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FREQUENCY OF MATERNAL MORBIDITY AND MORTALITY IN WOMEN WITH PRIMARY POSTPARTUM HEMORRHAGE

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Abstract

Postpartum hemorrhage is a leading cause of severe maternal morbidity and mortality in both developed and developing countries. We aimed to determine the frequency of maternal morbidity and mortality in women with primary postpartum hemorrhage. This descriptive case study was conducted at Department of Obstetrics & Gynecology, Allied Hospital, Faisalabad, from 15th September 2018 to 14th March 2019. A total of 241 women with PPH, having the age of 18-40 years, and gestational age of 37- 41 weeks were recruited. Patients were evaluated for the presence of sepsis, disseminated intravascular coagulation, acute renal failure, anaemia, and acute respiratory distress syndrome. In this study mean age was detected as 28.96 ± 4.11 years. Majority of the patients 146 (60.58%) were between 18 to 30 years of age. Mean gestational age was 38.87 ± 1.32 weeks. Mean parity was 3.10 ± 0.85 and mean BMI was 28.54 ± 2.54 kg/m2. Sepsis was found in 25 patients (10.37%), disseminated intravascular coagulation in 16 (6.64%), acute renal failure in 21 (8.71%), anaemia in 201 patients (83.40%), acute respiratory distress syndrome in 13 (5.39%) and mortality in 44 (18.26%) patients. This study indicates that frequency of maternal morbidity and mortality in women with primary postpartum hemorrhage is quite high. This necessitates early identification of high-risk pregnancies and provision of urgent, skilled, and multidisciplinary intensive care.

Keywords: *Maternal morbidity, Mortality, Primary postpartum hemorrhage (PPH)*

INTRODUCTION

Postpartum hemorrhage (PPH) is one of the important reasons of maternal mortality and morbidity worldwide that accounts for 26-30% of all maternal deaths. It complicates up to 18% of all deliveries and 6% of cesarean deliveries and may be a cause of hysterectomy in an avoidable condition. Maternal mortality in PPH accounts for 13.6% in developing countries whereas 4% in developed nations (2). Postpartum hemorrhage occurs when the total amount blood loss is more than 1000 ml, irrespective of whether it's a vaginal delivery or a Cesarian section, as the loss of up to one liter of blood is tolerated by a healthy pregnant woman importantly due to physiologically increased plasma volume and number of RBCs in the course of pregnancy (3, 4).

PPH is a significant contributor for both maternal morbidity and mortality around the globe, as more than 5 million women die annually due to a cause related to childbirth, and among them more than 90% of these deaths happens in the developing world including Pakistan (3,4). It has significantly high

maternal mortality rates which is 260 per 100,000 live births (5). PPH complicates around 5% of deliveries and is cause of more than 150,000 deaths annually. There are multiple risk factors for PPH that includes multiparous women, pregnancy with advanced maternal age, with distended uterus, in obese women, with induced or prolonged labor or with placenta previa. PPH is one of the obstetric emergencies that requires prompt diagnosis with effective management to prevent maternal mortality. In PPH, the reason of death is uterine atony in most of the cases whereas genital tract trauma, coagulopathy and Retained Product of Conception are other important factors. (5-7).

World Health Organization (WHO) defines the postpartum hemorrhage as "as blood loss, exceeding 500 ml from genital tract, after delivery of baby" (8). Postpartum hemorrhage is further classified in to two types depending upon the onset after delivery; primary PPH when hemorrhage occurs within 24 hours of delivery while secondary PPH when it occurs after 24 hours up to 6 weeks after delivery (10). It is leading cause of death in Pakistan and it is estimated that more than 25,000 women die to PPH every year (9). Approximately 14 million women suffer primary postpartum hemorrhage annually and at least 128,000 of these women bleed to death (11). Most of the reported deaths are within four hours of the delivery, and they are due to the result of the problems in the third stage of labor (12). Although previously national as well as international studies are available on primary postpartum hemorrhage but there is a variation in international and local studies. Therefore, we aimed to determine the frequency of maternal morbidity and mortality in women with primary postpartum hemorrhage.

Operational Definitions: (i) Primary postpartum hemorrhage: Blood loss of more than 500 ml from genital tract following normal vaginal delivery and 1000 ml after cesarean section is labeled as Postpartum haemorrhage (8) and estimated by calculating blood and blood clots in suction bottle, kidney tray and difference of weight of sponge (pre-operative and post-operative) by using formula 1g-1ml, (ii) Maternal morbidity: Presence of anyone of the following is taken as positive and followed for 72 hours after operation. These factors are sepsis, acute renal failure (ARF), disseminated intravascular coagulation (DIC), acute respiratory distress syndrome (ARDS) and anemia and (iii) Maternal mortality: Death within the first 72 hours of operation is taken as positive.

