Risk Factors for Primary Postpartum Hemorrhage in Vaginal Delivery

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ABSTRACT

Background: Postpartum hemorrhage is an emergency, condition encountered in obstetric cases. It is an acute life-threatening situation and needs an immediate and rapid management. Postpartum hemorrhage is leading cause of maternal mortality and morbidity worldwide, with more commonly affecting women of developing countries. Accurate assessment of blood loss, identification of risk factors and timely recognition of postpartum hemorrhage remain major challenge in obstetrics. Different risk factors like hypertensive disorder in pregnancy, antepartum hemorrhage, anemia, big baby, polyhydramnios, multiple pregnancy, obesity, augmented/prolonged labor are risk factors for primary postpartum hemorrhage. The objective of this study was to identify the various risk factors associated with primary postpartum hemorrhage, in Paropakar Maternity and Women's Hospital (PMWH), which is biggest institute in country for holding records of maximum number of deliveries.

Methods: A cross sectional study was conducted over a period of 3 months between March 2023 to May 2023 on 72 patients. Women with term pregnancy who experienced primary PPH were analyzed for different risk factors. Similarly, incidence of postpartum hemorrhage according to age, parity, gestational age, types of labor, types of vaginal delivery and causes of postpartum hemorrhage were studied. The results were then analyzed.

Results: The incidence of primary PPH during the study was 3%. Majority of cases of PPH were in age group of 20-24 (44.4%), followed by age group (25-29). Most of cases (50%) were of gravidity 2 to 3, followed by primigravida (45.8%). There was equal distribution of PPH in gestation age (37-39+6) WOG to (40-41+6) WOG. There were no risk factors associated with occurrence of PPH in 56%. Hypertensive disorder of pregnancy, anemia, APH, multiple pregnancy, fetal macrosomia, polyhydramnios and obesity are associated risk factors for PPH. Among risk factors associated with PPH, hypertensive disorder of pregnancy was most common risk factors (40.6%), followed by maternal anemia (25%), multiple pregnancy (12.5%), APH (6.3%) fetal macrosomia (6.3%), maternal obesity (6.3%), polyhydramnios (3.1%). PPH was more common in augmented labor (43%), followed by induced labor (29.2%) and spontaneous labor (27.8%). In this study most women (72.2%) experienced blood loss of 500-1000 ml. And most common cause of PPH was atony (83.3%) followed by genital tract injury (14%) and retained tissues (2.7%).

Conclusions: In many cases, PPH can't be predicted fully as many cases of PPH occur without vivid risk factors, as in this study 56% women experiencing PPH had no associated antenatal risk factors. Antenatal risk factors like hypertensive disorder of pregnancy, maternal anemia, twin pregnancy, APH, macrosomia, obesity are common risk factors for PPH. Similarly induced and augmented labor and instrumental delivery can lead to PPH.

Keywords: Postpartum haemorrhage, risk factors, vaginal delivery

INTRODUCTION

Postpartum hemorrhage is an emergency, condition encountered in obstetric cases. Postpartum hemorrhage (PPH) complicates 1-10% of all deliveries and is a leading cause of maternal mortality and morbidity worldwide.[1] Severe PPH occurs in about 1-2% of all deliveries.[1] The incidence of PPH is around 5% of deliveries when blood loss is not precisely assessed and around 10% when precisely assessed.[2] Women in low-income countries and lower middle-income countries have an increased likelihood of severe PPH and of dying from PPH-related consequences.[3]

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Different maternal risk factors like, hypertensive disorder of pregnancy, anemia, APH, obesity, macrosomia, multiple pregnancy, polyhydramnios, augmented and prolonged labour, instrumental delivery are common risk factors for postpartum hemorrhage.

Morbidity and mortality due to PPH are largely preventable. Accurate assessment of blood loss, identification of risk factors and timely recognition of postpartum hemorrhage remain major challenge in obstetrics.[4] This research was carried out to identify risk factors for primary PPH in PMWH which is biggest institute in country for holding records of maximum number of deliveries.

