JMCH Journal of Maternal and Child Health (2022), 07(05): 591-599
Masters Program in Public Health, Universitas Sebelas Maret

Research

Study of Utilization Pattern of Blood And Blood Components in Obstetrics at A Tertiary Care Hospital

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ABSTRACT

Background: Blood transfusion is a life-saving procedure, but inappropriate use of blood and its components in obstetric emergencies, especially in cases of massive bleeding, increases the risk of morbidity and mortality. The aim of this study was to describe the determinants of blood and blood components in obstetrics in a tertiary care hospital with indications for transfusion for different components during the study.
Subjects and Method: A Prospective Observational study was carried from May 2018 to December 2019 at Department of Obstetrics and Gynaecolog,T.N.M.C & B.Y.L.Nair Hospital Mumbai. The independent variables are sociodemographic characteristics, parity, mode of delivery, education, hospital level, while dependent variables are frequency of obstetric transfusion. Frequency of transfusion of blood and its components obtained from case file of patient. The other data were collected by questionnaire. Analysis of 366 Obstetric patients requiring blood transfusion in eighteen months period was done. Qualitative data were presented as frequency and percentages and analysed using the chi-square test.
Results: During the whole study 366 of obstetric admission required transfusion of blood and its components. Severe anaemia during pregnancy/postpartum anaemia (51%) were the most common indications for blood product transfusions followed by Accidental Haemorrhage (30%), Caesarean section (10.38%) Genital tract trauma including uterine rupture (11%), Postpartum Haemorrhage's (13%), Placenta previa (6.5%), Ectopic pregnancies (3.5%), Vesicular mole (3.27%), Retained placenta (3.27%) Ruptured uterus (1%), and Abortion (2.7%). Packed cells (47%) were the most common type of blood and blood products transfused followed by Fresh Frozen Plasma (41.86%).
Conclusion: : In obstetric emergencies, correct diagnosis and management of emergencies, A pre-planned, multidisciplinary protocol yields excellent effects in the management.

Keywords: blood transfusion, pregnancy, anaemia, obstetric emergencies

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Cite this as:
Rathod PA, Jadhao AN, Barapatre AR (2022). Study of Utilization Pattern of Blood And Blood Components in Obstetrics At A Tertiary Care Hospital. J Matern Child Health. 07(05): 591-599. https://doi.org/10.26911/-thejmch.2022.07.05.10.

BACKGROUND

Massive obstetric haemorrhage, which now leading cause of direct maternal deaths and contributes to 20-30% of all direct deaths, continues to be a significant contributor to maternal mortality in India (Drife, 1997). Blood transfusion is indicated for patients with evidence of haemorrhagic shock (James et al., 2009). The extensive assessment of not only blood volume loss but also the reason of

haemorrhage, a patient's medical history, age, vital signs, and blood parameters is required to determine whether a transfusion is necessary (Nuttall et al., 2003).Blood transfusion has been recognized as one of eight vital key that should be available in healthcare services providing comprehensive emergency obstetric care because of the unpredictable nature of postpartum bleeding (Chandy, 2007). The decision of blood transfusion should be made on both clinical and haematological grounds. The transfusion is almost always indicated in anaemia when Hb is less than 7 gm/dl to reduce the rate of maternal mortality and morbidity (Auerbach et al.,2008). According to the (WHO, 2011), the four keystones of a safe and effective blood donor service are a national system, volunteer donating blood, blood testing before transfusion, and avoidance of needless transfusions. Each of these keystones poses challenges in developing countries, especially where set-upsarenot adequate; the cost of blood purchasing, blood screening before transfusion, and the cost of storage is high; and healthy volunteer for blood donation is rare.

Pregnancy is a special physiological process, which causes many changes the system in a form coagulation system enhancement and suppression of fibrinolytic system, large-volume blood loss due to obstetric complications causes utilization of coagulation factors, which results in to more bleeding and starts a vicious cycle ending up with disseminated intravascular coagulation (Millar and Laffan 2015).

During pregnancy, due to physiological changes, pregnant ladies can tolerate bleeding leads to an inaccurate assessment of blood loss due to various haemorrhage in obstetrics may not show a change in their typical vital signs, consequently there is delay in the management (Millar and Laffan 2015).

In developing countries like India, appropriate use of blood and its components is very important so that availability of blood to needy and unnecessary exposure of blood transfusion related reactions like allergic reactions, haemolytic reactions,febrile, transfusion-related acute lung injury, negative immunomodulatory effect and transmission of infectious diseases. Accurate identification and treatment during obstetric emergencies are very important.

This study was undertaken with the objectives to find out the indication and incidence of transfusion of blood and blood components in the Department of Obstetrics' and Gynaecology at Tertiary Centre.

