Factors Related With Post Partum Hemorrhage At Dr. H. Moch. Ansari Saleh Banjarmasin Hospital

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Abstract. Post-Partum Hemorrhage (PPH) contributes 28% of maternal mortality rates in developing countries, especially Indonesia. In Ansari Saleh General Hospital, 11.9% PPH cases in 2012 there were 7.5% cases in 2013 and 13.3% cases in 2014. The Purpose of this study is know the factors associated with the incidence of PPH.This research is a quantitative observational study using a case-control study design. The subject of this study is the case group, namely the mother after birth with postpartum hemorrhage and the control group is the normal postpartum where the number of samples in the case group is 250 people and the control group is 250 people. Statistical tests use logistic regression. Based on the results of the analysis obtained data that significant factors associated with the incidence of postpartum hemorrhage are Labor Complications (p-value 0,000; OR 13.9), Parity (p-value 0,000 and OR 2.7), Anemia (p-value 0.019; OR 1.8), Age (p-value 0.018; OR 1.8) and Spacing of Pregnancy (p-value 0.013; OR 1.8). The variables most associated with the incidence of postpartum hemorrhage are complications of Labor, Parity, Anemia Status, Age and Spacing of Pregnancy.

Keywords: PPH ,Complication of Labor, Parity, Anemia, Age, Pregnancy Spacing

1 Introduction

Maternal death is one of the health problems that continues to be of concern to the world community. There are 180 countries that approve the Millennium Development Goals (MDGs) where one of the goals of the MDGs in 2015 is improving maternal health. Maternal deaths are made as expected and which are priorities that must be addressed through systematic efforts and concrete actions to address existing problems, ensure health and improve the quality of life and women. Worldwide according to the World Health Organization (WHO), 94% of maternal deaths are caused by labor or birth problems, the ratio of maternal deaths in developing countries is 450 maternal deaths per 100,000 live births. There are several factors that cause maternal death both directly and indirectly. One of the direct causes of maternal death is bleeding (RI Ministry of Health, 2014). WHO estimates that as many as 150,000 women die each year due to Post Partum Bleeding [1].

Post partum hemorrhage (Haemorrhage Post Partum) is bleeding that exceeds 500 ml postpartum. According to the time of post partum hemorrhage can be classified into 2 namely primary post partum hemorrhage that is bleeding that occurs within 24 hours after the baby is born and secondary post partum hemorrhage is bleeding that occurs after 24 hours after the baby is born [2].

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Regional General Hospital (RSUD) Dr. H. Moch Ansari Saleh Banjarmasin, besides being ateaching hospital, is also a government hospital and a referral center, so that patients in Dr. H. Moch Ansari Saleh Banjarmasin can represent most post partum hemorrhage sufferers in Banjarmasin City. Where in 2012 out of 1,037 births there were 124 cases (11, 9%), in 2013 of 1,265 births there were 96 cases (7.5%) experiencing post partum hemorrhage, whereas in 2014 it increased to maternity with 192 (13.3%) cases of post partum hemorrhage from 1,439 births.

From the data in RSUD Dr. H. Moch Ansari Saleh can be known that the incidence of Post Partum Bleeding every year has increased and there are no studies examining the factors associated with the incidence of Post Partum Bleeding so researchers are interested in examining the factors associated with the incidence of Post Partum Bleeding.

2 Research Metode

This research is a quantitative study with a case control study design. This research was conducted in December 2015, this research was conducted at Dr.H.Moch Ansari Saleh Hospital, Banjarmasin, January 2014-December 2015.

The population in this study were all post-partum mothers recorded in the register in the puerperium and delivery room in RSUD. dr. H. Moch Ansari Saleh Banjarmasin from January 2014 - September 2015. 3258 people. The sample of this study was a portion of all mothers who experienced post partum hemorrhage and some women who did not experience post partum hemorrhage at the Regional Hospital. dr. H. Moch Ansari Saleh Banjarmasin period January 2014 - September 2015. In this study the level of accuracy was used = 0.05 (5%) and the total population of maternal women in hospitals. dr. H. Moch Ansari Saleh Banjarmasin from January 2014 - September 2015. 3258 people Based on the sample formula, a total of 250 cases and 250 controls were obtained.

