

ORIGINAL ARTICLE

FREQUENCY, DISTRIBUTION BY PLACE OF DELIVERY AND PARITY, CAUSES, MANAGEMENT OPTIONS AND OUTCOME OF PRIMARY POSTPARTUM HAEMORRHAGE IN POSTPARTUM WOMEN OF DISTRICT PESHAWAR, PAKISTAN

Nazia Liaquat¹, Qudsia Qazi¹, Saadia Yasmeen²

¹Department of Obstetrics & Gynaecology, Lady Reading Hospital Peshawar, ²Fouji Foundation Hospital, Kohat, Pakistan

ABSTRACT

Background: Primary postpartum haemorrhage (PPPH) is the leading cause of maternal morbidity and mortality in low resource countries like Pakistan. The objectives of this study were to determine the frequency, distribution by place of delivery and parity, causes, management options and outcome of PPPH in postpartum women of District Peshawar, Pakistan.

Materials & Methods: This cross-sectional study was conducted in Department of Gynaecology & Obstetrics, Lady Reading Hospital, Peshawar, Pakistan from 1st January 2019 to 30th June 2019. Sample size of 4,034 was with 0.39342 % margin of error, 95% confidence level, prevalence of PPPH 2% and a population of 23,607 postpartum women. All postpartum women were eligible. Those with secondary PPH, surgical management for PPPH done at some other hospital, with known bleeding disorders and on anticoagulants were excluded. All these patients were managed according to standard protocols. Data was collected for following variables; presence of PPPH (yes/ no), place of delivery (in-hospital deliveries/ referred cases), parity (primipara/multipara/grandmultipara), causes of PPPH (uterine atony/ retained placenta-RPOC/ruptured uterus/genital tract tears), management options of PPPH (conservative management/laparotomy with repair of ruptured uterus/laparotomy with uterine artery ligation and B-Lynch/repair of genital tract tears other than ruptured uterus/removal of retained placenta & RPOC/hysterectomy) and outcome of PPPH (uneventful recovery/maternal near miss/maternal mortality). Frequencies and percentages with confidence intervals were calculated for these variables.

Results: Out of 4034 postpartum women, frequency of PPPH was 400 (9.92%). Out of 4034 women, distribution of 400 cases of PPPH by place of delivery was 222 (5.50%) in-hospital deliveries and 178 (4.42%) referred cases and by parity it was primipara 79 (1.96%), multipara 243 (6.03%) and grandmultipara 78 (1.93%) cases. Out of 400 cases of PPPH, frequency of uterine atony was 254 (63.50%) and conservative management 245 (61.25%). Out of 400 cases, frequency of uneventful recovery was 352 (88%), maternal near miss 40 (10%) and maternal mortality eight (2%) cases.

Conclusion: Primary postpartum haemorrhage (PPPH) continues to be a common and serious complication of delivery with uterine atony being its most predominant cause.

KEY WORDS: Postpartum; Haemorrhage; Postpartum haemorrhage; Postpartum Women; Uterine atony; Ruptured Uterus; Retained Placenta; Near Miss; Maternal Mortality; Hysterectomy.

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Corresponding Author:

Dr. Qudsia Qazi
Assistant Professor
Department of Obstetrics & Gynaecology
Lady Reading Hospital, Peshawar, Pakistan
E-mail: qudsia.qazi@lrh.edu.pk

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INTRODUCTION

Background: Primary postpartum haemorrhage (PPPH) is the leading cause of maternal mortality and morbidity worldwide, more so in developing countries. It accounts for 140,000 maternal deaths each year or approximately one death every four minutes.¹ For every single death resulting from PPPH, there are at least ten cases of maternal near

miss,^{2,3} which by definition is surviving a deadly complication during pregnancy, delivery or within 42 days of termination of pregnancy. Maternal mortality is any death occurring during pregnancy or within 42 days of termination of pregnancy irrespective of duration and site of pregnancy, from causes related to or aggravated by pregnancy except incidental and accidental causes. It is an important indicator of the quality of healthcare system of any country.⁴ Maternal deaths resulting from primary postpartum haemorrhage are eminently avoidable.

