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Women with postpartum hemorrhage at a tertiary care hospital: Frequency, risk factors, and clinical outcomes.

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ABSTRACT… Objective: To record the outcomes of postpartum hemorrhage for mothers, as well as to investigate the prevalence, factors that are susceptible to causing PPH, and clinical outcomes of PPH. **Study Design:** Retrospective study. **Setting:** Department of OBG, MTI Hayatabad Medical Complex, Peshawar. **Period:** January 2023 to December 2023. **Methods:** The study encompassed all the women who experienced postpartum hemorrhage ensuing birth in the labor unit, however patients with an erstwhile history of bleeding disorders and those taking "Warfarin" were excluded from the study. Relevant data of patients who suffered from PPH during the study period was obtained from the medical records of the unit, reviewed, and analyzed to obtain the required frequencies and sort the risk factors. **Results:** The frequency of postpartum hemorrhage among the 6235 patients was 3.61% (n=225). Out of 225 PPH cases, the primary PPH occurred in 215 (95.11%) cases while 10 (4.89%) patients suffered from secondary PPH. The mean age of the women was 28.26 years (SD ±5.84). The principal causes of PPH were uterine atony, RPOCs, and Trauma / perineal and vaginal tears accounting for 173 (76.89%), 27 (12.00%), and 21 (9.33%) cases respectively. **Conclusion:** Uterine atony was found to be the leading cause of PPH, followed by RPOCs and perineal and vaginal tears. Un-booked patients were found to be more vulnerable to PPH. To prevent PPH, it is important to assess risk factors, and actively manage the 3rd stage of labor.

Key words: Clinical Outcome, Post-partum Hemorrhage, Uterine Atony.

INTRODUCTION

Postpartum hemorrhage (PPH) is a leading cause of maternal morbidity and mortality worldwide, particularly in low-resource settings.[1] The World Health Organization (WHO) defines PPH as blood loss exceeding 500 mL after vaginal delivery or 1000 mL after cesarean section, with severe PPH classified as blood loss greater than 1000 ml.[2] PPH can be categorized into primary, occurring within 24 hours of delivery, and secondary, which occurs between 24 hours and 12 weeks postpartum.[3] Despite improvements in obstetric care, PPH remains a major public health concern, with global variations in incidence and outcomes by various factors including socioeconomic status, and the availability and quality of healthcare.[4]

PPH accounts for 25% of maternal deaths globally[5,6], with the highest burden observed in developing regions such as Northern Africa, where it contributes to 32% of maternal deaths.[7] In tertiary care hospitals, the reported prevalence of PPH varies significantly, ranging from 0.73% to 23% of deliveries, depending on regional factors and healthcare infrastructure.[8,9] The variation in incidence of PPH highlights the need for improved prevention and management strategies, especially in resource-limited settings.

Several maternal and obstetric risk factors contribute to the occurrence of PPH, the most common being uterine atony, accounting for 70–90% of cases.[8] Advanced maternal age (>35 years), preterm or post-term delivery (<37 or >41 weeks), pregnancy-induced hypertension, anemia, previous history of PPH, and multiple gestations are all associated with increased risk.[1,10]

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Additional risk factors include uterine over distension due to polyhydramnios, placenta previa, abruptio placentae, prolonged third stage of labor, cesarean delivery, and failure to attend antenatal care.[5,11]

PPH remains the most preventable cause of maternal mortality and morbidity. Severe cases of PPH may lead to life-threatening complications such as disseminated intravascular coagulation (DIC), severe anaemia, and the need for massive blood transfusions, obstetric hysterectomy, organ failure, and admission to intensive care units (ICU).[12] Preventive strategies are essential for reducing PPH-related mortality and morbidity. The implementation of standardized PPH management protocols, including active management of the third stage of labor (AMTSL), has significantly reduced the incidence of PPH.[13] The Modified Early Obstetric Warning System (MEOWS) has also been recommended to enhance early detection of maternal deterioration.[14]
Given that PPH is responsible for a substantial proportion of maternal deaths, targeted interventions focusing on equitable access to skilled birth attendants, adequate intrapartum care, and affordable prophylactic treatments are imperative.[15] Ensuring that PPH prevention and treatment remain a priority on the global health agenda will help mitigate disparities in maternal health outcomes, particularly in low-resource settings.

