



ORIGINAL ARTICLE

Incidence and outcome of primary postpartum hemorrhage at Zagazig University Hospitals

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ABSTRACT

Background: postpartum hemorrhage (PPH) is an obstetrical emergency that can occur after vaginal or cesarean delivery. It is the most common cause of maternal morbidity and may be complicated by shock, renal failure, acute respiratory distress syndrome, coagulopathy, and Sheehan syndrome. PPH is one of the top five causes of maternal death in both developed and developing countries. The Aim of work to assess the incidence and outcome of primary PPH in Zagazig University Hospitals to assess magnitude of the problem.

Methods: This is a prospective cohort clinical study which was conducted in Zagazig University Maternity Hospital. Cases diagnosed with primary post partum haemorrhage who delivered at or admitted to maternity hospital at Zagazig University Hospitals. **Results:** 3000 cases were admitted either delivered at our hospital or outside and admitted for immediate post partum hemorrhage, 74 cases were diagnosed by immediate post partum hemorrhage (2.5%).

percentage of PPH in our study was found to be 2.5%, the most common causes of PPH are uterine atony 71.6% , obstetric trauma 18.9%, the most common risk factors for PPH are placenta previa 28.4%, PIH 21.6%, Anemia 18.9%, 10.8% experienced previous postpartum hemorrhage, the majority of the studied women had no medical problems (75%), there was significant relation between PPH occurrence and past medical history, anemia and previous PPH, the tertiary care was the commonest place for delivery followed by private (94.6% and 4.1% respectively), 49 patients received 1_5 units blood (66.2%), 50 patients have moderate degree of shock (67.5%). **Conclusion:** primary PPH was found to be 2.5%, most common causes of PPH are uterine atony 71.6% , obstetric trauma 18.9%.

Keywords: primary postpartum hemorrhage, maternal morbidity, Obstetric, bleeding.

INTRODUCTION

Postpartum hemorrhage (PPH) is an obstetric emergency. It is one of the top five causes of maternal mortality in both high and low per capita income countries, although the absolute risk of death from PPH is much lower in high-income countries^[1].

PPH occurring in the first 24 hours after delivery may be called primary or early PPH, PPH occurring from 24 hours to 12 weeks after

delivery is usually called secondary, late, or delayed PPH^[1].

PPH is formally defined as the loss of at least 500 ml of blood after a vaginal birth or the loss of at least 1,000 ml of blood after a cesarean section within 24 hours of delivery [2].

In 2017, the American College of Obstetricians and Gynecologists revised their definition of PPH from the classic one (≥ 500 mL after vaginal birth or ≥ 1000 mL after

cesarean delivery) to (1) cumulative blood loss ≥ 1000 mL or (2) bleeding associated with signs/symptoms of hypovolemia within 24 hours of the birth process regardless of delivery route in order to reduce the number of women inappropriately labeled with this diagnosis [3].

Epidemiology the incidence of PPH varies widely, with age 20-30 years, more at low socioeconomic status, reasonable estimate is 1 to 5 percent of deliveries. In an analysis of population-based data from the United States National Inpatient Sample, the incidence was between 2 and 3 percent during the years 1994 to 2006 [4] and 3 percent in 2012 to 2013 [5].

The causes of PPH can be classified into four main groups: 1) uterine atony, 2) placental problems including retained placenta and abnormal placental implantation, 3) genital tract trauma, and 4) systemic medical disorders (including inherited and acquired coagulation defects). Uterine atony is the major cause of PPH accounting for up to 80% of cases of primary PPH [6].

