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Primary Postpartum Hemorrhage in Primigravida: Frequency and Causative Factors

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ABSTRACT

Background: Primary postpartum hemorrhage (PPH) remains a leading cause of maternal morbidity and mortality worldwide, with primigravida women particularly vulnerable due to physiological inexperience and lack of prior obstetric history. In developing countries like Pakistan, where access to quality maternal care remains inconsistent, understanding the burden and causes of PPH in first-time mothers is crucial for targeted interventions. **Objective:** This study aimed to determine the frequency of primary postpartum hemorrhage in primigravida women and identify its key contributing factors, with a focus on modifiable obstetric determinants and associated complications. **Methodology:** A descriptive cross-sectional study was conducted at the Department of Obstetrics and Gynecology, PUMHS Nawabshah, over six months from November 2023 to May 2024. 150 primigravida women who delivered during the study timeframe were included using a non-probability consecutive sampling method. Data were collected using a structured proforma and analyzed using SPSS version 25 to assess frequencies, percentages, and associations between PPH and obstetric variables. **Results:** Out of 150 participants, 13 women (8.7%) experienced primary postpartum hemorrhage. Significant determinants included prolonged labor (22.6%), uterine atony (25.8%), retained placenta (5%), and genital tract trauma (18.2%). 49% showed combined causes. Although complications such as acute kidney injury, postpartum anemia, lactation suppression, transfusion-related reactions, and maternal mortality were rare, they highlighted the serious risks associated with PPH. Women with PPH generally require longer hospital stays and more intensive postpartum care. **Conclusion:** The study emphasizes that PPH in primigravida women is significantly associated with preventable and manageable intrapartum factors. These findings underscore the need for improved antenatal screening, skilled intrapartum care, and rapid postpartum intervention. The results have important implications for health policy, including the development of targeted educational strategies for healthcare providers and patients, and reinforce the need for further multi-center research to evaluate context-specific preventive interventions and protocols to reduce PPH-related morbidity and mortality in first-time mothers.

INTRODUCTION

Postpartum hemorrhage (PPH), defined as excessive bleeding following childbirth, remains a significant global health concern due to its potential for severe morbidity and mortality. It is the leading cause of maternal mortality worldwide, with substantial implications for both the patient and her family. Immediate complications of PPH include hypovolemic shock, organ failure, and in severe cases, death. Beyond the immediate physical health consequences, PPH can lead to long-term sequelae such as anemia, infertility, and psychological trauma, affecting the well-being and productivity of mothers within their families and communities. It is a critical factor in global health systems, contributing significantly to the maternal mortality rates, especially in low- and middle-income countries (LMICs)[1]

The risk factors for PPH are multifactorial, encompassing both obstetric and systemic conditions. These include uterine atony, genital tract trauma, retained placental tissue, coagulopathy, and maternal age above 35 years. Primigravida women, due to their uterine inexperience and often insufficient prenatal care, are particularly vulnerable to PPH compared to multiparous women[2]. Studies indicate that primigravida women have a higher

incidence of uterine atony, which contributes to a significant proportion of PPH cases[3]. Moreover, factors like prolonged labor, inadequate nutrition, and anemia further complicate PPH management in primigravida women[4,5].

Local and global epidemiological studies underscore the prevalence of PPH, highlighting its varying incidence rates across different regions and healthcare settings. Global studies have reported that the incidence of PPH ranges from 2% to 6% of all deliveries[6]. In developing countries, including Pakistan, the incidence is often higher due to challenges such as inadequate healthcare infrastructure, poor antenatal care, and a lack of skilled birth attendants[7,8]. These studies emphasize the need for targeted interventions in resource-limited settings to prevent preventable maternal deaths[9].

In Pakistan, where maternal mortality remains a critical public health issue, understanding the determinants specific to PPH among primigravida women is crucial. Previous local studies have indicated a high frequency of PPH, underscoring the urgent need for context-specific preventive strategies. For example, a study in Sindh reported that about 4% of deliveries were complicated by PPH, with uterine atony being the leading cause[10]. These studies have identified factors such as anemia, prolonged labor, and lack of antenatal care as key contributors to PPH incidence, particularly in rural areas[11].

Societal and cultural dynamics further influence the prevalence of PPH, shaping healthcare-seeking behaviors and traditional birthing practices. Cultural norms around home deliveries and reliance on traditional birth attendants often result in delayed or inadequate medical interventions, exacerbating the risk of PPH. These factors necessitate tailored interventions that address local norms and practices, thereby improving maternal health outcomes. Local studies suggest that addressing sociocultural barriers to healthcare access is essential in reducing maternal morbidity and mortality in Pakistan[10,11].

This research aims to fill a significant gap in the literature by investigating the frequency and causative factors of primary postpartum hemorrhage specifically among primigravida women in Pakistan. By identifying modifiable risk factors and developing contextually relevant preventive guidelines, this study seeks to enhance maternal health services and reduce the burden of PPH-related complications.

