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Research Article

### PREVALENCE OF POSTPARTUM HEMORRHAGE AND ASSOCIATED RISK FACTORS AMONG WOMEN GIVING BIRTH IN KSA: A CROSS-SECTIONAL STUDY

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#### Abstract:

**Objective:** To assess the severity of PPH among women giving birth at Obstetric Hospitals in KSA and associated risk factors.

**Methods:** This will be a descriptive retrospective study of the postpartum hemorrhage surveillance data collected for women who are giving birth during the period from October 1<sup>st</sup> to December 31<sup>st</sup>, 2023. All women who are giving birth and have postpartum hemorrhage will be enrolled in this study. Data for this study will be retrieved from the completed forms.

**Results:** The study included 470 participants. The most frequent age among them was 25-29 years (n= 198, 42.1%) followed by 35 years and more (n= 126, 26.8%). The most frequent Onset of labor among study participants was Spontaneous (n= 379, 80.6%) followed by Induced (n= 91, 19.4%). The most frequent duration of labor among study participants was less than 24 hours (n= 295, 62.8%) followed by more than 24 hours (n= 175, 37.2%). Mode of delivery among study participants with most of them having Vaginal (n= 440, 93.6%) followed by CS (n= 30, 6.4%). The Birthweight of Neonatal among study participants with most of them having 2.5-3.5 kg.

**Conclusion:** Study results showed that most of the study participants were from 25-29 years. The most common Mode of delivery was Vaginal followed by CS. Most of them don't have previous CS. Their physical activity is low. In addition, most of study participants had good social connections.

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## INTRODUCTION:

Postpartum hemorrhage (PPH), defined as blood loss greater than 500 mL after vaginal birth or greater than 1000 mL following a cesarean section, is a major cause of maternal morbidity and death [1]. It is estimated that a woman dies of PPH every 10 minutes, accounting for the bulk of obstetric hemorrhage deaths [2-3]. Although PPH fatalities can occur outside of health care facilities due to increased home births, a large percentage occur in hospitals, where excellent emergency care has the potential to save lives [4]. PPH has an even more important role in poor and middle-income nations, where maternal mortality is tenfold greater than in other regions [5-6].

From 2013 to 2018, hemorrhage, mostly PPH, was responsible for 41-51 percent of all maternal fatalities in low and middle-income countries [7]. Aside from the significant maternal death rate from PPH, thousands of women survive the disease and continue to suffer from its crippling effects [8]. PPH is linked to both long-term and short-term health issues, including chronic sickness, disability, an increased risk of mortality and/or poor child growth and development, and crucial organ failure [9]. The majority of non-severe forms of PPH go unreported in most databases or studies, therefore focusing on the number of fatalities or complications may underestimate the disease's impact.

PPH is high in low-resource settings, and it is also associated with a high death rate. The proportion of PPH in poor and middle-income countries ranges from 5.8 to 16.6 percent depending on research settings, study design, and study type [10-13]. PPH had the highest case fatality rate among all direct obstetric complications in Ethiopia, according to a cross-section research [14]. Women with macrosomia, a history of PPH, a prior cesarean, aberrant placentation, a protracted third stage of labor, hypertensive disorders of pregnancy, soft tissue lacerations, or inducement of labor are more prone to develop PPH [15-17]. The most effective technique for preventing PPH is active treatment of the third stage of labor [18].

## METHODS:

### Study design

This will be a descriptive retrospective study of the postpartum hemorrhage surveillance data collected for women who are giving birth during the period from October 1<sup>st</sup> to December 31<sup>st</sup>, 2023. All women who are giving birth and have postpartum hemorrhage will be enrolled in this study. Data for this study will be retrieved from the completed forms.

### Study approach

The data will be collected retrospectively for all cases who had postpartum hemorrhage at Obstetric Hospitals in KSA.

### Study population

The participants for the current study were individuals belonging to the age group 18-75. This age group is chosen as the major influence of vitamin D deficiency and different physical and mental health issues is observed within this group.

### Study sample

The author selected all cases with postpartum hemorrhage during the study period. Medical records will be assessed according to the information required in the study questionnaire.

### Study tool

Data collection tool is self-designed and based on the latest literature. It contains sociodemographic data of the women, obstetric and medical history and factors associated with postpartum hemorrhage.

