



POSTPARTUM HEMORRHAGE-INCIDENCE, RISK FACTORS & MATERNAL OUTCOME IN PATIENT DELIVERED AT TERTIARY CARE CENTRE

Obstetrics & Gynaecology

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ABSTRACT

Postpartum Hemorrhage (PPH) classically is defined as blood loss from the birth canal in excess of 500 mL after a vaginal delivery or 1000 mL after a caesarean delivery occurring within first 24hrs of delivery. A Hospital based retrospective study was conducted in Mahatma Gandhi Medical College, Jaipur from January 2021 to June 2022 on all pregnant patients with >28 weeks of gestation who suffered PPH while delivering at our centre during the study period. Incidence of PPH in our study came out to be 6.28%. Most patients (61.37%) who suffered from PPH were between 25-35 years of age and belonged to rural area. 35.86% who had PPH were from upper lower socio-economic class, 32.41% had no formal education and 64.13% had normal BMI. In our study 20% (29/145) cases had no risk factors for PPH while rest 80% cases had a combination of risk factors. Majority of cases were of primary PPH i.e. 98.62% (143/145) while 1.37% (2/145) had secondary PPH. Uterine atony was the most common cause of PPH in 73.79% cases followed by traumatic PPH as the 2nd most common cause seen in 20.68% cases. Medical management was done invariably in all patients with atonic PPH along with bimanual uterine compressions. No maternal mortality was noted in our study. Proper identification of high-risk factors and active management of third stage of labor is the most crucial part in prevention of PPH.

KEYWORDS

Postpartum haemorrhage, PPH, AMTSL, Risk Factors.

INTRODUCTION:

Postpartum Hemorrhage (PPH) classically was defined as blood loss from the birth canal in excess of 500 mL after a vaginal delivery or 1000 mL after a caesarean delivery occurring within first 24hrs of delivery.^[1] However, this definition did not focus on clinical signs and symptoms of hemorrhage, and thus prevented early detection in many cases. Therefore, ACOG in 2017 changed the definition to blood loss of ≥ 1000 mL, or any blood loss that was accompanied by signs or symptoms of hypovolemia occurring within 24 h after birth, regardless of the mode of delivery.^[2] In contrast, RCOG defines PPH according to the amount of blood lost: Minor when blood loss is between 500 and 1000 mL and major when it is >1000 mL.^[3] Globally, postpartum hemorrhage (PPH) is one of the leading causes of maternal mortality. In developing countries, it accounts for more than 30% of all maternal deaths.^[4] Calvert C et al did a systemic review on the prevalence of PPH. It varies across various regions with highest prevalence of PPH 5.1%–25.7% reported in Africa, followed by North America 4.3%–13% and 1.9%–8% in Asia.^[5] In India as per Registrar General 2006, incidence of PPH is reported as 2% - 4% after vaginal delivery and 6% after caesarean section; with uterine atony being the cause in about 50% cases and is cause of maternal mortality in 19.9% cases.^[6]

As per FIGO 2022, the most common etiologies of PPH are: (4T): Tone, Trauma, Tissue and Thrombin.^[7] Occurrence is, however, unpredictable and can sometimes give rise to dreaded complications like massive hemorrhage, hysterectomy and even maternal death. Severe hemorrhage can also lead to coagulopathy causing further hemorrhage and requiring massive blood transfusions. PPH may lead to other complications like anemia, infection, lactational failure. Therefore, time is of utmost importance while dealing with postpartum hemorrhage. Apart from time, it is also crucial to overcome the other three delays in its management which are decision making, reaching the place of treatment, and early care at hospital when arrived.

Since 2007, WHO provided guidelines for the prevention of PPH based on the best available evidence regarding various interventions including AMTSL and proper training of health professionals, early diagnosis and timely interventions. By 2012 it not just became strongly recommended by WHO but also became an integral part of PPH reduction strategies throughout the world.^[8]

AMTSL recommendations (WHO 2012)-

This prophylactic intervention done in 3rd stage of labor mainly is composed of three components or steps.^[12]

1. Administration of uterotonics immediately after birth of the baby.
2. Controlled cord traction (CCT) to deliver the placenta. Placenta should be examined carefully after its delivery.
3. Massage of the uterine fundus after the placenta is delivered for proper tone of the uterus.