SUBJECTS AND METHOD

1. Study Design

A Prospective Observational study was carried from December 2018 to November 2020 at a Topiwala National Medical College and B.Y.L. Nair Charitable Hospital, Mumbai.

2. Population and Sample

The population in this study were all patients requiring blood transfusion. Total 366 patients (3.6%) required blood and component transfusion.

3. Study Variables

The independent variables are sociodemographic characteristics, parity, mode of delivery, education, hospital level, while dependent variables are frequency of obstetric transfusion.

4. Operational Definition of Variables

Sociodemographic characteristics (region, hospital level, place of birth, maternal education, maternal age, and birth order).

Parity was defined as a woman who has given birth to live baby.

hospital level (level 1-3 based on criteria like number of beds, clinical departments, number of medical personnel, type and quantity of equipment).

Education (none, primary school, middle

school, high school, college and higher qualification)

Mode of delivery (spontaneous vaginal birth, instrumental vaginal birth and caesarean section).

Obstetric transfusion was defined as the receipt of this blood and its component at any point during pregnancy from birth of new born to discharge.

5. Study Instruments

Frequency of transfusion of blood and its components obtained from case file of patient. The other data were collected by questionnaire

6. Data analysis

All the collected data were entered into Microsoft Excel sheet and then transferred to SPSS software ver. 22 for analysis. Qualitative data were presented as frequency and percentages and analysed using the chi-square test.

7. Research Ethics

This research has been approved by the Ethics Committee for Academic Research Project (ECARP) T.N.Medical College and B.Y.L. Nair Ch.Hospital Mumbai,letter no ECARP/2018/70. Dated on 27/12/2018.

RESULTS

1. General information about hospital admissions, deliveries and obstetric operations during study period

The Prospective analysis of blood utilization was carried out at Tertiary Centre over a period of 18 months. During the study period, there were 10,156 Obstetric admissions. Total number of deliveries during the study period was 9,603, including 1,561 caesarean sections. There were 56 abortions & 125 medical terminations of pregnancies (MTP). Total 366 patients (3.6%) required blood and component transfusion (Table 1)

Table 1. General information about hospital admissions, deliveries and obstetric operations during study period.

General Information	Frequency
No. of Obstetric admissions	10.156
No. of Deliveries (Total)	9.603
No of Caesarean sections	1.561
No. of Medical termination of pregnancy	125
No. of Spontaneous abortions	56
No. of Patients requiring blood transfusion	366
Percentage of Obstetric admissions requiring blood transfusion	3.6%

2. Sociodemographic profile of patients

During study period 366 patients were participated, between age group of 20-35 years, out of that in our study,age group between 20-24 received 213 (58.19%), 25-29 received 90 (24.59%) and 30-35 received 63 (17.21%). Primigravida received 83 (22.67%) and multigravida received 283 (77.32%). Singleton pregnancy received 345 (94.26%) and twin pregnancy received 21 (5.73%). Vaginal delivery patients received 183 (50%), Instrumental delivery 9 (2.4%) and LSCS 174 (47.54%) mother who delivered live birth received 361 (98.63%) and still birth received 5 (1.3%). Those who were not admitted in ICU received 319 (85.7%) and admitted in ICU received 47 (14.39%) of blood and its components (Table 2).

Table 2 Sociodemographic profile of patient (N-366)

Variable	Frequency	Percentage
Age (Years)		
20-24	213	58.19
25-29	90	24.59
30-35	63	17.21
Parity		
Primigravida	83	22.67
Multigravida	283	77.32
Intrauterine pregnancy		
Singleton	345	94.26
Twin	21	5.73
Type of Population		
Permanent Resident	303	82.78
Migrants	63	17.21
Mode of Delivery		
Vaginal	183	50
Instrumental	9	2.4
LSCS	174	47.54
Birth Outcome		
Live Birth	361	98.63
Still Birth	5	1.3
ICU Admission		
No	319	85.7
Yes	47	14.39

3. Obstetric blood and blood component requirement

It was observed that total number of blood unit issued to all department is 7,122 out of that 1,935 (27.16%) blood units issued to obstetrics, out of 1,935 blood units, 125 were whole blood and 1,810 were blood components (Table 3).

