

ORIGINAL ARTICLE

Pattern of Blood Transfusion among Women Undergoing Caesarean Section in a Tertiary Health Care Centre

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ABSTRACT

Background: Cesarean section delivery causes major risk factors in terms of intraoperative performance and blood loss while blood transfusion is a promising factor in emergency care in case of blood unavailability. Women undergoing cesarean section routinely require blood cross-matching.

Aim: The present study aimed to evaluate the pattern of blood transfusion among women who underwent c/section at the tertiary care center.

Materials and Methods: This cross-sectional study was conducted on 745 pregnant women who underwent cesarean section at Obstetrics & Gynaecology department of Quaid-e-Azam International Hospital Islamabad and PAF hospital Masroor, Karachi for duration of six months from January 2021 to June 2021. The demographic details, incidence of cesarean section, blood transfusion indications and types were recorded. Antenatal intraoperative and pre-operative details were also noted. Complications regarding blood transfusion were analyzed using multivariable analysis and EPI-statistical software v 3.5.3.

Results: Of the total 745 cesarean sections, the prevalence of blood transfusion was 10.1%. About 75 women transfused 216 units of blood with packed cells tailed by Fresh Frozen Plasma (FFP). The prevalence of emergency cesarean section was 61 (81.3%) while general anesthesia was utilized in 27 (44.3%) cases. Fetal distress and placenta praevia were the common indications of cesarean section. Placenta praevia Respiratory rate (RR) was 5.01 ($p < 0.001$). Other obstetric complications and risk factors were anemia, antepartum hemorrhage, hypertension, and previous cesarean section. The cross-matched transfusion ratio was 9.93 while the transfusion index and probabilities were 0.078 and 10.1 respectively. **Conclusion:** Our study found a higher prevalence of blood transfusion risks among pregnant women who underwent cesarean section. It has been observed that the risk of blood transfusion increased with placenta previa, preoperative maternal anemia, placenta abruption, and second stage cesarean section. During the antenatal period, the need for blood transfusion might be reduced with an increased concentration of maternal hemoglobin.

Keywords: Blood transfusion, Complications, Caesarean delivery, Transfusion index

INTRODUCTION

Despite the risks, blood transfusion is still a life-saving intervention. Limited blood supplies as a result of poor donor response; viral contamination causing donor blood wastage, and anemia [1]; and rising expenses endure impeding the availability, blood utilization, timely provision, and blood products. Because donor blood and blood-banking services are limited, judicious use is required to achieve the overall goal of blood transfusion [2]. Many researchers considered hemorrhage as a significant factor for maternal mortality and morbidity. The higher mortality rate is caused by postpartum hemorrhage linked with cesarean section [3]. These procedures had a higher risk of intraoperative blood loss [4]. In obstetric practice, a blood transfusion common indicator is a cesarean section which might be delayed to blood unavailability [5]. Although advances in medical and surgical intervention, obstetric hemorrhage outcomes including radiological intervention had been changed clinical care key part blood transfusion remain an integral part when patients bleed. Globally, maternal mortality is mostly caused by Postpartum hemorrhage (PPH) [6]. PPH contributes almost a quarter of maternal mortality [7]. World health organization declared

that about 74% transfusion of blood among adults population are inapt regardless of blood transfusion live savage proximity [8]. Medicine based care system quality essential part is to avoid unnecessary blood transfusion. The increased rate of mortality and morbidity could be due to blood transfusion as reported by some studies [9].

During pregnancy, maternal vascular system changes occur with childbirth causing blood loss to be tolerated. Hemoglobin levels become lower as chronic anemia is caused by exiting compensating mechanisms in physiological or rural mothers' pregnancy anemia [10]. Based on antenatal risk factors, the majority of the patients had blood transfusions due to severe hemorrhage [11]. In the majority of cases, pregnant women with scheduled cesarean sections are customized for blood cross-matching. In all specialties, blood components and usage of unsuitable blood are reduced by various strategies. Blood transfusion is identified as a comprehensive obstetric care essential component [12]. The present study evaluated the need for blood transfusion among pregnant women who underwent or were scheduled for cesarean section. Also, the pattern of blood transfusion was evaluated among pregnant women.