AMTSL reduces incidence of PPH and maternal mortality by 40%.^[ref] Despite these practice at tertiary care center, patients can still have PPH. Thus, our present study was conducted to identify the risk factors and evaluate various etiology leading to PPH and its effects on maternal outcome so that better prevention and management strategies can be adopted and brought into action to reduce maternal morbidity and mortality. The study also focused on various management techniques adopted for such patients, maternal complications faced and maternal outcome in these patients. We scrutinized the measures taken to manage these cases to check our preparedness in handling these cases.

AIMS AND OBJECTIVES:

- To study the incidence of PPH in patients delivering at a tertiary care center.
- To study the risk factors associated with Postpartum hemorrhage.
- To evaluate the etiology of PPH.
- To assess the maternal outcome in form of severity of PPH, need of transfusion of blood & blood products and ICU admission.

MATERIAL AND METHODS:

A Hospital based retrospective study was conducted in Mahatma Gandhi Medical College, Jaipur from January 2021 to June 2022 on all pregnant patients with >28 weeks of gestation who suffered PPH while delivering at our centre during the study period. These patients were studied on the basis of various demographic profile, risk factors, etiology, severity, measures taken to control it and maternal outcomes. For calculation of incidence, the total number of deliveries in the setting during study period was used. Estimation of blood loss was done by visual method of assessment and etiology was determined. Patients were managed according to the etiology. The study was done after taking due clearance from Clearance from Institute Ethics Committee and after informed consent of the patients.

Inclusion Criteria

- Patients who delivered at Mahatma Gandhi hospital during the study period with period of gestation >28 weeks.
- Patients who gave consent.

- Patients with estimated blood loss >500 ml after vaginal delivery and >1000ml after caesarean delivery.

Exclusion Criteria

- All patients who delivered at Mahatma Gandhi hospital during the study period with period of gestation <28 weeks
- All patients who delivered outside Mahatma Gandhi Medical Hospital and were referred I/V/O of PPH.

Statistical Analysis:

Pre designed and pretested Performa was used for the above study. Data was entered in micro soft excel worksheet and appropriate test were used to find the significant association. P value <0.05 will be considered statically significant.

OBSERVATIONS AND RESULTS:

Total 2308 patients delivered at our center during the period of which 145 patients suffered from PPH. These 145 patients were studied for their demographic profile and risk factors for PPH. All cases were further examined for etiology, severity of PPH and measures taken to manage it.

Incidence of PPH in our study came out to be 6.28%. A total of 1291 vaginal delivery occurred during the study period of which 68 had PPH making the incidence of PPH in vaginal delivery as 5.26%. While, a total of 1017 caesarean occurred during the period of which 77 had PPH making the incidence of PPH in caesarean sections as 7.57%. Most patients (61.37%) who suffered from PPH were between 25-35 years of age and belonged to rural area. 35.86% who had PPH were from upper lower socio-economic class, 32.41% had no formal education and 64.13% had normal BMI. Mean BMI was 23.85 ± 3.86 kg/m² (Table 1)

Table 1: Distribution Of Cases According To Socio-demographic Factors

	Cases Of PPH	Percentage (%)
1. AGE (years)		
18-24	43	29.65%
25-35	89	61.37 %
>35	13	8.96%
MEAN AGE $\pm$ SD: 26.81 $\pm$ 4.80 years		
2. Residence		
Rural	89	61.37%
Urban	56	38.62%
3. Socio- Economic Status		
Upper class	4	2.75%
Upper Middle Class	13	8.96%
Lower Middle Class	50	34.48%
Upper Lower Class	52	35.86%
Lower Class	26	17.93%
4. Educational Status		
No formal education	29	20.00%
Primary school	38	26.20%
Secondary school	47	32.41%
College and above	31	21.37%
5. BMI (kg/m ²)		
Underweight (<18.5)	6	4.13%
Normal (18.5-24.9)	93	64.13%
Overweight (25-29.9)	29	20%
Obese (>30)	17	11.72%
MEAN BMI $\pm$ SD: 23.85 $\pm$ 3.86		

