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Blood transfusion audit in obstetric patients at tertiary care hospital

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Abstract
Blood transfusion is an essential component of emergency obstetric care and appropriate blood transfusion significantly reduces maternal mortality. Availability of blood transfusion in developing countries depends upon infrastructure, economics, social and religious taboos and practices. A retrospective observational analysis of 3 months duration done to study indications of blood transfusion, use of various blood components and demographic variation in patient requiring blood transfusion. There is need to improve blood transfusion practices by using alternative measures to reduce the need of blood transfusion which should be practiced more aggressively. There should be periodic assessment of blood transfusion practices to identify loop holes as early as possible and correct it.

Keywords: Blood transfusion, Blood components, Indications of blood transfusion

Introduction
Blood and blood product transfusion is a common lifesaving procedure undertaken at various health facilities across the globe. However this routine procedure comes with its own set of immediate and long-term complication risks. According to estimates, around 85 million units of blood are utilized worldwide annually of which 16 million units are consumed by south-east Asia including India [1, 2]. First ever blood transfusion in medical history was done by James Blundell, a British Obstetrician in 1818 in a patient with postpartum haemorrhage [3]. Since then Obstetric patients comprise a major part of recipients of blood transfusion worldwide.
Though blood transfusions have revolutionized patient management with rapidity and increasing safety, the unmet need of blood and products is ever growing. Apart from striking the balance between risks and benefits of transfusion, healthcare facilities also have to formulate policies and manage resources for rational use of blood and products. This audit-study was thus carried out to understand the various epidemiological factors, patients' profiles and clinical situations requiring blood transfusion in obstetric patients at a tertiary care centre in South Gujarat, India. Also this study would be further helpful in formulating departmental policy for transfusion of blood and blood products.

Materials and Methods
This is a retrospective observational study carried out over a span of three months (1st June 2020– 31st August 2020) and includes 233 Obstetric patients managed with transfusions at a tertiary care hospital. Analysis of various epidemiological parameters, clinical situations and indication of blood and blood component transfusion was done from the hospital records after approval from the institutional ethics committee.

Results
During the study period, there were 4131 obstetric admissions. Total no. of deliveries during study period was 2416 including 798 cesarean sections. There were 169 abortions including Medical Termination of Pregnancy. Total 233 (5.64%) patients required blood and blood component transfusion.
233 obstetric patients received total 489 transfusions including blood and blood products like fresh frozen plasma and platelet concentrate. Patient profile including age of patient, area of residence (urban/rural), socioeconomic status, educational status, obstetric history, number of antenatal visits, whether registered or referred and presenting complaints were studied in details. Further, analysis of indications, timing, nature of transfusion and associated comorbidity and final outcome was done. There were no adverse transfusion reactions noted during our study period. More than 70% of our patients belonged to younger age group with 12% of them being teenagers. Thus the opportunity of improving adolescent health and correcting nutritional anaemia in young women should never be missed.

Table 1: Demographic characteristics of patients (N=233) enrolled in the study

	n (percentage) N=233	
Age (completed years)		
≤19	28(12.07)	Mean=23.8
20-25	142(60.94)	Median=23
26-30	51(21.88)	Mode=25
31-35	12(05.15)	Range: 15-34
Age (Mean±SD)	23.8±3.96	
Address/Locality		
Rural	100(42.91)	
Urban	133(57.08)	
Education		
Illietrate	62(26.60)	
Primary school	117(50.21)	
Secondary school	53(22.74)	
Graduation	01(00.42)	
Socioeconomic status (mod. Kuppuswamyclassif.)		
Lower Middle class	14(06.00)	
Upper Lower	76(32.61)	
Lower	143(61.37)	
Blood Group		
A Rh positive Rh negative	50(21.45) 47 03	
B Rh positive Rh negative	88(37.76) 85 03	
O Rh positive Rh negative	69(29.61) 63 06	
AB Rh positive Rh negative	26(11.15) 26 00	

