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PRIMARY POSTPARTUM HEMORRHAGE: RISK FACTORS, CAUSES AND MATERNAL OUTCOME

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Abstract:
Introduction: *Postpartum hemorrhage (PPH) is defined more than 500 ml of blood bleeding following vaginal delivery.* ***Objectives:*** *The main objective of the study is to analyse the primary postpartum haemorrhage risk factors, causes and its maternal outcome.* ***Material and methods:*** *This cross-sectional study was conducted in Fatima Jinnah Medical University during June 2010 to February 2020. Women were administered a questionnaire to ascertain risk factors for PPH, defined as a blood loss of 1,000 ml or more at childbirth. PPH is defined as the blood loss of more than 500 ml within the first 24 hours following childbirth. In this study, we defined as the blood loss of more than 1,000 ml which influences results in signs or symptoms of circulating blood volume instability.* ***Results:*** *The results are described by medians and interquartile ranges. Data collected among 1,068 women showed a mean blood loss of 505 ± 356 ml and ranged from 40 to 2,745 ml. Overall, 93 (8.7%) women had PPH (1,000 ml or more) and 22 (2.1%) had severe PPH. The use of ART, excessive weight gain (over 15 kg) during pregnancy, complicated PIH, severe vaginal/perineal lacerations and having a macrosomic baby were contributing factors for PPH.* ***Conclusion:*** *It is concluded that the risk factors for PPH in our setting were the use of ART, PIH, severe vaginal/perineal lacerations and macrosomic neonates. Extra vigilance during the antenatal and peripartum periods is needed to identify women at risk and enable early intervention to prevent PPH.*

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INTRODUCTION:

Postpartum hemorrhage (PPH) is defined more than 500 ml of blood bleeding following vaginal delivery. PPH is considered severe when blood loss exceeds 1,000 ml after a vaginal delivery, or results in signs or symptoms of circulating blood volume instability. It is a major cause of maternal mortality especially in developing countries and is the cause of 25% of maternal deaths worldwide. It is the most common maternal morbidity even in highly resourced countries and is increasing in incidence [1].

Sequelae of PPH include hypotension, anemia, and fatigue, which can make breastfeeding and maternal care of the newborn more difficult. The Society of Obstetricians and Gynaecologists of Canada has published guidelines on the prevention and management of this complications [2]. They summarize the causes for PPH as related to abnormalities of one or more of four basic processes, namely the "four Ts": tone, trauma, tissue, and thrombin. Atonic bleeding is major factor of PPH. Risk factors include antepartum and intrapartum conditions as including a history of PPH, multiple pregnancies, fetal macrosomia, primigravida, grand multiparity, older age, preterm births, genital tract injuries, non-use of oxytocin for PPH prophylaxis, labor induction, cesarean delivery and intra-uterine fetal deaths [3].

Postpartum haemorrhage (PPH) is a major cause of maternal morbidity and mortality, accounting for about one-third of all pregnancy-related deaths in Africa and Asia. Primary PPH is typically defined as bleeding from the genital tract of 500 ml or more in the first 24 hours following delivery of the baby [5]. The incidence of PPH in observational studies is believed to be around 6%, although this can vary somewhat by geographic region and delivery setting. Severe morbidities associated with PPH include anaemia, disseminated intravascular coagulation, blood transfusion, hysterectomy, and renal or liver failure [6].

Objectives

The main objective of the study is to analyse the primary postpartum haemorrhage risk factors, causes and its maternal outcome.

MATERIAL AND METHODS:

This cross-sectional study was conducted in Fatima Jinnah Medical University during June 2010 to February 2020. Women were administered a questionnaire to ascertain risk factors for PPH, defined as a blood loss of 1,000 ml or more at childbirth. PPH is defined as the blood loss of more than 500 ml within the first 24 hours following childbirth. In this study, we defined as the blood loss of more than 1,000 ml which influences results in signs or symptoms of circulating blood volume instability. Pregnant women were recruited at 22 weeks of gestation or greater. The study excluded women who underwent a caesarean-section delivery, or who had a stillbirth or a multiple pregnancy. Gestational age at birth was calculated based on ultrasound scan estimations or on the mother's recollection of her last normal menstrual period. The research team noted whether labor was induced or augmented with oxytocin, the mode of delivery (normal or assisted vaginal delivery), and any severe vaginal/perineal lacerations. The primary outcome was PPH defined as a blood loss of 1,000 ml or more after childbirth. If the blood loss is over 100ml, the vital sign deteriorated easily, so we defined more than 1000ml hemorrhage as PPH. The total blood loss collected in the calibrated conical receptacle was established by the attending midwife. The following variables were collected from medical record and questionnaire: maternal age; parity; the use of assisted reproductive technology (ART); maternal smoking habit; pregnancy-induced hypertension (PIH); maternal body weight and BMI before pregnancy; labor induction/augmentation by oxytocin; assisted vaginal delivery; severe vaginal/perineal lacerations; and neonatal birthweight. Multivariate Logistic regression analysis was used to estimate odds ratios (ORs) and 95% confidence intervals (CIs) and control for the potential confounders.