Table 3. Showing obstetric blood and blood components requirement

Department	Total no. of blood units issued	Total no. of whole blood issued	Total no of components issued (packed cell, fresh frozen plasma, platelets)
All departments	7122	550	6422
Obstetrics	1935	125	1810
% of blood units issued to obstetrics	27.16	22.72	28.18

4. Utilization of blood and blood components in obstetrics

It was observed that 47.33% patients were transfused with fresh frozen plasma, 41.86% patients were transfused with packed cell volume transfusion, 4.13% patents were transfused with platelet transfusion and 0.20 percentage of patients were transfused with whole blood (Table 4)

Table 4 Showing utilization of blood and blood components in obstetrics

Type of blood and components	No of units transfused (n=1935)	%
Whole blood	125	6.4
Packed cell volume	916	47.33
Fresh frozen plasma	810	41.86
Platelets	80	4.13
Cryoprecipitate	04	0.20

5. Indications for transfusions of blood and blood components

In the present study, it was observed that postpartum haemorrhage (10.38%), Accidental haemorrhage (30.32%), placenta praevia (6.5%) abortion (2.7%), ectopic pregnancy (3.5%) vesicular mole evacuation (3.27%), caesarean section (10.38%), Obstetric hysterectomy (0.54 %), retained placenta/Inversion of uterus (3.27%) were other common indications requiring blood transfusion. Severe anaemia either during pregnancy or during postpartum period was most common indication (50.81%) for blood transfusion. Genital tract trauma including uterine rupture/injury (3.55%) and Haemoglobinopathies (0.81%) (Table 5).

Table 5 Showing indications for transfusions of blood and blood components

Indication	Number of cases (%)
Postpartum haemorrhage	38 (10.38)
Accidental haemorrhage	111 (30.32)
Placenta praevia	24(6.5)
Abortions	10 (2.7)
Ectopic pregnancies	13 (3.5)
Vesicular mole	12 (3.27)
Rupture uterus	04 (1.09)
Caesarean section	38 (10.38)
Obstetric hysterectomy	02 (0.54)
Retained placenta/Inversion of uterus	12 (3.27)
Severe anaemia during pregnancy/postpartum anaemia	186 (50.81)
Genital tract trauma including uterine rupture/injury	13 (3.55)
Haemoglobinopathies	03 0.81)

6. Distributions of cases as per blood unit requirement

It was observed that 56% patients either required 2 or 3 units of blood transfusion. Only 21.85% patients required single blood transfusion. Five or more units of blood transfusion was required in 9.56% patients (Table 6)

Table 6 Distribution of cases as per blood unit requirement

No. of blood units transfused per case	Total no. of cases (N 366)	%
1	80	21.85
2	102	27.86
3	104	28.41
4	45	12.29
5 or more	35	9.56

DISCUSSION

Despite being a healthy state, pregnancy has the potential to quickly and unexpectedly become pathological if untreated. In the first half of pregnancy, problems include abortions, rupture of ectopic pregnancy, and vesicular moles can lead to acute blood loss. Low-lying placental haemorrhage can occur in the second half of pregnancy. Third stage haemorrhage or other difficulties during labour can cause substantial blood loss and a fast deterioration in the mother's general health. Blood that is safe and sufficient must be replaced quickly and urgently in order to save lives. Blood cannot be replaced by any other fluid, which highlights the need of blood banks in obstetrics. Any maternity hospital without a blood bank facility is not safe for confinement.

The unpredictable obstetric complications are leading indications of transfusion Blood transfusion has been documentted as one of the indispensable key components of comprehensive emergency obstetric care, which has been revealed to decrease maternal mortality.

In the present study, 20 to 24 years (58%) was the most common age group followed by 25 to 29 years (25%) and 30 to 35 years (17%). These findings were in agreement with the study conducted by (Sushil Chawla, 2018) in which 21-30 years (81%) were the most common age group. A similar study by (Biswas and Rengaraj, 2019) reported that 49% of the study population belongs to the age group of 20-25 years. A similar study by (Fazal and Poornima, 2018) reported that the maximum number of patients was in the age group of 20-29 years.

In the present study, 77% of the study population were multigravida and 22% were primigravida. These findings were in agreement with the study conducted by (Chawla, 2018) in which 53% of the study population were multigravida. A similar study by (Fazal and Poornima, 2018) reported that 49.2% and 50.8% were primigravida and multigravida respectively. Another similar study by (Chowdhury et al., 2016) reported that Multiparous patients constituted 68.35% of the total obstetric patients, received a transfusion. From the above picture, it is clear that parity status is important, multiparous women require more attention throughout pregnancy as multiparity is also an important risk factor, so obstetricians should be vigilant during management.

In the present study, 94% of the study population had singleton pregnancy and 5.7% were twin. This is in accordance with the study conducted by (Chawla, 2018) in which 81% had a singleton pregnancy.

In the present study, LSCS (47.54%) was the most common mode of delivery followed by Vaginal (50%) and Instrumental (2.4%). (Chowdhury et al., 2016) in their study reported that most common indication for blood transfusion in obstetric patients was mild preoperative anaemia with or without excessive bleeding during caesarean section (63.92%) and the second common cause was antenatal anaemia (24.05%).

