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Postpartum hemorrhage: clinical features and management in a tertiary care center of Nepal.

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Abstract

Introduction: Obstetric haemorrhage continues to account for a substantial proportion of maternal deaths in Nepal, despite implementation of different strategies. The most common type of obstetric haemorrhage is postpartum hemorrhage (PPH), mainly primary. Understanding its burden in the health care setting was the objective of this study by assessing its prevalence, associated factors and management.

Method: This was a retrospective study conducted at Patan Academy of Health Sciences from Mar 2019 to Mar 2022. Demographic, obstetrical, medical factors and management of primary PPH was collected from medical record. Statistical analysis was done using Statistical Packages for Social Sciences (SPSS-20). Results were expressed using frequencies, tables and figures.

Result: From a total 17,770 deliveries, primary PPH was seen in 84(0.47%). Most of them 49(58.3%) were multipara. The frequency and impact of PPH can be effectively reduced by reducing avoidable risk factors, especially those related to obstetric interventions as increased caesarean section rate which was 48(57.1%) among primary PPH. Other associated risk factors were induction of labor 32(38.1%), pre-existing medical diseases 32(38.1%), history of antepartum hemorrhage 15(17.9%), previous caesarean section 19(22.6%). Uterine atony 43(51.2%), abnormal placentation disorder 16(19%), genital trauma 9(10.71%), retained tissue 5(5.95%) were the leading causes of PPH. PPH in morbidly adherent placenta like placenta accreta spectrum was 8(9.5%) and placenta increta 1(1.2%). PPH was controlled by conservative management in 24(28.6%). Surgical intervention was required in 34(40.5%) including hysterectomy in 14(16.7%).

Conclusion: PPH can be minimized by extra vigilance and planned conjoined management.

Keywords: management, primary postpartum hemorrhage, risk factors

Introduction

Postpartum hemorrhage (PPH) is the leading cause of maternal mortality and morbidity worldwide.¹ World Health Organization (WHO) statistics suggested that 60% of maternal deaths in developing countries were due to PPH, accounting for more than 100,000 maternal deaths per year worldwide.² Most PPH deaths can be avoided with timely detection and management; however, critical challenges persist.³ Predicting who are likely to have a PPH is an active area of research and a component of quality improvement bundles.⁴ In Nepal, the most recent maternal mortality ratio (MMR) was estimated to be 151 per 100,000 livebirths,⁵ of which 27% has been attributed to PPH.⁵

The risk of maternal death from PPH represents one of the greatest challenges in global health. Reduction of maternal mortality has long been a global health priority, and a target in the United Nations (UN) 2030 agenda for Sustainable Development Goals is to reduce the global MMR to less than 70 per 100,000 live births.⁸ WHO⁹ indicates that most maternal deaths resulting from PPH occur within the first 24 hours postpartum and are preventable and manageable if appropriate and effective resources are readily available.

It is known that PPH is the consequence of several factors that can occur in isolation or combination. Assessing the prevalence of PPH and identifying its risk factors could help to prevent and control its negative consequences. Therefore, this study aimed to assess the magnitude of primary PPH, associated factors and various methods of management among women who delivered at Patan Academy of Health Sciences.

Method

This is a retrospective descriptive study which includes primary postpartum hemorrhage of the patients who delivered at Patan Academy of Health Sciences from Mar 2019 to Mar 2022. Retrospective chart review of clinical

factors, management detail for primary PPH was conducted. The WHO, defines PPH as blood loss of 500 ml or more following a normal vaginal delivery (NVD) or 1000 ml or more following a caesarean section (CS) within 24 hours after birth or blood loss followed by signs and symptoms of hypovolemia (hypotension, tachycardia, syncope) within 24 hours after birth. Early or primary postpartum hemorrhage, the most common type, occurs within the first 24 hours of delivery; secondary postpartum hemorrhage occurs after the first 24 hours.

This study includes the clinical factors, management of primary PPH. The inclusion criteria of primary PPH was that the blood loss occurred within the first 24 hours of delivery regardless of method of delivery (vaginal or CS) as described by WHO. If PPH was diagnosed beyond 24 hours to six weeks of delivery, it was considered secondary PPH and was then excluded.

