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Original Research Article

Obstetric Risk Factors in Primigravida Patients With Early Postpartum Hemorrhage

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Abstract: *Early postpartum hemorrhage remains a major contributor to maternal morbidity, even among primigravida women. Identifying modifiable obstetric risk factors can support timely prevention and preparedness. Evidence on the distribution of common risk factors in primigravida patients with early PPH is needed in routine obstetric practice.* ***Objective:*** *To determine the frequency of obstetric risk factors among early post-partum hemorrhage primigravida patients.* ***Methodology:*** *This study included 318 primigravida patients diagnosed with early PPH. Patients with bleeding dyscrasias, referred from other centres, and those with thyroid disorders or diabetes mellitus were excluded. Patients were assessed for the risk factors for PPH, such as multiple pregnancy, pre-labour rupture of membranes (PROM), induction of labour, non-progressing labour, and post-term pregnancy. Data was analysed using SPSS 25.* ***Results:*** *The cohort in the present study had a mean age of 28.81 ± 6.69 years and a mean gestational age of 40.86 ± 2.17 weeks. Regarding risk factors, induction of labour was observed in 142 patients (44.7%). Post-term pregnancy in 112 cases (35.2%), PROM in 49 (15.4%) cases, multiple pregnancies in 21 (6.6%) cases, and non-progressing labour in 14 (4.4%) cases.* ***Conclusion:*** *Several risk factors of early PPH in primigravida women were identified in this study; the most frequent risk factors were induction of labor, followed by post-term pregnancy and prelabor rupture of membrane.*

Keywords: Postpartum haemorrhage, Primigravida, Risk factors, Labour induction, Post-term pregnancy

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Introduction

Postpartum hemorrhage (PPH) establishes a serious obstetric emergency and remains a major contributor to maternal mortality worldwide. Regardless of the availability of preventive measures, PPH remains a common cause of maternal death, even within advanced setups. (1,2) PPH was defined as blood loss of at least 500 mL within 24 hours following the vaginal birth or greater than 1000 mL after the C-section. In 2017, the ACOG reviewed this definition and included cumulative blood loss greater than 1000 mL or clinical signs of hypovolemia during the first 24 hours following the delivery, regardless of birth mode. (3-5)

Incidence of PPH has escalated and is currently projected at 6%, with differences dependent on geographic location as well as the healthcare setting. Such a tendency has been attributed to rising C-section rates and a growing number of multiple gestations. Uterine atony is accountable for nearly 80% of PPH instances and is the most common cause, followed by hemorrhage after genital tract trauma. Other causal factors include retained placental tissue and disorders of coagulation (5, 6).

Several characteristics are documented as risk factors for PPH, including uterine overdistension, hypertension, history of C-section, placenta previa, and obesity. Further retained placenta, labor induction, and operative vaginal delivery were also linked with the increased likelihood of PPH. A study recognized differences in risk factors between severe and non-severe cases of early PPH (7, 8). Women recognized throughout the pregnancy as having a raised risk for PPH should plan delivery in settings equipped to deliver a suitable level of care. Irrespective of the resource setting, all labor units should implement a consistent PPH management protocol and ensure continuous staff education regarding its application. Such protocols should provide a framework for methodical patient assessment and treatment strategies. Evidence suggests that the implementation and consistent application of inclusive PPH management protocols are associated with improved maternal outcomes (8-11).

This study has been planned because knowledge is scarce regarding the risk factors leading to early post-partum hemorrhage in primigravida patients in our population. Results of this study will provide updated knowledge to local obstetricians about the risk factors for early post-partum hemorrhage. It will also help obstetricians in better counselling of such patients seeking obstetrical care.

Methodology

This cross-sectional study was conducted in the Department of Obstetrics and Gynaecology, Khyber Teaching Hospital, Peshawar. After taking ethical approval from the hospital under no 164/DME/KMC from (01-07-2024—01-01-2025). A sample of 318 women was selected by taking the previous frequency of labor induction in primigravida women, 51.5%,(7) margin of error 5.5%, and confidence interval 95%. A non-probability consecutive sampling technique was used to select patients in this study.