METHODS

This was a cross-sectional study conducted at Paropakar Maternity and Women's hospital (PMWH), Thapathali, Kathmandu, during a period of 3 months from March 2023 to May 2023.

Ethical approval was taken from Institutional Review Board (IRB), NAMS (National Academy of Medical Sciences). Patients who experienced PPH following vaginal delivery were included in the study after taking a informed consent.

All women with vaginal delivery with PPH (Blood loss 500 ml and more, after vaginal delivery were included, whereas referred PPH cases and gestational age < 37 weeks were excluded.

Data were collected every day. Data were collected from Labor room, MNSC, wards. Abdominal examination was done to know the tone of uterus. P/V examination was done to see any genital tract injury, cervical tear or retained placental tissues.

Once the patient was stabilized and treated in ward, data was collected on pre designed questioners. Relevant history regarding age, parity was taken. Patient LMP, POG, and EDD were calculated. Any antenatal risk factors for primary PPH were documented well. Patient's ANC reports, USG reports, investigation were evaluated. Partographs were reviewed. Patients were followed in wards for evaluating treatment procedure and outcomes.

Blood loss was collected in a bowl, and collected blood was measured by pouring in the calibrated jar. Blood clots obtained during process were weighed (one gram will be equal to 1 ml). Gauge pieces and pads weigh beforehand and later soaked with blood were taken for calculation.

SPSS 27 statistical software has been used to analyse the data in this study. Descriptive statistics was used.

RESULTS

During study period of 3 months, there were total 3318 vaginal deliveries and we had 89 (3%) of PPH.

Majority of cases of PPH were in age group of 20-24 (44.4%), followed by age group 25-29 (29.2%), age group 30-34 (12.5%). (Table1)

Table 1. Age distribution [N=72].

AGE	FREQUENCY	PERCENTAGE
15-19	8	11.1
20-24	32	44.4
25-29	21	29.2
30-34	9	12.5
35-39	2	2.8
>40	0	0

This study showed that there was equal distribution of PPH in gestation age (37-39+6) WOG to (40-41+6) WOG. Similarly, most primary postpartum hemorrhage was seen in gravidity (2-3) (50%), followed by primigravida (45.8%). There were 3(4.2%) cases above gravidity 4 experiencing PPH in this study.

Table 2 shows that Hypertensive disorder of pregnancy was most common risk factors (40.6%), followed by maternal anemia (25%), multiple pregnancy (12.5%) anemia (6.3%), obesity (6.3%), fetal macrosomia (6.3%) and polyhydramnios (3.10%)

Table 2. Different risk factors for PPH.

RISK FACTORS OF PPH	FREQUENCY	PERCENTAGE
HTN Disorder of Pregnancy	13	40.60%
APH	2	6.30%
Anemia	8	25%
Polyhydraminos	1	3.10%
Big Baby (>4 Kg)	2	6.30%
Multiple Pregnancy	4	12.50%
Obesity	2	6.30%

Table no 3 shows that PPH is more common in augmented labor (43%), followed by induced labor (29.2%) and spontaneous labor (27.8%).

Table 3. PPH in different types of labor.

TYPES OF LABOUR	FREQUENCY	PERCENTAGE
Spontaneous	20	27.8
Induced	21	29.2
Augmented	31	43
Prolonged	0	0

PPH was associated with twin delivery (5.4%) and instrumental delivery (1.32%).

In this study, 20.8% women experienced blood loss of 500 ml, most women about 72.2% experienced blood loss more than 500 ml,

with 7% experiencing blood loss of more than 1000 ml. Most common cause of PPH was atony (83.3%) followed by genital tract injury (14%) and retained tissues (2.7%).

DISCUSSION

Estimation of exact blood loss during PPH is a challenging part. There is difference in estimation of blood loss by quantitative blood loss and estimated blood loss. According to study done by Coviello et al the rate of PPH by expected blood loss(EBL) and quantitative blood loss(QBL) was 2.8 and 10.8%. [5] Similarly, the accuracy of gravimetric measurement of blood loss is better than visual estimation of blood loss.[6] In this study we used quantitative way of measuring blood loss by measuring blood in kidney tray, weighing the wet gauze piece and pads.