MATERIALS AND METHODS

This cross-sectional study was conducted on 745 pregnant women who underwent cesarean section at Obstetrics & Gynaecology department of Quaid-e-Azam International Hospital Islamabad and PAF hospital Masroor, Karachi for duration of six months from January 2021 to June 2021. The demographic details, incidence of cesarean section, blood transfusion indications and types were recorded. Antenatal intraoperative and pre-operative details were also noted. Complications regarding blood transfusion were analyzed using multivariable analysis. Pregnant women admitted for cesarean section in the maternity unit from February 2021 to September 2021 were enrolled in this study. The packed cell volume <30% and temperature >37.5 °C were defined as pre-operative anemia and fever respectively commenced of surgery within 24 hours. Prolong surgery was a surgical intervention that lasted for > one hour. About 1000mls of blood loss was estimated as an excessive surgery. Pregnant women with a body mass index greater than 30 kg/m² were considered obese. Pre-tested collection proforma was used for data collection from patients and medical records. Investigator collected data from admission till discharge. Patients who underwent vaginal deliveries were excluded.

Parity, age, body mass index, educational status, and maternal weight were the socio-demographic data of all the participants. Perioperative conditions such as anemia, previous uterine surgery, labor details, gestational age, uterine fibroids, and chronic hypertension were investigated. Duration of surgery, cesarean section indications, general or regional anesthesia, surgeon cadre, and abdominal incision type were the intra-operative and postoperative parameters. The amount of blood lost was calculated by counting the soaked abdominal packs and gauzes, measuring the vaginal expelled blood volume after a cesarean section, and visually assessing blood staining of theatre linen and drapes. EPI version 3.5.3 was used for collecting data entry and analysis. A Chi-square test was carried out for comparing non-transfused and transfused blood patterns. Independent risk factors were identified in women who underwent cesarean section considering <0.05 as a significant value.

RESULTS

Of the total 745 cesarean sections, the prevalence of blood transfusion was 10.1%. About 75 women transfused 216 units of blood with packed cells tailed by Fresh Frozen Plasma (FFP). The prevalence of emergency cesarean section was 61 (81.3%) while general anesthesia was utilized in 27 (44.3%) cases. Fetal distress and placenta praevia were the common indications of cesarean section. Placenta praevia Respiratory rate (RR) was 5.01 (p<0.001). Other obstetric complications and risk factors were anemia, antepartum hemorrhage, hypertension, and previous cesarean section. The cross-matched transfusion ratio was 9.93 while the transfusion index and probabilities were 0.078 and 10.1 respectively.

Of the total 216 packed cell blood units, the prevalence of platelets, red cell, and fresh frozen plasma were 19 (8.8%), 121 (56%), and 76 (35.2%) respectively as shown in Table.1 and Figure. 1. The mean age of transfused and non-transfused patients was 27.58± 6.86

and 26.75±7.34 respectively. Of the total 75 blood transfused women, about 61 (81.3%) had an age lower than 30 years while the primigravidae of the transfused group was 26 (34.7%). Demographic details of the participants are shown in Table 2. It has been found that patients of age above 30 years had a higher transfusion rates whereas risk factors such as diabetes, syndrome, and preeclampsia were accountable for higher transfusion rates among women age > 30 years. Of the 14 women above 30 years, 5 were transfused (35.7% Vs64.3%) with a p-value equal to 0.0001.

Table-1 Prevalence of transfused blood unit (216) among 75 women

Transfused blood unit	Frequency n	Percentage %
Platelets	19	8.8
Fresh Frozen Plasma	76	35.2
Packed Red Cell	121	56
Total	216	100