It can occur after vaginal or cesarean delivery, it is the most common cause of maternal morbidity and may be complicated by shock, renal failure, acute respiratory distress syndrome, coagulopathy, and Sheehan'S syndrome. Postpartum hemorrhage is one of the top five causes of maternal death in both developed and developing countries [7]. The Aim of work to assess the incidence and outcome of primary PPH in Zagazig University Hospitals to assess magnitude of the problem and to assess the different etiological causes and the complications of postpartum hemorrhage in Zagazig University Hospitals to reduce maternal mortality and morbidity

METHODS

The Site of study: The study will be carried out in Departments of Obstetrics & Gynecology Zagazig University Hospitals, Sharkia, Egypt.

Sample size: The study included 74 patients delivered at our hospital or outside and admitted for immediate post partum hemorrhage

Inclusion criteria

- Cases suffered from PPH delivered in our hospital
- Cases delivered both vaginal and C.S
- Cases admitted for PPH after delivery

Exclusion criteria

- Insufficient data in retrospective component

Ethical Considerations: Written informed consent was obtained from all participants and the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University. The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

All women were subjected to

- **History taking:** Full history was taken from the women including:
 - a. Personal history: age, duration of marriage, address, occupation, and special habits as smoking.
 - b. History of the present pregnancy: date of last menstrual period (to calculate the gestational age and expected date of delivery)
 - c. History suggesting risk factors or causes of PPH.
 - d. History of process of labor and delivery: course of labor, spontaneous or assisted vaginal delivery, partogram, indication of c.s, fetal outcome and place of delivery, and history of bleeding if delivered outside as regard time, onset, and amount.
 - e. Obstetric history: history of previous pregnancies, abortion, ectopic pregnancy, and outcome.
 - f. Past history: hypertension, diabetes mellitus, liver, renal diseases, coagulopathies, Anemia, APH, PPH, blood transfusion, and Of previous uterine surgery.
 - g. Family history: of medical diseases as hypertension or diabetes mellitus
- **General examination:** This included vital data signs blood pressure, pulse, temperature, urine output and body mass index.
- **Abdominal examination:** — Patients with persistent excessive vaginal bleeding after vaginal delivery should be assessed immediately for contraction, tone, fundal level, any masses, tenderness, ascites.

- **Local examination:** Estimated blood loss, Quantify the amount of blood loss by collecting blood in graduated volumetric containers, using visual aids that correlate the size and appearance of blood on specific surfaces (eg, maternity pad), examination under anesthesia (uterus, cervix, vagina, and perineum), for trauma, for uterine atony retained placental tissues, Postcesarean, it may not be recognized when blood is retroperitoneal, confined to the uterine cavity after closure of the uterine incision, When compensated shock is present (normal blood pressure with increasing heart rate) at cesarean delivery, these sites should be actively evaluated, modified focused assessment with sonography for trauma (FAST) examination in the recovery room may show fluid in the upper abdomen suggestive of intraabdominal bleeding, but sensitivity is low In all cases, clinical signs suggestive of ongoing bleeding (tachycardia, falling blood pressure, expanding abdomen, change in level of consciousness) should overrule a negative ultrasound scan in determining further management^[8].

Clinical findings in obstetric hemorrhage⁽⁹⁾:(table 1)

Investigations:

- Type and crossmatch for multiple units of packed red cells, if not already done.
- Complete blood picture (Hb level and Hct value at admission and 6 hours after delivery).
- Coagulation profile, PTT, PT and INR.
- Renal function tests.
- Liver function tests.
- Urine analysis.
- Ultrasound: to comment on uterine contour, cavity, any masses, hematoma, or free fluid.

Statistical analysis

Data collected throughout history, basic clinical examination, laboratory investigations and outcome measures coded, entered and analyzed using Microsoft Excel software. Data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) (Statistical Package for the Social Sciences) software for analysis. According to the type of data qualitative represent

as number and percentage, quantitative continues group represent by mean \pm SD, the following statistical tests and parameters were used.

1-Mean

2- Standard deviation (SD) is the sum of the square of the differences of each observation from the mean.

3- The t statistic to test whether the means are different.

4- Differences between frequencies (qualitative variables) and percentages in groups were compared by Chi-square test.