PPPH is defined as “blood loss of more than 500 ml at vaginal delivery or more than 1000 ml at cesarean delivery within 24 hours after birth”, whereas “excessive bleeding from genital tract after 24 hours of delivery for up to 12 weeks postpartum is classified as secondary postpartum haemorrhage, which is usually less devastating and has different etiology from that of primary postpartum haemorrhage”.⁵

PPPH occurs in up to 5-11% of births. The causes of PPPH include uterine atony, retained placenta, genital tract injuries and consumptive coagulopathy.^{6,7} Uterine atony causes more than 90% of cases of PPPH. Retained placenta is less common cause.⁸ Twin pregnancy, previous history of postpartum haemorrhage, induction of labour, polyhydramnios, placental abruption, placenta previa, prolonged labour, chorioamnionitis, instrumental delivery and mismanagement of third stage of labour are amongst the most studied risk factors for PPPH.

Although risk factors and preventive strategies are clearly documented, not all cases can be predicted or prevented. It can occur at any delivery regardless of the risk factors. Readiness by every obstetric unit combined with recognition and preventive strategies are of utmost importance in reducing morbidity and mortality from this condition.⁹

Worldwide primary postpartum haemorrhage is responsible for 25% of maternal deaths and significant morbidity in a sizeable number of survivors.¹⁰ Common morbidities from haemorrhage include anemia, acute renal failure, disseminated intravascular coagulation, hysterectomy and multiple blood transfusions with all its attendant risks.^{10,11}

PPPH is an extensively researched subject, however there are still many unresolved areas, like convenience of practical utility of its definition for diagnosis, prediction and absolute prevention.^{12,13}

Objectives: The objectives of this study were to determine the frequency, distribution by place of delivery and parity, causes, management options and outcome of primary postpartum haemorrhage in postpartum women of District Peshawar, Pakistan.

Significance: This could help us to provide feedback to the system and help make modifications to existing

practices if needed to tackle this deadly complication of delivery. It is evident that accurate and reliable data has pivotal role in policy formulation for improving health care system.

Operational definition: As accurate quantification of blood loss is very challenging and estimation of blood loss is almost always inaccurate, resulting in underestimation of blood loss. For general standardization and uniformity of diagnosis, we have devised a local diagnostic criterion after extensive literature search.^{14,15} This criterion was developed to standardize the definition for both in-hospital and referred cases. The diagnosis of PPPH was made by fulfilling any two out of the following five requirements.

1. Blood loss at delivery whether vaginal or cesarean section that emanated call for help and involved more than two persons or additional help in the management of patient solely for the concern of heavy blood loss.
2. Signs of blood loss; pallor, rise of pulse from more than ten beats per minute from baseline and drop of blood pressure.
3. Blood loss at delivery necessitating use of additional oxytocin and other agents like misoprostol.
4. Blood loss after delivery resulting in soaking of clothes, passage of clots and accompanied by dizziness, fainting and thirst.
5. Persistent abdominal pain during labour or after delivery along with symptoms of dizziness and fainting.

MATERIALS AND METHODS

Design, Setting & Duration: This cross-sectional study was conducted at the Department of Gynaecology & Obstetrics, Lady Reading Hospital, Peshawar, Pakistan from 1st January 2019 to 30th June 2019. Lady Reading Hospital is the oldest and the largest tertiary care hospital of the province. Hospital Ethical Review Board had granted approval. Informed consent was sought from all the patients/their attendants.

Population and Sampling Size & Technique: Located in the northwest, Peshawar is the capital city of Khyber Pakhtunkhwa province of Pakistan. The population of District Peshawar was 4,269,079, including 2,067,591 (48.4%) women as per 2017 census. Assuming 45.67% women in the reproductive age (15-49 years), the count will be 944,269 women for District Peshawar. Assuming 2.5% postpartum, it would be 23,607 postpartum women at risk of postpartum haemorrhage.

Sample size of 4,034 was calculated by an online sample size calculator Raosoft[®],¹⁶ with 0.39342 %

margin of error, 95% confidence level, prevalence of primary postpartum haemorrhage (PPPH) as 2% and a population of 23,607 postpartum women at risk of postpartum haemorrhage. Non probability consecutive sampling technique was employed.

