

RESEARCH ARTICLE

Analysis of several risk factors for postpartum hemorrhage at KRMT Wongsonegoro Hospital, Semarang City

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Abstract

Background: Postpartum haemorrhage is cumulative blood loss more than 1,000 ml after cesarean section or more than 500 ml after the fetus is born vaginally after the 3rd stage of labor is completed accompanied by signs of hypovolemia. Based on data from the Directorate of Maternal Health in 2010-2013, the biggest cause of maternal death is bleeding.

Methods: This study used a quantitative analytic observational approach to case control. The cases in this study were mothers who were diagnosed with postpartum hemorrhage in 2021. While the controls in this study were mothers who were not diagnosed with postpartum hemorrhage in 2021. The sample used consecutive sampling technique.

Results: Total sample of 306 people, namely 153 cases and 153 controls. In the chi square test and logistic regression analysis, namely age ($p=0.234$, $OR_1=1.495$), parity ($p=0.005$, $OR_1=2.233$, $OR_2=2.261$), pregnancy interval ($p=0.034$, $OR_1=1.760$), labor induction ($p=0.268$, $OR_1=1.356$), cesarean section ($p=0.001$, $OR_1=0.014$), retained placenta ($p=0.001$, $OR_1=15.457$, $OR_2=7.245$), and preeclampsia ($p=0.012$, $OR_1=0.329$).

Conclusion: There is a relationship between parity, gestational spacing, cesarean section, retained placenta, and preeclampsia with postpartum hemorrhage. Variable retained placenta has the highest risk for postpartum hemorrhage, continued parity, preeclampsia, and cesarean section. Caesarean section and preeclampsia variables are protective factors.

Keywords: Risk Factors, Maternal, Postpartum Bleeding



INTRODUCTION

Maternal death, as defined by the World Health Organization (WHO), is the accidental death of a woman during pregnancy or within 42 days after giving birth that is not caused by an accident. According to data from WHO, worldwide it is estimated that there were 295,000 cases of maternal death in 2017, resulting in an MMR of 211 per 100,000 live births.¹ According to the 2012 SDKI, the MMR in Indonesia is 359/100,000 live births.² Meanwhile in Central Java in 2020 there were 530 cases (MMR 98.6 per 100,000 live births).³

Bleeding is the main cause of maternal death, based on statistics from the Directorate of Maternal Health for 2010-2013. The next causes are hypertension, infection, prolonged labor and abortion. According to data from the Directorate of Maternal Health in 2012, bleeding was the most common cause of maternal death, namely 30.1%. Meanwhile, in the following year, this figure increased to 30.3%.²

According to ACOG, postpartum hemorrhage is a cumulative blood loss of more than 1,000 ml after completion of the 3rd stage of labor accompanied by symptoms and signs of hypovolemia.⁴ Symptoms and signs of hypovolemia include patients complaining of weakness, shivering, cold sweat, pulse > 100 x/minute, and systolic < 90 mmHg.⁵ Nearly a third of mothers who undergo caesarean section delivery experience a loss of more than 1,000 mL of blood. Uterine atony, genital tract trauma, or both are the most common causes of postpartum hemorrhage.⁴

In previous research conducted by Rodiani et al in 2019, the factors age, parity and gestational spacing were related to postpartum hemorrhage.⁶ Here parity is related to the incidence of postpartum hemorrhage in accordance with the theory put forward by Cunningham in 2018.⁴ However, according to research by Fathina (2015) and Artika (2020), age and parity are not related to postpartum bleeding.^{7,8} According to Ononge et al in 2016, stated that caesarean section delivery, multiple fetuses, macrosomia, HIV, labor induction, and a history of previous births are associated with postpartum hemorrhage. Meanwhile, maternal age, gestational age, parity, anemia and episiotomy were not related to postpartum bleeding.⁹

In an initial preliminary study at the KRMT Wongsonegoro Hospital, Semarang City, according to data from the last 3 years, there were 205 incidents of postpartum hemorrhage out of 2211 total deliveries (9.3%) in 2019. Then in 2020 and 2021 this increased to 10.6% and 11.04%. Because there are still differences in results in previous studies and cases of postpartum hemorrhage are still increasing, the author was encouraged to conduct research on the risk factors for postpartum hemorrhage at the KRMT Wongsonegoro Hospital, Semarang City.