MATERIAL AND METHODS

STUDY DESIGN AND SAMPLE SELECTION

In this descriptive case study, 241 women with primary postpartum hemorrhage were enrolled from 15th September 2018 to 14th March 2019 by non-probability, consecutive sample technique at Department of Obstetrics & Gynecology, Allied Hospital, Faisalabad. Sample size of 241 cases has been calculated by using WHO-calculator for sample-size estimation with 95% of confidence level and 3% margin of error. All women with primary postpartum hemorrhage (as per-operational definition), having the age of 18-40 years, gestational age of 37- 41 weeks as assessed on LMP, parity 1-5 and both booked and un-booked were recruited in this study. Twin and multiple pregnancy (assessed on ultrasonography), women with Diabetes mellitus, hypertension, bleeding disorder (INR >1.5), chronic renal failure, chronic liver disease, known cardiac disease (assessed on history and medical record) were excluded from this study.

DATA COLLECTION

A total of 241 women admitted to Department of Obstetrics & Gynecology, Allied Hospital, Faisalabad, were selected based on the inclusion criteria. Informed consent was taken from each patient before inclusion in the study. Patients were evaluated for the presence of any morbidity. All patients were followed, and mortality was noted. All data including demographic data (age, gestational age, parity, GDM, PIH, mode of delivery, booking status, referred, maternal morbidity and mortality) was recorded on a specially designed proforma.

STATISTICAL ANALYSIS

The collected information was analyzed by computer software SPSS version 20.0. Mean and standard deviation were calculated for age, gestational age, and parity. Frequency and percentage were presented for GDM (yes/no), PIH (yes/no), Mode of delivery (vaginal/cesarean), booking status (booked/un-booked), referred (yes/no), maternal morbidity, acute respiratory distress syndrome, (ARDS), anaemia, disseminated intravascular coagulation (DIC), acute renal failure (ARF) and sepsis) and mortality (yes/no). Effect modifiers like age, gestational age, parity, GDM (yes/no), PIH (yes/no), Mode of delivery (vaginal/cesarean), booking status (booked/un-booked) and referred (yes/no) were controlled through stratification. Post-stratification chi square was applied to see their effects on maternal morbidity and mortality p-value ≤ 0.05 was considered as significant: * ($P \leq .05$).

RESULTS

In this study, the age range of the patients was from 18 to 40 years with mean age of 28.96 ± 4.11 years. Majority of the patients 146 (60.58%) were between 18 to 30 years of age as shown in Table II. Mean gestational age was 38.87 ± 1.32 weeks, mean parity was 3.10 ± 0.85 and mean BMI was 28.54 ± 2.54 kg/m2. In primary postpartum hemorrhage (PPH), frequency of maternal morbidity and mortality are demonstrated in Table I. Stratification data with respect to age, gestational age and parity are listed in Table II. 162 (67.2%) patients were booked, 79 (32.78) patients were un-booked and 162 (67.2%) were referred cases (Table III). In the anaemia group, 116 patients had BMI >27 kg/m2 and 85 patients with BMI ≤ 27 kg/m2 (Table III). 107 (44.4%) women were having gestational diabetes mellitus (GDM) and 46 (19.09%) women were suffering from Pregnancy induced hypertension (PIH) (Table IV). 127 (52.7%) patients underwent Cesarean section while remaining had normal vaginal delivery (Table IV).

Table I. Frequency of maternal morbidity and mortality in women with primary postpartum hemorrhage

Outcome	Frequency (%)	
	Yes	No
Sepsis	25 (10.37%)	216 (89.63%)
Disseminated intravascular coagulation (DIC)	16 (6.64%)	225 (93.36%)
Acute renal failure (ARF)	21 (8.71%)	220 (91.29%)
Anaemia	201 (83.40%)	40 (16.60%)
Acute respiratory distress syndrome (ARDS)	13 (5.39%)	228 (94.61%)
Mortality	44 (18.26%)	197 (81.74%)

Table II. Stratification of the outcome with respect to age, gestational age, parity

Parameters		Age (Years)			Gestational Age (Weeks)			Parity		
		18-30	31-40	P-value	37-39	40-41	P-value	1-3	4-5	P-value
Number of Patients (n)		146	95		155	86		168	72	
Sepsis	Yes	13	12	0.354	17	08	0.685	14	11	0.107
	No	133	83		138	78		154	61	
DIC	Yes	10	06	0.871	09	07	0.486	10	06	0.498
	No	136	89		146	79		158	66	
ARF	Yes	13	08	0.083	14	07	0.814	15	06	0.881
	No	133	87		141	79		153	66	
Anaemia	Yes	119	82	0.897	127	74	0.411	141	59	0.705
	No	27	13		28	12		27	13	
ARDS	Yes	09	04	0.512	09	04	0.704	08	05	0.494
	No	137	91		146	82		160	67	
Mortality	Yes	27	18	0.930	30	15	0.715	29	16	0.367
	No	119	77		125	71		139	56	