Primigravida women, aged between 18 and 40 years, gestational age 37 weeks or above confirmed by the last menstrual period, presenting with early postpartum haemorrhage were included in this study. Early postpartum haemorrhage was defined as a measured blood loss of>500 ml within 24 hours following a vaginal delivery, or > 1000 ml after a caesarean section. Blood loss was measured using a standard 10-inch kidney tray with a capacity of 250 ml. Patients with bleeding dyscrasias, referred from other centres where they were managed initially, or those with thyroid disorders or diabetes mellitus were excluded.

After obtaining consent from the patients, their demographic information was recorded, such as age, body mass index, residence, educational status, professional status, and socioeconomic background. All patients were managed using standardised management according to the hospital's protocol for postpartum haemorrhage. Detailed history was taken, and clinical examinations were performed for each patient.

Data regarding the risk factors were collected. Post-term pregnancy was defined as a gestational age > 42 weeks at delivery. Prelabour rupture of membranes was confirmed by simultaneous findings of an amniotic fluid index < 10 cm on obstetric ultrasound and a positive Nitrazine litmus test, indicated by a colour change to dark blue. Labour induction was defined

as the use of prostaglandin E2 or artificial rupture of membranes to initiate uterine contractions, with a frequency of 2 or more every 10 minutes, a duration of 30 seconds, and an intensity sufficient to effect progressive effacement and dilation of the cervix. Non-progressing of labor was confirmed clinically by lack of continuous progression of cervical dilatation by at least 1.5 cm for 2 hours during the first stage of labor or failure of vaginal birth within 03 hours after attaining full cervical dilatation (10cm). Multiple pregnancy was confirmed by ultrasound evidence of two or more foetuses.

Data was analyzed using SPSS 25. For age, BMI, blood loss, and gestational age, the mean and SD were used; for qualitative demographic variables, frequencies and percentages were used. The chi-square test was used to assess associations, with P values set at ≤ 0.05.

Results

This study included 318 primigravida patients. Their mean maternal age was 28.81 ± 6.69 years, and the mean gestational age was 40.86 ± 2.17 weeks. The mean blood loss was 906.92 ± 183.27 ml, and the mean BMI was 24.76 ± 2.06 kg/m².

It was observed that 180 (56.6%) patients were housewives. Regarding education, 132 women (41.5%) were educated, and 186 (58.5%) were not. Residence status showed that 192 (60.4%) patients were from rural areas. Socioeconomic status showed that 112 patients (35.2%) were from lower-income backgrounds, and 128 (40.3%) were from middle-income backgrounds (Table 1).

Regarding the risk factors, multiple pregnancies were present in 21 cases (6.6%). Premature rupture of membranes (PROM) occurred in 49 cases (15.4%). Induction of labour was performed for 142 cases (44.7%). Non-progressing labour was observed in 14 cases (4.4%). Post-term pregnancy was documented in 112 cases (35.2%) (Table 2). Stratification of risk factors by demographics is shown in Tables 3-8.

Table 1: Demographics

Demographics		n	%
Professional status	Employed	138	43.4%
	Housewife	180	56.6%
Education status	Educated	132	41.5%
	Uneducated	186	58.5%
Residence	Urban	126	39.6%
	Rural	192	60.4%
Socioeconomic status	Low (> 40K)	112	35.2%
	Middle (40K to 90K)	128	40.3%
	HIgh (> 90K)	78	24.5%

Table 2: Risk factors

Risk factors		N	%
Multiple pregnancies	Yes	21	6.6%
	No	297	93.4%
PROM	Yes	49	15.4%
	No	269	84.6%
Induction of labor	Yes	142	44.7%
	No	176	55.3%
Non-progressing labor	Yes	14	4.4%
	No	304	95.6%
Post-term pregnancy	Yes	112	35.2%
	No	206	64.8%

Table 3: Stratification of risk factors with age

Risk factors		Age distribution (Years)				P value
		18 to 30		31 to 40		
		n	%	n	%	
Multiple pregnancies	Yes	13	61.9%	8	38.1%	0.81
	No	176	59.3%	121	40.7%	
PROM	Yes	33	67.3%	16	32.7%	0.22
	No	156	58.0%	113	42.0%	
Induction of labor	Yes	77	54.2%	65	45.8%	0.08
	No	112	63.6%	64	36.4%	
Non-progressing labor	Yes	11	78.6%	3	21.4%	0.13
	No	178	58.6%	126	41.4%	
Post-term pregnancy	Yes	67	59.8%	45	40.2%	0.91
	No	122	59.2%	84	40.8%	