METHOD

This research is quantitative research in the form of an analytical observation study using the case control method. This research was conducted in January 2023 at the KRMT Wongsonegoro Regional Hospital, Semarang City. The population in this study were women giving birth in 2021. This sample was selected using consecutive sampling technique. There were samples of 153 cases and 153 controls.

The inclusion criteria in this study were for the case group: mothers who were diagnosed with postpartum hemorrhage in 2021 with complete medical record data, and for the control group of mothers who were not diagnosed with postpartum hemorrhage in 2021. Meanwhile, the exclusion criteria were women who gave birth with multiple fetuses, macrosomia babies, coagulation disorders, prolonged labor, hydramnios, chorioamnionitis, and instrumental delivery (forceps or vacuum) in 2021.

This research uses univariate analysis tests, bivariate analysis uses the Chi Square test, and multivariate analysis uses logistic regression analysis. This research has received ethical permission issued by KEP RSUD KRMT Wongsonegoro Semarang City number B/070/588/I/2023.

RESULTS

Table 1 Frequency distribution of each variable

Variable	f	%
Age		
<20 years and >35 years (at risk)	55	18.0
20-35 years (not at risk)	251	82.0
Parity		
Multiparity (risky)	232	75.8
Primiparity (no risk)	74	24.2
Pregnancy spacing		
<2 years and >5 years (at risk)	92	30.1
2-5 years and 0 years (no risk)	214	69.9
Labor induction		
Yes	210	68.6
No	96	31.4
Cesarean section		
Yes	92	30.1
No	214	69.9
Retained placenta		
Yes	28	9.2
No	278	90.8
Preeclampsia		
Yes	30	9.8
No	276	90.2

Based on table 1, the majority of respondents aged 20-35 years were 251 people (82%), multiparities were 232 people (75.8%), pregnancy intervals were 2-5 years and 0 years were 214 people (69.9%), 210 people (68.6%) underwent induction of labor, 214 people (69.9%) did not use the cesarean section method, 278 people (90.8%) did not have retained placenta, and 276 people (90) did not use preeclampsia. 2%).

Table 2. Fisher Exact Chi Square Test

Characteristics	Case		Control		OR (95% CI)	P value
	f	%	f	%		
Age						
<20 years and >35 years (at risk)	32	11.0	23	15.0	1,495 (0.828-2.697)	0.234
20-35 years (not at risk)	121	79.0	130	85.0		
Parity						
Multiparity (risky)	127	83.0	105	68.6	2,233 (1,298-3,842)	0.005
Primiparity (no risk)	26	17.0	48	31.4		
Pregnancy spacing						
<2 years and >5 years (at risk)	55	36.0	37	24.2	1,760 (1,072-2,889)	0.034
2-5 years and 0 years (no risk)	98	64.0	116	75.8		
Labor induction						
Yes	110	71.8	100	65.4	1,356 (0.835-2.202)	0.268
No	43	28.2	53	34.6		
Cesarean section						
Yes	3	2.0	89	58.2	0.014 (0.004-0.047)	0.001
No	150	98.0	64	41.8		
Retained placenta						
Yes	26	17.0	2	1.4	15,457 (3,599-66,387)	0.001
No	127	82.0	151	98.6		
Preeclampsia						
Yes	8	5.2	22	14.4	0.329 (0.141-0.763)	0.012
No	145	94.8	131	85.6		
Amount	153	100	153	100		

Table 2 shows the results of the Chi Square test. The age of respondents in the case group was mostly 20-35 years, namely 121 people (79.0%). Meanwhile, the majority of respondents in the control group were 20-35 years old, namely 130 people (85.0%). The results of the bivariate analysis obtained a value of $p = 0.234$, that age was not related. Even though the Odds Ratio value is 1.495 (> 1) but the p value is > 0.05 , the age variable has no relationship with postpartum hemorrhage.