### Data collection

Data will be collected by a resident obstetrician at Obstetric Hospitals in KSA from the archive department.

### Data analysis

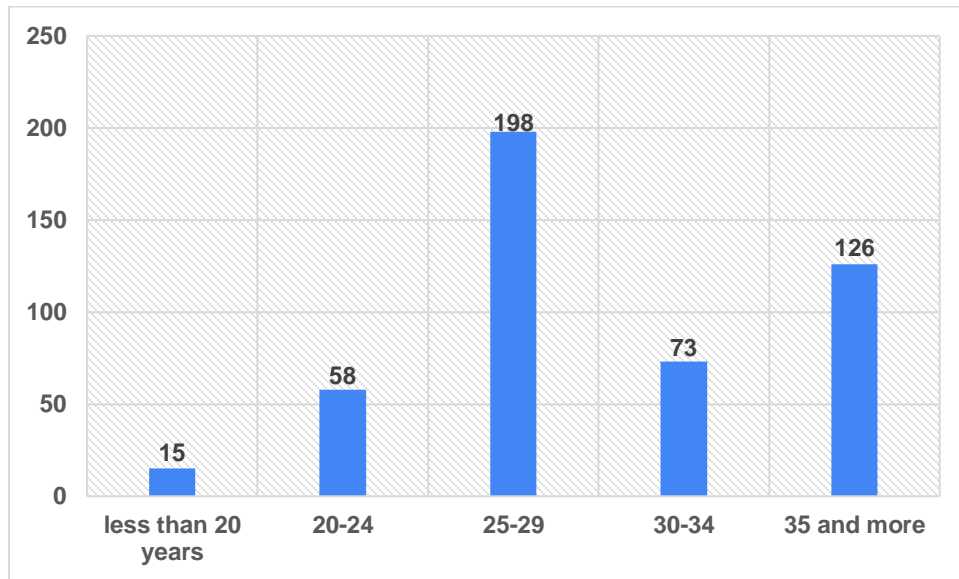
Data obtained from the questionnaire will be entered and analyzed using SPSS program version 23 computer software. Sociodemographic data are presented using descriptive statistics as means, median, percentages, and standard deviation. Independent T-tests and one-way ANOVA are used to show statistical significance among patients' characteristics and tool scores. The chi-square test is used to show the relationship between categorical variables.

### Ethical considerations

An approved permission will be gained from the Health Research Department to have access to medical records of study cases at Obstetric Hospital.

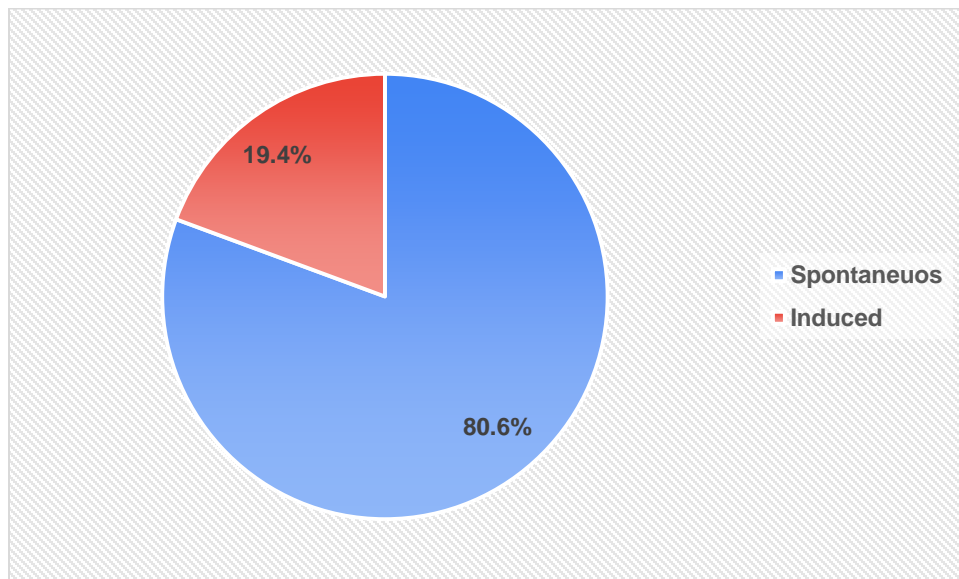
## RESULTS:

The study included 470 participants. The most frequent age among them was 25-29 years (n= 198, 42.1%) followed by 35 years and more (n= 126, 26.8%). Figure 1 shows the age distribution among study participants.