Objective

The objectives of this research are:

1. To determine the frequency of primary postpartum hemorrhage among primigravida women.
2. To identify the specific risk factors contributing to primary postpartum hemorrhage in this population.
3. To determine complications resulting from PPH in our community.
4. To propose contextually relevant interventions aimed at reducing the incidence of primary postpartum hemorrhage and improving maternal outcomes.

Through these objectives, this study aims to contribute to the development of evidence-based strategies that can effectively mitigate the risks associated with PPH among primigravida patients.

METHODOLOGY

This descriptive cross-sectional study was conducted at the Department of Obstetrics and Gynecology, Peoples University of Medical and Health Sciences for Women (PUMHS), Nawabshah, over a period of six months, from from November 2023 to May 2024. The primary objective was to assess the frequency and identify the causative factors of primary postpartum hemorrhage (PPH) specifically among primigravida patients.

Study Participants and Eligibility Criteria

The study included all primigravida women aged 18 to 35 years who delivered at PUMHS during the study period. Eligibility criteria required singleton pregnancies with gestational age ≥37 weeks and no history of bleeding disorders. Women with pre-existing coagulopathies, multiple gestations, incomplete records, or those who were critically ill and unable to communicate were excluded. Primary postpartum hemorrhage (PPH) was defined as blood loss of ≥500 mL following vaginal delivery or ≥1000 mL after cesarean section. Among primigravida patients, PPH was associated with significant complications such as anemia, hypotension, shock, blood transfusion requirement, prolonged hospital stays, and psychological distress, affecting both maternal well-being and family dynamics.

A sample of 150 participants was determined using WHO sample size software and recruited via non-probability consecutive sampling. Data collection involved a structured, pretested questionnaire, refined after a pilot test on 5% of the population. Trained data collectors operated under close supervision, and all forms were reviewed daily for completeness and accuracy. Clinical records and delivery notes were cross-verified for validity. Collected data included sociodemographic characteristics, obstetric history, PPH risk factors (e.g., prolonged labor, uterine atony, instrumental delivery), and maternal outcomes. Data was analyzed using SPSS version 25, Descriptive statistics were employed to assess frequencies, percentages, means, and standard deviations for both categorical and continuous variables, with significance set at $p < 0.05$. Ethical approval was obtained from the PUMHS Institutional Review Board, and informed consent was secured from all participants with strict confidentiality maintained throughout the study.

RESULTS

Participant Demographics

The mean age of participants was 25.75 ± 4.81 years, with the majority ranging from 18 to 34 years. The mean gestational age at delivery was 38.8 ± 1.38 weeks, indicating that most pregnancies were carried to term. Hemoglobin levels varied between 9.0 and 14.4 g/dL, with a mean of 11.66 g/dL, suggesting that mild anemia was common among the participants.

Regarding mode of delivery, the majority underwent normal vaginal delivery (66.7%), followed by cesarean section (25%) and instrumental delivery (8.3%).

Among the 150 participants, 13 women (8.7%) experienced primary postpartum hemorrhage (PPH), with several associated risk factors emerging from the analysis. Prolonged labor was observed in 22.6% of the total sample

and was more common among those who developed PPH. Uterine atony, the leading direct cause of PPH, was present in 25.8% of cases. Additionally, genital tract trauma was recorded in 18.2.6% of deliveries, while retained placenta occurred in 5% of patients, and coagulopathy was present in 2% of hemorrhages. 49% showed a combined cause for PPH.