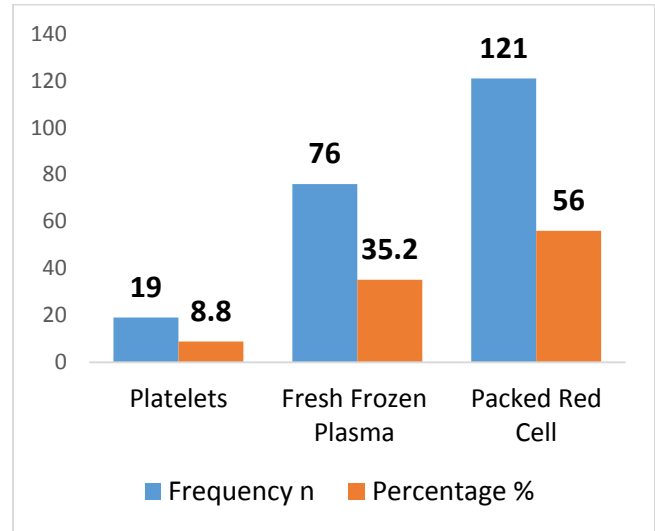


Figure-1 Prevalence of transfused blood unit (216) among 75 women

The pre and post-operative Hb mean value was 8.9 ± 1.9 g/dL and 8.7 ± 2.0 g/dL respectively. An Hb range varied from 0 g/dl to 5.1 g/dl. The mean Hb among transfused and non-transfused patients was 8.7 ± 1.6 g/dl and 10.3 ± 1.2 g/dl respectively with a maximum positive difference of 5.4 g/dl. During cesarean section, the prevalence of blood loss > 1000ml was 34 (45.3%) in a transfused group compared to the 90 (13.4%) non-transfused patients. Out of 75 women, the prevalence of common risk factors such as pregnancy hypertensive disorders, diabetes mellitus, previous CS, antepartum hemorrhage (APH), and anemia were 18 (24%), 12 (16%), 25 (33.3%), 17 (22.7%), and 3 (4%) respectively shown in Table 3/ Figure-2. Other risk factors were APH, PPH, uterus distension, anemia, coagulopathy, and GA. The prevalence of women who underwent general anesthesia was 27 (44.3%) cases. It has been observed that blood transfusion is significantly affected by anesthesia types. Table 4 demonstrate the association of clinical characteristics with blood transfusion while Figure 3 demonstrate the correlation between blood transfusion and cesarean section indications.

Table 2. Demographic details associated with blood transfusion

Parameters	n=745	Blood transfused women (n=75)	non-transfused women (n=670)	non-transfused women (n=670)	p-value
Age (years)					
< 21	49 (6.6%)	3 (6.1%)	46 (93.9%)	46 (93.9%)	0.39
21-30	644 (86.4%)	59 (9.2%)	585 (90.8%)	585 (90.8%)	0.57
>30	52 (7%)	13 (25%)	39 (75%)	39 (75%)	0.0001
Gestational Period (Weeks)					
< 34	54 (7.2%)	6 (11.1%)	48 (88.9%)	48 (88.9%)	0.78
35-40	579 (77.7%)	51 (8.8%)	528 (91.2%)	528 (91.2%)	0.16
>40	112 (15.1%)	18 (16.1%)	94 (83.9%)	94 (83.9%)	0.14
Gravidae					
G1 & G2	525 (70.5%)	47 (9%)	478 (91%)	478 (91%)	0.43
G3	182 (24.4%)	17 (9.34%)	165 (82.76%)	165 (82.76%)	0.52
G4	38 (5.1%)	11 (28.9%)	27 (71.1%)	27 (71.1%)	0.011

