

## A Hospital Based, Prospective, Observational Assessment of Risk Factors in Patients with Postpartum Hemorrhage

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Received: 14-11-2023 / Revised: 18-12-2023 / Accepted: 25-01-2024

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Conflict of interest: Nil

### Abstract

**Aim:** The aim of the present was to assess the risk factors in patients with postpartum hemorrhage at a tertiary hospital.

**Methods:** The present study was hospital based, prospective, observational study, conducted in the Department of Obstetrics and Gynaecology, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India. During one year study period, 5295 deliveries were conducted at our hospital, 100 patients had postpartum hemorrhage (1.88%).

**Results:** Majority were from 21-24 years (36%) followed by 25-29 years age group (32%). Mean age of study group was  $24.56 \pm 3.95$  years. As per parity status majority were primiparous (52%) followed by parity status >2 (25%). As per gestational age majority were from 38-40 weeks (32%) followed by 36-38 weeks (27%). In present study common risk factors were severe anaemia (Hb < 7 gm%) (37%), previous LSCS (27%), hypertensive disorders of pregnancy (23%), premature rupture of membranes (18%), hypothyroidism (18%), abruptio placentae (18%), Prolonged labor (16%) and placenta previa (16%). Interventions other than more than 2 uterotonics (100%) and > 2 PCV blood transfusions (85%), were bilateral uterine artery ligation (46%), bilateral uterine artery ligation + bilateral internal iliac artery ligation (9%), obstetric hysterectomy (16%) and perineal tear repair (10%). Mortality was noted in seven patients.

**Conclusion:** In present study, significant risk factors for post-partum hemorrhage were 21-24 years age, primipara, severe anaemia (Hb < 7 gm%), previous LSCS, hypertensive disorders of pregnancy, premature rupture of membranes, hypothyroidism, abruptio placentae, prolonged labor and placenta previa. Anemia is a correctable entity, significantly associated with uterine atony and should be corrected antenatally on a priority basis.

**Keywords:** risk factors, post-partum hemorrhage, atonic PPH, previous LSCS, hypertensive disorders of pregnancy

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### Introduction

Postpartum hemorrhage (PPH) is an obstetric emergency that complicates 1–10% of all deliveries and requires appropriate training for effective prevention, recognition and management. [1] To date, there is inconsistency in its definition among evidence-based guidelines around the world. Thus, the Society of Obstetricians and Gynaecologists of Canada (SOGC) defines PPH as blood loss >500 mL following vaginal delivery or >1000 mL after cesarean delivery, whereas the World Health Organization (WHO) defines PPH as blood loss  $\geq 500$  mL regardless of the mode of delivery; the American College of Obstetricians and

Gynecologists (ACOG) sets the threshold at 1000 mL. [2]

The most common causes of PPH are classified using the acronym of the four Ts (tone, trauma, tissue and thrombin); uterine atony accounts for about 70% of PPH cases, genital tract trauma accounts for 15–20% of cases, retention of the placenta and/or membranes increases the incidence of PPH by 3.5 times (10–40%) and coagulation disorders, both inherited and acquired, account for approximately 1% of PPH. [3-5] Known risk factors for PPH are prolongation of labor, multiple gestations, multiparity, fetal macrosomia, operative

vaginal delivery, uterine ruptures, placental abruption, uterine inversions and abnormal placentation. [6-8]

Despite the progress in obstetrics, PPH continues to represent the leading cause of maternal morbidity and mortality in many countries around the world. [9] Furthermore, there is a geographic variation in the incidence of PPH; it has been reported to be higher in Africa, North America and Asia. [10] Several risk factors for PPH are known, such as multiple pregnancy, operative delivery and chorionamnionitis, however PPH may occur among patients with no known risk factors. [11,12] Our ability to reduce the risk of PPH depends on ongoing investigations of previously unaccounted for causes and risk factors. Considering these recommendations and the preventable nature of PPH-associated maternal morbidity and mortality, risk assessment tools are recommended by ACOG to identify patients at risk of experiencing PPH. [13] There are several active statewide quality improvement initiatives (e.g. California and Louisiana) aiming to reduce severe maternal morbidity from PPH by implementing regular assessment of PPH risk during labor and quantitative blood loss measurement. [14] Nevertheless, PPH remains one of the leading causes of maternal mortality in Louisiana, and the Louisiana Maternal Mortality Review Report reports that from 2011 to 2016, 62.8% of the maternal deaths secondary to PPH in Louisiana were deemed to be preventable. [15]

The aim of the present was to assess the risk factors in patients with postpartum hemorrhage at a tertiary hospital.