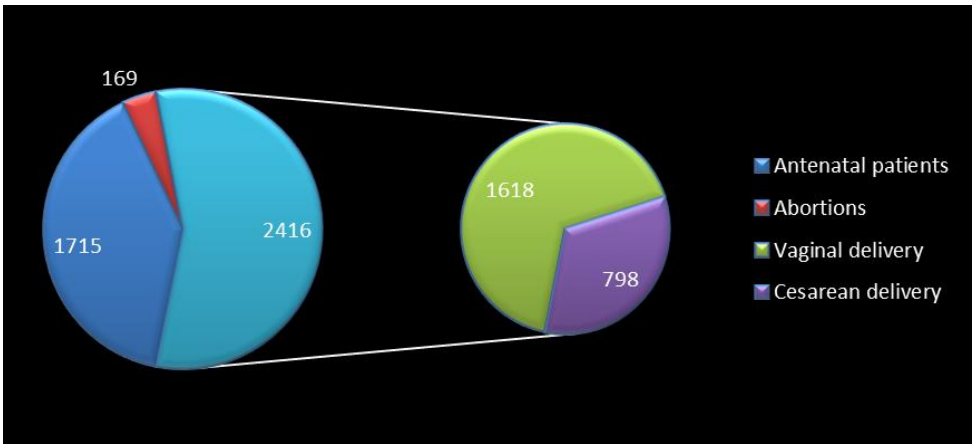

Diagram 1: General information about total obstetric admissions (4131) and total deliveries (2416) during study period at our hospital

As ours is a tertiary care centre located in a city, majority of our patients belonged to urban localities (57%) and very few of them were educated beyond primary schools (23%).

Ours being a government run hospital, 94% of our patients belonged to lower class families.

Table 2: Obstetric history and current pregnancy details of patients receiving blood transfusion

Obstetric History	**Primigarvida/ Nullipara**	**Primipara**	**Multipara (≥2)**	**Grand Multipara (≥5)**
n(%)	57 (24.46)	80 (34.33)	94 (40.34)	02(0.85)
Registration status	Registered at our	Unregistered	at our hospital	Referred from

	hospital	Emergency case	Referred case		
				Govt. set up	Private set up
n (%)	146 (62.66)	63 (27.03)	24 (10.3)	21(9.01)	03(1.28))
Gestataional Age at registration	No prior visit to health facility	First Trimester registration (upto 12 weeks)	Second Trimester registration (13-27 weeks)	Third Trimester registration (28-40 weeks)	
n (%)	36 (15.45)	27 (11.58)	105 (52.36)	65 (27.89)	
No. previous antenatal visits	No prior visits to health facility	Only 1 prior visit	2-4 antenatal visits	>4 antenatal visits	
n (%)	36 (15.45)	23 (9.87)	122 (52.36)	52 (22.31)	
ICMR category of patients presenting with anaemia (n=186, N=233)	Mild Anaemia (Hb: 10-10.9gm/dl)	Moderate Anaemia (Hb: 7-9.9gm/dl)	Severe Anaemia (Hb: 4-6.9gm/dl)	Very Severe Anaemia (Hb: <4gm/dl)	
n (%)	--	77 (33.04)	107 (45.92)	02 (0.85)	

Details of current pregnancy in the form of whether the patient is booked somewhere or not, in case of registered patients – no. of antenatal visits, gestational age at booking and place of referral in referred patients were noted. Majority of the patients either had no or inadequate antenatal visits. Most of them had started taking antenatal visit either in late second or third trimester. Also there is very less reliability of compliance to haematinics by antenatal women. Around 42% of our patients were multiparous, which is pointer towards poor nutrition status and unmet need of contraception.

Table 3: Details of timing and indication of blood and blood product transfusion

Timing of transfusion	**Antenatal**	**Intranatal**	**Postnatal**
n (%)	**98 (42.06)**	**46 (19.74)**	**89 (38.20)**
Indication of transfusion (N=233)			
Obstetric Haemorrhage (n=23)	Antepartum Haemorrhage	Postpartum Haemorrhage	Haemorrhage due to incomplete abortion
n (%)	14 (6.0)	09 (3.86)	10 (4.29)
Anaemia (n=186)	Nutritional Anaemia	Hemolytic	Anaemia
		Sickle cell disease	Thalassemia
n (%)	178 (76.39)	08 (3.43)	--
Hypertensive disorders of pregnancy (n=07)	Gestational Hypertension	Severe Pre-eclampsia	Eclampsia
n (%)	--	04 (1.71)	03 (1.28)
Others (n=07)	Sepsis	Pancytopenia	Intra-operative blood loss
n (%)	02 (0.85)	02 (0.85)	03 (1.28)

Out of 233 patients who received transfusion during the study period, 89 patients(38%) had Severe Anaemia at the time of presentation. 8 of our patients had Hemolytic Anaemia due to Sickle Cell disease. There were 14 cases of Antepartum Haemorrhage (Abruptio placentae, Placenta Previa and 1 case of Placenta Accreta) and 9 cases of Postpartum Haemorrhage.

In our study group, there are 7 cases of hypertensive disorders of pregnancy of which there are 04 cases of severe Preeclampsia and 03 cases of Eclampsia. Causes included in others were, 02 cases with Pancytopenia under evaluation, 02 cases of anaemia in case of sepsis and 03 cases with intraoperative blood loss in referred cases of obstructed labour.