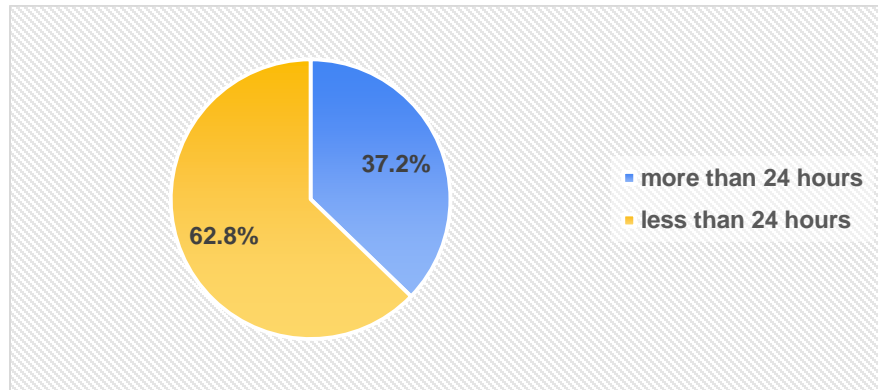


**Figure 1: Age distribution among study participants**

The most frequent Onset of labor among study participants was Spontaneous (n= 379, 80.6%) followed by Induced (n= 91, 19.4%). Figure 2 shows the Onset of labor distribution among study participants. The most frequent duration of labor among study participants was less than 24 hours (n= 295, 62.8%) followed by more than 24 hours (n= 175, 37.2%). Figure 3 shows the distribution of Duration of labor among study participants.