2.1 Data Analysis

1. Univariate Analysis
   This analysis aims to explain and describe the characteristics of each independent variable research variables
2. Bivariate Analysis
   The analysis is performed to see the relationship between variables. From the data obtained then analyzed using a statistical technique that is Chi-Square correlation test because the variables are categorical ... For the analysis, this study uses a 95% Confidence Interval (CI) or alpha (α) = 5% so that if $p \leq 0.05$, then Ho is rejected, meaning that there is a statistically significant relationship between the two variables and if $p > 0.05$, then Ho fails to be rejected, meaning that there is no statistically significant relationship between the two variables. Furthermore, to see the closeness of the relationship of the studied variables will be measured by Odds Ratio (OR). For case control studies calculated using the formula and 2x2 table.
3. Multivariate Analysis
   Multivariate analysis is used to see / find out which independent variable is most related to the dependent variable, namely early marriage. By using a simple logistic regression statistical test with prediction models.

The first step of multivariate analysis is to conduct bivariate selection, independent variables with p-values <0.25 or even though> 0.25 may enter multivariate if they are substantially important variables. Entering all the independent variables simultaneously into the multivariate model, the independent variables with p-values <0.05 that can remain in the model, while the variables p-value> 0.05 are excluded from the model one by one starting from the variable with the largest p-value. If the issued variable causes a large change in the coefficient (OR value) of the remaining variables (OR increases> 10%), then the variable is canceled and re-entered into the model. Variables with p-values <0.05 and have the largest OR value are determined as the most dominant variable.

3 Result and Discuccion

3.1 Univariate Analysis

Based on the results of the univariate analysis shown in table 4.1, it was found that mothers who had a parity of> 4 were 102 people (20.4%), maternal pregnancy distance kehamilan 2 years were 310 people (62%), postpartum mothers who had anemia as many as 124 people (24.8%), mothers who delivered macrosomia babies as many as 60 people (12%), mothers who experienced childbirth complications as many as 229 people (45.8%), mothers who experienced multiple pregnancy as many as 16 people (3.2%), age at risk of as many as 132 people (26.4%). For more details, please see the following table 1 resume:

Table 1. Resume of Univariate Analysis Results

No	Variabel & Kategori	Frekuensi	Persentage(%)
1	Parity		
	> 4	102	20.4
	≤ 4	398	79.6
	Number	500	100
2	Pregnancy Distance		
	≤ 2	310	62
	> 2	190	38
	Number	500	100
3	Anemia Status		
	Yes	124	24.8
	No	376	75.2
	Number	500	100
4	Makrosomia Babies		
	> 4000 gram	60	12
	≤ 4000 gram	440	88
	Number	500	100
5	Complication of Labour		
	Yes	229	45.8
	No	271	54.2
	Number	500	100
6	Age		
	Risk	132	26.4
	No Risk	368	73.6
	Number	500	100
7	Multiple Pregnancy		
	>1	16	3.2
	1	484	96.8
	Number	500	100

In table 1 we can see a homogeneous variable that is an independent variable which one of the categories has a value <15%, namely macrosomia infants> 4000 grams as many as 60 people (12%) and multiple pregnancy variables> 1 as many as 16 people (3.2%).

3.2 Bivariate Analysis

a. Relationship between parity and the incidence of post partum hemorrhage.
   The relationship of parity in postpartum mothers with the incidence of post partum hemorrhage in RSUD. Dr. H.M Ansari Saleh for the period of January 2014 - September 2015 can be seen in table 2 as follows:

Table 2. The relationship of parity in postpartum mothers with the incidence of post partum hemorrhage in RSUD. Dr. H.M Ansari Saleh Period January 2014 - September 2015.