All identified cases of primary PPH were reviewed in detail for maternal age, gestational age, gravida, parity, type of pregnancy, mode of delivery and other pertinent clinical factors like induction of labor, augmentation of labor, history of antepartum hemorrhage, fibroid uterus, polyhydramnious, previous CS, abnormal placentation disorder, maternal health related factors (gestational diabetes mellitus, preeclampsia, anemia, pruritus of pregnancy, different infections), uterine atony, retained placenta or tissues, trauma, sequence of treatments.

Active Management and use of prophylactic uterotonic in the third stage of labour was done in all the delivered patients in our institute to reduce the risk of PPH. First-line treatment option for PPH was conservative management with uterotonic drugs (oxytocin, prostaglandins), tranexamic acid. Management included stepwise use of available uterotonics, taking into account individual patient contraindications, with early recourse to mechanical then definitive surgical management in the unstable patient

where medical management was proving ineffective. Second-line therapy included mechanical interventions using different types of balloon tamponade, condom tamponade, uterovaginal packing and radiological intervention by uterine artery embolization. Surgical procedures included exploration with check curettage, manual removal of placenta, repair of lacerations, uterine compression suture (B lynch suture), vascular ligation (bilateral uterine artery ligation). Surgical option when other measures failed often warranted hysterectomy.

Ethical approval for the study was obtained from the Institutional Review Committee of Patan Academy of Health Sciences. Data were statistically analyzed using IBM statistical package for social sciences (SPSS) software and descriptive analysis was performed. Continuous data were expressed as the mean±standard deviation (SD) and percentage. Results were expressed using frequencies, tables and figures.

Result

In all, there were 17770 deliveries. During this period, 84 cases had primary PPH with the prevalence of 0.47%. The mean age of the study population was 28.64 y. Majority of cases were between age group of 25-34 y which was 66(78.6%) with 33(39.3%) in each group of 25-29 y and 30-34 y. Maximum of 12(14.3%) fell into age group of 30 years old, Table 1.

A total of 56(66.7%) patients were between gestational age 37-40 weeks of which 21(25%) were 38 weeks of gestation. High proportion of patients 49(58.3%) were multiparous. Concerning the type of pregnancy, 74(88.1%) were singleton cephalic. Regarding onset of labor, 32(38.1%) were induced for various reasons, 9(10.71%) underwent labor augmentation, 15(17.9%) had history of antepartum haemorrhage, and 19(22.6%) had

previous CS. The most common cause of postpartum hemorrhage was uterine atony 43(51.2%). Among abnormal placentation disorder, 16(19%) had placenta previa of which 8(9.5%) complicated with morbidly adherent placenta like placenta accreta spectrum and 1(1.2%) placenta increta. Nine(10.71%) cases had genital trauma with 7(8.3%) being vulval hematoma and the rest cervical, vaginal lacerations, Table 2.

A total of 32(38.1%) women had developed various medical problems. Ten(11.9%) had gestational diabetes mellitus (GDM), 3(3.57%) had GDM with other maternal health problems. Others were preeclampsia, hypothyroidism, pruritus of pregnancy, Table 3.

In view of method of delivery, 46(54.8%) delivered by lower segment CS. Classical CS was performed in 2(2.38%) and 33(39.3%) delivered vaginally, Table 5.

Most of the PPH cases, 24(28.6%) were controlled conservatively with uterotonic drugs (oxytocic agents, prostaglandins, tranexamic acid). Among mechanical methods, 24(28.6%) used condom tamponade and 2(2.38%) had uterovaginal packing with gauze. In surgical interventions, 13(15.5%) underwent different methods of exploration with evacuation of hematoma, manual removal of placenta, check curettage, repair of genital lacerations. Two(2.38%) had uterine compression sutures (B lynch suture) and 5(5.95%) patient had surgical ligation of bilateral uterine artery. Among five cases of surgical ligations, one had bilateral uterine ligation after attempted condom tamponade and two cases after attempted B lynch suture. Within the same period, there were 14(16.7%) peripartum hysterectomies for eight placenta accreta spectrum, one placenta increta not amenable to complete delivery for which other option was not considered due to PPH and hysterectomy was performed, Table 4.