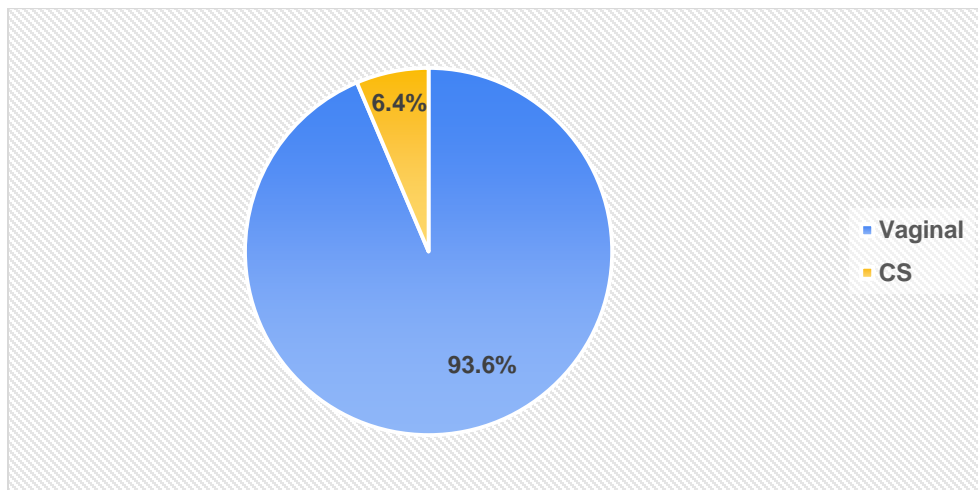


**Figure 2: Onset of labor distribution among study participants**



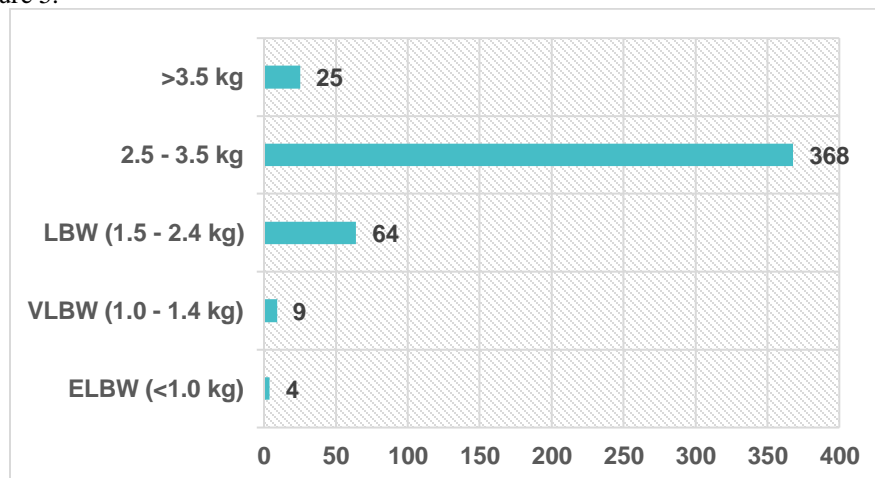
**Figure 3: Duration of labor distribution among study participants**

Mode of delivery among study participants with most of them had Vaginal (n= 440, 93.6%) followed by CS (n= 30, 6.4%). Figure 4 shows the distribution of Mode of delivery among study participants.



**Figure 4: Mode of delivery distribution among study participants**

The Birthweight of Neonatal among study participants with most of them having 2.5-3.5 kg. Perceived Birthweight is presented in Figure 5.

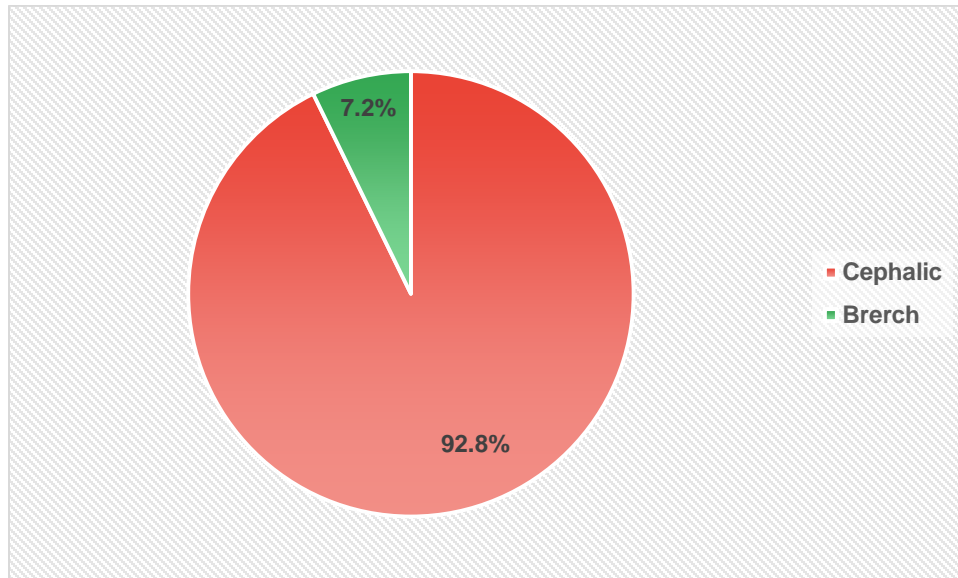


**Figure 4: Birthweight of Neonatal distribution among study participants**

Participants were asked to assess the complications that occur to the mother during pregnancy. Their responses and results are presented in Table 1.

<i>Table 1: Complications that occur to the mother during pregnancy</i>		
survey item	Yes	No
<b>Gestational Diabetes</b>	110	360
	23.4%	76.6%
<b>Pregnancy-induced hypertension</b>	54	416
	11.5%	88.5%
<b>Thrombophilia</b>	34	436
	7.2%	92.8%
<b>Thyroid Disease</b>	57	413
	12.1%	87.9%
<b>APH</b>	84	386
	17.9%	82.1%
<b>PPH</b>	169	301
	36.0%	64.0%
<b>Obstetric Cholestasis</b>	53	417
	11.3%	88.7%
<b>Prolonged labor</b>	182	288
	38.7%	61.3%
<b>Obstructed labor</b>	122	348
	26.0%	74.0%
<b>PROM</b>	92	378
	19.6%	80.4%
<b>Polyhydramnios</b>	68	402
	14.5%	85.5%
<b>Anemia</b>	182	288
	38.7%	61.3%
<b>Multiple Pregnancy</b>	41	429
	8.7%	91.3%
<b>Post-term</b>	131	339
	27.9%	72.1%

The Presentation of Neonatal among study participants with most of them was Cephalic (n=436, 92.8%), followed by Breech (n=34, 7.2%). The perceived Presentation of Neonatal is presented in Figure 5.