The current study aims to evaluate the maternal outcomes associated with PPH by quantifying its incidence, identifying the risk factors and analyzing primary etiological causes. The findings will support evidence-based prevention and management strategies.

METHODS

This cross-sectional retrospective study was conducted in the Department of Obstetrics and Gynecology, MTI Hayatabad Medical Complex, Peshawar from January 2023 to December 2023. The study population included all patients diagnosed with PPH within 24 hours following birth of the baby in the labour room or referred for primary or secondary PPH. Patients with a known history of bleeding disorders, trauma unrelated to childbirth e.g. pelvic vessel injury, chronic liver disease, severe hypertension, and eclampsia with HELP syndrome and those on anticoagulant therapy, such as warfarin, were excluded from the study.

Being a retrospective study, informed consent was not taken; however, ethical approval was obtained from the Institutional Research and Ethics Board (IREB) of Hayatabad Medical Complex (HMC-QAD-F-OO/1770 dated 02-05-2024), and patients' confidentiality was ensured by anonymizing the data.

Data collection involved a systematic review of birth records from the labour ward to ascertain patients diagnosed with PPH. The relevant case notes of these patients were retrieved, and information regarding demographic, clinical, and outcome data were recorded. Demographic variables included patient's age, parity, and booking status. Obstetrical data encompassed gestational age, mode of delivery, type, and causes of PPH, risk factors, and outcomes of the cases. Data analysis was conducted using SPSS version 26, employing descriptive statistics to summarize the findings. Results were presented as frequencies, percentages, and means, as appropriate.

RESULTS

Among the 6235 patients, the frequency of PPH was 3.61% (n=225). Of these, 95.11% were classified as primary PPH, while 4.89% of cases were secondary PPH.

Type of PPH	Number	%age
Primary PPH	214	95.11%
Secondary PPH	11	4.89%
	225	100.00%

Table-I. Incidence of primary and secondary PPH

The age distribution of the study population is presented in Table 2. The mean age of the women was 28.26 years (SD ±5.84). The highest frequency of primary PPH (64.49%) occurred in the age group of 21 to 30 years, while secondary PPH was most prevalent (45.45%) in the age

group of 31 to 40 years.

Maternal Age (Years)	Primary PPH		Secondary PPH	
	Number	%age	Number	%age
< 20	15	7.01%	1	9.09%
21 – 30	138	64.49%	3	27.27%
31 – 40	55 25.70%		5	45.45%
> 40	6	2.80%	2	18.18%
	214	100.00%	11	100.00%

Table-II. Age-wise distribution of study population

In terms of parity, 47.56% of PPH cases occurred in primiparas, 35.11% in multiparas, and 17.33% in grand multipara. The leading causes of PPH included uterine atony at 76.89%, retained products of conception (RPOCs) at 12.00%, and trauma (perineal and vaginal tears) at 9.33%. Among the 225 women with PPH, 191 (84.89%) delivered vaginally, and 34 (15.11%) women underwent cesarean section. Among the cases examined, 223 (99.11%) survived the PPH condition.

Clinical Factors	Number	%age
Parity		
Primiparas	107	47.56%
Multipara	79	35.11%
Grand multipara	39	17.33%
Cause of PPH		
Uterine atony	173	76.89%
AV malformation	1	0.44%
Endometritis	3	1.33%
RPOCs	27	12.00%
Trauma / Tears	21	9.33%
Mode of delivery		
NVD	191	84.89%
C/section	34	15.11%
Maternal Outcome		
Survived	223	99.11%
Died	2	0.89%

Table-III. Analysis of clinical factors

Majority of the women with PPH (92.89%) had classifiable risk factors (Table 4). Among these risk factors, prolonged labour (19.56%), a previous history of PPH (13.78%), and abnormal placentation (11.56%) were the most prominent.

