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Original Research Article

A Prospective, Multicentre, Observational, Cross-sectional Study of the Prevalence of Blood Transfusion Associated with Caesarean Section

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Abstract:

Background: Caesarean section (CS) is one of the most frequently performed obstetric procedures worldwide. Perioperative blood loss can sometimes necessitate blood transfusion, which increases maternal morbidity, hospital stay, and healthcare costs. Understanding the prevalence and risk factors for transfusion is vital to strengthen obstetric care.

Aim: To determine the prevalence of blood transfusion among women undergoing caesarean sections and to identify common indications and associated maternal risk factors.

Methods: A prospective, cross-sectional study was conducted over one year at Sadar Hospital, Khunti (Ranchi) and Bhagwan Mahabir Manipal Hospital. A total of 70 women undergoing caesarean section were included. Data regarding maternal age, parity, indication for CS, estimated blood loss, preoperative hemoglobin level, and transfusion requirement were collected. Transfusion prevalence was calculated, and associations with clinical variables were analyzed.

Results: Out of 70 CS cases, 18 women (25.7%) required blood transfusion. The most common indications for CS in the transfused group were placenta previa (22%), abruptio placentae (17%), and obstructed labor (17%). Preoperative anemia (Hb <10 g/dL) was significantly associated with transfusion (p=0.01). The mean estimated blood loss was higher in the transfusion group (850 ± 220 mL) compared to the non-transfusion group (560 ± 140 mL, p<0.001). Multiparous women had a slightly higher transfusion rate (28%) than primiparous women (23%), though not statistically significant.

Conclusion: Approximately one-fourth of women undergoing caesarean delivery required blood transfusion, with preoperative anemia and obstetric complications being key contributors. These findings highlight the importance of antenatal anemia correction, improved surgical preparedness, and strict blood loss monitoring to reduce transfusion rates and maternal morbidity.

Keywords: Caesarean Section, Blood Transfusion, Prevalence, Anemia, Maternal Morbidity.

Introduction

Caesarean section (CS) is a lifesaving procedure for both mother and fetus when vaginal delivery poses risks. However, it is often associated with increased intraoperative and postoperative complications, including hemorrhage. Severe blood loss may necessitate blood transfusion, which carries risks of transfusion reactions, infections, and alloimmunization, in addition to increasing healthcare costs.

Globally, transfusion rates during CS vary between 2% and 27%, depending on population characteristics, prevalence of anemia, and hospital preparedness. In India, where antenatal anemia is common, the likelihood of perioperative transfusion is higher. Evaluating local prevalence and risk factors is essential to improve maternal safety. This multicentre cross-sectional study aimed to determine transfusion prevalence among CS patients and analyze associated maternal and obstetric factors.

Objectives

1. To determine the prevalence of blood transfusion among women undergoing CS.
2. To analyze the association between preoperative anemia, parity, and transfusion requirement.
3. To identify common obstetric indications leading to transfusion.
4. To provide recommendations for preventive strategies in obstetric practice.

Study Design and Setting

- **Design:** Prospective, multicentre, observational cross-sectional study.
- **Places:** Sadar Hospital, Khunti (Ranchi) and Bhagwan Mahabir Manipal Hospital.
- **Duration:** January 2023 – December 2023 (12 months).

Participants

- **Sample size:** 70 women undergoing CS.
- **Inclusion criteria:** All women undergoing emergency or elective CS during the study period.
- **Exclusion criteria:** Women with incomplete data, known coagulation disorders, or those refusing transfusion on religious grounds.

Outcomes

- **Primary outcome:** Prevalence of blood transfusion during or after CS.
- **Secondary outcomes:** Indications for CS, relationship with preoperative hemoglobin, estimated blood loss, and parity.

Materials and Methods

Maternal demographic and clinical data were collected using a structured proforma. Preoperative hemoglobin levels were noted. Estimated blood loss was calculated using visual assessment and mop counts. Transfusion was given based on hemoglobin <7 g/dL, hemodynamic instability, or excessive intraoperative blood loss.

Statistical analysis: Data were analyzed with SPSS v25. Continuous variables were expressed as mean ± SD and compared using Student's t-test. Categorical variables were analyzed using chi-square test. A p-value <0.05 was considered significant.

Results

Demographics: Mean age was 27.3 ± 4.6 years. Majority (58%) were multiparous.

Table 1: Prevalence of Blood Transfusion in CS Cases

Total CS cases	Transfusion required	Prevalence (%)
70	18	25.7%

Table 2: Indications for CS among Transfused Patients

Indication	Cases (n=18)	Percentage (%)
Placenta previa	4	22%
Abruptio placentae	3	17%
Obstructed labor	3	17%
Previous CS with scar tenderness	2	11%
Fetal distress	3	17%
Cephalopelvic disproportion	2	11%
Others	1	5%

Table 3: Comparison of Hemoglobin and Blood Loss between Groups

Parameter	Transfusion group (n=18)	Non-transfusion group (n=52)	p-value
Mean pre-op Hb (g/dL)	9.1 ± 1.2	11.3 ± 1.1	0.01
Mean blood loss (mL)	850 ± 220	560 ± 140	<0.001

Discussion

In this multicentre analysis, it was observed that approximately one out of every four women undergoing caesarean delivery required a blood transfusion, a figure that aligns with the higher range of global estimates. Among the various risk factors assessed, preoperative anemia emerged as the most significant predictor, underscoring the critical role of timely antenatal screening and correction of iron deficiency during pregnancy. In addition, obstetric complications such as placenta previa and abruptio placentae were identified as major contributors to transfusion requirements, reflecting the clinical burden of such emergencies on maternal outcomes. The overall transfusion prevalence of 25.7%, noted in this study, was substantially higher than that reported from many developed nations, where systematic antenatal supplementation programs, better obstetric preparedness, and advanced blood conservation strategies are routinely implemented. These findings highlight the urgent need for strengthening institutional blood bank preparedness, developing patient blood management (PBM) protocols, and reinforcing antenatal anemia prevention and treatment measures to mitigate transfusion requirements. While the relatively small sample size and the hospital-based nature of the cohort may restrict the generalizability of results, the prospective multicentric design provides additional validity and supports the relevance of these observations for clinical practice in similar healthcare settings.

Conclusion

Blood transfusion was required in about one-fourth of CS cases, with preoperative anemia and obstetric complications being major contributors. Early correction of anemia, risk stratification of high-risk pregnancies, and preparedness for intraoperative hemorrhage are crucial to minimize transfusion needs and improve maternal outcomes.

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