The parity of respondents in the majority case group was multiparity, 127 people (83.0%). Meanwhile, the majority of respondents in the control group were multiparity, namely 105 people (68.6%). The results of bivariate analysis showed a p value = 0.005, that there was a relationship between parity and postpartum bleeding. The OR (Odds Ratio) in this test is 2.233 (> 1), meaning that parity is a risk factor for postpartum hemorrhage.

The pregnancy interval for respondents in the majority case group was 2-5 years, as many as 98 people (64.0%). Meanwhile, the majority of respondents' pregnancy interval in the control group was 2-5 years, namely 116 people (75.8%). The results of the bivariate analysis obtained a value of $p = 0.034$, meaning that the distance between pregnancies is related. The Odds Ratio for this test is 1.760 (> 1), meaning that the distance between pregnancies is a risk factor for postpartum hemorrhage.

The majority of respondents in the case group underwent induction, namely 127 people (71.8%). The majority of control group respondents who underwent induction were 100 people (65.4%). The results of the bivariate analysis showed a p value = 0.268, that labor induction was not related. Even though the OR value (Odds Ratio) is 1.356 (> 1) but the p value is > 0.05 , the labor induction variable has no relationship with postpartum bleeding.

The majority of respondents in the case group did not have a caesarean section, 150 people (98.0%). The majority of control group respondents performed caesarean sections, namely 89 people (58.2%). The results of the bivariate analysis showed a p value = 0.001, that caesarean section was related. The OR (Odds Ratio) in this test is 0.014 (< 1), meaning that caesarean section is a protective factor for reducing postpartum bleeding.

The majority of respondents in the case group were not diagnosed with retained placenta, 127 people (82.0%). The majority of control group respondents did not experience retained placenta, namely 151 people (98.6%). The results of the bivariate analysis showed a p value = 0.001, indicating that placental retention was related. The OR (Odds Ratio) in this test is 15.457 (> 1), meaning that placental retention is a risk factor for postpartum hemorrhage.

The majority of respondents in the case group did not have a history of preeclampsia, namely 145 people (94.8%). Meanwhile, the majority of respondents in the control group did not have a history of preeclampsia, namely 131 people (85.6%). The results of the bivariate analysis showed a p value = 0.012, indicating that preeclampsia was related. The OR (Odds Ratio) in this test was 0.329 (< 1), meaning that good management of preeclampsia includes protective factors to reduce postpartum bleeding.

Table 3. Logistic regression test

Variable	p-value	OR	95%CI	
			<i>Lower</i>	<i>Upper</i>
Age	0.288	1,603	0.671	3,828
Parity	0.038	2,261	1,047	4,883
Pregnancy spacing	0.308	1,460	0.705	3,027
Cesarean section	0.001	0.017	0.005	0.058
Retained placenta	0.011	7,221	1,569	33,233
Preeclampsia	0.007	0.208	0.067	0.650

Based on table 3, variables with a p value > 0.05 mean that there is no influence on postpartum bleeding, namely the variables age (0.208) and pregnancy distance (0.308). This means that age and gestational spacing do not affect postpartum bleeding. Placental retention is the dominant factor influencing postpartum bleeding based on the largest Odds Ratio value, namely 7.2 times (7.245). Then continued parity 2.3 times (2.261). Meanwhile, the caesarean section (0.017) and preeclampsia (0.208) variables have OR (Odds Ratio) values < 1, which means they are protective factors to minimize postpartum bleeding.

DISCUSSION

Postpartum hemorrhage is a cumulative blood loss of more than 1,000 ml after completion of the 3rd stage of labor accompanied by symptoms and signs of hypovolemia.⁴ Postpartum hemorrhage has many risk factors, including primiparity, high parity, early pregnancy and age over 35 years, previous history of postnatal hemorrhage, birth spacing of less than 2 years or more than 5 years, large fetal size, twin fetuses, preeclampsia, eclampsia, and others. Women with primiparity and high parity are at high risk of uterine atony, which has bleeding complications.⁴