**Figure 5: Birthweight of Neonatal distribution among study participants**

### DISCUSSION:

The purpose of this study was to compile available research on postpartum hemorrhage (PPH) and its physiological treatment (i.e., skin-to-skin contact and breastfeeding). The backdrop of PPH is highlighted, as is the importance of skin-to-skin contact (SSC) and breastfeeding (BF) in PPH, and these treatments are endorsed as critical ways of avoiding or reducing the occurrence of PPH. Despite its significance, to the best of my knowledge, no examination of this relationship has been conducted. To summarize topic-related research, the narrative literature review technique was adopted. The search included three databases: CINAHL, PubMed, and Google Scholar. All articles related to the role of SSC and BF in PPH were chosen from the different databases. The findings demonstrate that SSC and BF are cost-effective methods that could be considered practices for the prevention of PPH. Immediate Skin-to-skin contact (SSC) and breastfeeding (BF) are central mediators of the psychophysiological process during the first hour after delivery (the third and fourth stages of labor).

#### Background

In 2017, there were 295,000 maternal deaths worldwide, with an MMR of 211 deaths per 100,000 births. The WHO has established Sustainable Development Goal 5 of reducing maternal mortality by 75%. Obstetric hemorrhage is the greatest cause of maternal death in the world, accounting for 27.1% of all maternal fatalities [1]. Postpartum hemorrhage (PPH) accounts for 72 percent of all obstetric hemorrhages [2]. The injection of exogenous oxytocin

(Pitocin), control cord traction, and early cord clamping are all part of the active management of the

third stage of labor (AMTSL), which is a preventative intervention for PPH. However, there is mounting evidence that exogenous oxytocin has a negative impact on normal maternal physiological changes after postpartum, as well as an increased risk of PPH in women who have received larger doses of exogenous oxytocin [3,4,5].

Researchers are paying closer attention to the physiological management of the third stage of labor. Many research [6,7,8,9,10,11,12] have been undertaken to study the benefits of early skin-to-skin contact (SSC) between the baby and the mother and early nursing on the prevention of PPH through their effects on the duration of the third stage of labor and postpartum blood loss. This review aimed to determine the role of SSC and BF on PPH, the duration of the third stage of labor, and the amount of postpartum blood loss, and to clarify the physiological mediator of their effects on women during labor.

#### Postpartum Hemorrhage

Postpartum hemorrhage is defined differently by different institutes. PPH is defined by the WHO as "blood loss of 500 mL or more within 24 hours after delivery, with severe PPH defined as blood loss of 1000 mL or more within 24 hours" [13]. PPH is defined by the Royal College of Obstetricians and Gynecologists [14] as "the loss of 500 mL or more of blood from the vaginal tract within 24 hours after a baby's delivery." Minor (500-1000 mL) or significant (greater than 1000 mL) postpartum hemorrhage." PPH

is defined by the American College of Obstetricians and Gynecologists (ACOG) as blood loss of more than 500 mL after vaginal birth and more than 1000 mL during cesarean section [15], while their updated definition is "a cumulative blood loss of greater than or equal to 1000 mL or blood loss accompanied by signs or symptoms of hypovolemia within 24 h after the birth process" [16].

Saxton et al. distinguished between medical and physiological definitions of PPH. PPH is defined medically as "blood loss larger than 499 mL," but physiologically as "blood loss of any amount that induces indications of shock or anemia; this volume may vary from woman to woman" (p. 2) [7]. Uterine atony, or the inability of the uterus to contract properly following placenta delivery, is the most common cause of PPH [17,18,19]. PPH typically lasts 24 hours, which is known as immediate PPH, however there have been reports of hemorrhage lasting up to six weeks following birth, which is known as delayed PPH [20].

