

A Retrospective Study on Transfusion of Blood Components in Obstetrics at a Tertiary Care Centre

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Abstract

Background: Blood transfusion is an indispensable implementation in obstetric emergencies in saving lives. Appropriate utilisation of blood components reduces the maternal mortality and morbidity. The objective of this study is to analyse the indications of transfusion of blood components in obstetrics in Government Mohan Kumaramangalam Medical College Hospital, Salem.

Methods: This is a retrospective study done on women who received blood transfusion in obstetrics from the month of December 2021 to November 2022 for a period of 1 year. Patients receiving blood transfusion for various reasons during the study period were included in the study and data collected.

Results: A total of 4532 patients received transfusion of blood components during the study period in the department of obstetrics. Out of which 3420 patients received transfusion for anaemia (75.4%), 828 cases for atonic PPH (18.2%), 122 cases for HELLP (2.6%), 18 cases for placental abruption (0.39%), 36 cases for traumatic PPH (0.79%), 24 cases for placenta previa (0.52%), 18 cases for thrombocytopenia (0.39%), 21 cases for ruptured ectopic pregnancy (0.46%), 4 cases for uterine rupture (0.08), 6 cases for haemolytic anaemia and DIC each (0.13%), 19 cases for incomplete abortion (0.41%), 5 cases for complete abortion (0.11%) and 5 cases for molar pregnancy (0.11%).

Conclusion: In this study, anaemia was found to be the highest contributor to blood transfusion in our tertiary care centre.

Keywords: Blood Transfusion, Anaemia, Obstetric Haemorrhage, Indication.

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Introduction

This study was conducted at Government Mohan Kumaramangalam Medical College Hospital (GMKMCH) which is a tertiary care centre in Salem district covering 14 taluks, with a population of 3,482,056 as per 2021 censuses of India, of which the female population is about 1,700,485 with a sex ratio of 954 per 1000 male.

Blood transfusion is an indispensable implementation in obstetric emergencies in saving lives. Increased maternal mortality is mainly affiliated to preventable causes that require comprehensive emergency obstetric care such as PPH, preeclampsia, illegal abortions and sepsis. Blood transfusion facilities made available through

comprehensive emergency obstetric care in India has shown to reduce maternal mortality. The decision to transfuse blood components is based on the appraisal of the clinical condition and the individual needs of the patient also and not merely on haematological values. An efficient and a dynamic functioning of the blood bank becomes one of the key components in managing obstetrics haemorrhages especially in a high volume centre like ours. Blood transfusion should be done rationally as it challenges the immune system which has already been altered in pregnancy.

Blood transfusion guidelines should be followed and updated regularly according to the local available facilities for appropriate utilisation of the blood components. The guidelines are intended to amplify the standardised transfusion protocol, to cut back on the possible errors and intensify the safety elements during the procedure. This study helps update in blood transfusion practices and identify the lacunae in obstetrical care and ameliorate the standards of practice and thereby reduce the maternal mortality and morbidity.

Methods

This is a retrospective study conducted in the department of obstetrics and gynaecology, Government Mohan Kumaramangalam Medical College Hospital, Salem from the month of December 2021 to November 2022 for a period of 1 year, aimed to analyse the in-

-dications of blood transfusion in obstetrics. About 11,416 deliveries were recorded during the study period at GMKMCH. All antenatal and postnatal indoor patients who were transfused with blood components during the study period were included in the study. Study data was retrieved from the blood bank registers and blood bank requisition forms and medical records of patients who underwent the transfusion procedure during the study period. Data of transfusion reactions encountered during the procedure were collected. The statistical analysis was done using Chi square test.

Inclusion criteria

All inpatients transfused with blood components during the study period in the department of obstetrics in our tertiary centre.

Results

A total of 4532 inpatient women who received transfusion of blood components from the month of December 2021 to November 2022 for a period of one year were studied. They included both primigravida and multigravida.

