CHAPTER IV

RESULTS

A case-control study was used to identify the characteristics of the subjects, to ascertain the relationship between anemia in pregnancy and postpartum hemorrhage, and to examine the relationships among variables, among women who delivered in Delivery Room of the Uthai thani Provincial Hospital, Uthai thani, Thailand.

The 250 patients who met inclusion criteria and did not have exclusion criteria were selected to be subjects of this study. Among them, 50 were with postpartum hemorrhage history, namely cases group. While the rest were without postpartum hemorrhage history or controls group. Based on patient's medical records for 5 year, from 1998 to 2002, 15 items of information were abstracted.

Descriptive statistical analysis was used to identify the characteristics of the subjects. Chi-square test and linear regression was used to ascertain the relationship between anemia in pregnancy and postpartum hemorrhage. The relationships among all variables were examined by using multiple logistic regressions. After analyzing the data, the findings of this study may be presented in five parts:

A. The characteristics of the subject

B. Amount of blood loss among the subjects

C. Hematocrit level during pregnancy among the subjects

D. Relationship between anemia in pregnancy and postpartum hemorrhage

E. Relationships among the variables

A. The characteristics of the subjects

Two hundred and fifty subjects were included in this study. All of them delivered in the Delivery Room of the Uthai thani Hospital during the year 1998 to 2002. These 250 subjects were divided into cases and controls groups, and cases group was considered with the amount of blood loss more than 500 ml. The subjects were described by age, occupation, education, gravidity, parity, type of delivery, duration of labor, oxytocics drug administration, baby weight, attendant's profession, place of prenatal care, frequency of prenatal care, and complication. The details of the characteristics are presented in tables 2 to 7.

Table 2. Descriptive statistics of subjects in continuous variables

	N	Minimum	Maximum	Mean	Std. Deviation
Age	250	14	44	26.72	6.09
Gravidity	250	1	8	2.00	1.04
Parity	250	1	6	1.77	.85
Amount of blood loss	250	100	1300	276.64	182.19
Duration of labor	250	1.50	20.40	7.6363	3.7769
Baby weight	250	1250.00	4400.00	3032.4400	467.6095
Frequency of antenatal care	250	0	19	7.65	3.36
Hematocrit level	250	23.70	45.00	35.1956	3.6669

As shown in table 1 , the mean of age of the subjects was 26.72 years with a range from 14 years to 44 years. Amount of blood loss ranged from 100 to 1300 ml with a mean of 276.64 ml, and Hematocrit level ranged from 23.7 to 45 % with a mean of 35.2 %. For gravidity and parity, minimum value was the same, but the

maximum of gravidity was higher than parity. Duration of labor has quite a large range of 1.50 to 20.40 hours. Baby weight's mean was 3032.4 grams and frequency of antenatal care ranged from 0 to 19 times with a mean of 7 times.

Table 3 to 7 describes the characteristics of the 50 subjects who were "cases" and 200 subjects who served as "controls". Table 3 provides general information, Table 4 to 7 focus on information related to prenatal period, intranatal period and complication during prenatal and intranatal periods, respectively.

Table 3. Frequency and percentage of cases and controls groups by age, education and occupation.

			Controls (N=200)	Cases (N=50)	Total (N=250)
AGEGROUP	<20 years	Frequency	32	5	37
		%	16.0%	10.0%	14.8%
	20-35 years	Frequency	160	36	196
		%	80.0%	72.0%	78.4%
	>35 years	Frequency	8	9	17
		%	4.0%	18.0%	6.8%
EDUCATION	Illiterate	Frequency	4	1	5
		%	2.0%	2.0%	2.0%
	Elementary 1-4	Frequency	32	9	41
		%	16.0%	18.0%	16.4%
	Elementary 5-6	Frequency	98	20	118
		%	49.0%	40.0%	47.2%
	High School 1-3	Frequency	34	9	43
		%	17.0%	18.0%	17.2%
	High School 4-6	Frequency	21	7	28
		%	10.5%	14.0%	11.2%

