

## Original Article

# Blood Transfusion Practices in Obstetrics: An Observational Study at a Tertiary Level Hospital in Bangladesh

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### Abstract:

One of the eight emergency obstetric components to reduce maternal mortality is blood transfusion. Region, facility, and clinician influence transfusion rates. Bangladesh lacks hospital-based data on obstetric blood transfusions. The study aims to review the incidence, indications, and hazards of blood transfusions among obstetric patients in a tertiary hospital. This descriptive cross-sectional study was undertaken at the Department of Obstetrics, Bangabandhu Sheikh Mujib Medical College Hospital, Faridpur, from June 2022 to December 2022. One hundred and fifty pregnant and postpartum mothers requiring blood transfusions were selected. We analyzed their demographics, clinical history, transfusion hazards, and hospital courses. The blood transfusion rate among obstetric patients was 28.36%. Among the 150 study participants, 71% were from rural areas. Only 8% of patients took  $\geq 4$  antenatal care (ANC) visits. Antepartum anemia (51%) and postpartum hemorrhage (40%) were major blood transfusion indications. The mean blood requirement was  $1.83 \pm 1.22$  units (Range: 1 to 7). Forty eight percent of the transfused blood came from the patient's friends and family, while 7% of the blood was bought. Seven percent of transfusions resulted in adverse reactions. High transfusion rates necessitate planned facility management. In addition to facility preparation, it is essential to strengthen ANC and educate pregnant women about the hazards of anemia during the pregnancy period.

**Keywords:** Blood transfusion, Obstetric, Hemorrhage, Indications

### Introduction:

Transfusion of blood and blood components is a common practice in obstetric wards<sup>1</sup>. It is considered as one of the eight essential components of comprehensive

emergency obstetric care, which has been shown to reduce maternal mortality rates<sup>2-4</sup>. The World Health Organization (WHO) estimates that hemorrhage at the

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time of delivery complicates around 10% of all live births globally and in Bangladesh, hemorrhage is the leading direct cause of maternal death (31%)<sup>3</sup>.

There are several causes of pregnancy-associated blood transfusion. The most common causes requiring transfusion are anemia, antepartum hemorrhage, and

postpartum hemorrhage<sup>5</sup>. Meanwhile, various pregnancy complications or associated risk factors of pregnancy and labor such as abruptio placenta, placenta accreta, retained placenta, postpartum hemorrhage, and others warrant transfusion of blood or blood components to save the life of the mother<sup>5</sup>. The reported transfusion rate in obstetrics varies from 0.16 to 2.3%<sup>5, 6</sup>. But, blood transfusion is not without risk. The major risk is “incorrect” blood component transfusion. The important issues in blood transfusion are adverse events or risk such as blood transfusion reactions, infections, development of red blood cell antibodies, and iron overload in different organs of the body from a frequent blood transfusion. The incidence of blood transfusion reactions is 1-2% worldwide and is also a serious problem in Bangladesh.

Women at high risk of anticipated more blood loss should be strongly advised to deliver in a setting where blood transfusion and, preferably, intensive care facilities are available<sup>1</sup>. The rate of transfusion varies and shows regional variation, different practices in different hospitals, and among different clinicians<sup>5</sup>. Moreover, blood and blood components, like – red cell concentrate (RCC), fresh frozen plasma (FFP), platelet concentrate, cryoprecipitate, etc., are of limited resources. Inappropriate use of blood leads to the wastage of precious medical resources, which increases the economic burden and, in addition, leads to an increase in the blood transfusion risk contributing to increased maternal morbidity and mortality<sup>2</sup>.

Hence, it is very important to look into the common case scenarios of transfusion of blood and the demand for blood components in obstetric patients in local settings, which is limited in Bangladesh.

This study aims to review the practices of blood transfusion in obstetric care in a major referral hospital in Bangladesh with a view to contributing to the formulation of an effective blood transfusion policy to combat the high rate of mortality and morbidity associated with obstetric complications in the study area and other developing nations with similar clinical settings.