Most of the case respondents were in the 20-35 year age category, 121 people (79%). From the results of the bivariate analysis, it was found that age was related, with a p value of 0.234 and an Odds Ratio value of 1.495 (> 1). This research is in line with Fathina F. (2015) that age is not related, with a p value of 0.253.⁷ This research differs from Rodiani (2019) in that age is related, with a p value of 0.001.⁶ Under 20 years of age, reproductive function has not yet developed and the uterus is not ready for contractions, so it is not ready for pregnancy and childbirth. At the age of less than 20 years it can cause anemia, because they are mentally immature, emotions still tend to be unstable, so they easily experience stress which results in reduced nutritional needs during pregnancy. The result of anemia itself is weakening of uterine contractions during and after delivery. This can cause postpartum bleeding. Over the age of 35 years, there is a decline in reproductive function, for example reduced endometrial contractions during childbirth, weakening of the muscles in the uterus and muscles in the pelvis. Age under 20 years and over 35 years is one of the factors causing uterine atony.^{6,10-12}



Respondents who experienced postpartum hemorrhage were mostly in the multiparity category, namely 127 people (83%). From the chi square test, it was found that parity was related to postpartum bleeding with a p value of 0.005. The Odds Ratio in this test is 2.233 (> 1), meaning that parity is a risk factor for postpartum hemorrhage. And the results of the multivariate analysis showed that the Odds Ratio value was 2.261, which means that multiparity had an effect of 2.7x. This research is in line with Rodiani (2019) that parity is related, with a p value of 0.001.⁶ This research differs from Fathina F. (2015) in that parity is not related, with a p value of 0.953.⁷ Primiparity is the possibility of postpartum bleeding due to the mother's unpreparedness for giving birth so that lacerations of the birth canal can occur and the muscles in the birth canal are still stiff. For multiparities, postpartum bleeding can occur due to uterine overdistension and myometrial weakness caused by multiple pregnancies. This uterine overdistension can cause hypotonia and ultimately uterine atony.⁴

Respondents who experienced postpartum hemorrhage were mostly in the categories < 2 years and > 5 years (at risk), namely 81 people (52.9%). From the results of the bivariate analysis, it was found that the distance between pregnancies was related, with a p value of 0.03. The Odds Ratio in this test is 1.760 (> 1), meaning that pregnancy spacing is a risk factor. This research is in line with Rodiani (2019) that the distance between pregnancies is related, with a p value of 0.004.⁶ This study differs from Buntoro ID (2018) in that pregnancy spacing is not related, with a p value of 0.414.¹³ The condition of the uterus is less than 2 years of the previous pregnancy, the contractions in the uterus are not yet perfect and do not provide optimal nutritional reserves for the fetus so that the mother can experience anemia and the fetus may experience developmental disorders. Pregnancies that are too far apart (more than 5 years) are also associated with increasing maternal age. As we age, the muscles in the uterus and pelvis will weaken.⁶

Respondents who experienced postpartum hemorrhage were mostly in the induction category, namely 110 people (71.8%). From the results of the bivariate analysis, it was found that induction of labor was not related, with a p value of 0.268 and an Odds Ratio value of 1.356 (> 1). This research is in line with Shibghy S. (2021) that induction is not related, with a p value of 0.368.¹⁴ This research is different from Sam O. (2016) in that there is a relationship between giving induction and postpartum bleeding with a p value of 0.004.⁹ Induction of labor using prostaglandins or oxytocin often results in uterine atony.⁴ Uterine muscle fatigue can occur if you use prostaglandins or oxytocin for a long time continuously and will cause uterine atony which can increase the risk of postpartum bleeding. The use of prostaglandins or oxytocin can also cause uterine rupture due to excessive contractions of the uterus and for a long time.¹⁴

Respondents who experienced postpartum hemorrhage were mostly in the category of births that did not use the cesarean section method, namely 150 people (98%). From the results of

the bivariate analysis, it was obtained that the p value = 0.001 and the Odds Ratio was 0.014 (< 1), meaning that caesarean section is a protective factor for reducing postpartum bleeding. This research is in line with Sam O. (2016) that there is a relationship between caesarean section delivery and postpartum bleeding with a p value of 0.001.⁹ This research is different from Wahyu AWF (2015) in that there is no relationship between caesarean section delivery and postpartum bleeding with a p value of 0.646.¹⁵ Delivery using the cesarean section method includes protective factors to reduce postpartum bleeding. This caesarean section reduces the risk of placental retention, prolonged labor, uterine atony and birth canal lacerations. If caesarean section treatment is carried out correctly and quickly, postpartum bleeding can be reduced¹⁵