	Diploma degree	Frequency	4	1	5
		%	2.0%	2.0%	2.0%
	Higher	Frequency	7	3	10
		%	3.5%	6.0%	4.0%
OCCUPATION	Labor	Frequency	72	17	89
		%	36.0%	34.0%	35.6%
	Gov. Employee	Frequency	3	2	5
		%	1.5%	4.0%	2.0%
	Trader	Frequency	12	6	18
		%	6.0%	12.0%	7.2%
	Agriculture	Frequency	29	9	38
		%	14.5%	18.0%	15.2%
	House wife	Frequency	84	16	100
		%	42.0%	32.0%	40.0%

From the above table, it is clear that in both the cases and controls groups, the majority of subjects were from 20-35 age group (80.0% for controls and 72.0% for cases). But in the cases group there were more subjects of age more than 35 year-old (18%) compared with controls group (4%). In terms of educational level, 49.0% among controls and 40% among cases were educated up to grade 5-6 of elementary school. For higher than diploma degree, the percentage was higher in cases group (6%) than in controls group (3.5%), while for other levels of education the percentage were almost equal in both cases and controls groups. There was diversity in terms of occupation of the subjects. In controls group housewife was the majority (42%) and government employee was the least (1.5%), while in cases group labor was the majority (34%) and government employee was the least (4.0%).

Table 4. Frequency and percentage of cases and controls groups by gravidity, place of prenatal care and frequency of prenatal care.

			Controls (N=200)	Cases (N=50)	Total (N=250)
GRAVIDITY	1	Frequency	76	13	89
		%	38.0%	26.0%	35.6%
	2-4	Frequency	123	34	157
		%	61.5%	68.0%	62.8%
	>4	Frequency	1	3	4
		%	.5%	6.0%	1.6%
PLACE OF ANC	No ANC	Frequency	4	3	7
		%	2.0%	6.0%	2.8%
	Hospital	Frequency	108	26	134
		%	54.0%	52.0%	53.6%
	Private clinic	Frequency	59	15	74
		%	29.5%	30.0%	29.6%
	Health center	Frequency	29	6	35
		%	14.5%	12.0%	14.0%
FREQUENCY OF ANC	No ANC	Frequency	4	3	7
		%	2.0%	6.0%	2.8%
	1 times	Frequency	5		5
		%	2.5%		2.0%
	2 times	Frequency	4	1	5
		%	2.0%	2.0%	2.0%
	3 times	Frequency	7	3	10
		%	3.5%	6.0%	4.0%
	4 times	Frequency	14	3	17
		%	7.0%	6.0%	6.8%
	>4 times	Frequency	166	40	206
		%	83.0%	80.0%	82.4%

Regarding the information about prenatal period of the subjects, Table 4 showed that most of the subjects' gravidity was 2 to 4, 61.5% in controls group and 68% in cases group. But for gravidity more than 4 cases group has higher percentage (6%) than controls group (0.5%); on the other hand, for gravidity 1 there was higher percentage in controls group (38%) than cases group (26%). For place of ANC, more than half of subjects went to hospital for ANC in both cases group (52.0%) and controls group (54%), and also private clinic and health center have almost equal percentage in both groups. In terms of frequency of ANC, there were more subjects with no ANC in cases group (6.0%) than in controls group (2.0%). The subjects went for ANC more than 4 times in controls group was 83.0%, while in cases group was 80%.

Table 5. Frequency and percentage of cases and controls groups by parity, type of labor, duration of labor, oxytocics drug administration, baby weight and profession of attendant.

			Controls (N=200)	Cases (N=50)	Total (N=250)
PARITY	1	Frequency	91	15	106
		%	45.5%	30.0%	42.4%
	2-4	Frequency	108	33	141
		%	54.0%	66.0%	56.4%
	>4	Frequency	1	2	3
			.5%	4.0%	1.2%
TYPE OF LABOR	Spontaneus	Frequency	10	5	15
		%	5.0%	10.0%	6.0%
	Spont.+ Episiotomy	Frequency	178	40	218
		%	89.0%	80.0%	87.2%
	Vacuum	Frequency	12	5	17