When associated factors of PPH were considered, one patient may have more than one risk factors. It is important to emphasize that the risk factors identified contribute to only fraction of hemorrhage cases as suggested by this study, 56% had no identified risk factors.

Maternal age less than 18 years is risk factor for PPH.[7] Mothers aged 35 and above were nearly seven times more likely to have experienced PPH respect to women in the age group between 20–34 years old.[8] In this study among women experiencing PPH, most were between the age of 20-24 (44%). Similarly, women between age 25-29 had 29.2% of PPH. There were 2 (2.8%) women with age above 35 years experiencing PPH. The incidence of PPH in age 20-24 years is as this is commonest age group for marriage and family in Nepal.

According to Alexander J Butwick, et al. the incidence of postpartum hemorrhage was highest for deliveries between 41 and 42 weeks of gestation 9.5% and 5.6% respectively.[9] In this study, PPH was common in gravida 2 and 3 with total women 36 (50%), followed by primigravida 33 (45.8%). There were no grand multiparous women in this study.

According to study done by Ganzalez Carillo, et al, the highest incidence of bleeding was between 35 and 40 weeks with a total of 280 women of which 101 (36.07%) developed PPH.[10]In this study there was equal distribution of PPH in gestation age (37-39+6) WOG to (40-41+6) WOG. There were no cases of PPH noted in women above 42 weeks since most of cases in this hospital are induced before 42 weeks for termination of pregnancy. The high incidence of PPH in 40-42 weeks is due to the fact that most of the pregnancy in this group gets induced and augmented and use of oxytocin in this group is also high. Oxytocin used for both induction and augmentation desensitizes the receptors and reduces postdelivery effect of oxytocin on uterine contractility and causes atonic PPH.

In this study among 72 women who were taken for study, 40 (56%) cases had no known antenatal risk factors for PPH. So, we should expect PPH in every case undergoing delivery and adequate preparation like baseline investigations, serology status, blood grouping and blood arrangement should be done.

Durmaz and Komurcu, indicated the existence of a relationship between chronic or pregnancy-induced hypertension and PPH.[11] In this study, Hypertensive disorder of pregnancy was commonest risk factors for PPH, among 72 women enrolled in study 13 (18%) cases were hypertensive. Among all risk factors hypertensive disorder holds highest percentage (40.6%). Among these hypertensive disorder, 3 women had severe preeclampsia and one had severe bleeding (more than 2000 ml) requiring peripartum hysterectomy. Increased PPH in hypertensive disorder can be explained as hypertensive disease in pregnancy causes poor placentation; this combined with the higher mean arterial blood pressure could predispose to brisker blood loss after delivery.[54] Similarly use augmenting agent like oxytocin also predispose the risk of PPH.

In this study 2 (6.30%) cases of APH had PPH. Both cases were the cases of Abruptio Placenta. 1 case was associated with IUFD, which was augmented later

with oxytocin. There were no cases of Placenta previa undergoing vaginal delivery. The incidence of PPH will be surely higher in total deliveries, as most of the cases of APH (placenta previa and Abruptio Placenta) undergoes caesarean delivery and ultimately results in massive PPH.

In a study, Frass, et al concluded that there was a strong correlation between low Hb levels and blood loss and supported the association between anemia (Hb < 10) and the risk of PPH.[12]In this study, Anemia was found to be second most common risk factors for PPH with total women of 8 (25%), among women with PPH. This high incidence as risk factors may be explained as our hospital is referral center for delivery, where most of women arrives at late trimester from rural areas. These women are nutritionally anemic and which ultimately leads to PPH.

In this study, one (3.10%) woman with polyhydramnios experienced PPH. PPH due to polyhydramnios is due to atony of uterus due to overdistension of uterus. Most of polyhydramnios also end up with caesarean delivery so, the incidence of PPH in vaginal delivery due to it may have been less.