### Materials and Methods:

This Descriptive type of cross-sectional study was conducted at the Department of Obstetrics, Bangabandhu Sheikh Mujib Medical College Hospital (BSMMCH), which is a tertiary-level teaching hospital and a referral hospital for both public and private hospitals in Faridpur and surrounding other districts in Bangladesh.

Sample size for the study is estimated 150 patients with 6.02% prevalence of blood transfusion among the obstetric patients based on the study published by

Chowdhury et al.<sup>7</sup>, with an absolute error of 5% and 1% type 1 error. Between June to November 2022, all pregnant and postpartum women admitted to the Department of Obstetrics of BSMMCH who needed blood transfusion were selected for the study serially till the sample size was met.

Informed consent from the patient or from the guardian was obtained. Trained physicians recorded detailed medical history and clinical examination findings in a pre-structured questionnaire. Required blood units were calculated, and the patients were monitored for complications. All patients were managed as per standard treatment protocol. Obstetric and hospital outcomes were also recorded. IBM SPSS 21.0 for Mac (SPSS Inc., Chicago, IL, USA) was used for the statistical evaluation of our research data. The protocol was approved by the Ethical Review Committee (ERC) of BSMMC.

### Results:

During the study period, 4976 obstetric patients got admitted at BSMMCH. Of them, 1411 (28.36%) patients required blood transfusion.

The demographic characteristics of the 150 mothers participated in our study are presented in Table I. The majority of them (71.33%) were from rural areas. Seventy percent of the patients were between the ages of 20 and 30, with a mean age of  $26.35 \pm 5.67$  years. The majority of them (91.33%) were housewives, and 34.67% of them had finished between 1-5 years of schooling. The mean BMI of the patients was  $22.55 \pm 4.07$ , with the majority of them (70.67%) being within the normal BMI range (18.5 - 24.9).

**Table-I: Demographic characteristics of the participants (n=150)**

Characteristics	Number (%)
Residence	
Rural	107 (71.33)
Urban	43 (28.67)
Age	Mean $\pm$ SD: $26.35 \pm 5.67$
< 20 years	13 (8.67)
20 - 30 years	105 (70)
> 30 years	32 (21.33)
Occupation	
Housewife	137 (91.33)
Student	5 (3.33)
Nurse	3 (2)
Other	5 (3.33)
Level of education (years of schooling)	
1-5	52 (34.67)

6-10	50 (33.33)
>10	48 (32)
BMI	Mean $\pm$ SD: 22.55 $\pm$ 4.07
< 18.5	11 (7.33)
18.5 - 24.9	106 (70.67)
25.0 - 29.9	32 (21.33)
> 30.0	1 (0.67)

\* BMI: Body mass index

Very few of the mothers reported preexisting co-morbidities and bad obstetric history. Only 5.33% of patients had a history of hypertension, and only 4% had type 2 diabetes. Nine (6%) of the patients had a history of early neonatal death, while 7 (4.67%) had a history of preeclampsia or eclampsia (Table II).

**Table-II: Maternal co-morbidities and past history of the participants (n = 150)**

Characteristics	Number (%)
Maternal Co-morbidities	
Chronic hypertension	8 (5.33)
Type II diabetes mellitus	6 (4)
Hypothyroidism	4 (2.67)
Thalassemia	2 (1.33)
Heart disease	1 (0.67)
Past history	
Early neonatal death	9 (6)
PE/ Eclampsia	7 (4.67)
Malpresentation	7 (4.67)
IUFD	6 (4)
Recurrent pregnancy loss	5 (3.33)
GDM	3 (2)

\* PE: Preeclampsia; IUFD: Intrauterine fetal death; GDM: Gestational diabetes mellitus.

In terms of obstetric history, the majority of participants (48.67%) were married before the age of 18 years. More than half of the participants (51.33%) had gravida three or more. About 19% of them had a history of abortion. About half of the patients (48.66%) had a history of one or more previous cesarean sections. The majority of patients who had blood transfusions had a gestational age between 28 - 36 weeks (45.33%), followed by those between 37 - 40 weeks (42%). Only 8% of patients received four or more ANC visits. Fourteen percent of these patients had a history of getting whole blood, 4.67% had received elemental iron infusion, and only 0.67 % had a history of receiving red cell concentrate during pregnancy (Table III).