Table 4: Stratification of risk factors with BMI

Risk factors		BMI (Kg/m^2)				P value
		18 to 24.9		> 24.9		
		n	%	n	%	
Multiple pregnancies	Yes	13	61.9%	8	38.1%	0.43
	No	158	53.2%	139	46.8%	
PROM	Yes	27	55.1%	22	44.9%	0.83
	No	144	53.5%	125	46.5%	
Induction of labor	Yes	83	58.5%	59	41.5%	0.13
	No	88	50.0%	88	50.0%	
Non-progressing labor	Yes	6	42.9%	8	57.1%	0.40
	No	165	54.3%	139	45.7%	
Post-term pregnancy	Yes	60	53.6%	52	46.4%	0.95
	No	111	53.9%	95	46.1%	

Table 5: Stratification of risk factors with residence

Risk factors		Residence				P value
		Urban		Rural		
		n	%	n	%	
Multiple pregnancies	Yes	8	38.1%	13	61.9%	0.88
	No	118	39.7%	179	60.3%	
PROM	Yes	18	36.7%	31	63.3%	0.65
	No	108	40.1%	161	59.9%	
Induction of labor	Yes	60	42.3%	82	57.7%	0.38
	No	66	37.5%	110	62.5%	
Non-progressing labor	Yes	2	14.3%	12	85.7%	0.04
	No	124	40.8%	180	59.2%	
Post-term pregnancy	Yes	42	37.5%	70	62.5%	0.56
	No	84	40.8%	122	59.2%	

Table 6: Stratification of risk factors with education status

Risk factors		Education status				P value
		Educated		Uneducated		
		n	%	n	%	
Multiple pregnancies	Yes	7	33.3%	14	66.7%	0.43
	No	125	42.1%	172	57.9%	
PROM	Yes	22	44.9%	27	55.1%	0.60
	No	110	40.9%	159	59.1%	
Induction of labor	Yes	60	42.3%	82	57.7%	0.80
	No	72	40.9%	104	59.1%	
Non-progressing labor	Yes	2	14.3%	12	85.7%	0.03
	No	130	42.8%	174	57.2%	
Post-term pregnancy	Yes	46	41.1%	66	58.9%	0.90
	No	86	41.7%	120	58.3%	

Table 7: Stratification of risk factors with professional status

Risk factors		Professional status				P value
		Employed		Housewife		
		n	%	n	%	
Multiple pregnancies	Yes	11	52.4%	10	47.6%	0.39
	No	127	42.8%	170	57.2%	
PROM	Yes	22	44.9%	27	55.1%	0.81
	No	116	43.1%	153	56.9%	
Induction of labor	Yes	63	44.4%	79	55.6%	0.75
	No	75	42.6%	101	57.4%	

Non-progressing labor	Yes	5	35.7%	9	64.3%	0.55
	No	133	43.8%	171	56.2%	
Post-term pregnancy	Yes	56	50.0%	56	50.0%	0.08
	No	82	39.8%	124	60.2%	

Table 8: Stratification of risk factors with socioeconomic status

Risk factors		Socioeconomic status						P value
		Low (> 40K)		Middle (40K to 90K)		High (> 90K)		
		n	%	n	%	n	%	
Multiple pregnancies	Yes	8	38.1%	3	14.3%	10	47.6%	0.01
	No	104	35.0%	125	42.1%	68	22.9%	
PROM	Yes	16	32.7%	18	36.7%	15	30.6%	0.56
	No	96	35.7%	110	40.9%	63	23.4%	
Induction of labor	Yes	52	36.6%	62	43.7%	28	19.7%	0.19
	No	60	34.1%	66	37.5%	50	28.4%	
Non-progressing labor	Yes	5	35.7%	7	50.0%	2	14.3%	0.61
	No	107	35.2%	121	39.8%	76	25.0%	
Post-term pregnancy	Yes	40	35.7%	50	44.6%	22	19.6%	0.28
	No	72	35.0%	78	37.9%	56	27.2%	

Discussion

Various studies have been conducted that observed the risk factors for postpartum haemorrhage; the current research focused on risk factors for postpartum haemorrhage in primigravida women. A primary focus is the comparative risk associated with induced and spontaneous labour. Shah et al. demonstrated a significantly higher frequency of PPH in primigravidas who were undergoing induced labour (38.9%) compared to those with spontaneous onset (18.8%), a conclusion also documented in other studies. (12,13) This association can be attributed to physiological mechanisms, such as uterine muscle fatigue and oxytocin receptor saturation following pharmacological stimulation. Several studies have also noted that underlying maternal risk profiles may contribute to this observed relationship. (14,15) The importance of following the established clinical guidelines for labour induction is mandatory, highlighting that the procedure should be reserved for well-justified indications to lower the risk of maternal morbidity.

