1.472 (0.909-2.384)	1	
High		35 (66.0)				
Parity	20 (57.1)	15 (42.9)				
Risk	19 (31.7)	41 (68.3)	0.015	1.805 (1.128-2.886)	1	
No Risk						
Distance of pregnancy						
Risk	10 (38.5)	16 (61.5)	0.753	0.915 (0.523-1.601)	1	
No Risk	29 (28.3)	40 (40.7)				

The results of data analysis in the Table 6 showed that antenatal care, mother's age, and parity had a significant correlation with maternal labor complication. Model 2 was selected with higher R<sup>2</sup> (0.318), lower -2 log

likelihood (105.395) and deviance (72.6), with significant of 95% confident interval. Logistic regression test showed that the dominant variable influencing maternal labor complication was mother's age (OR 5.837),

indicating that risk-age mothers had a probability of 5.837 times at risk of maternal labor complication compared with mothers

with no risk age, with minimum risk of 1.880 to 18.129 times.

**Table 6** Dominant factors influencing maternal labor complication using logistic regression test (n=95)

Variable	Model 1 OR 95% CI	Model 2 OR 95% CI	Model 3 OR 95% CI
ANC			
Standardized	5.556 (2.213-13.949)	4.733 (1.788-12.527)	4.407 (1.919-11.822)
Unstandardized	1	1	1
Age			
Risk		5.837 (1.880-18.129)	5.409 (1.718-17.035)
No Risk		1	1
Parity			
Risk			1.555 (0.566-4.272)
No Risk			1
R <sup>2</sup>	0.195	0.318	0.365
-2log likelihood	116.231	105.395	104.663
Deviance	73.6	72.6	72.6

## DISCUSSION

The results showed that there was a correlation between antenatal care and maternal labor complication. The value of PR was 2.051, which mean that the woman who got unstandardized ANC have 2.051 times at risk of maternal labor complication rather than mother who got standardized ANC service. Previous research ([Fantu, Segni, & Alemseged, 2010](#)) indicated that the comprehensive improvement of ANC service was recommended to prevent the childbirth complication. The most labor complication happened in Kutai Kartanegara Region was prolonged labor (35.5%).

Maternal labor complication in Kutai Kartanegara was caused by some factors, such as prolonged labor, and pre-eclampsia. Some pregnant mothers did not get antenatal care based on standard; in fact, they never get maternal class. The result of this study were in line with the research of Taguchi et al. that ANC visit less than four times may increase to the mother's death risk 3.3 times than by checking 4 times or more ([Taguchi, Kawabata, Maekawa, Maruo, & Dewata, 2003](#)). The first check at the age of pregnancy more than four months increase the death risk 3.7 times than

the first check, which were 1 to 3 months. ANC will do screening process to pregnant mothers with risk factor and attempt to prevent the complication so that the mothers is healthy during pregnancy, childbirth and parturition period without both physic and mental trauma damage.

Antenatal care for every woman does not only focus on the quantity but also quality. The mothers who fulfilled total visit four times minimum but had no experience in having checking procedure, and obtaining information about her pregnancy, the mothers may experience complication due to lack of detection and information in facing the complication that possibly happen to her pregnancy even both childbirth and parturition. Correlation between age and labor complication was showed with p-value 0.000, which mean that there was meaningful correlation between age and maternal labor complication. The value of PR was 2.203 which clarified that woman with at risk of age was 2.203 times at risk than pregnant mother without risk of age. The age factor either too young or too old may increase mortality.

The research showed that woman whose age 35-54 years would cause labor complication

such as long childbirth and dysfunction, bleeding, breech, mal presentation, caesarean section. A mother whose age 45 years with multipara is at risk to had experience chronic hypertension, at primipara is riskier to experience bleeding, hypertension in pregnancy and birth less than 32 weeks. Meanwhile, Cavazos-Rehg et al. shows that mother's age is related to premature childbirth, chorioamnionitis, endometritis, postpartum hemorrhage, fetal distress, hypertension, mild preeclampsia, severe preeclampsia, eclampsia, superimposed preeclampsia, and other complications ([Cavazos-Rehg et al., 2015](#)).

Correlation between education and maternal labor complication was showed with *p*-value 0.024 and PR value was 1.536 explained that mother whose low education was 1.536 times at risk to experience complication than high education pregnant mother. The mother's education and the family's economy status were far-reaching determinant to make childbirth complication, which this determinant would affect the determinant between high education mother who should notice her self-healthy and family-healthy and able to receive information about her pregnancy and health from health workers. This was in line with research by Pembe et al. shows that low education mother has less awareness on complication signs ([Pembe et al., 2010](#)).

Education is the key of mother to take decision in searching health service when complication occurs. The awareness upon the danger signs of complications is related to age, parity, and total antenatal visit. High economy status mother has more choices in using health service. However, low education mother usually consider the cost to spend on ANC service ([Lori & Starke, 2012](#)).

The result also showed the correlation between parity and maternal labor complication, with *p*-value 0.026 and PR value was 1.524 explained that mother with at risk parity was 1.524 times at risk of maternal labor complication than mother with no risk parity. The parity of 2-3 was the safest parity

according to maternal death. The first parity and more than four parities increased the risk of maternal mortality. The number of mortalities usually increased started from the fourth childbirth and drastically increased at the fifth childbirth and every next infant. The mother who pregnant and bear for the first time would be risk because that mother is not both medically and mentally ready, and more than four parities will make mother's physic decreased ([MOH, 2013](#)).

Too much childbirth in woman will make variety of complications, which cause the mother's death such as bleeding, uterine rupture and infection. Mother with parity of >5 will increase the number of death than mother with <4 parity. This shows that parity may give contribution to maternal labor complication ([Ujah et al., 2005](#)).

The result of analysis of the correlation between the distance of pregnancy with maternal labor complication showed that *p*-value was 0.020 and PR value was 1.576, explained that mother with risky distance of pregnancy was 1.576 times at risk having labor complication than pregnant mother with no risky distance of pregnancy. Short pregnancy distance might increase the number of pain and maternal mortality. Short interval (<2 years) pregnancy has a higher trend incidence rate to bleeding at trimester III, premature rupture of membranes, anemia and maternal mortality. The safest spacing for pregnancy and birth is 2 years. This is expected to give time for mother in time of lactation and allowing mother to recover. The recommended pregnancy spacing in order to save the program of pregnancy at least 2 years to assure or body recovered from extra need in pregnancy and lactation ([Conde-Agudelo & Belizán, 2000](#)). Too close pregnancy distance because mother has higher risk to experience complication. Distance of pregnancy less than 19 months relates to the decreased of number of success vaginal delivery after previous cesarean section ([Huang, Nakashima, Rumney, Keegan Jr, & Chan, 2002](#)).

Multivariate analysis showed that age has significant correlation with maternal labor complication based on value of OR 5.409, explained that mother whose risk of age will be at risk 5.409 times getting maternal labor complication rather than mothers with no risk. Too young age (<20 years) is risk age to increase labor complication because a woman is not ready physically or psychologically so that she has no ability to treat and prepare childbirth, but older woman (>35 years) will experience labor complication due to decreased function of female organs.

## CONCLUSION

Based on the results of the study, it can be concluded that majority of antenatal care in Kutai Kartanegara Region was based on standard. There was a significant relationship between antenatal care, mother's age, education level, parity, distance of pregnancy with maternal labor complication. The dominant factor related to maternal labor complication was age of the mothers.

### Declaration of Conflicting Interest

None declared.

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### Author Contribution

All authors contributed equally in this study.

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