

ORIGINAL RESEARCH

Transfusion practices in obstetric emergencies and its associated maternal outcome

¹Dr. Shri JananiR, ²Dr.PVairamala, ³Dr.SDivya, ⁴Dr.SVRThenmozhi, ⁵Padmanaban Srinivasan

^{1,3}Assistant Professor, Department of Obstetrics and Gynaecology, Govt. Medical College, Tiruvallur, Tamil Nadu, India

²Associate Professor, Institute of Obstetrics and Gynaecology, Madras Medical College, Chennai, Tamil Nadu, India

⁴Associate Professor, Department of Obstetrics and Gynaecology, Govt. Vellore Medical College, Vellore, Tamil Nadu, India

Corresponding Author

Dr.SVRThenmozhi

Associate Professor, Department of Obstetrics and Gynaecology, Govt. Vellore Medical College, Vellore, Tamil Nadu, India

Received: 12 March, 2023

Accepted: 18 April, 2023

ABSTRACT

Introduction: Blood transfusion practices is recognized as one of the essential component of comprehensive obstetric emergency care. It aids in reducing the maternal morbidity and mortality and also in promoting a healthier birthing experience for the expectant mother. In countries like India, efforts should be made to ensure early and easy availability of blood and blood products so as to decrease the incidence of maternal mortality. **Aim:** To describe the blood transfusion pattern in obstetric emergencies and maternal outcome. To assess the underlying obstetric risk factors which necessitate blood transfusion and to assess the ratio of the components used in obstetric emergencies. **Methodology:** This observational study was conducted for one year on 254 obstetric in-patients who were received in a state of emergency and who received a total of 2171 blood and blood products transfusion to alleviate imminent danger. The data collected were analysed for the red cell usage according to their diagnosis. Blood utilization indices calculated and their role in the reduction of maternal mortality and morbidity. **Results:** In this study, obstetric emergencies contributed to 26.1% of all transfusions. Most of the cases were in the 25-30 years 31.8% age group and were multigravida 61.7%. The most commonly encountered were Antepartum Haemorrhage-34.2% cases, Hypertensive disorders-20.4%, Post-partum Haemorrhage-17.7% and ectopic pregnancy-17.5%. Caesarean section was done in 49.6% of cases. The ratio of the components used were PRBC 30.7%, Platelets 18%, Fresh frozen plasma 41.9% and Cryoprecipitate 9.3%. A meagre 1% had transfusion reactions. The maternal mortality rate in the study is 12.9% and ratio is 259/1,00,000. The transfusion indices calculated are C/T ratio 1.01, T 95.6% and TI 1.8. **Conclusion:** The early and adequate use of blood and blood products shows significant decline in maternal morbidity and mortality. This important Millennium Development Goal can be attained with judicious use. The transfusion rate in the current study is 3.3: 1.9: 4.2: 1.

Key words: Blood transfusion, obstetric haemorrhage, RBC, post-partum haemorrhage, ectopic pregnancy, maternal mortality

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

INTRODUCTION

Pregnancy a physiological state can become pathological suddenly and unexpectedly. Blood transfusion serves as the backbone in alternating between life and death for an expectant mother during her time of an obstetric emergency. Thus, it is what makes it an essential component of a comprehensive emergency obstetric and newborn care (CEM/ONC) and is used as an effective element to manage maternal mortality¹.

As per WHO estimates and as per the recent data released in September 2020 obstetric haemorrhage remains the leading cause of maternal mortality accounting to about 27% of deaths annually¹ which is a preventable cause of mortality and needs addressal. Massive and life threatening haemorrhage occurs in about 3-5% of deliveries and amounts 0.1% of deliveries respectively and blood and blood products are required in about 0.3-1% of all deliveries¹.

LIFETIME RISK OF MATERNAL DEATH:It is the probability that a 15 year old girl will die from complications of pregnancy and childbirth over her lifetime. It takes into account both the maternal mortality ratio which is currently at 113/1,00,000 live births in 2020 in India & 60/1,00,000 in Tamil Nadu and the total fertility rate (average number of births per woman during her reproductive years under age specific fertility rates) which is at 2.2 births per woman in 2020 in India. The lifetime risk of maternal death ranges from 1 in 5400 in developed countries to 1 in 45 in developing countries according to UNICEF²data.