		%	6.0%	10.0%	6.8%
DURATION OF LABOR	<8 hours	Frequency	121	30	151
		%	60.5%	60.0%	60.4%
	8-12 hours	Frequency	54	10	64
		%	27.0%	20.0%	25.6%
	>12 hours	Frequency	25	10	35
		%	12.5%	20.0%	14.0%
OXYTOCIC DRUG ADMINISTRATION.	Syntocinon	Frequency	51	46	97
		%	25.5%	92.0%	38.8%
	No Syntocinon	Frequency	149	4	153
		%	74.5%	8.0%	61.2%
BABY WEIGHT	<2500 grams	Frequency	10	5	15
		%	5.0%	10.0%	6.0%
	2500-4000 grams	Frequency	186	45	231
		%	93.0%	90.0%	92.4%
	>4000 grams	Frequency	4		4
		%	2.0%		1.6%
PROF.OF ATTENDANT	Doctor	Frequency	50	31	81
		%	25.0%	62.0%	32.4%
	Nurse	Frequency	150	19	169
		%	75.0%	38.0%	67.6%

Table 5 showed that among cases group 66.0% of subjects were with 2-4 parity, far higher than percentage of 1 parity (30.0%); while in controls group 54.0% of subjects were with 2-4 parity, which was not much higher than percentage of 1 parity (45.5%). There were two out of three subjects who have more than 4 parity in cases group. For type of labor, there were 89.0% of controls group and 80.0% of cases group were delivered with spontaneous+episiotomy, and there was a higher percentage in cases group for subjects who delivered with spontaneous and with

vacuum. Mostly the duration of labor among subjects was less than 8 hours, which was 60.5% in controls group and 60.0% in cases group.

There was big difference in oxytocics drug administration during the third stage of labor. Ninety two percent of cases group was given syntocinon, while only 25.5% of controls were given syntocinon. For baby weight, there were 93.0% of controls group and 90.0% of cases group with 2500 to 4000 grams of baby weight. In terms of attendant, there were 26 attendants from different professions; among controls group75% were attended by nurses, while among cases group doctors attended 62.0%.

Table 6. Frequency and percentage of cases and controls groups by complication during prenatal period

			Controls (N=200)	Cases (N=50)	Total (N=250)
Bleeding	no	Frequency	199	50	249
		%	99.5%	100.0%	99.6%
	yes	Frequency	1	-	1
		%	.5%	-	.4%
Pre-eclamsia	no	Frequency	198	48	246
		%	99.0%	96.0%	98.4%
	yes	Frequency	2	2	4
		%	1.0%	4.0%	1.6%
Others	no	Frequency	198	50	248
		%	99.0%	100.0%	99.2%
	yes	Frequency	2		2
		%	1.0%		.8%

From Table 6, there were 0.5% of controls group who have bleeding complication during pregnancy, and among cases group there were 4.0% with pre-

eclamsia. No one has other complication among cases, but 1.0% among controls group. Some of other complications were thalassemia and hyperthyroid.

Table 7. Frequency and percentage of cases and controls group by complication during intranatal period.

			Control (N=200)	Cases (N=50)	Total (N=250)
Pre-eclamsia	no	Frequency	196	49	245
		%	98.0%	98.0%	98.0%
	yes	Frequency	4	1	5
		%	2.0%	2.0%	2.0%
Dystocia	no	Frequency	197	47	244
		%	98.5%	94.0%	97.6%
	yes	Frequency	3	3	6
		%	1.5%	6.0%	2.4%
Retained placenta	no	Frequency	200	46	246
		%	100.0%	92.0%	98.4%
	yes	Frequency		4	4
		%		8.0%	1.6%
Others	no	Frequency	186	42	228
		%	93.0%	84.0%	91.2%
	yes	Frequency	14	8	22
		%	7.0%	16.0%	8.8%

As shown in Table 7 , the percentage of subjects with pre-eclamsia during intranatal period was equal in cases and controls groups. For dystocia, there were 6.0% of cases group and 1.5% of controls group. Eight percent of cases group suffered from retained placenta, and no one in controls group. The percentages of

subjects who have other complications were 16.0% in cases group and 7.0% in controls group. Some other complications during intranatal period were uterine atony, hypertension, premature rupture of membrane, preterm labor, postterm labor, low placental site, cervix tear, prolonged labor and syphilis.