5- Differences between parametric quantitative independent groups by t test.

6- P value was set at <0.05 for significant results & <0.001 for high significant.

RESULTS

3000 cases were admitted either delivered at our hospital or outside and admitted for immediate post partum hemorrhage 74 cases were diagnosed by immediate post partum hemorrhage (2.5%)

In the present study, Demographic data of the studied populations: This table shows that the age of the whole women ranged between 17 and 45 years with mean of 29 years with mean BMI of 28.1, More than three fourth of them were of low social class (78.3%), This table shows that the age of the studied population ranged between 19 and 40 years with mean of 28 years with mean BMI of 26.7, One hundred percent of them were of low social class (100%). (**Table 2**).

Table (3) Percentage of postpartum hemorrhage among the studied population: This table shows that the percentage of postpartum hemorrhage among the studied population was found to be 2.5% (74 females).

(Table 4) This table shows that the majority of the studied women had no medical problems (75%), About 18.9% of them had anemia and 10.8% experienced previous postpartum hemorrhage, there was significant relation between PPH occurrence and past medical history, anemia and previous PPH.

Table (5) showed Causes of PPH of the studied population: This table shows that uterine atony was the commonest detected

cause of PPH followed by Obstetric Trauma (71.6% and 18.9% respectively).

Table (6) This table shows Mode and Place of delivery of delivery of the studied population: This table shows that vaginal delivery was significantly associated with postpartum hemorrhage occurrence, the tertiary care was the commonest place for delivery followed by private (94.6% and 4.1% respectively).

Table (7) Degree of shock and amount of blood transfusion among the studied population: This table show that 49 patients received 1_5 units blood (66.2%) while 8 patients received more than 5 units, 50 patients have moderate degree of shock (67.5%) while 7 patients have severe shock (9.4%).

Table 1. Clinical findings in obstetric hemorrhage

Blood volume loss	Blood pressure (systolic)	Symptoms and signs	Degree of shock
500-1000(10-15%)	Normal	Palpitations tachycardia, dizziness	Compensated
1000-1500 ml (15-25%)	Slight fall (80-100 mm hg)	Weakness, sweating	Mild
1500-2000 (25-35%)	Moderate fall (70-80 mm hg)	Restlessness, oliguria	Moderate
2000-3000 ml (35-50%)	Marked fall (50-70 mm hg)	Collapse, air hunger, anuria	Severe

Table 2. Demographic data of the studied populations

Variables	Total population admitted (n=3000)		Cases with 1ry PPH (n=74)			
Age:						
Mean \pm SD	29.94 \pm 5.47		28.81 \pm 4.01			
Range	17 – 45		19 – 40			
BMI:						
Mean \pm SD	28.14 \pm 5.52		26.78 \pm 1.71			
Range	21 – 33		23 – 30			
	No	%	No	%	χ^2	P value
Social class:						
Low:	2350	78.3	74	100	148	<0.001 (HS)
Moderate:	600	20	0	0		
High:	50	1.67	0	0		
Parity:						
Low parity(para 1_3):	2167	72.2	53	71.6	42.43	<0.001 (HS)
High parity(more than para 3):	833	27.7	21	28.3		

Table 3. Percentage of postpartum hemorrhage among the studied population:

Variable	Studied population (n=3000)	
	No	%
post-partum hemorrhage	74	2.5

Table 4. Risk factors for postpartum hemorrhage in the studied population:

Variables	Studied population (n=74)		χ^2	P value
	No	%		
Medical history:				
No:	56	75		
DM:	1	1.4	109.4	<0.001 (HS)
DVT:	1	1.4		
PIH:	16	21.6		
Placenta previa:	21	28.4	28.4	0.01 (S)
Accidental hemorrhage:	5	6.8	55.35	<0.001
Twins:	5	6.8	55.35	<0.001 (HS)
Polyhydramnios:	4	5.4	58.86	<0.001 (HS)
Anemia:	14	18.9	28.59	0.001 (S)
Previous history of PPH:	8	10.8	45.45	<0.001 (HS)
Fibroid:	2	2.7	66.21	<0.001 (HS)