55.85% who had PPH were multipara of which 2.75% were grand multi-para. In our study mean gestational age was 36.95 ± 2.55 weeks and 77.24% who suffered PPH had period of gestation between 34-39⁶ weeks. (Table 2)

Table 2: Distribution Of Cases According To Present Obstetric History

	Cases Of PPH	Percentage (%)
1. PARITY		
Primipara	64	44.13%
Multipara	77	55.85%
2.GESTATIONAL AGE		
<34 weeks	8	5.51 %

34-39 ⁶ weeks	112	77.24%
>40 weeks	15	10.34 %
MEAN GESTATIONAL AGE: 36.95 $\pm$ 2.55		

29.65% (43/145) were taking continuous ANC visit at our hospital while 70.34% (102/145) have reported for the first time in labor. 28.39% (23/81) had history of PPH in their previous pregnancies which was managed medically or surgically. In our study 20% (29/145) cases had no risk factors for PPH which signifies the importance of universal practise of AMTSL guidelines. Rest 80% cases had a combination of risk factors. Therefore, screening of all ANC patients should be done for identification of risk factors that can help us to be prepared to deal with any emergency in advance. Most common factors were Anemia found in 25.51% and Hypertensive Disorders in Pregnancy present in 20.68% that included Gestational Hypertension, pre- eclampsia and its spectrum, eclampsia and chronic hypertensives. (Table-3)

21/145 patients had elective LSCS while remaining 124 had trial of labour. 52.41% (65/124) patients who suffered from PPH had spontaneous onset of Labor while 47.58% (59/124) had induction of labour. PPH was comparatively more in those who had induced labour rather than spontaneous onset. 45.16% (56/124) patient who suffered from PPH had labor of <12 hours duration while 54.83% (68/124) had >12 hours. PPH was found to be more in cases with labour duration >12 hours.

Table 3: Distribution Of Cases According To Risk Factors

	No.	%
No risk Factors	29	20%
RISK FACTORS FOR PPH		
Anemia	37	25.51%
Hypertensive Disorder of Pregnancy	30	20.68%
Previous uterine surgery: previous LSCS, myomectomy, Hysterotomy	17	11.72%
Over distended uterus (Polyhydrominos/ multifetal pregnancy/ big baby)	17	11.72%
Oligohydromnios	16	11.03%
Fetal factors (IUD/ IUGR/ anomalies)	14	9.65%
APH (Placenta previa/ morbidly adherent placenta/ Abruptio)	11	7.58%
Systemic diseases and infections (renal disease/ heart disease/ respiratory disease/ neurological disease/ COVID/ dengue)	11	7.58%
Prolonged rupture of Membranes	10	6.89%
Drug (tocolytics/ MgSo4/ blood thinners) and H/o drug abuse: alcohol/ tobacco/ smoking/ gutka	10	6.89%
IHCP and other Liver Diseases	9	6.20%
Diabetes Mellitus	9	6.20%
Instrumental deliveries	8	5.51%
Thrombocytopenia	6	4.13%
Labor related (Prolonged/ Obstructed/ Precipitate labor, premature cord pulling)	5	3.44%
Grand Multipara	4	2.75%
Uterine Anomalies	3	2.06%
Others (Rh sensitized/ IVF)	8	5.51%

Majority of cases were of primary PPH i.e. 98.62% (143/145) while 1.37% (2/145) had secondary PPH. Both patients presented on postpartum day 3 and on exploration, cause was found to be retained products of conception. 70.35% suffered from major PPH while 29.65% had minor PPH in our study.

Uterine atony was the most common cause of PPH in 73.79% cases followed by traumatic PPH as the 2nd most common cause seen in 20.68% cases. Coagulopathy and Retained Tissue contributed to 4.13% and 1.37% cases respectively. In our study a total of 30 patients suffered from traumatic PPH. 56.66% (17/30) occurred during trial of normal labor while 43.33% (13/40) during LSCS. 40% (12/30) patients had birth canal trauma which comprised of cervical tear/ vaginal tear/ perineal tear/ para-urethral tear. 13.33% (4/30) had episiotomy hematoma. 1 patient had uterine rupture during second stage of labor which ultimately led to peri-partum hysterectomy. Causes of traumatic PPH in LSCS consisted of extension of uterine incision in 16.66% (5/30) and injury to uterine artery in 26.66% (8/30) cases. Cases of PPH due to coagulopathy were more in LSCS that maybe due to associated obstetric factors like PIH and DIC that landed

them in LSCS. PPH due to retained tissue were more in vaginal delivery. (Table 4)