The obstetric complications that indicated blood transfusions in our institution were anaemia, antepartum and postpartum haemorrhage, HELLP, thrombocytopenia, ruptured ectopic pregnancy, uterine rupture, haemolytic anaemia, DIC, incomplete abortion, complete abortion and molar pregnancy.

Table 1: Demographic data

Age group	Number of cases n=4532	%
18-25	1562	34.4
26-35	2047	45.1
36-45	923	20.3
Parity		
Primigravida	1496	33
Multigravida	3036	67

Table 1 shows the distribution as per the age group and parity. 34.4% were between 18-25yrs, 45.1% were between 26-35yrs and 20.3% were between 36-45yrs.

Table 2: Obstetric Complications Necessitating Blood Transfusion

Causes	Number of cases n=4532	Percentage %
Anaemia	3420	75.4
Atonic PPH	828	18.2
Placenta previa	24	0.52
Placental abruption	18	0.39
Traumatic PPH	36	0.79
HELLP	122	2.6
Thrombocytopenia	18	0.39
Ruptured ectopic pregnancy	21	0.46
Uterine rupture	4	0.08
Haemolytic anaemia	6	0.13
DIC	6	0.13
Incomplete abortion	19	0.41
Complete abortion	5	0.11
Molar pregnancy	5	0.11

Table 2 shows the indications of blood transfusion, the most common being anaemia (75.4%), followed by atonic PPH (18.2%), HELLP (2.6%).

Table 3: Degree of anaemia (WHO classification)

Haemoglobin level g/dl	Number of cases n=3420	%
<4	0	0
4 - 6.9	1104	32.2%
7 - 9.9	1344	39.2%
10 - 10.9	972	28.4%

Table 3 shows the severity of anaemia with 32.2% severely anaemic, 39.2% with moderate anaemia and 28.4% with mild anaemia.

Table 4: Association between age and severity of anaemia.

Degree of anaemia (g/dl)	Age group (in years)					
	18-25 (n=1110)		26-35 (n=1669)		36-45 (n=641)	
	N	%	N	%	N	%
4-6.9	184	16.5	653	39.1	267	41.6
7-9.9	413	37.2	686	41.1	245	38.2
10-10.9	513	46.2	330	19.7	129	20.1

$$X^2 - 312.40 \text{ P value} - 0.001$$

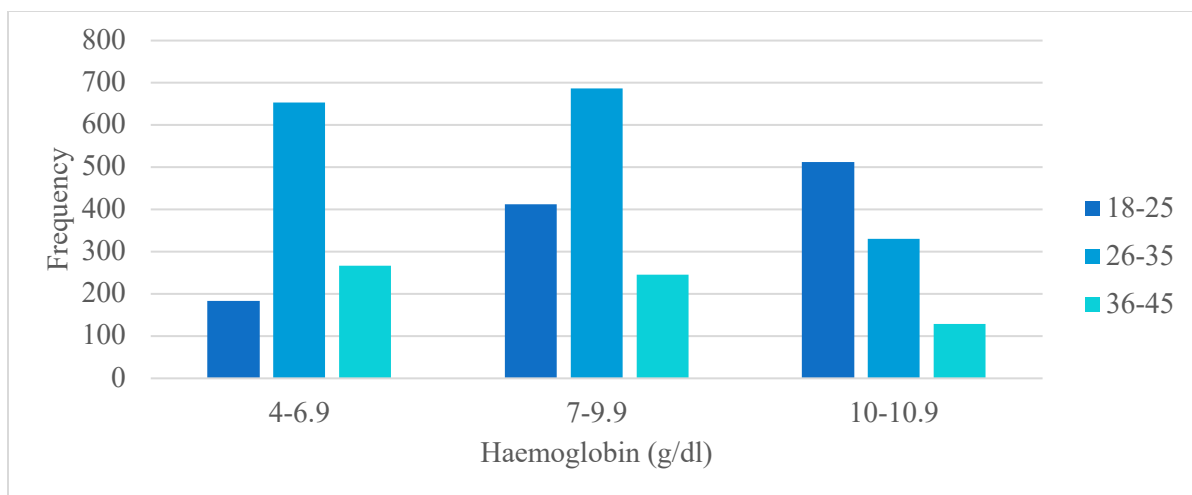


Figure 1: Bar chart showing association between age and severity of anaemia.