B. Amount of blood loss among the subjects

To describe postpartum hemorrhage among subjects, the amount of blood loss were analyzed using descriptive statistics of cases and controls groups. The result was shown in the table 8 below.

Table 8. Descriptive statistics of amount of blood loss by cases and controls groups.

GROUP	Mean	Std. Deviation
Controls (Blood loss≤500ml)	194.90	47.46
Cases (Blood loss>500ml)	603.60	152.25
Total	276.64	182.19

From the above table, mean of blood loss in controls group was 194.9 ml with SD 47.4 and mean of blood loss in cases group was 603.6 ml with SD 152.2.

C. Hematocrit level among subjects

To describe anemia in pregnancy among the subjects, the descriptive analysis of Hematocrit level was performed in cases and controls groups. The anemia status was considered as Hematocrit level less than 33%. The results were shown in the table 9 to 10.

Table 9. Hematocrit level in cases and controls group and the t value

	CASES GROUP		C O N T R O L S GROUP		t	df	p
	Mean	SD	Mean	SD			
HEMATOCRIT LEVEL	33.6620	4.0676	35.5790	3.4658	3.375	248	0.001

Table 7 showed, mean of Hematocrit level in cases group was 33.6% with SD 4.0, and mean of Hematocrit level in controls group was 35.5% with SD 3.4. To know whether the two groups have different means or not, the Independent Sample T-test was performed and the t value was 3.375 or located in rejection area with $p<0.05$, giving the meaning that the two groups have significant different means or they were from different population. For further analysis, the two by two table was constructed.

Table 10. Frequency and percentage of anemia status by cases and controls group

		ANEMIA STATUS		Total
		NO (Hct≥33%)	YES (Hct<33%)	
Controls	Frequency	154	46	200
	% within GROUP	77.0%	23.0%	100.0%
Cases	Frequency	28	22	50
	% within GROUP	56.0%	44.0%	100.0%
	Frequency	182	68	250
	% within GROUP	72.8%	27.2%	100.0%

As shown in Table 10, 23.0% of controls group were with anemia, while in cases group it was 44.0%.

D. Relationship between anemia in pregnancy and postpartum hemorrhage

To determine the relationship between anemia in pregnancy and postpartum hemorrhage in this study, the Bivariate Correlations, Chi-square test and Mantel-Haenzel Odds ratio calculation were performed. The results of bivariate correlation between blood loss and Hematocrit level in continuous data are shown in the Table 11.

Table 11. Bivariate Correlations between blood loss and Hematocrit level

		BLOOD LOSS	HCT LEVEL
BLOOD LOSS	Pearson Correlation	1.000	-.251
	Sig. (1-tailed)	.	.000
	N	250	250
HCT LEVEL	Pearson Correlation	-.251	1.000
	Sig. (1-tailed)	.000	.
	N	250	250

Correlation is significant at the 0.01 level (1-tailed).

From the table, Pearson Correlation coefficient was –0.251 with $p<0.01$ indicating that there was weak but significant relationship between Hematocrit level and blood loss.

Figure 3. Scatter diagram of correlation between Hct level (anemia in pregnancy) and blood loss (postpartum hemorrhage)