Table 5. Causes of PPH of the studied population:

Variables	Studied population (n=74)		χ^2	P value
	No	%		
Obstetric Trauma				
Rupture uterus:	1			
Cervical tears:	3	18.9	28.59	0.001 (S)
Vagina tears:	4			
Perineal tears:	6			
Uterine atony:	53	71.6	13.83	<0.001 (HS)
Retained placenta:	2	2.7	66.21	<0.001 (HS)
Bleeding disorders:	1	1.3	70.05	<0.001 (HS)
Idiopathic :	4	5.4	58.86	<0.001 (HS)

Table 6. Mode and Place of delivery of delivery of the studied population:

Variable	Studied population (n=74)		χ^2	P value
	No	%		
Mode of delivery:				
Cesarean section:	22	29.7		
vaginal delivery:	52	70.3	12.16	0.04 (S)
At home:	2	2.7		
Private:	3	4.1		
Tertiary care:	68	91.9		
General hospital:	1	1.4		

Table 7. Degree of shock and amount of blood transfusion among the studied population:

Variables	Studied population (n=74)	
	No	%
Blood transfusion:		
No:	17	22.9
1-5 units:	49	66.2
More than five units:	8	10.8
Degree of shock:		
Mild:	17	22.9
Moderate:	50	67.5
Severe:	7	9.4

DISCUSSION

Postpartum hemorrhage is often defined as the loss of more than 1,000 ml of blood within the first 24 hours following childbirth.

Postpartum hemorrhage is one of the top five causes of maternal death in both developed and developing countries, during PPH, blood loss may become uncontrollable and life-threatening [7].

Concerning age in our cases the incidence of PPH varies widely, with age 20-30 years, the mean age was 28 years old and almost all cases were of low socioeconomic,

In Kramer et al. [10] study Significant risk factors for PPH included maternal age ≥ 35 years this may be due to increased number of elderly women in this study.

As regard BMI mean BMI 26.7 in our cases, in Blomberg et al. [11] The risk of atonic uterine hemorrhage increased rapidly with increasing BMI, There was an increased risk for postpartum hemorrhage for women with a BMI of 40 or higher (5.2%) after normal delivery this may be due to the routine use of heparin like drugs in obese women in Blomberg et al. [11] study .

In this work we found that there is significant relation between low parity and PPH as PPH was higher among low parity. In the study done by Alsammani et al. [12] reported similar results, in contrast Selo-Ojeme et al. [13] found that neither primigravidity nor grand multiparity were significant risk factors for PPH in his group. This may be explained by

lack of awareness, while in Selo-Ojeme et al. [13] study a departmental policy were commenced where by all grand multiparous women were attended in labour by the most senior departmental staff on labour ward duties, the reduced incidence of PPH among grand multipara in the study may be a reflection of the high degree of success and proper ANC plans in this policy.

In our study the incidence of PPH was 2.5%, this is lower than the incidence in the study of Ononge et al. [14] where the incidence of PPH was 9.0 %, and higher than the incidence in the study of ngwenya et al. [15] where the the incidence of PPH was 1.6%, this data is crucial as it focuses on which areas to target most so that global efforts aimed at reducing maternal deaths are fully utilized, We hypothesized that such variability may reflect, in part, differences in the quality of obstetrical care. For example, improper or inexperienced conduct of operative deliveries could result in obstetrical trauma leading to postpartum hemorrhage. Hospitals with high incidence of postpartum hemorrhage also reported high rates of obstetrical trauma.