Explanatory variables included in this model were those that statistically significant for outcome in the univariate analysis.

RESULTS:

The results are described by medians and interquartile ranges. Data collected among 1,068 women showed a mean blood loss of 505 ± 356 ml and ranged from 40 to 2,745 ml. Overall, 93 (8.7%) women had PPH (1,000 ml or more) and 22 (2.1%) had severe PPH. The use of ART, excessive weight gain (over 15 kg) during pregnancy, complicated PIH, severe vaginal/perineal lacerations and having a macrosomic baby were contributing factors for PPH.

Table 01: **Association between the risk factors and postpartum hemorrhage.**

Variable		**No PPH (%)**	**PPH (%)**	***P* value**
Age at birth				
	under 19	51 (5.2)	3 (3.2)	<0.05
	20–35	652 (66.9)	62 (66.7)	Reference
	35–40	228 (23.4)	21 (22.6)	*NS*
	over 40	44 (4.5)	7 (7.5)	<0.05
Pre-pregnant body mass index				
	under 18.4	173 (17.7)	18 (19.4)	*NS*
	18.5–24.9	661 (67.8)	59 (63.4)	Reference
	over 25.0	141 (14.5)	16 (17.2)	*NS*
Parity				
	Primipara	485 (49.7)	44 (47.3)	Reference
	Multipara	490 (50.3)	49 (52.7)	*NS*
Weight gain during pregnancy (Kg)				
	less 9.9	552 (56.6)	36 (38.7)	Reference
	10.0–14.9	337 (34.6)	40 (43.0)	*NS*
	over 15.0	86 (8.8)	17 (18.3)	<0.01
Gestational week at delivery (weeks)				
	after 40/0	283 (29.0)	31 (33.3)	*NS*
	37/0-39/6	549 (56.3)	56 (60.2)	Reference
	before 36/6	143 (14.7)	6 (6.5)	<0.01
Pregnancy induced hypertension				
	No	913 (93.6)	78 (83.9)	Reference
	Yes	62 (6.4)	15 (16.1)	<0.01
Labor induction/ augmentation by oxytocin				
	No	657 (67.4)	60 (64.5)	Reference
	Yes	318 (32.6)	33 (35.5)	*NS*
Assisted vaginal delivery				
	No	897 (92.0)	84 (90.3)	Reference
	Yes	78 (8.0)	9 (9.7)	*NS*
Severe vaginal/perineal laceration				
	No	834 (85.5)	68 (73.1)	Reference
	Yes	141 (14.5)	25 (26.9)	<0.01
Neonatal birth weight (g)				
	less 2499	209 (21.4)	2 (2.2)	<0.01
	2500–3499	679 (69.6)	67 (72.0)	Reference
	3500–3999	77 (7.9)	20 (21.5)	<0.05
	over 4000	10 (1.0)	4 (4.3)	<0.01

DISCUSSION:

Calvert et al. reported that the prevalence of PPH (blood loss >500 ml) ranged from 7.2% in Oceania to 25.7% in Africa [6]. The prevalence of severe PPH (blood loss >1,000 ml) was highest in Africa at 5.1% and lowest in Asia at 1.9%. This high incidence of PPH in our study may have been influenced by the characteristics of the study population. Our hospital is a single tertiary perinatal medical facility in Japan that is reported to have higher rates of PPH. We excluded cesarean deliveries and multiple pregnancies in this study as the former associated with an increased risk of PPH [7]. Multiple pregnancies are also associated with an increased risk of PPH. Singleton transvaginal deliveries were analyzed in this study to identify the risk factor clearly. The risk for PPH was highest for women using ART. This is consistent with previous studies [8]. Thus, Zhu et al. reported that placental adherence occurred more frequently in a group of women after using ART.[17] Placental adherence reflects abnormal development, and is an independent risk factor for PPH. However, there was no placental adhesion or uterine inversion in our study. Another possibility is the presence of uterine myomas or uterine anomalies, but we did not investigate maternal uterine factors. Complicated PIH was the second major risk factor in our study [9]. Hematological abnormalities can develop in some women with PIH and the levels of plasma clotting factors may decrease. Other possible and not registered confounders were the use of magnesium sulfate, increased blood loss via vasodilatation, a tocolytic effect predisposing to uterine atony, prolonged bleeding time through inhibition of platelet activity and red cell deformities [10].

CONCLUSION:

It is concluded that the risk factors for PPH in our setting were the use of ART, PIH, severe vaginal/perineal lacerations and macrosomic neonates. Extra vigilance during the antenatal and peripartum periods is needed to identify women at risk and enable early intervention to prevent PPH.

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