Among the participants in the age group 18 to 25 years, 16.5% had Hb of 4 to 6.9 g/dl while in the age group 26 to 35 years the proportion was 39.1% and in the age group 36 to 45 years it was 41.6%. The degree of anaemia was lower among those in the age group 36 to 45 years than those in the rest of the age groups with P value of less than 0.05.

Table 5: Association between severity of anaemia and parity.

Degree of anaemia (g/dl)	Parity			
	Primigravida (n=990)		Multigravida (n=2430)	
	N	%	N	%
4-6.9	242	24.4	862	35.5
7-9.9	377	38.1	967	39.8
10-10.9	371	37.5	601	24.7

$X^2 - 67.21$ P value - 0.001

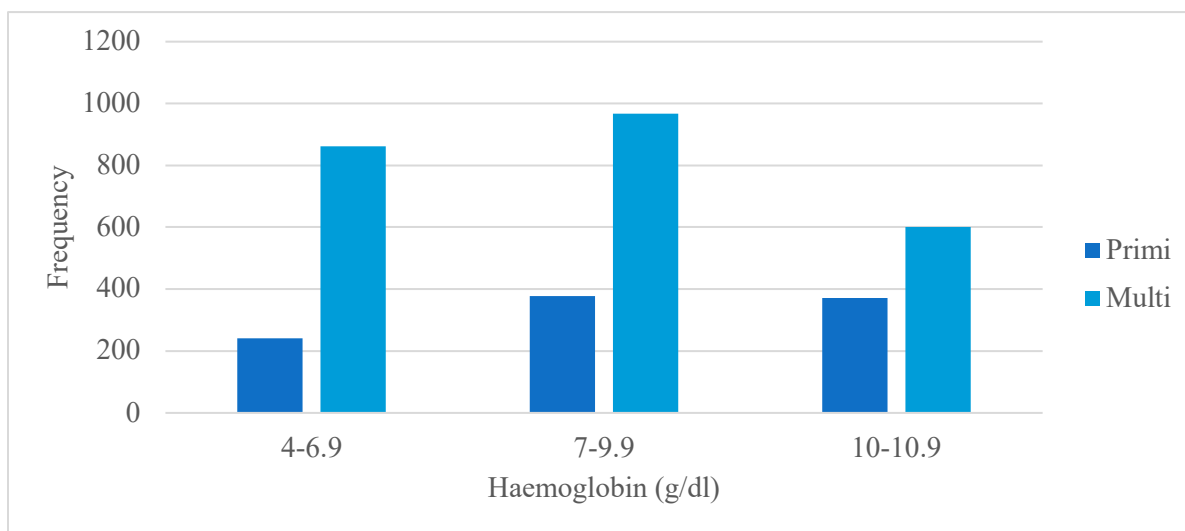


Figure 2: Bar chart showing association between severity of anaemia and parity.

Among the primigravida 38.1% were having Hb of 7 to 9.9 g/dl followed by 37.5% with Hb 10 to 10.9 g/dl. Among the multigravida, 39.8% were having Hb of 7 to 9.9 g/dl followed by 35.5% with Hb of 4 to 6.9 g/dl. The degree of anaemia was severe in multigravida than primigravida and the difference was significant with P value of less than 0.05.