Table III. Stratification of the outcome with respect to BMI, booking status, referred cases (yes/no)

Parameters		BMI			Booking Status			Referred cases		
		≤27 kg/m²	>27 kg/m²	P-value	Booked	Un-booked	P-value	Yes	No	P-value
Number of Patients (n)		95	146		162	79		162		79
Sepsis	Yes	07	18	0.217	17	08	0.930	17	08	0.930
	No	88	128		145	71		145	71	
DIC	Yes	09	07	0.154	13	03	0.216	13	03	0.216
	No	86	139		149	76		149	76	
ARF	Yes	09	12	0.736	10	11	0.045*	10	11	0.045*
	No	86	134		152	68		152	68	
Anaemia	Yes	85	116	0.041*	135	66	0.967	135	66	0.967
	No	10	30		27	13		27	13	
ARDS	Yes	04	09	0.512	08	05	0.654	08	05	0.654
	No	91	137		154	74		154	74	
Mortality	Yes	20	25	0.444	32	13	0.537	32	13	0.537
	No	75	121		130	66		130	66	

Table IV. Stratification of the outcome with respect to GDM, PIH, mode of delivery

Parameters		GDM			PIH			Mode of Delivery		
		Yes	No	P-value	Yes	No	P-value			P-value
Number of Patients (n)		107	134		46	195		127	114	
Sepsis	Yes	09	16	0.372	04	21	0.678	12	13	0.619
	No	98	118		42	174		115	101	
DIC	Yes	04	12	0.106	01	15	0.176	03	13	0.005*
	No	103	122		45	180		124	101	
ARF	Yes	13	08	0.091	03	18	0.558	15	06	0.072
	No	94	126		43	177		112	108	
Anaemia	Yes	90	111	0.223	37	164	0.548	105	96	0.749
	No	17	23		09	31		22	18	
ARDS	Yes	06	07	0.896	00	13	0.072	07	06	0.932
	No	101	127		46	182		120	108	
Mortality	Yes	18	27	0.510	04	41	0.054	24	21	0.924
	No	89	107		42	154		103	93	

DISCUSSION

Primary PPH is the most frequent cause of maternal mortality (19%) and morbidity in the world, accounting for 8% and 19.7% of maternal deaths in developed and developing countries, respectively (13). In Colombia, PPH accounts for 23% of all maternal deaths (14). Prevention and treatment of primary PPH is critical in diminishing maternal mortality (15). Causes of obstetric bleeding after childbirth have been divided into four main groups as follows: tone, trauma, tissue, and thrombin, the most frequent being uterine atony at 70% (16-19). Delay in the identification of severe PPH is the main cause of maternal morbidity and mortality secondary to hemorrhage (20-21).

In this study, sepsis was found in 25 (10.37%), disseminated intravascular coagulation in 16 (6.64%) patients, acute renal failure in 21 (8.71%), anemia in 201 (83.40%), acute respiratory distress syndrome in 13 (5.39%) and mortality in 44 (18.26%) patients (Table I). In another study, maternal morbidity was detected in

62% of cases; the major morbidities were DIC in 6% cases, acute renal failure in 6% patients and shock in 9.9% cases and anaemia in 90.1% cases and no mortality (22). In another study, mortality was seen in 21.73% and morbidity in 78.26% (8.95% accounted for sepsis, 8.52% accounted for acute renal failure, 4.93% accounted for ARDS) (23).

The association of PPH with increased maternal mortality is well established and PPH contributes disproportionately to severe maternal morbidity (24-25). Maternal morbidity and mortality are significant not only to individual patients and clinicians, but also those involved in health policy research and development. Authors have advocated for population based observational studies to strengthen the available epidemiologic evidence regarding PPH (26).

Postpartum hemorrhage contributes significantly to severe maternal morbidity. A Canadian study showed that postpartum hemorrhage caused over 50% of severe maternal morbidity (27). Hemorrhage is the major cause of severe maternal morbidity in almost all 'near miss' audits in both developed and developing countries (28). For every maternal death there are around 80 instances of 'near-miss' (29).

In severe cases, hemorrhagic shock may lead to dilutional coagulopathy (where a patient's blood is diluted by transfused blood products which may contain insufficient coagulants), cardiac dysfunction, other organ impairment, anterior pituitary ischemia with delay or failure of lactation, and death (30,31). Patients may undergo hysterectomy to stop the bleeding. The onset of postpartum hemorrhage is often unpredictable and sudden and may have catastrophic results (32). This makes prevention difficult, and the focus is often on prevention, recognition and management of the condition, and optimization of the women's hemoglobin antenatally.

CONCLUSION

In conclusion, the findings of this study indicate that frequency of maternal morbidity and mortality in women with primary postpartum hemorrhage is quite high. Therefore, we recommend that these patients should be monitored and managed efficiently in order to reduce maternal morbidity and mortality due to severe postpartum hemorrhage.

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