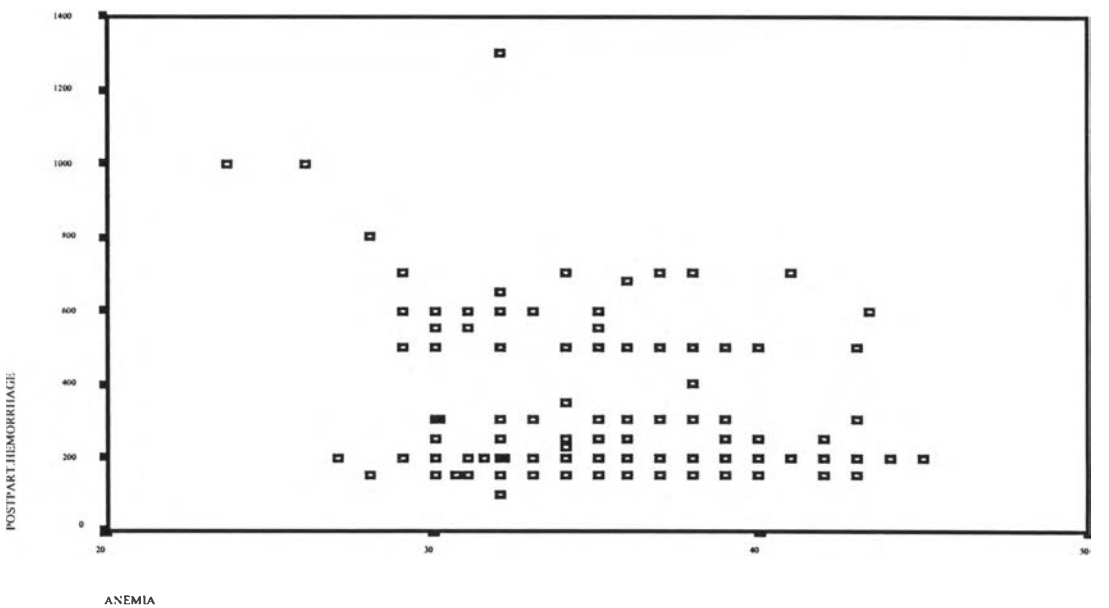

Table 12. Postpartum hemorrhage and anemia in pregnancy in 2x2 table and Chi-Square value.

		POSTPARTUM HEMORRHAGE			Pearson Chi-Square	p
		YES	NO	TOTAL		
ANEMIA IN PREGNANCY	YES	22	46	68	8.908	0.003
	NO	28	154	182		
TOTAL		50	200	250		

Table 12 illustrated that the women with anemia in pregnancy experienced postpartum hemorrhage significantly more than the women without anemia at p value = 0,003.

The Mantel-Haenszel Common Odds Ratio Estimate was performed to demonstrate the difference of relative risk between anemia and non-anemia groups to have postpartum hemorrhage. The Odds Ratio Estimate value was 2.630, significant at p value = 0.003, which demonstrated that the risk of experiencing postpartum hemorrhage among anemic group was 2.6 times as high as among non-anemic group.

E. Relationships among variables in the study

To examine the relationships among all variables in the study, bivariate correlation and conditional multiple logistic regression were performed. The bivariate correlation was to indicate how all variables in question were related to each other as shown below.

Table 13. The correlation among variables of age, gravidity, parity, blood loss, duration of labor, baby weight, frequency of ANC and Hematocrit level.

		Age	Gravi-dity	Parity	Blood loss	Dur.of labor	Baby wgt.	Fr.of ANC	Hct. level	Educa-tion
Age	r	1.00								
	p	.								
Gravi-	r	**.488a**	1.00							
dity	p	**.000**	.							
Parity	r	**.562a**	**.865a**	1.00						
	p	**.000**	**.000**	.						
Blood	r	.094a	.036a	.058a	1.00					
loss	p	.139	.575	.364	.					
Dur.of	r	**-.156b**	**-.154a**	**-.236a**	.013a	1.00				
labor	p	**.013**	**.015**	**.000**	.842	.				
Baby	r	-.076b	.071a	-.006a	.093a	.077b	1.00			
weight	p	.231	.264	.929	.143	.223	.			
Fr.Of	r	.048b	-.054a	-.058a	-.009a	.027b	**.143b**	1.00		
ANC	p	.447	.397	.359	.882	.666	**.024**	.		
Hct.	r	-.058b	.046a	.036a	**-.132a**	.032b	**.126b**	.101b	1.00	
level	p	.361	.471	.574	**.036**	.616	**.047**	.111	.	
Educa	r	**-.237b**	**-.257a**	**-.298a**	.075a	.006b	**.147b**	.116b	.065b	1.00
-tion	p	**.000**	**.000**	**.000**	.237	.923	**.020**	.067	.308	.