Table 1. Sociodemographic characteristics of women with primary PPH who gave birth in Patan Academy of Health Sciences

Age	f (%)
15-19 y	1(1.19%)
20-24 y	11(13.1%)
25-29 y	33(39.3%)
30-34 y	33(39.3%)
>=35 y	6(7.14%)

Table 2. Distribution of clinical factors associated with primary PPH among women who gave birth in Patan Academy of Health Sciences

Variable	Category	f (%)	
Gestational age	<37 w	26(30.95%)	
	37-40 w	56(66.7%)	
	>40 w	2(2.38%)	
Parity	Primi	35(41.7%)	
	Multi (n=49)	G ₂ A ₁	3(3.6%)
		G ₂ P ₁ L ₁	30(35.7%)
		G ₃ P ₁ L ₁ A ₁	11(13.1%)
		G ₃ P ₂ L ₂	5(6%)
Type of pregnancy	Singleton, cephalic	74(88.1%)	
	Singleton, breech	8(9.52%)	
	Twin	2(2.38%)	
Induction of labor		32(38.1%)	
Labor augmented		9(10.71%)	
History of APH		15(17.9%)	
Previous cesarean section		19(22.6%)	
Fibroid uterus		4(4.76%)	
Abnormal placentation disorder	Placenta previa	16(19%)	
	Morbidly adherent placenta	Placenta accreta spectrum	8(9.5%)
		Placenta increta	1(1.2%)
Polyhydramnious		1(1.2%)	
PROM		3(3.57%)	
PPROM		1(1.2%)	
Uterine atony		43(51.2%)	
Genital trauma		9(10.71%)	
Retained placenta or tissues		5(5.95%)	
Uterine inversion		1(1.2%)	

Table 3. Characteristics of medical problems among women with primary PPH (N=32)

Variables	f (%)	Variables	f (%)
Gestational diabetes mellitus (GDM)	10(11.9%)	Obstetric cholestasis	1(1.2%)
GDM +hypothyroidism	1(1.2%)	Anxiety disorder	1(1.2%)
GDM + anemia	1(1.2%)	Covid positive	1(1.2%)
GDM+preclampsia+hypothyroidism	1(1.2%)	DVT + anemia	1(1.2%)
Preeclampsia	3(3.57%)	H/o PTB	1(1.2%)
Gestational HTN (GHTN)	2(2.38%)	Heart disease	1(1.2%)
GHTN+thrombocytopenia	1(1.2%)	Jaundice + thrombocytopenia	1(1.2%)
Hypothyroidism	3(3.57%)	Snake bite + Covid positive	1(1.2%)
Pruritus of pregnancy	2(2.38%)		

Table 4. Distribution of cases according to management of primary PPH among women who gave birth in Patan Academy of Health Sciences

Pattern of management	f (%)
Conservative management	24(28.6%)
Mechanical interventions	
Condom tamponade	24(28.6%)
Uterovaginal packing	2(2.38%)
Surgical procedures	
Exploration, Evacuation of hematoma, Manual removal of placenta, Check curettage, Repair of lacerations	13(15.5%)
Uterine compression suture (B lynch suture)	2(2.38%)
Vascular ligations (bilateral uterine artery ligations)	5(5.95%)
Condom tamponade + bilateral uterine ligations	1(1.2%)
B lynch suture+bilateral uterine ligations	2(2.38%)
Peripartum hysterectomy	14(16.7%)

Table 5. Mode of delivery of women with primary PPH in Patan Academy of Health Sciences

Mode of Delivery	f (%)	Mode of Delivery	f (%)
Lower segmentCS	46(54.8%)	Vacuum Delivery	1(1.2%)
Vaginal Delivery	33(39.3%)	Vaginal birth after CS	1(1.2%)
Classical CS	2(2.38%)	Hysterotomy	1(1.2%)