The risk factors for PPH were pregnancy induced hypertension placenta previa twins, anemia, accidental hemorrhage and previous history of PPH

As regarding to placenta previa and or accreta in our research, there was significant association with PPH 28.4% (p value 0.01), in another study Mhyre et al. [16] including over

690,000 deliveries, abnormal placentation (placenta accreta or previa) was among risk factors associated with the highest odds for predicting the need for massive transfusion during hospitalization for delivery 14.7-23.3%

Regarding pregnancy induced hypertension in our study there was highly significant association with PPH 21.6% (p value <0.001) in the study of ngwenya et al. [15] There was significant relation between PPH occurrence and pregnancy induced hypertension 33.3% this agree with our study.

Concerning accidental hemorrhage in this study, there was significant relation between PPH occurrence and accidental hemorrhage 6.8% in the study done by ngwenya et al. [15] There was significant relation between PPH occurrence and accidental hemorrhage 8.8% and this agree with our study .

About Polyhydramnios in our study about 5.4% of cases who developed primary PPH had polyhydramnios, in contrast in the study done by Sheiner et al. [17] show the rate of hydramnios among cases with PPH to be 12% this may be due to the proper ANC plans and the more cases of polyhydramnios in the other study.

Regarding history of previous PPH, In our study about 10.8% of women with primary PPH had history of previous PPH, in agreement with the preceding studies Hall et al. [18] & Lennox et al. [19] There was significant relation between PPH occurrence and history of previous PPH, While Selo-Ojeme et al. [13] results indicate no relation between them, this explained by low number of cases with previous PPH in this study.

Relating to anemia, in this study there was significant relation with PPH (p <0.001) (18.9%) , in the study done by Kavle et al. [20] there was a strong association between moderate-to-severe anaemia at 28 weeks gestation (on average) and greater severity of blood loss at delivery and postpartum

About multiple pregnancy in this study, there was high significant relation between PPH occurrence and multiple pregnancy 6.8% (p

value <0.001), This is consistent with previous studies that report multiple pregnancy being associated with PPH Kramer et al. [10]

As regarding to causes of PPH, In relation to uterine atony, The most frequent cause of obstetrical hemorrhage is failure of the uterus to contract sufficiently after delivery and to arrest bleeding from vessels at the placental implantation site That said, some bleeding is inevitable during third stage labor as the placenta begins to separate. Blood from the implantation site may escape into the vagina immediately the Duncan mechanism of placental separation, or it remains concealed behind the placenta and membranes until the placenta is delivered the Schultze mechanism, the commonest detected cause of PPH in our study uterine atony followed by obstetric trauma (71.6% and 18.9% respectively),

Uterine atony is the primary direct cause of maternal morbidity globally, the active management of the third stage of labor with uterotonic reduces the risk of postpartum hemorrhage Adnan et al. [21] Oxytocin and ergometrine are the drugs widely used for this purpose. At this maternity unit, the third stage of labor is actively managed with oxytocin as the main uterotonic agent.

All the cases of primary PPH diagnosed during the study period received additional uterotonic doses as treatment for PPH. Currently, the use of oral misoprostol has been associated with significant decreases in rates of acute cases of PPH and mean blood loss van Stralen et al. [22] Misoprostol has been found to be an effective therapy for primary PPH and can be used after exposure to uterotonic agents, In the study done by ngwenya et al. [15] results show that Uterine atony was the most common cause of postpartum hemorrhage followed by obstetric trauma, In many women, uterine atony can at least be anticipated well , however, up to half of women who had atony after cesarean delivery were found to have no risk factors Silver et al. [23] Thus, the ability to identify which individual woman will experience atony is limited

Regarding obstetric trauma in our study 18.9% of cases had obstetric trauma as the main cause of PPH in the study done by ngwenya et al. [15] found that uterine atony was the most common cause of postpartum hemorrhage (82.4%) followed by obstetric trauma (13.5%) and this agree with our results.

Concerning retained placental tissues in our results 2.7% of cases of PPH had retained placenta and 39.1% had remnant of products of conception, in the study done by ngwenya et al. [15] found that 2.7% of cases of PPH had retained placental tissues as a cause of PPH.