Parity	HPP					P *Value*	OR (95% CI)
	Case		Control		Total	0.000	2,507 (1,584-3,968)
	N	%	n	%	n (%)		
> 4	69	13,8	33	6,6	102 (20,4 %)		
≤ 4	181	36,2	217	43,4	398 (79,6%)		
Number	250	50	250	50	500 (100 %)		

Table 2 shows that p value = 0.000 means there is a relationship between postpartum mothers who have parity> 4 with the incidence of post partum hemorrhage, where mothers who have parity> 4 are 2.5 times more likely to experience post partum hemorrhage compared to postpartum mothers who have parity ≤ 4 (95% CI: OR = 1.6 - 4.0).

b. The relationship between anemia status and the incidence of post partum hemorrhage
   The relationship between anemia status and the incidence of post partum hemorrhage in RSUD. Dr. H.M Ansari Saleh for the period of January 2014 - September 2015 can be seen in table 4.3 as follows:

Table 3. The relationship between anemia status and the incidence of post partum hemorrhage.

Anemia Status	HPP					P *Value*	Or (95% Ci)
	Case		Control		Total	0,001	2,105 (1,385-1,665)
	N	%	N	%	N (%)		
Yes	79	15,8	45	9	124 (24,8)		
No	171	34,2	205	41	376 (75,2)		
Total	250	50	250	50	500 (100)		

Table 3. Shows that p value = 0.001 means that there is a relationship between anemia status with the incidence of post partum hemorrhage, where there are mothers who have anemia more at risk of 2 times post partum hemorrhage compared with postpartum mothers who do not have anemia where (95% CI: OR = 1.4 -1.7).

Table 4. a relationship between the distance of pregnancy with the incidence of post partum hemorrhage

Pregnancy Spacing	HPP					P *Value*	Or (95% Ci)
	Case		Kontrol		Total		
	N	%	N	%	N (%)	0.003	1,729 (1,200-2,490)
≤ 2	171	34,2	139	27,8	310 (62%)		
> 2	79	15,8	111	22,2	190(38%)		
Number	250	50	250	50	500 (100)		

Table 4 shows that p value = 0.003 means that there is a relationship between the distance of pregnancy with the incidence of post partum hemorrhage, where pregnant women have a pregnancy interval ≤ 2 years more risk of experiencing post partum bleeding compared with postpartum mothers whose pregnancy spacing is> 2 years where (95 % CI: OR = 1.2 -2.5).

Relationship between infant macrosomia with the occurrence of post partum hemorrhage
Relationship between macrosomia infants and the incidence of post partum hemorrhage in RSUD Dr. H.M Ansari Saleh for the period of January 2014 - September 2015 can be seen in table 5 as follows

Table 5. Relationship between macrosomia infants and the incidence of post partum hemorrhage.

Makrosomia	HPP					P *Value*	OR (95% CI)
	Case		Control		Total		
	N	%	N	%	N (%)	0.039	1.858(1,064-3,244)
>4000 Gram	38	7,6	22	4,4	60 (12 %)		
≤ 4000 Gram	212	42,4	228	45,6	440 (88 %)		
Jumlah	250	50	250	50	500 (100)		

Table 5 shows that p value = 0.039 means that there is a relationship between macrosomia infants and the incidence of post partum hemorrhage, where post partum mothers who give birth to babies with birth weight> 4000 grams are twice as likely to experience post partum hemorrhage compared to post partum mothers who give birth to babies with birth weight <4000 grams where (95% CI: OR = 1.0 -3.2).

c. Relationship between labor complications and the incidence of post partum hemorrhage
The relationship of labor complications with the incidence of post partum hemorrhage in RSUD. Dr. H. M Ansari Saleh The period of January 2014 - September 2015 can be seen in table 4.5 as follows:

Table 6. The relationship of labor complications with the incidence of post partum hemorrhage

Complication Of Labour	HPP					P *Value*	Or (95% Ci)
	Case		Control		Total		
	N	%	N	%	N (%)	0.000	13,991 (9.062-21.599)
Yes	186	37,2	43	8,6	229 (45,8)		
No	64	12,8	207	41,4	271 (54,2)		
Number	250	50	250	50	500 (100)		

Table 6 shows that p value = 0.000 means there is a relationship between childbirth complications and the incidence of post partum hemorrhage, where postpartum mothers who experience childbirth complications are 14 times more likely to experience post partum hemorrhage compared to postpartum who did not experience childbirth complications where (95% CI : OR = 9.0 -21.5).

a. Relationship of multiple pregnancy with the incidence of post partum hemorrhage. Relationship of multiple pregnancy with the incidence of post partum hemorrhage in RSUD. Dr. H. M Ansari Saleh The period of January 2014 - September 2015 can be seen in table 4.7 as follows:

Table 7. Relationship of multiple pregnancy with the incidence of post partum hemorrhage

Multiple Pregnancy	HPP					P *Value*	Or (95% Ci)
	Case		Control		Total		
	N	%	N	%	N (%)	0.799	1.296 (0.475-3.537)
>1	9	1,8	7	1,4	16(3,2)		
1	241	48,2	243	48,6	484 (96,8)		
Number	250	50	250	50	500 (100)		

Relationship of multiple pregnancy with the incidence of perda Table 6 shows that p value = 0.799 means that there is no relationship between multiple pregnancy and the incidence of post partum hemorrhage.

a. Relationship between age and the incidence of post partum hemorrhage
   Relationship between age and the incidence of post partum hemorrhage in RSUD. Dr. H. M Ansari Saleh The period of January 2014 - September 2015 can be seen in table 7 as follows:

Table 8. Relationship between age and the incidence of post partum hemorrhage.

Age	PHPP					P *Value*	OR (95% CI)
	case		Control		Total		
	N	%	N	%	n (%)	0.002	1.952(1.299-2.933)
< 20 > 35	82	16,4	50	10	132 (26,4)		
20 – 35	168	33,6	200	40	368 (73,6)		
Number	250	50	250	50	500 (100)		

Table 8 shows that p value = 0.002 means that there is a relationship between maternal age after childbirth with the incidence of post partum hemorrhage, where postpartum mothers aged <20 -> 35 years of age are twice as likely to experience post partum hemorrhage compared to postpartum mothers aged 20 - 35 years in which (95% CI: OR = 1.3-3.0)

Multivariate Analysis

Bivariate Selection

From the results of the bivariate selection, only educational variables were not included in the multivariate modeling because it had a value of p> 0.25. The results of bivariate selection for multivariate candidates can be seen in the following table 12

Table 10. Bivariate Selection Results For Multivariate Candidates (p <0.25

No	Variabel	P Value	OR
1	Parity	0,000	Kandidat
2	Anemia status	0,001	Kandidat
3	Pregnancy Spacing	0,004	Kandidat
4	Makrosomia	0,039	Kandidat
5	Complicatio labour	0,000	Kandidat
6	Age	0,002	Kandidat

Multivariate Modeling

After multivariate analysis of 6 independent variables with the incidence of post partum hemorrhage, a multivariate analysis of modeling 1 is produced as shown in table 13 as follows:

Table 11. Multivariate Modeling(Model 1)

No	Variabel	P Value	OR	(95%CI)	
				Lower	Upper
1	Parity	0,001	2,748	1,553	4,862
2	Anemia Status	0,019	1,890	1,108	3,224
3	Spacing of Pregancy	0,013	1,798	1,130	2,863
4	Makrosomia	0,706	1,143	0,570	2,294
5	Complication labour	0,000	13,908	8,822	21,925
6	Age	0,021	1,850	1,099	3,117

Table 13 shows that there is 1 independent variable with a value of p> 0.05 which is the Macrosomia variable. Variables with a value of p> 0.05 were excluded from the multivariate model then gradually starting from the highest p value. It can be seen in table 4.13 that the greatest p value is the macrosomia variable, then the macrosomia variable is excluded from the second modeling, so we get the results as in table 4.14 below:

Table 12 Multivariate Modeling (Model 2)

No	Variabel	P Value	OR	(95%CI)	
				Lower	Upper
1	Parity	0,000	2,778	1,575	4,901
2	Anemia Status	0,019	1,897	1,112	3,238
3	Pregnancy Spacing	0,013	1,807	1,136	2,874
4	Complication Labour	0,000	13,976	8,871	22,020
5	Age	0,018	1,871	1,114	3,141

Table 14 shows that after the second modeling, the next change in OR values (OR before X variable is issued - OR after X variable is issued / OR before X variable is issued x 100%) on other independent variables with or without the macrosomial baby variable is in the table 15 as follows:

Table 13. OR changes with and without macrosomial variables (Model 2)