"r": Coefficient Correlation ; "p": p-value (2-tailed)

"a": Spearman Coefficient Correlation ; "b": Pearson Coefficient Correlation

There were some significant correlations between variables ($p<0.05$), some in positive directions and some in negative directions. The positive correlations were between age and gravidity, age and parity, gravidity and parity, baby weight and frequency of ANC, baby weight and Hct level and baby weight and education. The negative correlations were between age and duration of labor, gravidity and duration

of labor, parity and duration of labor, blood loss and Hct level, age and education, gravidity and education, and parity and education.

The conditional multiple logistic regression was performed to demonstrate the magnitude of the effect of factors toward postpartum hemorrhage. Table 14 described the variables used in the analysis and how they were categorized.

Table 14. Distribution of subjects by groups of variables that were involved in the logistic regression.

		Frequency (N=250)	Percent (100%)
Age group	<20 years	37	14.8
	20-35 years	196	78.4
	>35 years	17	6.8
Gravidity group	1	89	35.6
	2-4	157	62.8
	>4	4	1.6
Parity group	1	106	42.4
	2-4	141	56.4
	>4	3	1.2
Duration of labor	<8 hours	151	60.4
	8-12 hours	64	25.6
	>12 hours	35	14.0
Baby weight group	<2500 grams	15	6.0
	2500-4000 grams	231	92.4
	>4000 grams	4	1.6
Anemia	No	182	72.8
	Yes	68	27.2

Frequency of ANC group	No ANC	7	2.8
	1 times	5	2.0
	2 times	5	2.0
	3 times	10	4.0
	4 times	17	6.8
	>4 times	206	82.4
Education group	ILLITERATE	5	2.0
	ELEM.1-4	41	16.4
	ELEM.5-6	118	47.2
	HIGH.1-3	43	17.2
	HIGH.4-6	28	11.2
	DIPLOMA	5	2.0
	HIGHER	10	4.0
Postpartum hemorrhage	No	200	80.0
	Yes	50	20.0

The conditional multiple logistic regression was performed with applying the logistic model:

$$Y = \alpha + \beta 1X1 + \beta 2X2 \ldots\ldots\ldots\ldots \beta kXk$$

Then, three equation models were created based on the variables included in the calculation process. As shown in Table 14, there were basically eight variables. However, according to the nature of some variables, it was needed to split them into subgroups as dummy variables. There were two dummy variables for the variable age: younger and older; and two dummy variables for the variable education: elementary

and high school - up. Therefore, there were a total of ten independent variables in the logistic model:

1. Younger = YG
2. Older = OLD
3. Parity = PAR
4. Gravidity = GRA
5. Duration of labor = DUR
6. Baby weight = WGT
7. Frequency of ANC = ANC
8. Elementary school = ELM
9. High school - up = HIG
10. Anemia in pregnancy = ANE

Based on the above variables, the three equation models were applied to the logistic model as follows:

Model 1. $Y = \alpha + \beta 1YG + \beta 2\ OLD + \beta 3\ \mathbf{PAR} + \beta 4\ \mathbf{GRA} + \beta 5\ DUR + \beta 6\ WGT + \beta 7\ ANC + \beta 8\ ELM + \beta 9\ HIG + \beta 10\ ANE$

Model 2. $Y = \alpha + \beta 1YG + \beta 2\ OLD + \beta 3\ \mathbf{PAR} + \beta 4\ DUR + \beta 5\ WGT + \beta 6\ ANC + \beta 7\ ELM + \beta 8\ HIG + \beta 9\ ANE$

Model 3. $Y = \alpha + \beta 1YG + \beta 2\ OLD + \beta 3\ \mathbf{GRA} + \beta 4\ DUR + \beta 5\ WGT + \beta 6\ ANC + \beta 7\ ELM + \beta 8\ HIG + \beta 9\ ANE$

Tables 15 to 17 showed the results of conditional multiple logistic regression based on the above three models, respectively. The differences among the three models were, in the first model, variables "parity" and "gravidity" were put into the

model together with the rest of variables. While in the second model only variable "parity", and in the third model only variable "gravidity" were put into the model together with the rest of variables. The reason for using different models was due to the inter correlation between variables in the logistic regression model.