Blood is a scarce resource and without a substitute it is potentially dangerous owing to its immune and non-immune complications. The average requirement for a particular procedure is usually based on the subjective anticipation of blood loss rather than on evidence-based data leading to in judicial use³. Thus, Hemovigilance helps in minimizing unnecessary transfusions, conserves the blood components, reduces expenditure and makes blood products available in need of emergency⁴.

AIM AND OBJECTIVE

AIM

- To describe the blood transfusion pattern in obstetric emergencies andmaternal outcome.

OBJECTIVES

- **PRIMARY OBJECTIVE:** To assess the underlying obstetric risk factorswhich necessitate blood transfusion.
- **SECONDARY OBJECTIVE:**To assess the ratio of the components used inobstetric emergencies.

METHODOLOGY

STUDY OBSERVATION AND RESULTS

Table 1: Frequency distribution of age in years in the study population

S.No.	Age distribution	%
1.	<20 years	4.7
2.	20-25 years	28.7
3.	25-30 years	31.8
4.	30-35 years	27.9
5.	>35 years	9

Table 2: Frequency distribution of parity in the study population

S.No.	Parity	%
1.	Primigravida	39.3
2.	Second gravida	27.1
3.	Multi gravida	34.6

Table 3: Frequency distribution of Obstetric risk factor in the study population

S.No.	Risk factor	%
1.	Abruption	16.1
2.	Placenta previa/accreta	18.1
3.	HELLP	12.2
4.	Ectopic pregnancy	17.3
5.	PPH	17.7

This is an observational study including 254 patients who presented to the hospital with obstetric emergencies at any time during the course of her pregnancy and used their transfusion details from the blood forms 2171 transfusions used over a period of one year at Govt. Thanjavur Medical College. The mothers were followed up until discharge and notes were made about the morbidity and mortality associated, the most common causes requiring transfusions, the ratio of the components used for correction and reactions if any.

INCLUSION CRITERIA

All antepartum and postpartum mothers requiring emergent blood transfusions were included in the study.

EXCLUSION CRITERIA

Elective transfusions in antepartum and postpartum for anaemia correction were excluded from the study.

STUDY PROTOCOL

- After stablisation of the patient and obtaining her consent, a thorough history taking and physical examination is done to assess the underlying cause which lead to an obstetric emergency
- The transfusion request form for the patient is used to note the type and volume of blood component being used.
- The indication for the transfusion is also noted.
- In patients who underwent massive blood transfusions the ratio of the components used are noted.
- Transfusion reactions if any are duly noted from transfusion reaction form.

6.	Severe anaemia	6.2
7.	DIC	5.5
8.	Severe pre-eclampsia	3.1
9.	Rupture uterus	0.3
10.	Molar pregnancy	1.5
11.	Thrombocytopenia	1.5

Table 4: Frequency distribution of gestational age in weeks in the study population

S.No.	Gestational age	%
1.	<14 weeks	18.1
2.	14-27+6 weeks	1.5
3.	28-31+6 weeks	1.9
4.	32-36+6 weeks	32.6
5.	37-39+6 weeks	38.1
6.	>40 weeks	7.4

Table 5: Frequency distribution of Blood components in the study population

S.No.	Blood/component	%
1.	Whole blood/packed cell	30.7
2.	Platelets	18
3.	Fresh frozen plasma	41.9
4.	Cryoprecipitate	9.3

Table 6: Frequency distribution of Maternal outcome in the study population

S.No.	Maternal outcome	%
1.	No complications	79.9
2.	Morbidity	7
3.	Mortality	12.9