## Materials and Methods

The present study was hospital based, prospective, observational study, conducted in the Department of Obstetrics and Gynaecology, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India. During one year study period, 5295 deliveries were conducted at our hospital, 100 patients had postpartum hemorrhage (1.88%).

**Inclusion criteria:** Pregnant women, >18 years, delivered at our hospital, with any one of the following criteria: Patients with estimated blood loss more than 500 ml after vaginal delivery, more than 1000ml after caesarean delivery, 1500 ml loss in obstetric hysterectomy. Patients with excessive bleeding that makes the patient symptomatic (e.g., Light-headedness, vertigo, syncope) and/or results in signs of hypovolemia (eg, hypotension, tachycardia or oliguria). Patients with >10 % decline in postpartum haemoglobin concentration from prepartum levels or required blood transfusion.

### Exclusion Criteria-

Women who are too sick to give consent or to be interviewed or not willing to participate in the study

A written informed consent was taken for participation from patient/relatives. Demographic and clinical data such as maternal age, gestational age, parity, history of abortions, prior obstetric history, co-morbidity, period of gestation, risk factors for PPH, amount of blood loss, mode of delivery, birth weight of child, causes of PPH, blood transfusion, management of PPH and maternal morbidity. Data was collected and compiled using Microsoft Excel, statistical analysis was done using descriptive statistics.

## Results

**Table 1: General characteristics**

Characteristics	N	%
<b>Age in years</b>		
19-20	4	4
21-24	36	36
25-29	32	32
30-34	18	18
≥ 35	10	10
<b>Parity</b>		
1	52	52
2	23	23
>2	25	25
<b>Gestational age (weeks)</b>		
<34 weeks	10	10
34- 36	9	9
36- 38	27	27
38- 40	32	32
>40	22	22

Majority were from 21-24 years (36%) followed by 25-29 years age group (32%). Mean age of study group was  $24.56 \pm 3.95$  years. As per parity status majority were primiparous (52%) followed by parity status >2 (25%). As per gestational age majority were from 38-40 weeks (32%) followed by 36-38 weeks (27%).

**Table 2: Risk factors associated with PPH**

Risk factors	N	%
Severe Anaemia (Hb < 7 gm%)	37	37
Previous LSCS	27	27
Hypertensive disorders of pregnancy	23	23
Premature rupture of membranes	18	18
Hypothyroidism	18	18
Prolonged labor	16	16
Placenta previa	16	16
Abruptio placentae	17	17
Mal presentation	11	11
Instrumental delivery	11	11
Genital trauma	9	9
Gestational diabetes mellitus	9	9
Fever	8	8
Primary LSCS	7	7
Multiple pregnancy	6	6
Macrosomia (Birth weight > 4 kg)	6	6
Polyhydramnios	6	6
Placenta accreta spectrum	1	1
Fibroid uterus	1	1

In present study common risk factors were severe anaemia (Hb < 7 gm%) (37%), previous LSCS (27%), hypertensive disorders of pregnancy (23%), premature rupture of membranes (18%), hypothyroidism (18%), abruptio placentae (18%), Prolonged labor (16%) and placenta previa (16%).

**Table 3: Management outcomes**

Type of intervention for PPH	No. of cases	Percentages
Uterotonics > 2	100	100
Blood transfusions > 2 PCVs	85	85
Surgical intervention		
Bilateral uterine artery ligation	46	46
Bilateral uterine artery ligation + bilateral internal iliac artery ligation	9	9
Obstetric hysterectomy	16	16
Perineal tear repair	10	10
Mortality	7	7

Interventions other than more than 2 uterotonics (100%) and > 2 PCV blood transfusions (85%), were bilateral uterine artery ligation (46%), bilateral uterine artery ligation + bilateral internal iliac artery ligation (9%), obstetric hysterectomy (16%) and perineal tear repair (10%). Mortality was noted in seven patients.