27 cases underwent surgical interventions and required blood transfusion. Of which 15 cases were transfused either during or after LSCS.

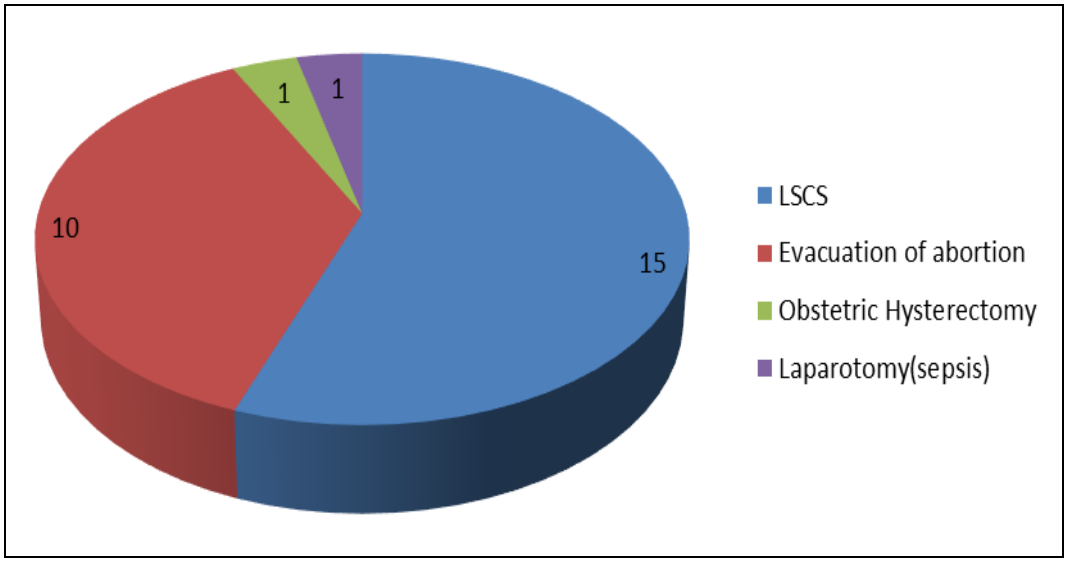

Diagram 2: Surgical interventions undertaken in patients enrolled in study (n=27)

Table 4: Details of blood and blood product transfusion

Blood Product	Packed cell volume (PCV)	Fresh Frozen Plasma (FFP)	Platelet concentrate (PC)
No. of patients n (%)	231 (99.14)	11 (4.72)	06 (2.57)
No. of units transfused			
1	119	--	--
2-4	106	07	03
>4	006	04	03
Multiple Products	PCV+FFP	PCV+PC	PCV+FFP+PC
No. of patients (n)	06	01	04

Out of 233 patients, 15 patients required four or more PCV transfusions. 11 patients required Fresh Frozen Plasma and 6 patients required Platelet concentrate in addition to packed cell volume. 4 cases required multiple transfusions with all three products.