Discussion

In this study, we assessed the magnitude of primary PPH and its associated factors among women who gave birth at Patan Academy of Health Sciences. We found that in three years span, during the study period, 84(0.47%) out of 17,770 total women who gave birth in this hospital developed PPH. In one of the study done in Dhulikhel Hospital, Nepal, there were 41(68.3%) cases of primary PPH among 3805 total deliveries.¹⁰ In this study, PPH was found more in home deliveries, unbooked cases and in multiparas.¹⁰ In eastern Ethiopia, a total of 83(12.9%) women had PPH with maternal age >35 y, no antenatal care, history of PPH, and grand multigravida.¹¹ In another study done in Sidama regional state of Ethiopia, the magnitude of PPH was 9.4% among prolonged labor (≥ 24 h), giving birth by CS, instrumental vaginal delivery, and history of the uterine atony during their last delivery.¹² In Pakistan, the prevalence was 21.3% of the study population.¹³ Factors associated with PPH in this study were age, number of pregnancies, duration of labour, avoidance of milk, insertion of homemade remedies in vagina, retained placenta. Poor infrastructure, lack of appropriate training for healthcare providers, economic conditions, and negative cultural practices were amongst the factors that had impact on women's health. The morbidities

were the result of malpractices ingrained in the community.¹³ In low resource countries like Cameroon, it was 23.6%¹⁴ among previous postpartum hemorrhage, multiparity, prolonged labor and macrosomia. In Zimbabwe, the incidence was 1.6%¹⁵ with the most identifiable risk factor being pregnancy-induced hypertension followed by prolonged labor. In a study done in Pune, India, the prevalence of primary PPH was 0.9%¹⁶ which was nearly similar to our result and 85.2% of the patients in the study were unbooked. The difference in prevalence rate in different studies may be due to different study population.

In Nepal, of the 12,976 deaths among women of reproductive age (15-49 y), 653 were pregnancy-related, comprising five percent of the total deaths in this age group.⁵

In our study, 66(78.6%) of women were between the age group of 25-34y. The mean age was 28.64 y. The mean age of the study population in Dhulikhel Hospital was 26.4 y,¹⁰ which was similar to ours. In Ethiopia, it was 27.26(± 5.6) years with majority of the participants being between 20-34 y (72.6%).¹¹ In another study also it was 20-34 y with a mean age of 25.7(± 5.6) y¹² which was similar to our study. In a study done in India, it was observed that 35(43.8%) participants were

between 25-28 y of age followed by 25(31.2%) participants between 18-24 y of age,¹⁷ whereas in our study, it was same 33(39.3%) between 25-29 y and 30-34y followed by 11(13.1%) between 20-24y. This age difference may be due to early marriages and childbearing in some societies due to cultural customs as per religion, socioeconomic status of the population, and country. According to the marriage act of Nepal, the legal age for marriage without the consent of guardians is 18 y for women and 21 y for men and the consent of guardians further reduces the legal age at marriage for girl to 16 y and 18 y for boys.

In our study, 49(58.3%) were multiparous which was similar to other studies of Pakistan 69.5%,¹² Pune, India 60%.¹⁷ Repeated stretching of muscle fibers may lead to loss of muscle tone leading to PPH. Concerning the mode of delivery, delivery by CS was associated with increased risk of PPH which was 46(54.8%) including previous CS 19(22.6%). This is consistent with previous studies that report cesarean births being associated with an increased risk of PPH.¹⁸ We had 33(39%) vaginal deliveries. Thirty-two(38.1%) were induced for various risk factors and the main reason among medical problems were 10(11.9%) GDM, 3(3.57%) preeclampsia and 3(3.57%) hypothyroidism. In contrast to our study, one of the studies revealed 247(82.9%) was spontaneous vaginal delivery.¹² Regarding the onset of the labor, 12(4%) were induced with the main reason being hypertensive disorders (preeclampsia and eclampsia).¹²