Figure 1

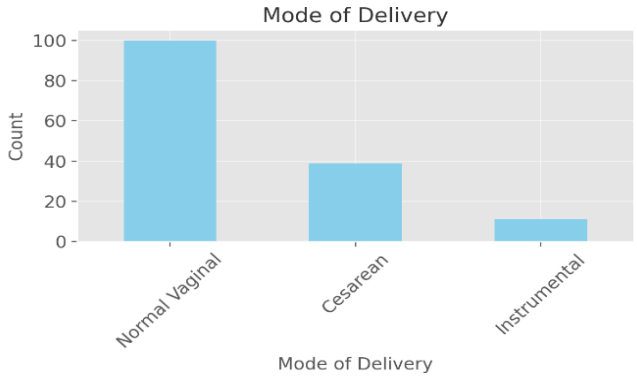


Figure 2

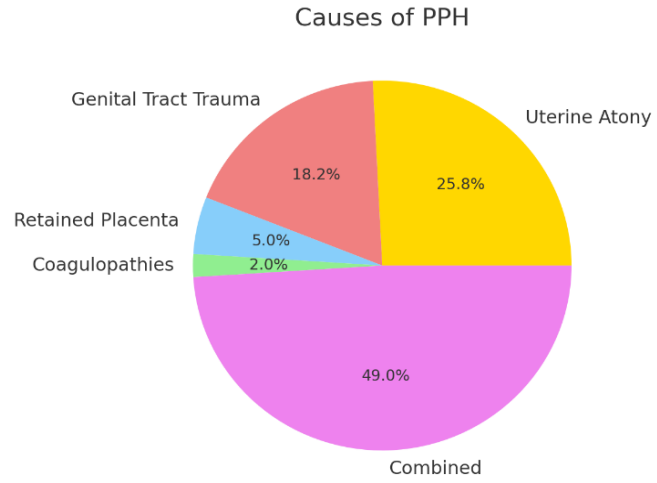
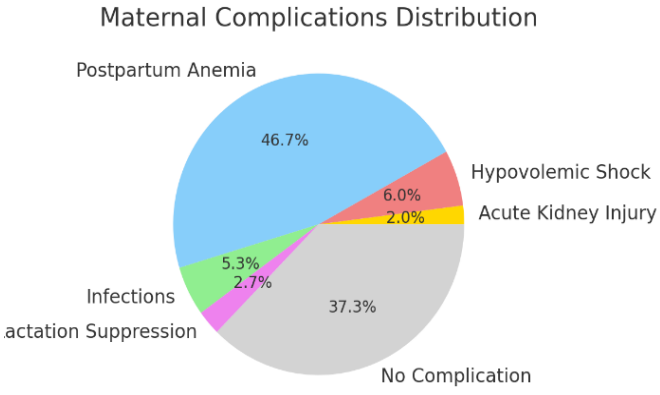


Figure 3



Complications directly attributed to primary postpartum hemorrhage (PPH), though relatively rare, highlight the potential for serious maternal morbidity and mortality even among primigravida patients. Acute kidney injury (AKI) occurred in 2%, likely resulting from hypovolemic shock due to massive blood loss. Hypovolemic shock occurred in 6%. Postpartum anemia was observed in 6.7% of patients, emphasizing the importance of routine antenatal anemia screening and iron supplementation. Lactation suppression affected 2.7% of patients, reflecting the hormonal disruption caused by severe hemorrhage. Additionally, there was one case (0.7%) of transfusion-related reaction, underscoring the critical need for safe transfusion protocols. Tragically, maternal mortality was recorded in one case (0.7%), reinforcing the potentially fatal nature of unanticipated PPH and the urgent need for well-prepared obstetric emergency response systems. The average hospital stay was 2.4 days; however, women who experienced PPH or associated complications required longer admissions for stabilization and close monitoring.

DISCUSSION

This study aimed to assess the frequency and determinants of primary postpartum hemorrhage (PPH) among primigravida women at a tertiary care facility. The findings revealed that 8.7% of the participants experienced PPH, which aligns with figures reported in hospital-based studies from developing countries, highlighting PPH as a persistent maternal health challenge[15,16]. Analysis of contributing risk factors revealed significant associations with prolonged labor (22.6%), uterine atony (25.8%), retained placenta (5%), and genital tract trauma (18.2%). These findings are consistent with international and regional studies emphasizing the critical role of timely diagnosis and intervention to prevent maternal complications[17,18].

The frequency of PPH (8.7%) falls within the global range of 6–10%, as reported by WHO estimates and regional studies[12,13]. A study in Bangladesh reported a similar PPH incidence of 8.1% in institutional deliveries, reinforcing the similarity in obstetric profiles and healthcare system gaps[13].

Prolonged labor was notably associated with PPH, supporting evidence from prior research indicating its role in uterine exhaustion and impaired contractility[14]. The correlation may also reflect delayed hospital presentation or inadequate intrapartum monitoring in lower-resource settings. Uterine atony, found in 25.8% of cases, was the leading cause of PPH in this study and has been widely cited in literature as the primary etiology, with prevalence rates between 10–20%[15,16]. These results stress the importance of effective use of uterotonics and active management of the third stage of labor (AMTSL).

Retained placenta, observed in 5% of patients, exceeds global averages (3%) and matches findings from regional studies where delayed third-stage labor and unskilled manual removal are common[17]. Genital tract trauma, noted in 18.2% of deliveries, is slightly higher than figures reported by Begley et al., where trauma contributed to 15% of PPH cases, and may be due to frequent episiotomies or improper instrumental delivery[18].

Regarding complications, the occurrence of postpartum anemia (46%), AKI (2%), and lactation suppression (2.7%) reflects known sequelae of moderate to severe blood loss, especially in settings with inadequate antenatal nutritional support[19,22]. The maternal mortality rate (0.7%) parallels national statistics from Pakistan where PPH accounts for more than one-third of maternal deaths[20,21].

Public Health Implications: These findings emphasize

the need for:

- Improved antenatal screening for anemia and high-risk labor patterns.
- Training of skilled birth attendants in emergency obstetric care and hemorrhage management.
- Strengthening referral systems to ensure timely interventions.

These interventions align with WHO's recommendations and successful maternal health programs in South Asia[15].

Future Research Directions: Future studies should explore:

- Cultural practices and delays contributing to late presentation.
- Community-level interventions in rural areas.
- Comparative evaluations of pharmacologic vs. non-pharmacologic prevention strategies.

A larger multicenter study could further validate these findings and broaden applicability.

Study Limitations

This single-center, cross-sectional study limits generalizability and causal inference. Factors like parity, comorbidities, and exact timing of intervention were not explored. Despite these limitations, it provides critical insight into preventable causes of PPH in primigravida women.

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