### Discussion

Postpartum hemorrhage may occur in 1-5% of deliveries in developed as well as in developing countries and it is still most common cause of maternal morbidity and mortality. [16] Postpartum hemorrhage is labelled when in vaginal delivery blood loss of above 500 ml, in C-section blood loss of above 1000 ml or 1500 ml loss in obstetric

hysterectomy. Another definition of PPH is that blood loss sufficient to cause hypovolemia, a 10% drop in the hematocrit or requiring transfusion of blood products (regardless of route of delivery). [16,17] Post-partum hemorrhage is a preventable cause of maternal mortality. Maternal deaths due to post-partum hemorrhage are significantly low (approximately 8%) in developed countries. i.e. pregnant women giving childbirth in the developing countries are exposed to greater risk of dying during labour than countries in their developed counterparts. [18] Several risk factors for PPH are known, such as anemia, multiple pregnancy, Obstetric interventions (augmentation and induction of labor, instrumental vaginal delivery, cesarean delivery) and chorio-amnionitis, however PPH may

occur among patients with no known risk factors. [19]

Rajeshwari, et al [20] studied 142 women with postpartum hemorrhage, majority of the women were primiparous, in the age group of 25 to 29 years, and, pre-existing anaemia was seen in 11%, PROM in 16%, hypothyroidism in 20% were found as risk factors and 19% of the woman underwent secondary LSCS. Similar findings were noted in present study. Chandrika SK [21] noted that severe obstetrical hemorrhage (more than 1500 ml) was in 115 patients (prevalence of 0.9%). The prevalence of severe obstetric hemorrhage was 0.9%. A large proportion of the patients (62%) were multipara. Mortality in this study was 21.73% and morbidity was 78.26%. Most common cause of obstetric hemorrhage in this study was uterine atonic PPH. Majority were from 21-24 years (36%) followed by 25-29 years age group (32%). Mean age of study group was 24.56 ± 3.95 years. As per parity status majority were primiparous (52%) followed by parity status >2 (25%). As per gestational age majority were from 38-40 weeks (32%) followed by 36-38 weeks (27%). In present study common risk factors were severe anaemia (Hb < 7 gm%) (37%), previous LSCS (27%), hypertensive disorders of pregnancy (23%), premature rupture of membranes (18%), hypothyroidism (18%), abruptio placentae (18%), Prolonged labor (16%) and placenta previa (16%).

Nanani M [22] studied 200 cases of PPH, most common risk factor for the post-partum hemorrhage was the atonicity of the uterus (84%) followed by PIH (37%), APH (22.5%), prolonged labour (14%) and retained placental products (8.5%) cases of PPH. Others were large baby induced PPH (7%), genital tract Injuries (6.5%), ruptured uterus (4.5%), multi parity (4.5%), infections (2.5%) and uterine inversion (1%). In a study Kebede BA et al [23] noted that among 422 study participants, overall prevalence of primary postpartum hemorrhage was 16.6%. Mothers aged 35 and above [AOR = 6.8, 95% CI (3.6, 16.0)], pre-partum anemia [AOR = 5.3, 95% CI (2.2, 12.8)], complications during labor [AOR = 1.8, 95% CI (2.8, 4.2)], history of previous postpartum hemorrhage [AOR = 2.7, 95% CI (1.1, 6.8)] and instrumental delivery [AOR = 5.3, 95% CI (2.2, 12.8)] were significant predictors of primary postpartum hemorrhage. PPH may be aggravated by pre-existing anaemia and, in such instances, the loss of a smaller volume of blood may still result in adverse clinical sequelae. Interventions other than more than 2 uterotonics (100%) and > 2 PCV blood transfusions (85%), were bilateral uterine artery ligation (46%), bilateral uterine artery ligation + bilateral internal iliac artery ligation (9%), obstetric hysterectomy (16%) and perineal tear repair (10%). Mortality was noted in seven patients.

Active management of the third stage of labour is highly effective at preventing postpartum

hemorrhage among facility- based deliveries. It is more effective than physiological management in preventing blood loss, severe postpartum hemorrhage (>500 ml) and prolonged third stage of labour. [24] Given that PPH can occur without warning, rural communities should consider ways to increase both primary prevention (iron supplementation, AMTSL) and secondary prevention of PPH (availability of obstetric first aid, availability of transport, and availability of emergency obstetric care). [25]

### Conclusion

In present study, significant risk factors for postpartum hemorrhage were 21-24 years age, primipara, severe anaemia (Hb < 7 gm%), previous LSCS, hypertensive disorders of pregnancy, premature rupture of membranes, hypothyroidism, abruptio placentae, prolonged labor and placenta previa. Anemia is a correctable entity, significantly associated with uterine atony and should be corrected antenatally on a priority basis.

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