**Table-III: Obstetric characteristics of the participants. (n = 150)**

Characteristics	Number (%)
Age of marriage	
< 18 years	73 (48.67)
18-25 years	71 (47.33)
25-30 years	5 (3.33)
> 30 years	1 (0.67)
Gravida	
1	28 (18.67)
2	45 (30)
3	42 (28)
4	19 (12.67)
>4	16 (10.67)
Miscarriage/abortion	
1	29 (19.33)
2	6 (4)
3	1 (0.67)
Number of previous cesarean section	
1	44 (29.33)
2	21 (14)
>2	8 (5.33)
Gestational age	
< 28 weeks	16 (10.67)
28-36 weeks	68 (45.33)
37-40 weeks	63 (42)
> 40 weeks	4 (2.67)
Number of ANC	
None	39 (26)
1-3	99 (66)
4 or more	12 (8)
Received whole blood during pregnancy	21 (14)
Received elemental iron infusion during pregnancy	7 (4.67)
Red cell concentration (RCC) during pregnancy	1 (0.67)

In the first trimester, 24.67% of women had a history of oral iron intake, followed by 52% in the second trimester and 42.67% in the third (Table IV).

**Table-IV: Oral iron intake of the participants during pregnancy (n = 150)**

Oral iron intake	Number (%)
1st trimester	37 (24.67)
2nd trimester	78 (52)
3rd trimester	64 (42.67)

Sixty eight percent of the study participants were admitted on an emergency basis. Among the various reasons for blood transfusion, different causes of PPH accounted for 40% of incidences. The leading cause, however, was antepartum anemia (51.33%). APH, perioperative blood loss, and shock were significant among the other reasons for blood transfusion (4.67%, 6%, and 5.33%, respectively). The patients required an average of  $1.83 \pm 1.22$  units of blood, with a range of 1 - 7 units. A similar proportion of patients underwent elective cesarean section and spontaneous vaginal delivery (32.67% and 32%, respectively) and 23.33% of participants required emergency cesarean delivery. The average length of participants' hospital stays was  $3.92 \pm 1.38$  days, and 80.67% were discharged with advice (Table V).

**Table-V: Hospital course of the study participants (n = 150)**

Characteristics	Number (%)
Mode of admission	
Emergency	102 (68)
Elective	45 (30)
Diagnosis/Obstetric disorders requiring blood transfusion PPH due to:	60 (40)
Uterine atony	6 (4)
Genital trauma	10 (6.67)
Retained placenta	13 (8.67)
Coagulation disorder	1 (0.67)
Placental abruption	8 (5.33)
Placenta previa	9 (6)
Placenta previa accreta	6 (4)
HELLP syndrome	3 (2)
Secondary PPH	4 (2.67)
Antepartum anemia	77 (51.33)
APH	7 (4.67)
Perioperative blood loss	9 (6)
Shock	8 (5.33)
Other	3 (2)
Required blood (units)	Mean $\pm$ SD: $1.83 \pm 1.22$ Range (1-7)
Mode of delivery	
Elective Caesarean	49 (32.67)
Spontaneous Vaginal Delivery/ Assisted	48 (32)
Emergency Caesarean	35 (23.33)
VBAC	2 (1.33)
Hospital outcome	
Discharge with advice	121 (80.67)
Discharged on request	25 (16.67)
Referred to other specialized hospitals	4 (2.67)
Duration of hospital stay	Mean $\pm$ SD: $3.92 \pm 1.38$ Range 1-8

Regarding the donors, approximately half (48%) of the blood transfused was collected from the patient's friends and neighbors. About 31% obtained blood from a blood bank or volunteer blood donation organization, 28% from other family members, 14% from first-degree relatives, and 7.33% of the blood was purchased through brokers. Almost all blood was transfused after ABO and Rh type and cross-matching (95.33%); however, antibody screening was performed in 62.67% of cases. Only 7.33 percent of transfusion reactions were reported (Table VI).