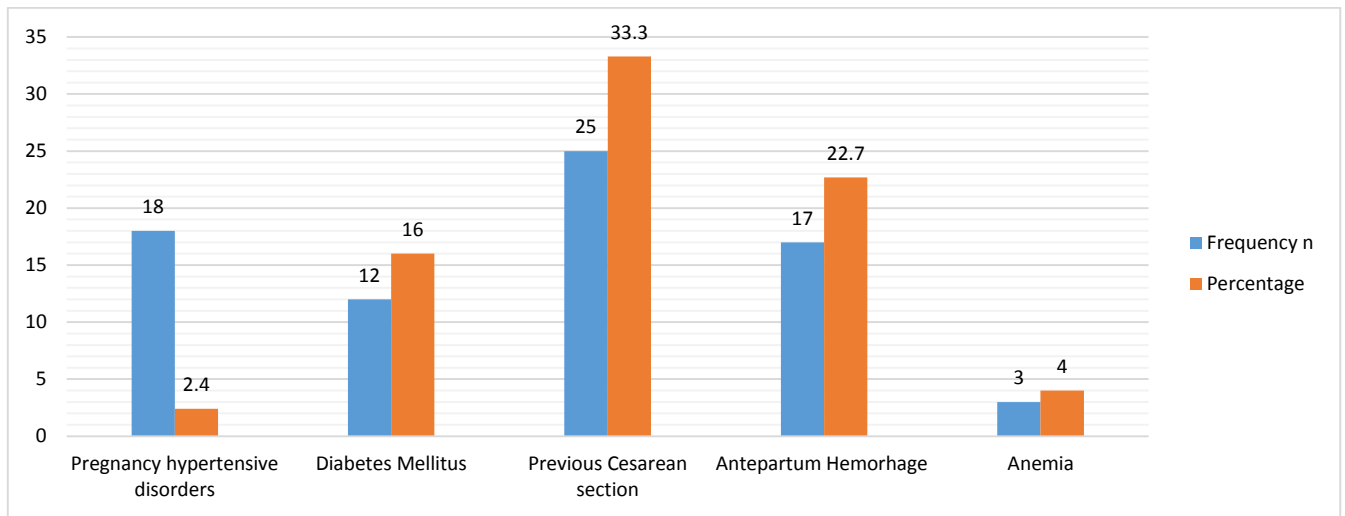


Figure-2 Prevalence of common risk factors among 75 women

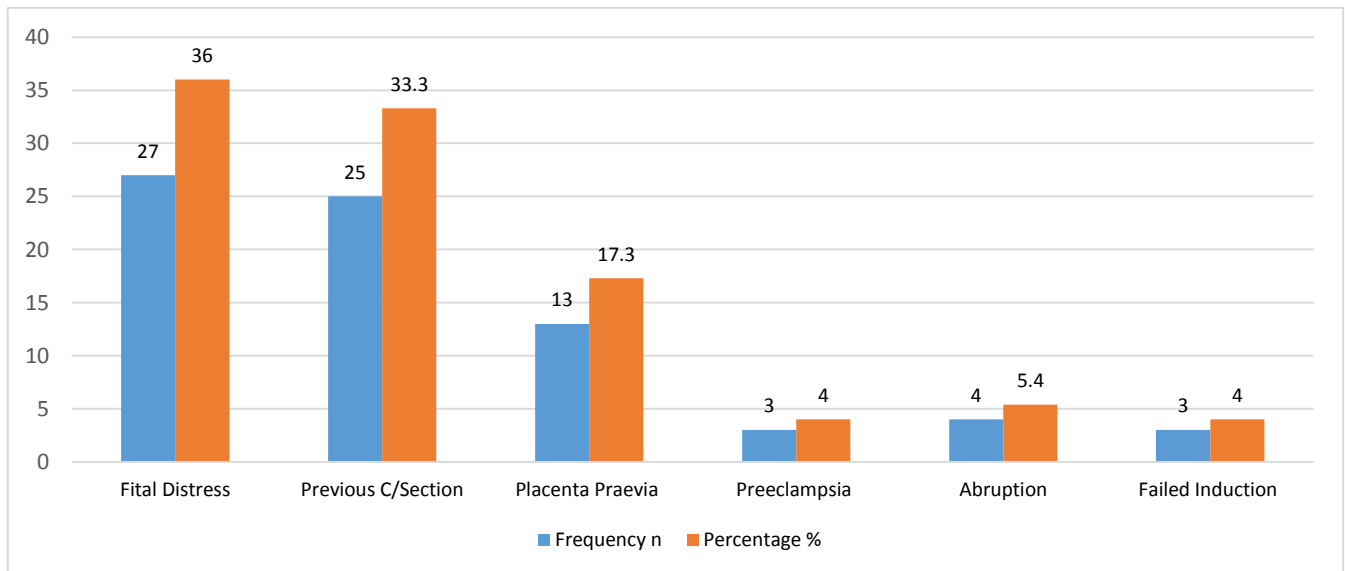


Figure.3 Correlation between blood transfusion and cesarean section indications.