Recent studies classify risk factors by the strength of their association, providing a stratified agenda for clinical risk assessment. Factors such as previous PPH, caesarean birth, multiple pregnancy, and placenta praevia are frequently identified as conferring a high risk, while induction of labour, instrumental delivery, and premature rupture of membranes are categorised as weakly associated factors. (16) This stratification is clinically critical, as it helps in differentiating conditions that require vigilance and enhanced prophylactic measures from those that represent a more modest increase in risk.

Factors such as increased maternal age, high parity, and lack of antenatal care are reported as notable predictors in these contexts. (17,18) This highlights the multifactorial nature of PPH, where biological, obstetric, and systemic healthcare factors intersect. Another study highlighted critical gaps between recommended clinical guidelines and actual practice, including poor documentation and inconsistent specialist consultation. (17)

The demographic profile of the present study showed a mean age of 28.81 years, consistent with other studies. (12,17) More than 50% of the women in this study were homemakers; the majority were from rural areas, and most patients were from lower- or middle-income backgrounds. This profile aligns with observations from other studies conducted in low- and middle-income settings. (17,18)

Regarding the risk factors in this study, the rate of labour induction was notably high 44.7% in the cohort of primigravida women presenting with PPH. This finding has also been reported by Shah et al. (12). The frequency of post-term pregnancy (35.2%) in this study is noteworthy, as it is a common indication for induction.

Other risk factors, such as multiple pregnancies (6.6%), were lower in this study, which is expected in a cohort of primigravida women, it remains a critical risk factor for PPH in larger populations. (16) The occurrence of premature rupture of membranes (15.4%) and non-progressing labour (4.4%) was also noted. These factors are also contributors to PPH risk. (14,15)

The findings of the present study contribute to existing knowledge by providing localised data on risk factors associated with early PPH in primigravida women. By highlighting the socioeconomic and educational profile, the study further emphasizes the importance of broader public health and social interventions, along with clinical management, to reduce the burden of PPH.

Conclusion

The present study identified several risk factors of early PPH in primigravida women; the most frequent risk factors were induction of labor, followed by post-term pregnancy and prelabor rupture of membrane. Future studies should be conducted across multiple centres with a control arm to further confirm the effect of these risk factors in this population.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (164/DME/KMC)

Consent for publication

Approved

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Conflict of interest

The authors declared no conflict of interest.

Author Contribution

N (Trainee Medical Officer)
Data Collection, Manuscript drafting, and Study Design.
NQFB (Associate Professor)
Critical Input and Final Approval.
R (Trainee Medical Officer)
Review of Literature
A (Trainee Medical Officer)
Review of Literature, Critical Input.
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Review of Literature
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All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