Table 7: Comparison of Risk factor and blood utilization in the current study

S. No.	Risk factor/blood component	Wb/PRBC		Platelets		FFP		Cryo-Precipitate		P Value
		N	%	N	%	N	%	N	%	
1.	Abruption	140	20.9	88	22.4	320	35.1	60	29.7	0.01
2.	Placenta previa/accreta	122	18.2	47	11.9	116	12.7	18	8.9	
3.	HELLP	87	13	142	36.2	210	23	48	23.7	
4.	Ectopic	79	11.8	10	2.5	26	2.8	8	3.9	
5.	PPH	102	15.2	20	5.1	82	9	20	9.9	
6.	Severe anaemia	55	8.2	8	2	12	1.3	0	0	
7.	DIC	72	10.7	86	21.9	162	17.8	80	39.6	
8.	Severe pre-eclampsia	20	2.9	16	4	44	4.8	4	1.9	
9.	Molar pregnancy	12	1.7	4	1	12	1.3	0	0	
10.	Rupture uterus	5	0.07	8	2	12	1.3	8	3.9	
11.	Thrombocytopenia	13	1.9	24	6.1	12	1.3	0	0	

Table 8: Comparison of Maternal outcome and risk factors in the current study

S. No.	Risk factor/maternal outcome	Alive with no complications		Alive with morbidity		Mortality		P Value
		N	%	N	%	N	%	
1.	Abruption	34	13.3	4	1.6	3	1.2	0.0001
2.	Placenta previa/accreta	39	15.3	6	2.4	1	0.4	
3.	HELLP	19	7.4	5	2	7	2	
4.	Ectopic	40	15.7	0	0	1	0.4	
5.	PPH	39	15.3	1	0.4	5	2	
6.	Severe anaemia	15	5.9	0	0	1	0.4	
7.	DIC	4	1.6	4	1.6	8	2.8	
8.	Severe pre-eclampsia	1	0.4	2	0.8	6	2.4	
9.	Molar pregnancy	4	1.6	0	0	0	0	
10.	Rupture uterus	1	0.4	0	0	0	0	
11.	Thrombocytopenia	4	1.6	0	0	0	0	

Table 9: Massive blood transfusion practice in the current study

S. No.	Massive blood transfusion	N	%	Whole blood/ PRBC	Platelets	Fresh frozen Plasma	Cryoprecipitate	Reactions
1.	Abruption	13	20.6					
	a. Alive	6		32	26	68	12	1
	b. Morbidity	5		23	34	52	22	3
	c. Mortality	2		10	16	32	16	0
2.	Placenta previa/accreta	7	11.1					
	a. Alive	4		20	14	36	6	1
	b. Morbidity	2		19	14	24	8	1
	c. Mortality	1		6	12	12	4	0
3.	HELLP	6	9.5					
	a. Alive	2		10	16	21	12	0
	b. Morbidity	3		14	24	32	8	3
	c. Mortality	1		4	4	4	0	0
4.	Ectopic	2	3.1					
	a. Alive	1		4	0	8	0	0
	b. Morbidity	0		0	0	0	0	0
	c. Mortality	1		6	10	16	8	0
5.	PPH	7	11.1					
	a. Alive	2		10	0	10	0	1
	b. Morbidity	2		9	8	12	4	1
	c. Mortality	3		14	12	36	16	0
6.	Severe anaemia	9	14.2					
	a. Alive	4		16	0	0	0	0
	b. Morbidity	4		17	10	26	0	0
	c. Mortality	1		4	4	4	0	0
7.	DIC	13	20.6					
	a. Alive	3		20	24	38	24	2
	b. Morbidity	5		23	34	52	26	3
	c. Mortality	5		23	20	56	28	0
8.	Severe-pre eclampsia	2	3.1					
	a. Alive	1		4	4	8	0	0
	b. Morbidity	0		0	0	0	0	0
	c. Mortality	1		5	4	8	4	0
9.	Molar pregnancy	1	1.5					
	a. Alive	1		4	0	8	0	0
	b. Morbidity	0		0	0	0	0	0
	c. Mortality	0		0	0	0	0	0
10.	Rupture uterus	1	1.5					
	a. Alive	0		0	0	0	0	0
	b. Morbidity	1		5	8	12	8	0
	c. Mortality	0		0	0	0	0	0
11.	Thrombocytopenia	2	3.1					
	a. Alive	2		8	8	4	0	0
	b. Morbidity	0		0	0	0	0	0
	c. Mortality	0		0	0	0	0	0