Table 15. Magnitude of the effects of independent variables toward postpartum hemorrhage applying the model 1.

Variables	Beta	S.E.	df	p	Odds Ratio
Younger	-0.28391	0.59883	1	0.6354	0.753
Older	**1.70796**	**0.69823**	**1**	**0.0144**	**5.518**
Parity	0.32761	0.68957	1	0.6347	1.388
Gravidity	0.43065	0.68830	1	0.5315	1.538
Duration of labor	0.16900	0.24194	1	0.4848	1.184
Baby weight	-0.65259	0.62833	1	0.2990	0.521
Frequency of ANC	-0.15234	0.14907	1	0.3068	0.859
Elementary school	0.71971	0.59310	1	0.2249	2.054
High school and up	**1.22194**	**0.61297**	**1**	**0.0462**	**3.394**
Anemia	**1.09894**	**0.41377**	**1**	**0.0079**	**3.001**

Table 15 indicated that among the independent variables, there were three variables with $p<0.05$, that were older age, high school-up and anemia with coefficients (Beta) 1.71, 1.22 and 1.10 respectively, while the Odds Ratio was 5.52,

3.39 and 3.00 respectively. In this model, when both parity and gravidity were included in the model together, we cannot see the effects of parity as suggested in the literature review. This may be due to the gravidity being highly correlated with parity (as shown in Table 13), and it may mask the effects of either variable. Therefore, only parity or gravidity should be included in the model.

Table 16. Magnitude of the effects of independent variables toward postpartum hemorrhage applying the model 2.

Variables	Beta	S.E.	df	p	Odds Ratio
Younger	-0.31496	0.59762	1	0.5982	0.730
Older	**1.70576**	**0.70109**	**1**	**0.0150**	**5.506**
Parity	**0.68641**	**0.40135**	**1**	**0.0872**	**1.987**
Duration of labor	0.18768	0.23940	1	0.4331	1.206
Baby weight	-0.62890	0.62573	1	0.3149	0.533
Frequency of ANC	-0.14157	0.14764	1	0.3376	0.868
Elementary school	0.69038	0.58848	1	0.2407	1.994
High school and up	**1.18242**	**0.60816**	**1**	**0.0519**	**3.262**
Anemia	**1.07413**	**0.41035**	**1**	**0.0089**	**2.927**

As shown in table 16, when the "gravidity" was omitted from the model, the level of significance of the "parity" was remarkably increased at p-value from 0.63 to 0.09 with the Odds ratio increased from 1.39 to 1.99, while the significant variables in

the Model 2 remained the same with the Model 1 (older age, high school – up and anemia), even though there was some little change of the values.

Table 17. Magnitude of the effects of independent variables toward postpartum hemorrhage applying the model 3.

Variables	Beta	S.E.	df	p	Odds Ratio
Younger	-0.34310	0.58247	1	0.5558	0.710
Older	**1.76096**	**0.68680**	**1**	**0.0103**	**5.818**
Gravidity	**0.69091**	**0.39423**	**1**	**0.0797**	**1.996**
Duration of labor	0.14702	0.23802	1	0.5368	1.158
Baby weight	-0.65052	0.62693	1	0.2994	0.522
Frequency of ANC	-0.16330	0.14766	1	0.2688	0.849
Elementary school	0.74800	0.59339	1	0.2075	2.113
High school and up	**1.22679**	**0.61562**	**1**	**0.0463**	**3.410**
Anemia	**1.11721**	**0.41257**	**1**	**0.0068**	**3.056**

In the table 17, the same treatment was done to the "parity". When the "parity" was excluded from the model, the level of significance of the "gravidity" was also remarkably increased at p-value from 0.53 to 0.08 with the Odds ratio increased from 1.54 to 1.99. On the other hand, the effects of "older age", the "high school-up" and the "anemia" remained significant in all three models. In conclusion, the second and the third models seemed to be the reasonable models to be used in this study.