Concerning bleeding disorders in that study 1.3% of cases of PPH was the cause bleeding disorders in the study done by ngwenya et al. [15] found that 1.4% of cases of PPH had bleeding disorders as a cause of PPH and this the same as in our results.

concerning uterine inversion, this is a rare but important cause of PPH and shock. This typically occurs secondary to strong traction on the cord before placental separation. The bleeding is probably because the uterus obviously cannot contract and compress the blood vessels. Shock is often disproportionate to the observed amount of blood loss .Nonetheless, this cause of PPH, if not recognized and treated appropriately, can become life-threatening

In our study 5.4% of cases of primary PPH the cause was unknown.

Concerning mode of delivery, in this study normal vaginal delivery was significantly associated with postpartum hemorrhage occurrence 70.3% in contrast to the study done by Ononge et al. [14] results show that delivery by cesarean section was associated with increased risk of PPH, also previous studies report cesarean births being associated with increased risk of PPH. [24],[25],[10]

However, few studies report a protective effect of cesarean section against PPH when compared to vaginal births Liu et al. [26] The lower rates of PPH in cesarean section than in vaginal birth are in studies that included participants not in labor with some of the cesarean sections probably being done late in

advanced stages of labour. There is increased risk of severe PPH when cesarean sections are performed when the cervical dilatation is more than 9 cm or in second stage of labor, Cesarean section also increases risk of uterine atony, a leading cause of PPH. [27] Because women undergoing cesarean section are at increased risk of PPH, health units performing them should have blood bank capacity to respond to a need for blood transfusion when required

Concerning Blood loss and transfusion in that study about 77% of cases of PPH received blood, in the study done by Shakur et al. [28] In a trial including over 20,000 women worldwide with PPH 54 % received a blood transfusion the high incidence of blood transfusion in our study may be due to the over expectations of blood loss and poor socioeconomic status of our patients as regard anemia, malnutrition, and lack of ANC plan programs .

By comparison, the rate of transfusion in the overall obstetric population of the United States is 4 to 7 per 1000 deliveries [5] and the frequency of transfusion in PPH deliveries was 16 percent in 2012-2013 [5]. Risks of transfusion include infection, electrolyte abnormalities, allergic reactions, alloimmunization, and volume overload

Concerning maternal outcome in our study three women needed hysterectomy (4%) two cases experienced DIC, In the study done by Shakur et al. [28] results show that 3.5% of women underwent peripartum hysterectomy because of PPH, also in the study done by Marshall et al. [5], in the United States, results show that 2.5% of women with PPH underwent hysterectomy in 2012-2013.

In our results one case died 1.3% in the study done by Shakur et al [29] maternal mortality after PPH averages approximately 2 %, with wide variations worldwide depending on both the overall health of pregnant women in the population and the resources for treatment of PPH.

Death rates vary from 0.6 percent in the United Kingdom to 20 percent in parts of Africa, and from 1 in 100,000 deliveries in the

United Kingdom versus 1 in 1000 deliveries in parts of the developing world. Women who are anemic at delivery due to poor nutrition or malaria are particularly vulnerable to severe sequelae of PPH Shakur et al. ^[29]

CONCLUSION

From our study we concluded that the percentage of primary PPH was found to be 2.5%, 90% of cases delivered at our hospital, the most common risk factors for PPH are placenta previa 28.4%, PIH 21.6%, Anemia 18.9%, the most common causes of PPH are uterine atony 71.6% , obstetric trauma 18.9%, vaginal delivery was significantly associated with PPH, as regard to blood transfusion 66% of cases received blood transfusion with 10% received more than 5 units, Morbidity recorded in this study only 3cases needed hysterectomy, 2 cases had DIC one case died.

Conflict of Interest: Nothing to declare.

Financial Disclosures: Nothing to declare.

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