Table 4: Distribution Of Cases According To Cause Of PPH And Mode Of Delivery

	VAGINAL		LSCS		TOTAL	
	No.	%	No.	%	No.	%
Atonic	49	33.79%	58	40%	107	73.79 %
Traumatic	16	11.03%	14	9.65%	30	20.68 %
Coagulopathy	1	0.68%	5	3.44%	6	4.13%
Retained Tissue	2	1.37%	0	0%	2	1.37%
TOTAL	68	100%	77	100%	145	100%

Medical management involving use of uterotonics (oxytocin, carboprost, misoprostol and methergine) and tranexamic acid was done invariably in all patients with atonic PPH along with bimanual uterine compressions. Intrauterine packing with sterile gauze was done in 5.51% (8/145). In 6 cases 4.13% (6/145) compression sutures were applied (Cho sutures in 3 cases and B- lynch sutures in 3 cases) for management of PPH. Step-wise devascularization was done in 4.13% (6/145) of atonic PPH. Obstetric hysterectomy was done in 0.68% (2/145) cases. 1 patient had uterine rupture during second stage of labor while other had morbidly adherent placenta both of which ultimately led to peri-partum hysterectomy. Management of traumatic PPH resulting from LSCS was done in 8.96% and 6.27% need repair of birth canal trauma (Cervical tear/ Vaginal Tear/ Perineal/ Para-urethral Tear). (Fig 1)

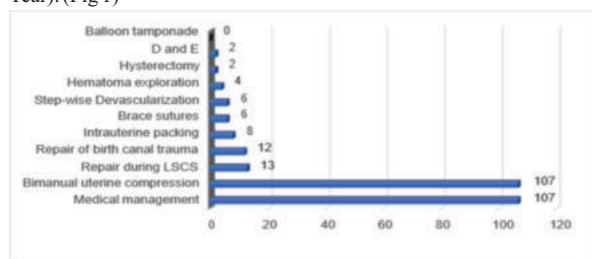


Fig 1: Distribution of cases according to management of PPH

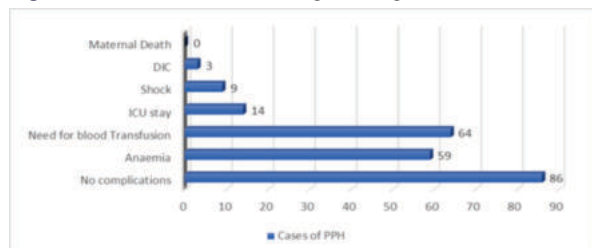


Fig 2: Distribution of cases according to Maternal Mortality and Morbidity

59.31% (86/145) patient were managed medically or surgically in either labour room or OT without any major complications in our study. We had no maternal mortality due to PPH. Blood transfusion was required in 44.13% (64/145) cases. Only 9.65% (14/145) needed ICU admissions in our study. (Fig 2)

DISCUSSION:

PPH is a complication which is largely preventable. Even after leaps and bounds of advancement in obstetric care, PPH still remains a major cause of both maternal mortality and morbidity worldwide not just in developing countries but also in developed. Early identification of risk factors and active management of third stage of labor with prophylactic use of uterotonics are considered to be key preventive methods of PPH. The exact incidence of obstetric hemorrhage is difficult to calculate and compare because of its imprecise definition as well as difficulty in its recognition and thus its diagnosis. Talking about global statistics, reported incidences of PPH include 1.6% at a low resource setting hospital in Zimbabwe, 4.5% in Nigeria, 6% in Uganda, 2.6% in resource rich areas of US and 6.4% in Netherlands.^[9, 10, 11, 12, 13] The incidence of PPH in our study came out to be 6.28% which was comparable to the incidences calculated by the other researchers.