#### Prevalence and Consequences of PPH

Obstetric hemorrhage is one of the main causes of maternal mortality globally, accounting for 27.1 percent of all pregnancy-related fatalities [1]. This avoidable disease has complicated obstetric treatment across the world. Calvert et al. conducted a systematic review and meta-analysis of 71 studies using meta-regression techniques to provide regional estimates of the prevalence of postpartum hemorrhage and discovered that the overall prevalence rate for blood loss 500 cc was 10.8 percent worldwide, with Africa accounting for 25.7 percent of cases, Latin America and Asia accounting for 8 percent each, and Europe and North America accounting for 13 percent [21]. The medicalization of the natural birth process may explain the rising global prevalence of PPH [22,23,24,25]. The incidence of PPH in the United States has increased by 27% from 1995–2004 [26]. A recent cohort study found that the rate increased by 47.5% from 2009–2015 in one tertiary hospital in the United States [17].

PPH is a source of worry since it is connected with significant maternal morbidity, in addition to contributing to death rates. Grobman et al. calculated the prevalence of severe maternal morbidity in the United States and analyzed the underlying etiologies, discovering that PPH is responsible for almost half of all instances of severe morbidity (46.6 percent) [27]. Anemia, hypovolemic shock, disseminated intravascular coagulation, severe respiratory distress, renal failure, poor breastfeeding, and the aggravation

of pre-existing illnesses in mothers are all associated with maternal hemorrhage [28,29].

#### CONCLUSION:

Study results showed that most of the study participants were from 25-29 years. The most common Mode of delivery was Vaginal followed by CS. Most of them don't have previous CS. Their physical activity is low. In addition, most of study participants had good social connections.

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**ANNEX 1: DATA COLLECTION TOOL**

Age					Month of delivery		
Age group	<20	20-24	25-29	30-34	35 or more		
Gravida					Parity		
Abortions					Previous CS	Yes	No
Indication of previous CS					Gestational age		
ANC follow up	Yes	No			Previous PPH	Yes	No
Onset of labor	Spontaneous				Induced		
Labor augmented	Yes	No			Duration of labor	<24 hours	> 24 hours
Obstructed labor	Yes	No			Mode of delivery	Vaginal	CS
Episiotomy	Yes	No			Prolonged 3 <sup>rd</sup> stage	Yes	No
Active management of 3 <sup>rd</sup> stage					Yes	No	
Complications	Yes	No			Received blood	Yes	No
Units of blood					Hospitalization (days)		
Amount of PPH							

Maternal complications			
Gestational diabetes	Pregnancy-induced hypertension	Thrombophilia	Thyroid disease
APH	PPH	Obstetric cholestasis	
Prolonged labor	Obstructed labor	PROM	Polyhydramnios
Anemia	Multiple pregnancy	Post-term	others: .....

<i>Neonatal Information</i>					
Gender	M	F	Neonatal outcome		
Birthweight			Dead	Alive	
>3.5 kg	2.5 - 3.5 kg		NICU admission	Yes	No
LBW (1.5 - 2.4 kg)	VLBW (1.0 - 1.4 kg)		Apgar 1		
ELBW (<1.0 kg)			Apgar 5		
Presentation			Cephalic	Breech	

## APPENDIX 2: Participants responses to scale items

	variable	Frequency	Percent
Age	less than 20 years	15	3.2%
	20-24	58	12.3%
	25-29	198	42.1%
	30-34	73	15.5%
	35 and more	126	26.8%

survey item	Yes	No
Previous CS	38	432
	8.1%	91.9%
ANC follow up	448	22
	95.3%	4.7%
Previous PPH	99	371
	21.1%	78.9%
Labor augmented	174	296
	37.0%	63.0%
Obstructed	185	285
	39.4%	60.6%
Episiotomy	339	131
	72.1%	27.9%
Prolonged 3rd stage	200	270
	42.6%	57.4%
Active management 3rd stage	275	195
	58.5%	41.5%
complications	105	365
	22.3%	77.7%
Received Blood	72	398
	15.3%	84.7%

Onset of labor	freq	%
Spontaneous	379	80.6%
Induced	91	19.4%

Duration of labor	freq	%
more than 24 hours	175	37.2%
less than 24 hours	295	62.8%