No	Variabel	OR With Variabel Makrosomia	OR Without Variabel Makrosomia	Changes Of OR (%)
1	Parity	2,748	2,778	1,0
2	Anemia Status	1,890	1,897	0,4
3	Pregnancy Distance	1,798	1,807	0,5
4	Labour Complication	13,908	13,976	0,5
5	Age	1,850	1,871	1,1

From table 15 above there is no visible change in OR> 10%, then macrosomic variables are excluded from the multivariate model. And in table 16 is the last modeling where the results can be seen as follows:

Table 14 Final Multivariate Modeling (Model 3)

No	Variabel	P Value	OR	(95%CI)		Nagelkerke R Square
				Lower	Upper	
1	Parity	0,000	2,778	1,575	4,901	
2	Anemia status	0,019	1,897	1,112	3,238	
3	Pregnancy Distance Complication	0,013	1,807	1,136	2,874	0,452
4	Labour	0,000	13,976	8,871	22,020	
5	Age	0,018	1,871	1,114	3,141	

Discussions

Independent variables related to the incidence of post partum hemorrhage. Application of a causal relationship between independent variables with the dependent variable (post partum hemorrhage) in this study as follows :

a. Labor complications
    1) Temporal (+) relationship, it can be ascertained that labor complications occur earlier than post partum hemorrhage.
    2) Plausibility (+), found a theory that complications of labor are caused by parturition of precipitate, difficult or prolonged labor, preeclampsia, and caesarean section. In women who have undergone SC surgery, they are more prone to bleeding due to the possibility of reopening of the post-operative wound so that bleeding will occur from the wound while in partus presipitatus occurs due to strong contractions causing strong pressure by the fetal head so that when the cervix is long and stiff walking will cause bleeding due to cervical tears and the birth canal while complications of labor with preeclampsia often result in hemoconcentration or no occurrence of hypervolemia as in normal pregnancy so it is more susceptible to blood loss [3].
    3) Consistency (+), found by darmin, 2013 which states that labor complications are related to the incidence of post partum hemorrhage [4].
    4) Strength of association (+), strength of the relationship between complications of labor and the incidence of post partum hemorrhage is 13,976 (95% CI: OR = 8,871-22,020). This means that post partum mothers who experience childbirth complications risk 14 times compared with postpartum mothers who have no history of complications of childbirth.
    5) The dose response relationship (-) relationship cannot be assessed because this study uses categorical data (not continuing data).
    6) Design type (-) Inference type of case study control design is weak ie moderately suggestive
b. Parity
    1) Temporal (+) relationship, it is certain that parity occurs earlier than post partum hemorrhage.
    2) Plausibility (+), found a theory that supports the higher incidence of post partum hemorrhage at the number of parity> 4 aused by contractions of the weak uterus because the uterine wall is very stretched and many placental implantations in previous labor so that at the time of labor retention will occur then because the placenta is done manually the mother will experience fatigue so that it will cause post partum hemorrhage caused by uterine atony [5].
    3) Consistency (+), the results of the study are consistent with the research of Milaraswati (2008) which states that there is a relationship between parity and the incidence of post partum hemorrhage [6].
    4) The strength of the association (+), the strength of the relationship between parity and the incidence of post partum hemorrhage is 2,778 (95% CI: OR = 1,575-4,901). This means that post partum mothers who have parity> 4 risk 3 times compared to postpartum mothers having parity ≤ 4.
    5) The dose response relationship (-) relationship cannot be assessed because this study uses categorical data (not data continue).
    6) Design type (-) Inference type of case control study design is weak ie moderately suggestive

c. Anemia status
   1) Temporal relationship (+), it can be ascertained that anemia status occurs earlier than post partum hemorrhage.
   2) Plausibility (+), found a theory that supports that in anemic states the effective number of red blood cells decreases, this affects the amount of Hb in the blood so that oxygen bound in the blood decreases thereby reducing the amount of oxygen delivery and coverage of nutrients to the uterus, causing muscle- myometrial muscle cannot contract adequately resulting in uterine atony, resulting in Post Partum Bleeding [7].
   3) Consistency (+), the results of the study are consistent with the research of Santosa Research (2012) which states that there is a relationship between anemia status and the incidence of post partum hemorrhage [8].
   4) The strength of the association (+), the strength of the relationship between anemia status and the incidence of post partum hemorrhage is 1,897 (95% CI: OR = 1,112-3,238). This means that postpartum who has anemia is twice the risk compared to postpartum mothers who do not have anemia.
   5) The dose response relationship (-) relationship cannot be assessed because this study uses categorical data (not continuing data).
   6) Design type (-) Inference type of case study control design is weak ie moderately suggestive.