References

1. Bienstock JL, Eke AC, Hueppchen NA. Postpartum hemorrhage. *New England Journal of Medicine*. 2021;384(17):1635-1645. https://doi.org/10.1056/NEJMra1513247
2. Corbetta-Rastelli CM, Friedman AM, Sobhani NC, Arditi B, Goffman D, Wen T. Postpartum hemorrhage trends and outcomes in the United States, 2000–2019. *Obstetrics and Gynecology*. 2023;141(1):152-161. https://doi.org/10.1097/AOG.0000000000004972
3. Wilbeck J, Hoffman JW, Schorn MN. Postpartum hemorrhage: Emergency management for uncontrolled vaginal bleeding. *Advanced Emergency Nursing Journal*. 2022;44(3):E9. https://doi.org/10.1097/TME.0000000000000425
4. Sheldon WR, Blum J, Vogel JP, Souza JP, Gülmezoglu AM, Winikoff B, et al. Postpartum haemorrhage management, risks, and maternal outcomes: findings from the World Health Organization Multicountry Survey on Maternal and Newborn Health. *BJOG: An International Journal of Obstetrics and Gynaecology*. 2014;121(Suppl 1):5-13. https://doi.org/10.1111/1471-0528.12636
5. Bateman BT, Berman MF, Riley LE, Leffert LR. The epidemiology of postpartum hemorrhage in a large, nationwide sample of deliveries. *Anesthesia and Analgesia*. 2010;110(5):1368-1373. https://doi.org/10.1213/ANE.0b013e3181d74898
6. Marshall AL, Durani U, Bartley A, Hagen CE, Ashrani A, Rose C, et al. The impact of postpartum hemorrhage on hospital length of stay and inpatient mortality: a National Inpatient Sample-based analysis. *American Journal of Obstetrics and Gynecology*. 2017;217(3):344.e1-344.e6. https://doi.org/10.1016/j.ajog.2017.05.004
7. Buzaglo N, Harlev A, Sergienko R, Sheiner E. Risk factors for early postpartum hemorrhage (PPH) in the first vaginal delivery, and obstetrical outcomes in subsequent pregnancy. *Journal of Maternal-Fetal and Neonatal Medicine*. 2015;28(8):932-937. https://doi.org/10.3109/14767058.2014.937698
8. Ende HB, Lozada MJ, Chestnut DH, Osmundson SS, Walden RL, Shotwell MS, et al. Risk factors for atonic postpartum hemorrhage: a systematic review and meta-analysis. *Obstetrics and Gynecology*. 2021;137(2):305-323. https://doi.org/10.1097/AOG.0000000000004228
9. Liu CN, Yu FB, Xu YZ, Li JS, Guan ZH, Sun MN. Prevalence and risk factors of severe postpartum hemorrhage: a retrospective cohort study. *BMC Pregnancy and Childbirth*. 2021;21(1):332. https://doi.org/10.1186/s12884-021-03818-1
10. Bailit JL, Grobman WA, McGee P, Reddy UM, Wapner RJ, Varner MW, et al. Does the presence of a condition-specific obstetric protocol lead to detectable improvements in pregnancy outcomes? *American Journal of Obstetrics and Gynecology*. 2015;213(1):86.e1-86.e6. https://doi.org/10.1016/j.ajog.2015.01.055
11. Skupski DW, Brady D, Lowenwirt IP, Sample J, Lin SN, Lohana R, et al. Improvement in outcomes of major obstetric hemorrhage through systematic change. *Obstetrics and Gynecology*. 2017;130(4):770-777. https://doi.org/10.1097/AOG.0000000000002207
12. Shah S, Hayat N, Kishwar N, Shah M. Postpartum hemorrhage in spontaneous versus induced labor in primigravida at term. *Journal of Postgraduate Medical Institute*. 2022;36(3):166-169. https://doi.org/10.54079/jpmi.36.3.3034
13. Hussain SS, Shafqat T. Frequency of postpartum haemorrhage in induced versus spontaneous labour. *Pakistan Journal of Medical and Health Sciences*. 2014;8(3):659-662.
14. Phaneuf S, Rodriguez Liñares B, TambyRaja RL, MacKenzie IZ, López Bernal A. Loss of myometrial oxytocin receptors during oxytocin-induced and oxytocin-augmented labour. *Journal of Reproduction and Fertility*. 2000;120(1):91-97. https://doi.org/10.1530/reprod/120.1.91
15. Khireddine I, Le Ray C, Dupont C, Rudigoz RC, Bouvier-Colle MH, Deneux-Tharaux C. Induction of labor and risk of postpartum hemorrhage in low-risk parturients. *PLoS One*. 2013;8(1):e54858. https://doi.org/10.1371/journal.pone.0054858
16. Yunas I, Islam MA, Sindhu KN, Devall AJ, Podesek M, Alam SS, et al. Causes of and risk factors for postpartum haemorrhage: a systematic review and meta-analysis. *Lancet*. 2025;405:1468-1480. https://doi.org/10.1016/S0140-6736(25)00448-9
17. Zejnullahu VA, Isjanovska R, Ibishi VA. Risk factors for postpartum hemorrhage in a low-middle-income country: a retrospective cross-sectional study. *Modern Medicine*. 2025;32(2):181-188. https://doi.org/10.31689/rmm.2025.32.2.181
18. Abecassis A, Wainstock T, Sheiner E, Miodownik S, Pariente G. Risk factors for early postpartum hemorrhage: a retrospective, population-based, cohort analysis. *International Journal of Gynecology and Obstetrics*. 2024;166:812-818. https://doi.org/10.1002/ijgo.15414