Cause of PPH	Number	%age
Prolong labour	44	19.56%
Induction augmentation	21	9.33%
Grand multiparity	11	4.89%
Nullipara	17	7.56%
History of PPH	31	13.78%
Operative delivery	7	3.11%
Macrosomia	10	4.44%
Use of magnesium sulphate	5	2.22%
Fetal demise	14	6.22%
Over distension of uterus: Multiplesestation - 12 Polyhyderamnia - 3 Fibroids – 1	16	7.11%
Abnormal placentation: Placenta Previa - 18 Placenta accreta spectrum – 8	26	11.56%
Unexplained PPH (No risk factors)	23	10.22%
	225	100.00%

Table-IV. Analysis of risk factors

DISCUSSION

This study examined the frequency and risk factors of PPH with added emphasis on clinical outcomes. The findings revealed that PPH occurred in 3.61% of the cases, with 95.11% classified as primary PPH, and 4.89% as secondary PPH. These findings are comparable to other studies[5,16], which reported incidences of 2.48% and 2.2% respectively. The frequency identified in this study also fits well within the range as reported by WHO stating that PPH complicates 2-4% of deliveries. Some studies[8,11] have reported incidences as low as 0.74%, 0.73%, 0.64%. Conversely, much higher incidences of 12.6% and 23% have also been documented in other research.[9,17]

The mean age of participants was 28.26 years (SD ±5.84). The highest prevalence of PPH was observed in age range of 21 to 30 years, at 64.49%. This was followed by a prevalence of 25.70% in age range of 31 to 40 years. These findings are consistent with a study[18] which reported a higher prevalence of PPH (61%) among individuals in the productive age range of 20 to 30 years, and a research by Lie et al[7], reporting a prevalence of

62.85% in the age group of 18 to 34.9 years.

In this study, the majority of women who experienced PPH were primiparas, accounting for 47.56%. This finding aligns with a study by Ramani et al[8], which reported that 49.78% of women were primigravida. Among the 225 women with PPH, 191 (84.89%) delivered vaginally, while 34 (15.11%) underwent cesarean section which is corresponding to a study[19] reporting that 75.7% of PPH cases followed vaginal delivery.

Uterine atony was identified as the primary cause responsible for PPH in 76.89% cases in this study. This finding is in consonance to several previous studies[6,8,11] that reported uterine atony as the main cause of PPH in a similar range 75% to 85%. Other studies[5,17] indicated slightly lower rates, reporting uterine atony as the main cause of PPH in 42.6%, and 57.6% of cases respectively. The next major causes leading to PPH in our study were RPOCs and traumas accountable in 12.00%, and 9.33% of the cases. Consistent with our observations, another study[5] reported similar findings.

Among the risk factors for postpartum hemorrhage (PPH), prolonged labor, a previous history of PPH, and abnormal placentation were the most significant contributors. Prolonged labor accounted for 19.56% of cases, while a history of PPH was involved in 13.78%. Abnormal placentation was responsible for PPH in 11.56%. Previous studies[5,8] have also identified prolonged labor, a prior history of PPH, and abnormal placentation as major risk factors for PPH.
Among the PPH cases examined in this study, 223 (99.11%) survived the PPH condition. Maternal mortality of 0.89% in this study is lower compared to reported maternal mortality range of 2 – 20% in other studies.[11]

CONCLUSION

PPH remains a major challenge in obstetric care, contributing significantly to maternal morbidity and mortality. This study confirms that uterine atony is the leading cause of PPH, followed by retained products of conception (RPOCs) and trauma. Key risk factors identified include prolonged labor, a history of PPH and abnormal placentation, highlighting the need for early risk identification and intervention.

Targeted strategies such as active management of the third stage of labor, timely treatment of uterine atony, and improved maternal healthcare access are crucial in reducing PPH incidence and improving outcomes. Future research should focus on developing cost-effective interventions for low-resource settings, ensuring equitable access to life-saving obstetric care and further reducing maternal deaths associated with PPH.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Rubina Akhtar:** Study design, collected data, review the case notes, drafted manuscript final review.
2	**Rukhsana Karim:** Performed critical review, statistical analysis, editing manuscript.