Table-3 Prevalence of common risk factors among 75 women

Parameters	Frequency n	Percentage %
pregnancy hypertensive disorders	18	24
Diabetes mellitus	12	16
Previous CS	25	33.3
Antepartum hemorrhage (APH)	17	22.7
Anemia	3	4

DISCUSSION

In this cross-sectional study, about 745 women underwent cesarean section with the prevalence of 10.1% blood transfusion whereas the overall risk regarding cesarean section was 19.6%, which is more prevalent than the 0.63% to 12.2% reported in similar studies [13, 14]. The higher prevalence of blood transfusion reported in the present study might be caused by various parameters such as pelvic disproportion, placenta previa, prolong labor, hypertensive disorders, and placental abruption in pregnancy. Another study found about a 12.1% prevalence of blood transfusion [15] which was higher than the present study 10.1%. In the present study, the emergency cesarean section rate was 44.3% higher than 32.9% found in a US study conducted on cesarean section [16]. Another study reported a 5 to 21.8% cesarean rate among pregnant women [17]. The standard prevalence of cesarean section rate suggested by the world health organization was 5% to 15% at any facility [18]. The repetition of monotonous blood cross-matching for women undergoing cesarean section regardless of indication may result in unnecessary transfusions.

The rising trend of cesarean section causes blood consumption as a major challenge for obstetricians. During a blood transfusion, various investigators studied the prevalence of previous cesarean sections. The blood usage trend in cesarean section increased with the advancement in material physiology and general anesthesia [19]. Due to parental iron usage, blood transfusion has been minimized by anemia correction [20]. The current study reported a higher rate of cesarean section compared to other studies carried out in developing countries. Another study found a cesarean section rate of 40% which is much higher than the world health organization standard of 5% to 15% [21]. One study observed a 26% rate of cesarean section in their investigation [22]. In the present study, the blood transfusion rate was 10.1% which is in the limit of most studies from 1% to 14% [23, 24].

The majority of the blood cross-matched was non-transfused in this study whereas cross-matching of blood in the cesarean section should be customized based on transfused. Routinely cross-matched was reviewed due to the lower transfusion rate and cesarean deliveries in large numbers. In women >30 years of age, body weight, age, blood transfusion rate, and parity were found significantly higher. Advanced maternal age women usually face major challenges of risk factors such as PPH and APH which increase the blood transfusion. Women who were scheduled to go through cesarean section had higher rates of Hb levels, and transfusion rates were minimized due to

labor induction. Another study found that obesity increases the transfusion rate among women [25]. One study revealed a significant association between transfusion of blood and obesity [26].

Obstetric complications such as cesarean section recurrence, timing, and gestational age were found insignificant when correlated with transfusion of blood among women who need to go through cesarean section. The blood transfusion rate is affected by the anesthesia type. Women undergoing cesarean section under general anesthesia had an almost 44% transfusion rate reported in one study [27]. PPH is caused by general anesthesia as a risk factor due to preference of coagulopathy, placenta praevia, and APH. The chance of blood loss increases in emergency-based intervention through cesarean section besides indications for cesarean section. Several studies found similar results. In the current study for PPH, nearly half of the women (49%) received transfusion. More than two-thirds of the patients (82.7%) had PPH risk factors. More than one-third (38.5%) of the women received intraoperative transfusions. More than half (60%) of them received a single unit transfusion [28]. If the patients' pre-operative hemoglobin levels are optimized, they will be more tolerant of blood loss during CS/delivery, and single unit blood transfusions will be avoided.

CONCLUSION

Our study found a higher prevalence of blood transfusion risks among pregnant women who underwent cesarean section. It has been observed that the risk of blood transfusion increased with placenta previa, preoperative maternal anemia, placenta abruption, and second stage cesarean section. During the antenatal period, the need for blood transfusion might be reduced with an increased concentration of maternal hemoglobin.

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