Table 10: Table showing Transfusion Indices of the current study

S.No.	Diagnosis	Transfused		C/T Ratio	%T	TI
		Patients	Units			
1.	Abruption	41	401	1.1	92%	1.8
2.	Placenta previa	46	342	1.02	95.8%	2.1
3.	Severe pre-eclampsia/HELLP	39	611	1	100%	1
4.	DIC	14	339	1	96%	2.4
5.	Ectopic pregnancy	44	206	1.1	96.6%	1.5
6.	Post-partumhaemorrhage	45	278	1.02	96%	1.7
7.	Molar pregnancy	4	32	1	97%	1.2

DISCUSSION

This study shows that Most of the cases presenting with emergencies the frequency was highest in the 25-30 age group constituting 31.8% of patients. Multigravida were most commonly affected involving 67.1% of the study population

The most common obstetric emergencies in the decreasing order of occurrence is as follows:

1. Antepartum haemorrhage (Abruptio placentae + placenta previa)-34.2%.

The observed ratio is 1:1:1.6:1.4 for abruption and is 2:1.3:1.3:1 for placenta previa.

2. Hypertensive disorders complicating pregnancy (Pre-eclampsia + HELLP + DIC) – 20.4%.

The observed ratio is 1:2.3:1.3:2.4.

3. Post-partum haemorrhage-17.7%.

The observed ratio is 3:1:1.7:1.7.

4. Ectopic pregnancy-17.5%.

The observed ratio is 4:1:1:1.5.

The complications and emergencies were most commonly noted in the late preterm and early term pregnancies accounting for 38.1% and 32.6%. The most common mode of termination of pregnancy was caesarean section-49.6%. The blood and blood component usage are WB/PRBC:PLT:FFP:CRYO are in the usage ratio of 3.3 : 1.9 : 4.2 : 1. The maternal outcome of the study population depended upon the age of the patient (lower the age, lower the incidence of mortality), the risk factor causing the emergency and thus providing an efficient modality of treatment and mode of delivery conducted.

CONCLUSION

Obstetric haemorrhage remains the major cause of mortality worldwide. The early and adequate use of blood and blood products shows significant decline in maternal morbidity and mortality. Reduction in maternal mortality being an important Millennium Development Goals (MDG) can be attained with the judicious use of blood components as per the protocol in obstetric emergencies. The transfusion rate in the current study is 3.3: 1.9 : 4.2 : 1 and has a Cross match/Transfusion ratio is 1.01% of Transfusion is 95.6% and the Transfusion index is 1.8 which is ideal which has greatly reduced the maternal morbidity and mortality

REFERENCES

1. Chhabra S, Namgyal A. Rationale use of blood and its components in obstetric-gynecological practice. *J Mahatma Gandhi Inst Med Sci.* 2014;19:93–9.
2. Padmasekar, Anju, and ShyamalaJothy. "Retrospective study of massive obstetric haemorrhage and its maternofetal outcomes in a tertiary care centre." *International Journal of*

Reproduction, Contraception, Obstetrics and Gynecology, vol. 6, no. 2, Feb. 2017, pp. 554+. *Gale OneFile: Health and Medicine.*

3. Bangal VB, Gavhane SP, Aher KH, Bhavsar DK, Verma PR, Gagare SD. Pattern of utilization of blood and blood components in obstetrics at tertiary care hospital. *Int J Reprod Contracept ObstetGynecol*2017;6:4671-6
4. Fazal S, Poornima AP. A study on transfusion practice in obstetric hemorrhage in a tertiary care center. *Glob J Transfus Med* 2018;3:41-5.
5. RCOG greentop guidelines no.47.
6. Patil V, Shetmahajan M. Massive transfusion and massive transfusion protocol. *Indian J Anaesth.* 2014 Sep;58(5):590-5. doi: 10.4103/0019-5049.144662. PMID: 25535421; PMCID: PMC4260305.