Miyoshi Y et al had incidence of PPH as 6.3% and **Carroli et al** as 6%.^[14, 15] In a study by **Mahendra G et al** it was 4.86% and 2.20% respectively in normal and Caesarean deliveries. Incidence of PPH in LSCS was more in our study was 7.57%.^[16] A likely explanation can be

our hospital being a tertiary care center more high-risk pregnancies were delivered here. The study by **Pooja G et al** stated that most of the patients in their study too were unbooked and belonged to the rural areas with lower socio-economic status reflecting the lack of proper antenatal care, illiteracy and ignorance among such population.^[17] **Moitra B et al** had 33% patients who were literate and belonging mostly to lower middle class in their study.^[18]

We found no significant difference in occurrence of PPH in primigravida (44.13%) and multigravida (55.85%). This can be because of different predisposing factors in primigravida like teenage pregnancy, preeclampsia, eclampsia, abruptio, anemia, dysfunctional labor and uterine over-activity while high parity and anemia with malnutrition was the reason in multipara patients. **Thawal D et al** stated that in their study 40.0% cases were of primigravida and 60.0% cases were of multigravida. The results were similar in terms of mean age and mean gestational age of the patient. Anemia, HTN and DM were major contributors for PPH seen in 25%, 37.5% and 15% respectively in their study while 42.5% had no co-morbidities at all. Their result were comparable to our study.^[19] **Duhan L et al** stated that 72.5% patients who had PPH were unbooked. They also found that the commonest risk factor associated with postpartum hemorrhage in their study was prolonged labor (26%) followed by ante partum hemorrhage (20%). Other factors were multiparity (14.5%), gestational hypertension/pre-eclampsia (13.2%), Multiple pregnancy (6.6%), macrosomia (3.94%), infections (2.63%) and uterine abnormalities (2.63%).^[20]

Michael S. Kramer et al. found that Labor induction, augmentation of labor, and prior caesarean section is significantly associated with the risk of PPH.^[21] **Miyoshi Y and Solwayo Ngwenya** also concluded most patients lost 500-1000ml in vaginal deliveries and 1000-1500ml in caesarean section which was similar to our study.^[11, 14]

In our study 98.62% (143/145) had primary PPH while 1.37% (2/145) had secondary PPH. **Pooja G et al** concluded that the incidence of secondary PPH in their study was 2.3% while that in the study by **Singh N et al** was 2.4%.^[17, 22] In our study Uterine atony was the most common cause of PPH in 73.79% cases. Traumatic PPH was the 2nd most common cause seen in 20.68% cases. Coagulopathy and Retained Tissue contributed to 4.13% and 1.37% cases respectively. Similar results were noted by **Gora K et al** where atony was responsible for 79.8% of PPH and trauma in 20.2% cases.^[23] In the study done by **Ganesh Tondge et al.** repair of rupture uterus was done in 2.94% cases, hematoma drainage in 2.94% and hysterectomy in 5.88%.^[24]

In the study by **Mahendra G et al** out of 66 atonic PPH cases, 81.81% (54/66) were managed medically, 10.6% by B lynch suture, 3.03% by Hayman suture, 1.51% by internal iliac artery ligation and 1.51% by peripartum hysterectomy. In our study majority of PPH cases were tackled by uterotonics (73.39%).^[16] In our study 59.31% (86/145) had no major complications, 44.13% (64/145) needed blood transfusion, 9.65% (14/145) needed ICU admissions and 6.20% (9/145) suffered from shock. The study done by **Pooja G et al** stated that anemia (46.1%) followed by hypovolemic shock and DIC were the most common maternal morbidity associated with PPH. ICU was needed in 12.3% cases.^[17] Maternal mortality was 6.06% in their study while in ours there was no maternal death. This difference was mainly because we did not include referred cases.

Limitations Of Our Study:

- It is a single center prospective study.
- Various long-term complications such as secondary amenorrhea, secondary infertility or genital fistula were not assessed.
- Referred patients were not included.
- Observer variations may have occurred as different clinicians with differences in their grade, training, and experience made the diagnosis.

Conflict Of Interest: nil

Funding: Nil

CONCLUSION:

Proper identification of high-risk factors and active management of third stage of labor is the most crucial part in prevention of PPH. Easy identification of risk factors and timely intervention is the cornerstone of the treatment. Institutional deliveries with availability of

anesthetist, ICU backup and good blood bank facility ultimately improves clinical outcome of every patient drastically.

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