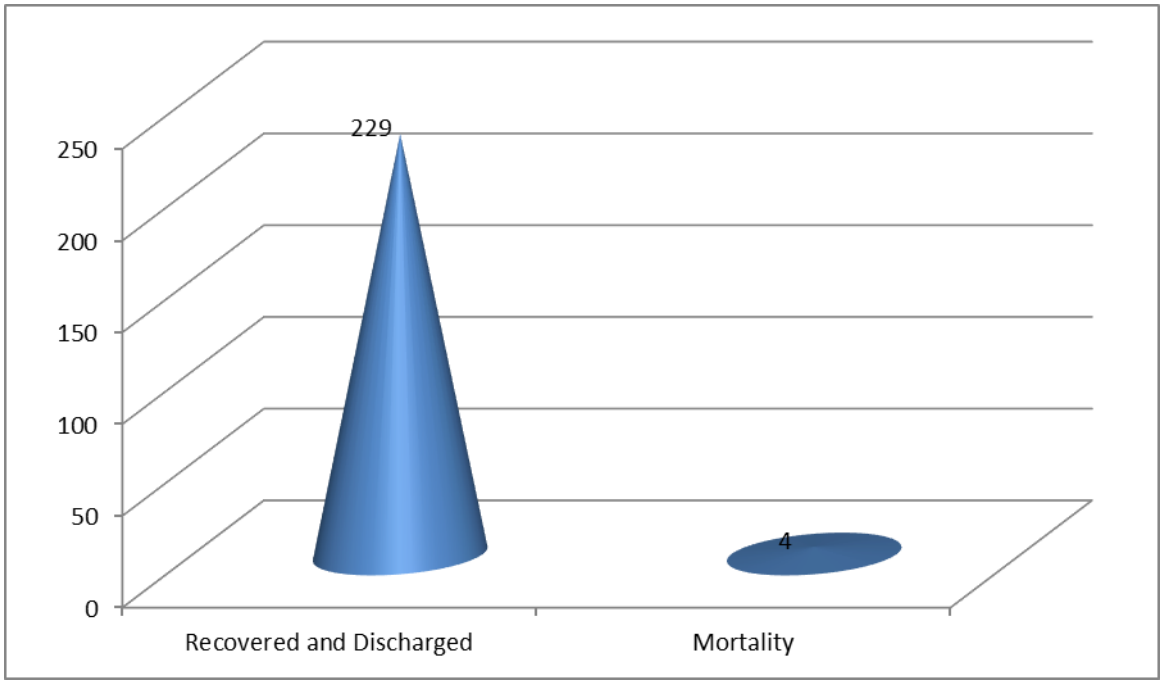

Diagram 3: Overall outcome of patients enrolled in our study (N=233)

Causes for mortality included cases of placenta previa with antepartum haemorrhage, septicaemia (two cases, including one with pancytopenia) and disseminated intravascular coagulopathy.

Discussion

Transfusion of blood and blood products is one of the most dependable interventions undertaken routinely in obstetrics. Indications in obstetric cases are distributed between anaemia complicating pregnancy, obstetric haemorrhage, postpartum correction of anaemia and intra-operative haemorrhage in Obstetric surgery.

Obstetric Haemorrhage is one of the leading causes of maternal mortality worldwide with incidence up to 30-40% in developing nations [4]. Assessment and correction of anaemia in pregnancy is challenging task due to altered physiology, associated comorbid conditions and higher rate of blood loss in case of antepartum and postpartum haemorrhage. Hence trauma based obstetric haemorrhage protocols should be used whenever indicated [5].

5-33% young girls of age group 15-24 years drop out of studies every year due to early marriage or pregnancy leading to negative social, economic and health effects [6].

In our study, 12% of our patients requiring blood transfusions were adolescents and 61% of them belonged to age group of 20-25 years. More than 75% of them were either illiterate or barely educated up to primary school and belonged to lower socioecominc classes. In a study by G.S. Toteja *et al*, 84.9% of pregnant women had Haemoglobin level less than 11gm/dl, 13.1% had severe anaemia (Hb<7gm/dl) and 60% had moderate anaemia (Hb between 7-10 gm/dl). Prevalence of moderate anaemia amongst adolescent girls was 50-60% [7]. Thus, there is a need to address and correct anaemia due to nutritional, infectious and inflammatory causes before pregnancy or as early in pregnancy as possible.

Correlation between High parity and short inter-delivery interval and anaemia in pregnancy is well known.[8] In our study also 41% women multipara with two or more births. Also 62% of them were registered antenatal patients who had been provided with iron and folic acid supplementation. Despite this measure, there is anaemia mainly due to noncompliance to oral haematinics. Options like building up prenatal Haemoglobin levels and use of parenteral iron on a routine basis should be considered.

In cases of severe anaemia often blood transfusion is the only feasible intervention left with treating physicians. But the dilemma about transfusion arises when Haemoglobin levels are between 6 to 10 gm/dl. In actively bleeding patients or in cases of previous haemorrhage or associated co-morbid conditions, transfusion should be done to keep target Hb level above 7gm/dl

[9].

In a study by Patel *et al.* at a high risk maternity centre in New Jersey, it was found that 2.74% of obstetric patients delivering there over a span of three years required blood transfusions. 6% of them had pre-delivery anaemia, 32% of them had acute blood loss and 61% of them had symptomatic postpartum anaemia [10].

In our study 5.52-% (233 out of 4214) of obstetric patients required blood transfusions. 6.5% patients had antepartum haemorrhage, 4.3% had postpartum haemorrhage and 3.43% had bleeding in early pregnancy.

In our study there were no cases of adverse transfusion reactions noted and a mortality rate of 1.71% was observed.

Conclusion

Anaemia in obstetric patients is more often if not always life threatening. Transfusion of blood and blood products comes with a risk: benefit ratio. Interventions thus, should be individualized, strategized and should be rational. Whenever required treating surgeon should seek help from Intensivist and Haematologist. Local ownership and strengthening of blood bank framework is the need of the hour especially in developing countries. Refined and updated surgical skills help in reducing blood loss in obstetric patients. Periodic assessment and auditing of current practices in transfusion of blood and blood products is strongly recommended.

Conflict of interest: None
Disclaimer: Nil

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