Table 6: Antepartum and Postpartum Haemorrhage

Causes	Number of cases n=912	%
Placenta previa without accreta	23	2.5
Placenta previa with accreta	1	0.1
Placental abruption	18	1.9
Atonic PPH	828	90.7
Traumatic PPH	36	3.9
DIC	6	0.6

Table 6 shows the causes of obstetric haemorrhage of which atonic PPH was the most common cause accounting to 90.7%. Out of the 6 cases of DIC, one of the cases was due to placental abruption which came in a state of shock with a Hb of 5.8 g % requiring transfusion of 6 PRBCs, 12 FFPs, 8 cryoprecipitate and 12 platelets. PRBCs and FFPs were transfused at a ratio of 1:2.

Table 7: Blood components transfused

Blood components	Number transfused
PRBC	6155
FFP	2192
Platelets	738
Cryoprecipitate	32

Table 7 shows the number of blood components transfused. Anaemia being the commonest indication of transfusion, 4718 PRBCs were used for anaemia correction. 1104 women with severe anaemia were transfused with 1884 PRBCs, 1344 women with moderate anaemia were transfused with 1862 PRBCs, and 972 women with mild anaemia were transfused with one unit of PRBC each.

Table 8: Transfusion reactions

Type of reaction	Number of cases n=552	Percentage %
Chills and rigors	408	73.9%
Urticarial rashes	48	8.6%
Transfusion associated dyspnoea	72	13.0%
Transfusion associated hypotensive reaction	24	4.3%

Table 8 shows the type of transfusion reactions encountered. 73.9 % cases developed chills with rigor only, 13 % had transfusion associated dyspnoea and 8.6 % had urticarial rashes. None develop any major complications.

Discussion

In this study the incidence of blood transfusion in the obstetric women during the study period was 39.7 %. Sushil Chawla *et al* [1] reported the incidence of blood transfusion as 1.3 % during the study period. Indian council of medical research defines haemoglobin level below 10.9 g/dl as cut off point for anaemia in pregnancy. WHO Health Statistics data [2] shows that anaemia is prominent in Southeast Asian countries accounting to about half of all the global maternal deaths and India contributes to about 80% of the maternal death due to anaemia in South Asia. Maternal and perinatal outcome is drastically affected when antenatal care is compromised.

Anaemia is found to be the commonest cause of blood transfusion at our tertiary centre similar to the study done by Deshpande Madhushree *et al* [3] at Belgaum. 972 cases with mild anaemia at > 36 weeks of gestation had necessitated avoidable transfusions when diagnosed early. Anaemia was more prevalent in the age group between 26-35 years (48.8%) similar to the study done by Pandya M *et al* [4]. A study done by, Kimitoshi Imai [5] showed a decrease in serum ferritin levels among multiparity indicating increased prevalence of nutritional deficiency anaemia similar to our study with high prevalence of anaemia among multiparous women (71.3%).

Still a prevalence of 28.7% anaemia among primigravida points to the need to improve the nutritional status among adolescent girls. All women with severe anaemia irrespective of gestational age were transfused with PRBCs. Women with a haemoglobin of < 9 g/dl at 30-36 weeks of gestation were managed with transfusion. Women with >36 weeks of gestation were treated with transfusion irrespective of the severity of anaemia. RCOG [6] recommends screening for anaemia at first visit and at 28weeks

gestation. In case of multigravida screening at 20-24 weeks is to be done additionally. Early detection and treatment of anaemic women through routine and outreach activities and regular follow up of severely anaemic women who live in low resource areas by the village health nurse with continuous monitoring by the medical officers at Primary Health Centre help in significant reduction in PPH associated mortality. Common factors contributing to nutritional deficiency are deficient intake of iron rich food and iron enhancers in the diet, excess quantity of iron inhibitors in diet.

Emphasises should be made on the importance of dietary iron with good bioavailability apart from the routine supplementary iron. Haem iron has more bioavailability and that of non-haem iron can be increased by Vit C. Small pregnancy interval in multigravida, early marriage and susceptibility to hookworm infestations are also accounted for. All antenatal women should receive a single dose of Albendazole 400 mg in the second trimester to combat hookworm infestation. A fierce tie-up exists between anaemia and the socioeconomic status of the women. A study done by Imdad A, Bhutta ZA [7]. comparing iron supplementation with no iron or placebo found that iron supplementation prevented maternal anaemia and iron deficiency anaemia.