Population Selection: All postpartum women population of District Peshawar, Pakistan was eligible to be selected as sample. These included those who delivered in our labour suit (in-hospital cases) and those referred within 24 hours of delivery.

Postpartum women presenting with secondary postpartum haemorrhage, surgical management for primary postpartum haemorrhage done at some other hospital, those with known bleeding disorders and those on anticoagulants were not eligible to be selected in the sample.

Conduct of Procedure: All the patients whether inpatient or referred cases with diagnosis of primary postpartum haemorrhage were vigilantly managed according to the standard protocol by a team involving consultant obstetrician, anaesthetist, staff nurses and postgraduate trainees jointly. Management included thorough history of antenatal, intrapartum and postpartum events, physical examination for vitals and abdominal examination for uterine atonia and ruptured uterus and local examination for presence of retained placenta and genital tract tears. Resuscitation went on parallel to assessment with placement of two wide bore intravenous lines, urgent blood for cross match or group specific or O negative blood depending on the condition of the patient. Complete blood picture (CBC), coagulation profile, renal and liver biochemistry and where needed, ABGs were conducted. Initially, crystalloids and colloids were utilized for stabilization till the availability of blood. Patients with uterine atony were started on 30 units oxytocin in 500 ml ringer lactate solution along with bimanual uterine compression. Those with well contracted uterus and with genital tract tears were provided with haemostatic packing till blood and OT arrangements were done with intravenous support continued. Patients were treated according to the cause of haemorrhage. For uterine atony conservative measures were the first line strategy, which if deemed to be failing, an early rather than delayed recourse to surgical management was adopted with laparotomy and uterine conservation techniques like B-Lynch and bilateral uterine and internal iliac ligation. Hysterectomy was performed for refractory cases.

For lower genital tract tears, repairs under general anaesthesia were carried out. Laparotomy with either repair of ruptured uterus or hysterectomy was carried out for ruptured uterus based on the nature of tears. For extended tears at cesarean deliveries, repairs and securing angles of incisions

were done. For uterine atony at cesarean deliveries, conservative measures were tried first with use of uterotonics, uterine artery ligation, B-Lynch and as a last resort hysterectomy for refractory cases. Antibiotic prophylaxis was given to all patients. Blood transfusions, FFPs and platelets transfusions were carried out based on the condition of the patient and the laboratory reports of CBC and coagulation profile according to protocol. Patients who regained haemodynamic stability were retained in the high dependency unit of the labour suite and those who were critical with either haemodynamic instability or multi organ failure were shifted to intensive care unit of the hospital. All the patients were followed for the ultimate outcome of near miss and mortality.

Patients were defined to have uneventful recovery if they regained haemodynamic stability with normal labs within 24 hours after treatment with normal renal, liver and coagulation profile and were discharged in the next 48-72 hours after observation. Patients who went on to develop renal failure, sepsis, multi organ failure or needed intensive care support for haemodynamic stability or ventilatory support were defined as near miss and were kept for two weeks to take care of complications. Those who expired either during treatment or following treatment as a result of complications of primary postpartum haemorrhage were defined to have maternal mortality.

Data Collection & Analysis Plan: Data was collected by a Performa for the following study variables and their attributes.

1. Presence of PPPH (yes/ no)
2. Place of delivery (in-hospital delivery/ referred cases)
3. Parity (primipara- para 1/ multipara- para 2-5/ grandmultipara >5)
4. Causes of PPPH (uterus atony/ retained placenta-RPOC/ ruptured uterus/ genital tract tears)
5. Management options of PPPH (conservative management/ laparotomy with repair of ruptured uterus/ laparotomy with uterine artery ligation and B-Lynch compression suture/ repair of genital tract tears other than ruptured uterus/ removal of retained placenta & RPOC/ hysterectomy)
6. Outcome of PPPH (uneventful recovery/ maternal near miss/ maternal mortality)

Frequencies and percentages were calculated for these variables for the sample while interval estimates were calculated as confidence intervals for the population at 95% confidence level using the normal distribution approximation for the binomial distribution through an online statistical calculator.¹⁷

RESULTS

Out of a sample of 4034 postpartum women, the frequency of primary postpartum haemorrhage was 400 (9.92%). The estimated parameters for population are given in Table 1.