Mode of delivery	freq	%
Vaginal	440	93.6%
CS	30	6.4%

Number of pregnancy	freq.	%
0	18	3.8%
(1-3)	315	67.0%
(4-6)	114	24.3%
(7-9)	16	3.4%
(10-12)	7	1.5%

Number of Birth	freq.	%
0	13	2.8%
(1-3)	337	71.7%
(4-6)	105	22.3%
(7-9)	15	3.2%

Number of abortions	freq.	%
0	331	70.4%
1	120	25.5%
2	6	1.3%
3	10	2.1%
4 and more	3	0.6%

Gestational age (weeks)	Frequency	Percent
nothing (0)	300	63.8%
(1-4)	1	0.2%
(5-8)	3	0.6%
(9-13)	13	2.8%
(14-18)	30	6.4%
(19-22)	5	1.1%
(23-26)	23	4.9%
(27-30)	47	10.0%
(31-35)	23	4.9%
(36-40)	25	5.3%

<i>Table 1: Complications that occur to the mother during pregnancy</i>		
survey item	Yes	No
<b>Gestational Diabetes</b>	110	360
	23.4%	76.6%
<b>Pregnancy-induced hypertension</b>	54	416
	11.5%	88.5%
<b>Thrombophilia</b>	34	436
	7.2%	92.8%
<b>Thyroid Disease</b>	57	413
	12.1%	87.9%
<b>APH</b>	84	386
	17.9%	82.1%
<b>PPH</b>	169	301
	36.0%	64.0%
<b>Obsteric Cholestasis</b>	53	417
	11.3%	88.7%
<b>Prolonged labor</b>	182	288
	38.7%	61.3%
<b>Obstructed labor</b>	122	348
	26.0%	74.0%
<b>PROM</b>	92	378
	19.6%	80.4%
<b>Polyhydramnios</b>	68	402
	14.5%	85.5%
<b>Anemia</b>	182	288
	38.7%	61.3%
<b>Multiple Pregnancy</b>	41	429
	8.7%	91.3%
<b>Post term</b>	131	339
	27.9%	72.1%

**Neonatal Information**

survey item	Male	Female
Gender	236	234
	50.2%	49.8%

	Yes	No
Neonatal outcome	410	60
	87.2%	12.8%
NICU admission	96	374
	20.4%	79.6%

	low	natural	high
Apgar 1	44	326	100
	9.4%	69.4%	21.3%
Apgar 5	36	351	83
	7.7%	74.7%	17.7%

Birthweight	ELBW (<1.0 kg)	4 (0.9%)
	VLBW (1.0 - 1.4 kg)	9 (1.9%)
	LBW (1.5 - 2.4 kg)	64 (13.6%)
	2.5 - 3.5 kg	368 (78.3%)
	>3.5 kg	25 (5.3%)

**Regression****Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.683 <sup>a</sup>	.467	.450	.309

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	38.044	14	2.717	28.424	.000 <sup>b</sup>
	Residual	43.499	455	.096		
	Total	81.543	469			

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.165	.133		1.242	.215
Gestational. diabetes	-.037	.046	-.037	-.792	.429
Pregnancy-induced hypertension	-.083	.059	-.063	-1.400	.162
Thrombophilia	-.113	.078	-.070	-1.448	.148
Thyroid. disease	-.025	.052	-.020	-.481	.631
APH	.144	.055	.133	2.633	.009
PPH	.029	.047	.033	.608	.544
Obstetric. cholestasis	.241	.062	.183	3.879	.000
Prolonged.labor1	.102	.050	.119	2.039	.042
Obstructed labor	.217	.053	.229	4.118	.000
PROM	-.043	.043	-.041	-1.011	.313
Polyhydramnios	.325	.059	.274	5.495	.000
Anemia	.090	.039	.105	2.282	.023
Multiple pregnancy	.108	.076	.074	1.419	.157
Post-term	-.051	.040	-.054	-1.254	.210

## Chi-square

## Crosstab

			Previous CS		Total
			yes	no	
Age	1	Count	0	15	15
		% of Total	0.0%	3.2%	3.2%
2	Count	0	58	58	
	% of Total	0.0%	12.3%	12.3%	
3	Count	28	170	198	
	% of Total	6.0%	36.2%	42.1%	
4	Count	0	73	73	
	% of Total	0.0%	15.5%	15.5%	
5	Count	10	116	126	
	% of Total	2.1%	24.7%	26.8%	
Total	Count	38	432	470	
	% of Total	8.1%	91.9%	100.0%	

## Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	22.619 <sup>a</sup>	4	.000
Likelihood Ratio	32.755	4	.000
Linear-by-Linear Association	.016	1	.898
N of Valid Cases	470		



Crosstab

			Labor. augmented		Total
			yes	no	
age	1	Count	0	15	15
		% of Total	0.0%	3.2%	3.2%
	2	Count	10	48	58
		% of Total	2.1%	10.2%	12.3%
	3	Count	75	123	198
		% of Total	16.0%	26.2%	42.1%
	4	Count	24	49	73
		% of Total	5.1%	10.4%	15.5%
	5	Count	65	61	126
		% of Total	13.8%	13.0%	26.8%
Total	Count	174	296	470	
	% of Total	37.0%	63.0%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	30.616 <sup>a</sup>	4	.000
Likelihood Ratio	36.459	4	.000
Linear-by-Linear Association	23.539	1	.000
N of Valid Cases	470		

Crosstab

			Duration of labor		Total
			more than 24 hours	less than 24 hours	
age	1	Count	10	5	15
		% of Total	2.1%	1.1%	3.2%
	2	Count	25	33	58
		% of Total	5.3%	7.0%	12.3%
	3	Count	71	127	198
		% of Total	15.1%	27.0%	42.1%
	4	Count	15	58	73
		% of Total	3.2%	12.3%	15.5%
	5	Count	54	72	126
		% of Total	11.5%	15.3%	26.8%
Total	Count	175	295	470	
	% of Total	37.2%	62.8%	100.0%	

## Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	16.977 <sup>a</sup>	4	.002
Likelihood Ratio	17.508	4	.002
Linear-by-Linear Association	.779	1	.378
N of Valid Cases	470		

## Crosstab

			Obstructed labor		Total
			yes	no	
Age	1	Count	0	15	15
		% of Total	0.0%	3.2%	3.2%
	2	Count	20	38	58
		% of Total	4.3%	8.1%	12.3%
	3	Count	61	137	198
		% of Total	13.0%	29.1%	42.1%
	4	Count	44	29	73
		% of Total	9.4%	6.2%	15.5%
	5	Count	60	66	126
		% of Total	12.8%	14.0%	26.8%
Total	Count	185	285	470	
	% of Total	39.4%	60.6%	100.0%	

## Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	33.359 <sup>a</sup>	4	.000
Likelihood Ratio	38.358	4	.000
Linear-by-Linear Association	18.683	1	.000
N of Valid Cases	470		

## Crosstab

			Mode of delivery		Total
			Vaginal	CS	
Age	1	Count	15	0	15
		% of Total	3.2%	0.0%	3.2%
	2	Count	58	0	58
		% of Total	12.3%	0.0%	12.3%
	3	Count	178	20	198
		% of Total	37.9%	4.3%	42.1%
	4	Count	73	0	73
		% of Total	15.5%	0.0%	15.5%
	5	Count	116	10	126
		% of Total	24.7%	2.1%	26.8%
Total	Count	440	30	470	
	% of Total	93.6%	6.4%	100.0%	

## Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.044 <sup>a</sup>	4	.005
Likelihood Ratio	23.667	4	.000
Linear-by-Linear Association	.689	1	.407
N of Valid Cases	470		

## Crosstab

			complications		Total
			yes	no	
age	1	Count	0	15	15
		% of Total	0.0%	3.2%	3.2%
	2	Count	10	48	58
		% of Total	2.1%	10.2%	12.3%
	3	Count	50	148	198
		% of Total	10.6%	31.5%	42.1%
	4	Count	15	58	73
		% of Total	3.2%	12.3%	15.5%
	5	Count	30	96	126
		% of Total	6.4%	20.4%	26.8%
Total	Count	105	365	470	
	% of Total	22.3%	77.7%	100.0%	

## Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.444 <sup>a</sup>	4	.168
Likelihood Ratio	9.740	4	.045
Linear-by-Linear Association	1.452	1	.228
N of Valid Cases	470		