**Table-VI: Transfusion history and transfusion complications of the participants (n = 150)**

Characteristics	Number (%)
Who donated blood	
Friends/ neighbors	72 (48)
Received from the blood bank/volunteer blood donation organization	47 (31.33)
Other family members	42 (28)
1st-degree relative	21 (14)
Bought from brokers	11 (7.33)
Pre-transfusion checking of the doner	
ABO and Rh typing	143 (95.33)
Cross-matching	143 (95.33)
Antibody screening	94 (62.67)
Transfusion complication	
Transfusion reaction	11 (7.33)

### Discussion:

In Bangladesh, hemorrhage is a severe problem and a primary cause of maternal mortality<sup>8</sup>. Anemia in pregnancy can cause major maternal and fetal consequences<sup>9-12</sup>. The blood transfusion rate for obstetric patients at BSMCH is around 28%, which is significantly higher than previous similar studies done by Chowdhury et al., Chawla et al., James et al., and others<sup>5,7,8,13,14</sup>.

The majority of patients receiving blood transfusions were from rural areas. Lack of knowledge about the significance of nutritional care for mothers and ignorance of anemia is one of the major concerns<sup>15</sup>. About half of them (48.67%) were married before the age of 18. Only 18.67% of them were primigravida, while the rest were multipara. For over half of them (51.33%), it was their third or subsequent pregnancy. Only 8% of them took four or more ANC. Lack of ANC results in delayed identification of anemia, and increasing hemoglobin levels with oral iron supplementation become ineffective and necessitates blood transfusion<sup>16</sup>. Early marriage, repeated pregnancies without adequate nutritional supplementation in between and inadequate ANC may be one of the leading causes of anemia among rural pregnant women<sup>17, 18</sup>.

In Bangladesh, red cell concentrate transfusions during pregnancy are uncommon<sup>19</sup>, and only one patient has a history of RCC transfusions. The majority of the patients were admitted on an emergency basis and required immediate blood transfusions. It urges the establishment of an effective blood bank for these patients so that emergency care can be offered as soon as they arrive at the hospital. Although our research indicates that most patients require emergency blood, arranging blood in government hospitals is quite challenging, as found in the study by Akhter et al<sup>20</sup>. If the procedure of blood collection is complex, precious time is lost before patients receive optimal care.

Major indications for blood transfusion were antepartum anemia (51%) and PPH (40%). These findings are almost similar to previous studies<sup>3,8,21</sup>. However, Chowdhury et al. found that bleeding during cesarean section was the major cause of blood transfusion in obstetric patients<sup>7</sup>.

In most cases, blood was donated by the patient's friends or neighbors. Approximately one-third of the time, blood was taken through blood banks or volunteer organizations. It is alarming that 7% of patients purchased blood from brokers, which is alarming because the reliability of blood from brokers is frequently questioned. They abuse the patient parties by demanding enormous sums of money in exchange for urgently needed blood. Careful donor selection and strengthening testing are vital for safe transfusion<sup>22</sup>. In this regard, the blood transfusion reaction rate in our study was approximately 7%.

A high blood transfusion rate necessitates adequate facility preparation. Transfusing whole blood is not risk-free<sup>2</sup>, but most hospitals in Bangladesh currently lack the functionalities to transfuse blood components.

In this regard, strengthening proper and timely ANC and educating mothers about the hazards of anemia during pregnancy can aid in the early diagnosis of low hemoglobin levels and allow the option for oral and intravenous iron infusions to increase hemoglobin levels.

### Limitations:

Due to a lack of blood component transfusion facilities, we could not compare blood component transfusion to whole blood transfusion. Additional multicenter research is required to reveal more precise data for the entire population of Bangladesh.

### Conclusion:

Women, particularly those living in rural areas, must be educated about the significance of ANC for the early detection and treatment of anemia. No women should go to labor before correction of anemia. It is important to make a strong facility preparedness to combat the emergency acute blood loss by safe blood transfusion.

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