Out of a sample of 4034 postpartum women, the distribution of 400 cases of PPPH by place of delivery was 222 (5.50%) in-hospital deliveries and 178 (4.42%) referred cases. The estimated parameters for population are given in Table 2.

Out of a sample of 4034 postpartum women, the distribution of 400 cases of PPPH by parity was primipara 79 (1.96%), multipara 243 (6.03%) and grandmultipara 78 (1.93%) cases. The estimated parameters for population are given in Table 3.

Out of 400 cases of PPPH, the commonest cause of PPPH was uterine atony in 254 (63.50%) cases, while the least common cause was ruptured uterus in 18 (4.50%) cases. The estimated parameters for population are given in Table 4.

Table 1: Frequency of primary postpartum haemorrhage (PPPH) in postpartum women of District Peshawar, Pakistan (n= 4034)

Variable	Attributes	Sample Statistics		95% CI for Proportion	
		Count	Percentage	Lower	Upper
Presence of PPPH	Yes	400	09.92%	08.96	10.83
	No	3634	90.08%	89.16	91.00
Total		4034	100.0%	Population Parameters	

Table 2: Distribution of 400 cases of primary postpartum haemorrhage (PPPH) by place of delivery in 4034 postpartum women of District Peshawar, Pakistan

Variable	Attributes	Sample Statistics		95% CI for Proportion	
		Count	Percentage	Lower	Upper
Place of delivery	In-hospital deliveries	222	5.50%	4.79	6.20
	Referred cases	178	4.42%	3.77	5.04
Total		400	9.92%	Population Parameters	

Table 3: Distribution of 400 cases of primary postpartum haemorrhage (PPPH) by parity in 4034 postpartum women of District Peshawar, Pakistan

Variable	Attributes	Sample Statistics		95% CI for Proportion	
		Count	Percentage	Lower	Upper
Parity	Primipara (Para 1)	79	1.96%	1.53	2.38
	Multipara (Para 2-5)	243	6.03%	5.28	6.75
	Grandmultipara (Para >5)	78	1.93%	1.50	2.35
Total		400	9.92%	Population Parameters	

Table 4: Causes of primary postpartum haemorrhage in postpartum women of District Peshawar, Pakistan (n= 400)

S. No.	Causes	Sample Statistics		95% CI for Proportion	
		Count	Percentage	Lower	Upper
1	Uterine atony	254	63.50%	58.78	68.21
2	Retained placenta/ RPOCs	75	18.75%	14.92	22.57
3	Ruptured uterus	18	4.50%	02.46	06.53
4	Genital tract tears other than ruptured uterus	53	13.25%	09.92	16.57
Total		400	100%	Population Parameters	

Out of 400 cases of PPPH, conservative management with either uterotonics alone or with uterotonics and uterine packing in combination was applied in 245 (61.25%) cases. Rest of the options with their respective estimated population parameters are given in Table 5.

Out of 254 cases of uterine atony, 245 (96.46%) cases were managed conservatively, two (0.78%) cases underwent laparotomy with uterine artery ligation and B-Lynch compression suture and seven (2.75%) cases ended in hysterectomy.

Hysterectomies were performed in 14 (3.5%) cases out of 400 cases of PPPH, which included seven (50%) cases of atonic uterus and seven (50%) cases of ruptured uterus.

Out of 18 cases of ruptured uterus, seven (38.39%) were managed by hysterectomy.

Out of 400 cases of PPPH, 352 (88%) cases had uneventful recovery. Maternal near miss occurred in 40 (10%) cases, while maternal mortality occurred in eight (2%) cases. The estimated parameters for population are given in Table 6.