Factors significantly associated with PPH included induction of labor,¹⁸ whereas in another study, PPH was seen maximum with spontaneous onset of labor 58(96.7%) and less with induced labor 2(3.3%).¹⁰ In our study, PPH was noted among 32(38.1%) of induced labor and 9(10.7%) of augmented labor. PPH is a frequent complication of delivery and its reported incidence in India is 2-4% after vaginal delivery and 6% after CS with uterine atony being the most common cause (50%).¹⁹ Twenty-one(7%) had a history

of uterine atony.¹² In one of the study, it was observed that 62(77.5%) cases had uterine atony, 12(15%) cases had perineal trauma, 4(5%) had retained placenta and 2(2.5%) cases had bleeding disorder.¹⁷ In our study, 43(51.2%) had uterine atony, 9(10.71%) had perineal trauma, 5(5.95%) had retained placenta or tissues. In another study, the most common cause of obstetric haemorrhage was uterine atony which contributed to 39(33.91%) followed by abruption 26(22.60%), and placenta previa 19(16.52%), retained placenta 9(7.82%), genital tract trauma 5(4.34%), coagulopathy 6(5.21%) and uterine rupture were 11(9.56%).¹⁶ However, in Dhulikhel Hospital, retained placenta seemed to be the culprit for primary PPH with 37(61.7%) followed by atonic PPH 10(16.7%) and traumatic PPH 8(13.3%) respectively.

Multiple pregnancy was associated with increased risk of PPH.¹⁸ The over-distension caused by multiple pregnancies increases the risk of uterine atony. In our study there were only 2(2.38%) twin pregnancies, 4(4.76%) cases of fibroid uterus and 1(1.2%) case of polyhydramnios. Risk factors for PPH included multiple pregnancies, fibroids, preeclampsia, amnionitis, placenta previa or abruption, cervical laceration, uterine rupture, instrumental vaginal delivery, and cesarean delivery.²⁰ In our study, there were 16(19%) cases of placenta previa, 8(9.5%) placenta accrete spectrum and 1(1.2%) placenta increta. Women diagnosed with a morbidly adherent placenta had a markedly higher risk of total PPH in other studies as well.²¹

In our study, most of the PPH cases, 24(28.6%) were managed conservatively with uterotonic drugs (oxytocic agents, prostaglandins, tranexamic acid), 24(28.6%) with condom tamponade and 2(2.38%) with uterovaginal packing of gauze. This was possible due to early identification and timely intervention. We had exploration with evacuation of hematoma, manual removal of placenta, check curettage, repair of lacerations in 13(15.5%), B lynch suture in 2(2.38%), bilateral uterine artery ligation in

5(5.95%) and peripartum hysterectomy in 14(16.7%). In a study done at Dhulikhel Hospital, 12(20%) patients did not require surgical management and were managed conservatively with uterotonics and 3(5%) cases required hysterectomy.¹⁰ In another study, it was observed 56 (70%) cases were managed by medical methods while rest 24(30%) cases required surgical management.¹⁷ Among the surgical management, 12(15%) cases had repair of cervical and vaginal laceration, 4(5%) cases had removal of retained placenta, 4(5%) cases had uterine artery ligation, 4(5%) cases had internal iliac artery ligation and 2(2.5%) cases had hysterectomy done.¹⁷ In a study done in Algeria, oxytocics were administered in 95.8%, uterine revision was performed in 80.6%, artificial delivery was performed in 26.4%, vascular ligation was performed in 20.8% and hemostasis hysterectomy was necessary in 19.4%.²² In another study, only three patients underwent hysterectomy out of 60,²³ with success rate of B Lynch suture of 95%.²³ However, in our study, two cases had to undergo additional bilateral uterine ligation even after B Lynch suture to control the PPH.

Conclusion

In our study, prevalence rate of primary PPH was low out of which atony of uterus was the most common cause followed by traumatic PPH and retained placental tissue. The PPH was more common in patients with induction of labor done for various medical problems. The chance of PPH was more among previous CS, history of APH and placenta previa. A high proportion of women who experienced PPH was managed conservatively and with the use of condom tamponade. Adherent placenta led to peripartum hysterectomy not preserving future fertility but was life-saving in our context.

Conflict of Interest

None

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None

Author Contribution

Concept, design, planning: APM, SA; Literature review: APM, SA; Data collection: APM, SA; Data analysis: APM, SA, BT; Draft manuscript: APM; Revision of draft: APM, SA, BT; Final manuscript: APM, SA, BT.

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