Most of the respondents who experienced postpartum hemorrhage were in the category of not experiencing retained placenta, namely 127 people (82%). From the results of bivariate analysis, it was found that placental retention was related, with a p value of 0.001. The Odds Ratio in this test is 15.457 (> 1), meaning that placental retention is a risk factor for postpartum bleeding. And the results of the multivariate analysis showed that the largest OR (Odds Ratio) value was 7.221, which means that placental retention had an effect of 7.2x. This research is in line with Pubu Z. (2021) that there is a relationship between placental retention and postpartum bleeding with a p value of 0.001.¹² This research differs from Johanna B. (2017) in that there is no relationship between placental retention and postpartum bleeding with a p value of 0.12.¹⁶ Retention of the placenta will interfere with uterine contractions, resulting in the blood vessels around the placental adhesions not being squeezed by muscle fibers or the blood vessels not closing. So bleeding occurs and becomes more abundant. The muscle fibers in the uterus cross each other, so that when there is a contraction, these fibers can pinch the blood vessels so that the bleeding stops. To prevent retained placenta, namely by active management of the third stage. Active management of the third stage is a treatment that strengthens the uterus to contract and will shorten the third stage. The management itself includes administering uterotonics (oxytocin 10 units, ergonovine 0.2 mg, methergin, carboprost tromethamine, or misoprostol) intramuscularly within 1 minute in the outer third of the mother's cauda dextra thigh after the baby is delivered. Then after 2 minutes the umbilical cord is clamped using a clamp 3 cm from the navel, and the contents of the umbilical cord are pushed towards the mother. Then clamp it again with clamps about 2 cm from the previous clamp. Then the second clamp is moved 5-10 cm to the vulva after the part between the two clamps. Next, stretch the umbilical cord by placing your left hand on the pubic symphysis to detect contractions in the uterine fundus. Then gently tighten the umbilical cord downwards using the right hand. Then after feeling contractions of the uterine fundus, the hand on the stomach presses the uterus towards the upper back. If after 30-40 seconds the placenta does not come out, then stop the tension and feel for the next contraction. If the placenta is still not separated after 15 minutes, then repeat the administration of uterotonics



(oxytocin 10 units, ergonovine 0.2 mg, methergin, carboprost tromethamine, or misoprostol), insert a catheter if the bladder is full, and repeat the tension 15 minutes later. Then make a referral if the placenta does not come out 30 minutes after the baby is born. If there is bleeding, do the placenta manually.¹⁷

Most of the respondents who experienced postpartum hemorrhage were in the category of not experiencing preeclampsia, namely 145 people (94.8%). From the results of the bivariate analysis, it was obtained that the p value = 0.012 and the Odds Ratio was 0.329 (< 1), meaning that good management of preeclampsia includes protective factors to reduce postpartum bleeding. This research is in line with Ika NM (2017) that there is a relationship between preeclampsia and postpartum bleeding with a p value of 0.028.¹⁸ This research is different from research by Muhammad AR (2020) which stated that there was no relationship between preeclampsia and postpartum hemorrhage with a p value of 0.616.¹⁹ Good management of preeclampsia includes protective factors to reduce postpartum bleeding. This reduces the risk of reduced fibrinogen which will prevent postpartum bleeding from occurring. Preeclampsia causes cyclic vasospasm and endothelial damage. Endothelial damage causes edema, hypertension, and proteinuria. Cyclic vasospasm causes a decrease in organ perfusion which will destroy erythrocytes. This situation causes hypofibrinogenemia, namely a reduction in fibrinogen in the blood. If the reduction in fibrinogen is too much, it will make bleeding difficult to stop.¹⁸

CONCLUSION

In this study, the relationship between postpartum bleeding was parity, gestational spacing and placental retention. The retained placental factor has the greatest influence on the occurrence of postpartum bleeding, namely 7.2 times. Followed by a parity factor of 2.3 times. The factors age and induction of labor have no relationship to postpartum bleeding. Meanwhile, caesarean section and preeclampsia are protective factors to reduce postpartum bleeding. What is meant is good and appropriate handling methods.



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