According to cohort study done by Onoge, the risk of PPH was doubled in large (macrosomia, ≥4000 babies. Large babies are known to over-distend the uterus which is associated with uterine atony.[12] Macrosomia is risk factors for PPH as it causes overdistension of uterus, ultimately causing atonicity of uterus. Another cause for PPH in big baby vaginal delivery, there is high probability of genital tract injury (tear, laceration) which will contribute to PPH. In this study 2 women experienced PPH after vaginal delivery of big baby more than 4000 gm. The cause of PPH in one case was atonicity of uterus, while another case had genital tract injury.

In this study, among 72 women experiencing PPH, 4(12.5%) were twin pregnancy. PPH in twin pregnancy is attributed due to overdistension of uterus, abnormal placentation and associated maternal medical illness like pregnancy induced hypertension. In this study, one woman had associated hypertensive disorder along with twin pregnancy.

Obesity is considered another risk factor for PPH. According to Blomberg et al, -based conducted population cohort study including 1,114,071 women, there was an increased risk for postpartum hemorrhage for women with a BMI of 40 or higher (5.2%) after normal delivery compared with normal-weight women (4.4%) and even more pronounced (13.6%) after instrumental delivery compared with normal-weight women (8.8%).[13] Obesity can increase risk for PPH as women may have medical illness like, hypertension, GDM, hypothyroidism as well there is increased chance of prolonged labor, labor dystocia and need for augmentation. Atonicity is common in obese in women. In this study 2 (6.30%) had PPH. Both women had BMI of more than 30 kg/m^2.

Oxytocin used for augmentation of labor is itself a major risk factor for post-partum hemorrhage due to atonic uterus as it desensitizes the receptors and reduces postdelivery effect of oxytocin on uterine contractility.[14] In this study PPH was more common in augmented labor (43%), followed by induced labor (29.2%). Augmentation was done by ARM and oxytocin in escalating dose. Induction was done by prostaglandin and oxytocin. 27.8% women experiencing PPH had spontaneous labor.

Instrumental delivery increases the risk for vaginal, cervical, or perineal lacerations.[15] In this study, one woman. experienced PPH following forceps delivery done for fetal bradycardia in second stage labor. Following, delivery she had genital tract injury (fourth degree tear) with PPH which was later repaired.

Total blood loss differs in PPH. PPH can be minor (500-1000 ml) or major (more than 1000 ml). Major could be divided to moderate (1000-2000 ml) or severe (more than 2000 ml). In this study most women about 72.2% experienced blood loss of 500-1000 ml, 5 (7%) women had blood loss more than 1000 ml. Most women who had blood loss more than 500 ml needed blood transfusion in ward later.

Atony is most common cause of PPH, followed by genital tract injury, retained tissues and rarely by coagulopathy which is classically explained as 4 T. Similar findings were seen in this study. Most common cause of PPH was atony (83.3%) followed by genital tract injury (14%) and retained tissues (2.7%). Most cases of Atony were treated with uterine massage and uterotonics drugs, bimanual compression. Those not responding to these were managed with condom tamponade.

One case of atony with blood loss of more than 2000 ml not responding to uterotonics and tamponade ultimately resulted in peripartum hysterectomy and MICU admission.

Amng 10 cases of genital tract injury, 1 had fourth degree tear, 1 had deep extended episiotomy and 8 had cervical tear. These injuries were repaired. 2 cases of

retained tissues underwent exploration under antibiotic coverage.

CONCLUSIONS

In many cases, postpartum hemorrhage can't be predicted fully as many cases of hemorrhage occur without vivid risk factors, as in this study 56% women experiencing postpartum hemorrhage had no associated antenatal risk factors. Antenatal risk factors like hypertensive disorder of pregnancy, maternal anemia, twin pregnancy, APH, macrosomia, obesity are common risk factors for postpartum hemorrhage. Similarly induced and augmented labor and instrumental delivery can lead to postpartum hemorrhage.

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