d. Age

   1) Temporal relationship (+), we can be sure that age occurs earlier than the incidence of post partum hemorrhage.
   2) Plausibility (+), found a theory that supports that age causes post partum hemorrhage because in women with age <20 years are in the process of growth and development reach an adult size biologically not optimal emotions tend to be unstable due to lack of fulfillment of nutrients during pregnancy causing reduced supply of nutrients and oxygen, resulting in the failure of myometrial contractions and muscle tone that is no longer good, causing failure of the compression of the arteries in the implantation of the plasenta which results in bleeding due to uterine atony. Whereas at the age above 35 years will tend to experience bleeding due to a decrease in contraction of the myometrium muscle inadequate during labor that can trigger contraction failure occurs [9].
   3) Consistency (+), the results of the study are consistent with Abdullah's (2002) study which states that age is related to the incidence of post partum hemorrhage [10].
   4) The strength of the association (+), the strength of the relationship between age and the incidence of post partum hemorrhage is 1,871 (95% CI: OR = 1,114-3,141). This means that post partum mothers who are <20 years old and> 35 years old are at twice the risk compared to postpartum mothers who have 20-35 years of age.
   5) The dose response relationship (-) relationship cannot be assessed because this study uses categorical data (not continuing data).
   6) Design type (-) Inference type of case study control design is weak ie moderately suggestive.

e. Pregnancy Spacing
   1) Temporal (+) relationship, it is certain that the distance of pregnancy occurs earlier than the incidence of post partum hemorrhage.

2) Plausibility (+), found a theory that supports that the distance between births that is less than 2 years will cause the return of nutrients to the mother that is not enough will cause degenerative processes or weakening the strength of the functions of the uterine muscles and pelvic muscles causing the uterus to fail to contract so that it occurs post partum hemorrhage [11].
3) Consistency (+), the results of the study are consistent with the research of Yuniarti (2004) which states that there is a relationship between the distance of pregnancy and the incidence of post partum hemorrhage [12].
4) Strength of association (+), strength of the relationship between the distance of pregnancy with the incidence of post partum hemorrhage is 1,807 (95% CI: OR = 1,136-2,874). This means that post partum mothers with <2 pregnancy spacing risk 2 times compared with postpartum women who experience pregnancy spacing> 2.
5) The dose response relationship (-) relationship cannot be assessed because this study uses categorical data (not continuing data).
6) Design type (-) Inference type of case study control design is weak ie moderately suggestive.

4 Conclusions

Based on the description in the results of research chapters and discussion chapters, the researchers hereby draw the following conclusions:

1. Childbirth complications related to cause and effect with the incidence of post partum hemorrhage: complications during labor affect 14 times experienced post partum hemorrhage in mothers compared with mothers who did not experience complications of childbirth.
2. Parity is causally related to the incidence of post partum hemorrhage: the number of parities> 4 affects 3 times the experience of post partum hemorrhage in mothers compared to mothers with a number of parities ≤ 4.
3. Anemia status is causally related to the incidence of post partum hemorrhage: anemia affects 2 times the experience of post partum hemorrhage in mothers compared to mothers who do not experience anemia.
4. Age related cause and effect with the incidence of post partum hemorrhage: age <20 years and> 35 years has 2 times the effect of experiencing post partum hemorrhage in mothers compared with mothers aged 20-35 years.
5. Pregnancy distance is causally related to the incidence of post partum hemorrhage: a pregnancy interval> 2 years affects 2 times the experience of post partum hemorrhage in mothers compared to mothers with a pregnancy interval ≤ 2 years.
6. Nagelkerke R Square value is 0.452 so it can be said that of the 5 independent variables that are related can only explain 45.2% of the incidence of post partum hemorrhage.
7. Independent variables which are not related are multiple pregnancy variables and infant macrosomia variables

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