In the present study, Severe anaemia during pregnancy/postpartum anaemia (51-%) was the most common indications of Obstetric indications for blood product transfusions followed by Accidental Haemorrhage's (30%), Caesarean section (10.38%) Genital tract trauma including uterine rupture/injury (11%). Postpartum Haemorrhage's (13%), Placenta previa (6.5%), Ectopic pregnancies (3.5 %) Vesicular mole (3.27%) Retained placenta (3.27%) Ruptureduterus (1%), and Abortion (2.7%), Genital tract trauma including uterine rupture/ injury (11%). These findings were in agreement with the study conducted by (Bangal et al., 2017). These findings were in agreement with the study conducted by (Murugesan et al., 2019).

In which the most common indications of Obstetric indications for blood product transfusions followed by anaemia (75.2%), Ectopic pregnancy (69%) and DIC (63%). Similar study by (Fazal and Poornima, 2018) reported that 61.6% (50) cases were for anaemia correction which accountted for the maximum cases. This is followed by ectopic pregnancy (34.7%) and vesicular mole (3.7%). The indications observed in their study include abruption placenta (23.4%), atonic postpartum haemorrhage (13.8%), placenta previa (24.8%), uterine inversion (6.9%), eclampsia (9.2%), HELLP syndrome (6.9%).

In the present study, Packed cells (47.33%) was the foremost common sort of blood and blood products transfused followed by Whole blood (6.4%), platelets (4.13%), FFP (41.86%) and Cryoprecipitate (0.20%). These findings were in agreement with the study conducted by (Fazal and Poornima, 2018) who reported that 87.2%, 43.7%, and 48.1% received packed red cell, platelet, and fresh frozen plasma transfusion, respecttively. Immediately haematocrit will now not reflect the real blood loss. Fall of haematocrit of only 3% in the 1st hour once loss of thousand ml of blood (Cunningham et al., 2010). Urine output, however, being sensitive to adjustments in blood volume, can deliver an early indication of modifications in renal perfusion and consequently perfusion of other organs (Thomas et al., 2010). Pulse Oximetry is not a good device in the hemodynamically unstable patient. Use of central venous pressure (CVP) monitoring alone in bleeding obstetric patients with hemodynamic instability is not recommended because it is not real surrogate of evaluation of the patient's intravascular status. CVP and its response to a fluid challenge or noninvasive cardiac variables using ultrasound can guide fluid restoration in obstetrics patients who are hemodynamic unstable. The decision of blood transfusion is taken on the basis of the individual patient's status (SauleI and Hawkins, 2012; Gutierrez et al., 2012). In their study discouraged the practice of singleunit transfusion as it avertable in the majority of the cases, and the risks involved in blood transfusion can cause bigger injury than advantage to the patient (Vachhani et al., 2008).

The main motive of study is complete blood and its components have to be reserved to address complicated conditions at some point of obstetric emergencies and correct diagnosis and management of emergencies. Sensitize clinical work force to keep away from unnecessary blood transfusion.

In obstetric care, transfusion is an important lifesaving element. There is noticeable variation in the incidence of whole transfusion associated with major obstetric haemorrhage between countries. Acute obstetrics, where blood loss is generally unpredictable, unexpected and deciding when red cell transfusion is necessary to maintain adequate tissue oxygenation in the face of acute haemorrhage is fairly difficult undertaking. The overall occurrence of blood factor usage has extensively elevated in recent years, but nevertheless, the usage of whole blood is preferred by many clinicians due to its easy availability inside the blood banks. WHO strongly criticizes the use of single-unit transfusion. A pre-planned, multidisciplinary protocol yields afine outcome in the management. Blood products (red cells, platelets, fresh frozen plasma, or cryoprecipitate) are being used quite variably by physicians in various medical institutions, and sometimes the reasons for transfusion are not the right ones. Each individual blood product may only be transfused after an evaluation of the expected outcome. In the case of obstetric emergency, it is also crucial to assess the individual patient's need for blood products and their combination. To

improve healthcare practitioners' skills and optimize treatment alternatives in obstetric emergencies, indications for blood component transfusion in obstetrics are outlined.

AUTHOR CONTRIBUTION

Dr.Pallavi Anil Rathod is the main researcher who chooses the topic, explores and collects data. Dr.Avinash Namdeo Jadhao & Dr.Amit Ramesh Barapatre played a role in analysing data and reviewing research documents.

FINANCIAL AND SPONSORSHIP

None.

ACKNOWLEDGEMENT

None.

CONFLICT OF INTEREST

There are no conflicts of interest of any commercial or financial relationships that could be construed as a potential conflict of interest

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