The second most common cause of blood transfusion was atonic PPH in our study. PPH is exacerbated by the increased prevalence of anaemia among antenatal women in India accounting to 38% of maternal deaths. Atonic PPH was the most common cause among the women who were given blood transfusion due to obstetric haemorrhage with 90.7%. Out of the 828 cases of atonic PPH, 180 cases developed hemodynamic instability requiring blood transfusion and 648 cases

were given PRBCs to correct anaemia due to PPH. Four cases of atonic PPH led to reversible DIC were recorded. Thirty cases of vaginal laceration, four cases of vaginal hematoma and two cases of vulval hematoma requiring transfusion were reported. In Balki M *et al* [8] study the rate of blood transfusion for PPH was 0.31 % as against 7.6 % (864/11,416) in this study. Assessing the degree of shock in obstetric haemorrhage is the key indicator to estimate the amount of blood loss and a guide to transfusion.

Blood loss is underestimated in pregnancy because it does not present itself until losses are immense. Active management of third stage labour, anticipation and preparedness to encounter a PPH can avoid hemodynamic instability in these women, however not all type of obstetric haemorrhage is predictable. In a study done by Vibhuti Pravin bhai *et al* [9] of 2200 patients the major cause of blood transfusion was obstetric haemorrhage which was about 70 % in contrast to 20.1 % in our tertiary care. One case of septic shock with DIC due to illegal abortion was reported.

Indicated blood components should be judiciously selected for a more acceptable management. Each bag of PRBC contains 250-300ml of RBCs with a haematocrit of 60-80%. PRBC transfusion is mainly used to increase the haemoglobin and O₂ carrying capacity. It is indicated in anaemia and hypovolemia due to haemorrhage. Each bag of platelets contain 150-300ml when isolated by apheresis from a donor. Platelet transfusion is indicated when the count falls below 50,000/cu mm in preeclampsia, HELLP and dengue shock syndrome.

One unit of platelet transfusion increases the count by 5000-10,000/L. Each bag of FFP contains 200-250 ml, ideally thawed in blood bank. It contains stable clotting factors as well as Factor VIII, so indicated in DIC and clotting factor deficiencies. Cryoprecipitate contains 80-100 IU of Factor VIII/bag. It is

indicated in DIC, hypofibrinogenemia and Factor XIII deficiency. The PRBC/FFP ratio transfused at our centre was 1:2 in obstetric haemorrhage. A study by Borgman MA *et al* [10]. recommends the transfusion on PRBC/FFP at a ratio of 1:1.4 for massive haemorrhage.

12.1 % of the women developed mild transfusion reactions. No major reactions were recorded. Acute transfusion reactions were diagnosed by the recognition of signs and symptoms by the bedside. Chills with rigor is associated with milder form of non-haemolytic transfusion reactions, but they could be the first sign of more serious reactions like TRALI. Urticarial rashes is a sign of allergic reaction to foreign protein in the donor. Dyspnoea is a sign of concern that can develop into serious anaphylaxis. In this study all the reactions were self-limiting on discontinuation of the blood component with supportive treatment. An efficient component therapy allows excellent survival of each transfused component, allows transfusion of only the essential component and avoids unnecessary component transfusion and thus the economic burden in a developing country like India.

Conclusion

This study concludes anaemia as the major indication for blood transfusion with the major contributor being nutritional deficiency anaemia in our tertiary care centre. This study observes the urgent need in capturing the missing gaps in approaching nutritional deficiency anaemia. The health status of our study population could be improved by maximising the ground level monitoring and regularising the follow up of all pregnant women.

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Ethical Approval

Approved by institution ethical committee.

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