DISCUSSION

Primary postpartum haemorrhage (PPPH) continues to be the killer obstetric condition, despite advances in antenatal care, increased uptake of facility based deliveries and availability of safe blood transfusion services. This is because of its unpredictability, underestimation of blood loss, delays in the definitive surgical treatments and substandard care. There are well defined risk factors for PPPH; however in 20% of cases it happens even in the absence of any risk factors.¹⁵ Each of the defined risk factor in isolation has a moderate effect on the prevalence of PPPH. This is the cumulative effect of various factors which can be disastrous. Active management of third stage of labour has been advocated by WHO and by the Society of Obstetrician and Gynecologists of Canada as a measure for risk reduction of PPPH.¹⁸ It is effective in reducing risk of haemorrhage by more than 1000 ml.^{19,20}

In our study the frequency of PPPH was 9.92%. In a study done at Kohat, Pakistan the estimated frequency was 3.14%.²¹ In another study done at Lahore, Pakistan the estimated frequency was 18.6%.²² In

Table 5: Management options for primary postpartum haemorrhage in postpartum women of District Peshawar, Pakistan (n = 400)

S. No.	Managements Options	Sample Statistics		95% CI for Proportion	
		Count	Percentage	Lower	Upper
1	Conservative management	245	61.25%	56.47	66.02
2	Laparotomy with repair of ruptured uterus	11	2.75%	01.14	04.35
3	Laparotomy with uterine artery ligation and B-Lynch compression suture	02	00.50%	-00.19	01.19
4	Repair of genital tract tears other than ruptured uterus	53	13.25%	09.92	16.57
5	Removal of Retained placenta/ RPOCs	75	18.75%	14.92	22.57
6	Hysterectomy	14	03.50%	01.69	05.30
Total		400	100%		

Table 6: Outcome of patients with primary postpartum haemorrhage in postpartum women of District Peshawar, Pakistan (n = 400)

S. No.	Outcome	Sample Statistics		95% CI for Proportion	
		Count	Percentage	Lower	Upper
1	Uneventful recovery	352	88%	84.81	91.18
2	Maternal near miss	40	10%	07.06	12.93
3	Maternal mortality	08	02%	00.62	03.37
Total		400	100%		

another study, it is reported to be 7%.²³ These variations can be explained by the differences in selection criterion, methodology, referral bias, demographic differences and subjectivity of definition of PPPH.

In our study the predominant cause of PPPH was uterine atony in 63.50% cases, as is in many other studies.^{11,22} The high prevalence of uterine atony can be attributed to high numbers of induction of labours, prolonged labours, referred obstructed labour cases, instrumental deliveries, twin pregnancies and high risk un-booked cases delivering in our hospital.

Retained placenta was the second most prevalent cause accounting for 18.75% cases. In other studies the second commonest etiology was genital tract tears as opposed to retained placenta.^{11,21-23} It was common in referred cases because of mismanagement of third stage of labour by the unskilled birth attendants or absence of any attendant at birth at all.

Genital tract tears were the third common cause. Ruptured uterus was common in referred cases where labour was handled by unskilled attendants.

Most of the patients were identified and managed timely according to standard protocol. Most of the cases of uterine atony were managed successfully with conservative measures. Conservative management was done in 61.25% of cases of uterine atony either with uterotonics (oxytocin and misoprostol) alone or with uterotonics and uterine packing in combination. In study done at Kohat, Pakistan,²¹ conservative management was successful in 36.82% of cases. In our study uterine packing was seen to be very effective along with uterotonics in patients with in-hospital deliveries who were managed within the golden hour of postpartum haemorrhage.

Hysterectomy was done for seven refractory cases of uterine atony and in seven cases of ruptured uterus not amenable to repair. The hysterectomy prevalence in our study was 3.5% against 13.64% in the study done at Liaquat Memorial Hospital, Kohat, Pakistan.²¹ In another study rate of hysterectomy for postpartum haemorrhage was found to be 5% with mortality rate of 2% among Asian population.²⁴ Maternal mortality in our study was 2%, comparable to other studies.²⁴⁻²⁶ In a study done at Lahore, maternal mortality among patients with PPPH was 3.9%.²⁷ It is reported as 5.4% in the study done by Ngwenya.²⁸

CONCLUSION

Primary postpartum haemorrhage (PPPH) continues to be a common and serious complication of delivery with uterine atony being its most predominant cause. While most cases are managed conservatively, significant morbidity and mortality occur in those with delayed presentation.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	NL, QQ
Acquisition, Analysis or Interpretation of Data:	NL, QQ, SY
Manuscript Writing & Approval:	NL, QQ, SY

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.



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