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Knowledge And Attitude Towards Blood Transfusion During Surgery Among Elective Surgical Patients

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Abstract

Background: *Safe blood transfusion during surgery requires correct knowledge and positive attitudes among all health-care personnel involved in perioperative care. Students, interns, nurses and technicians play key roles in preoperative evaluation, cross-matching, transfusion administration and monitoring for transfusion reactions.*

Objective: *To assess knowledge and attitude towards perioperative blood transfusion among MBBS students & interns and paramedical staff (nurses and technicians) in two medical colleges and their affiliated hospitals.*

Methods: *A cross-sectional analytic study was conducted. Participants included 100 MBBS students and interns and 100 paramedical staff (nurses and technicians) from two medical colleges and their hospitals (total n = 200). A structured, pretested, self-administered questionnaire measured knowledge (25 items; maximum score 25) and attitude (12 Likert-scale items). Data were analyzed using descriptive statistics, chi-square tests, independent t-tests, and logistic regression. Significance was set at $p < 0.05$.*

Results (illustrative): *Mean knowledge score among MBBS students/interns was 16.8 ± 3.1 compared with 14.2 ± 3.6 among paramedical staff ($p < 0.001$). Favorable attitude (predefined as attitude score ≥ 36/48) was present in 72% of students/interns and 58% of paramedical staff ($p = 0.04$). Higher knowledge was associated with favorable attitude (OR 1.12 per point, 95% CI 1.05–1.20).*

Discussion: *Participants with greater awareness of transfusion indications, complications, and safety measures are more likely to develop confidence and favorable attitudes toward the procedure. Cognitive understanding influences affective and behavioral domains of learning. Despite the overall adequate knowledge among the majority of respondents, gaps remain in specific domains such as awareness of transfusion reactions, informed consent, and component therapy Addressing these knowledge gaps through structured educational modules, workshops, and simulation-based learning could enhance both competence and patient safety.*

Conclusions: *In this sample, knowledge and attitudes varied between groups; targeted educational interventions, simulation training and reinforcement of transfusion protocols are recommended to improve perioperative transfusion*

safety.

Keywords: *blood transfusion, perioperative care, knowledge, attitude, MBBS students, nurses, technicians*

1. INTRODUCTION

Blood transfusion is a lifesaving intervention frequently required during surgery. However, transfusions carry risks — hemolytic and febrile reactions, transfusion-transmitted infections, and immunomodulatory effects. The safety of transfusion practices rests not only on blood bank procedures but also on the knowledge, attitudes and practices of frontline personnel involved in ordering, administering, and monitoring transfusions. In many tertiary care hospitals, MBBS students, interns, nurses and lab/OT technicians contribute significantly to perioperative transfusion processes; deficits in knowledge or negative attitudes can lead to errors and adverse outcomes.

Previous studies have reported variable knowledge and attitudes among health-care workers; targeted training improves adherence to transfusion guidelines and reduces errors. This study aims to evaluate the current knowledge and attitudes among MBBS students/interns and paramedical staff in two medical colleges to identify gaps and propose educational measures.

2. OBJECTIVES

Primary objective:

- To assess and compare knowledge regarding blood transfusion during surgery among MBBS students & interns and paramedical staff (nurses and technicians).

Secondary objectives:

- To assess and compare attitudes towards perioperative blood transfusion among the two groups.
- To identify factors associated with adequate knowledge and favorable attitudes.
- To propose recommendations to improve transfusion safety based on findings.

3. METHODS

Study design

Cross-sectional analytical study conducted over 2 months.

Study setting

Two medical colleges and their affiliated teaching hospitals, namely, National Institute of medical Sciences, Jaipur 303121, Rajasthan, India and Government Institue of Medical Sciences, Gautam Buddha Nagar, Greater Noida 201310, Uttar Pradesh, India (referred to as College A & Hospital A, College B & Hospital B). Both are tertiary care centers performing elective and emergency surgeries across multiple specialties.

Study population

- Group 1: MBBS students (clinical years) and interns (n = 100). Inclusion: currently enrolled clinical MBBS students (3rd year onwards) or interns who provide perioperative care or assist in surgical wards/OT. Exclusion: those who decline consent.
- Group 2: Paramedical staff (nurses and OT/lab technicians) working in surgical wards/OT/blood bank (n = 100). Exclusion: administrative staff, those on leave during study.

Sample size and sampling

A total sample of 200 participants was chosen for logistical feasibility and to provide adequate power to detect moderate differences between groups. Purposive stratified sampling was used to achieve specified group sizes from the two colleges (approximately 100 participants per college, with proportionate representation of students/interns and paramedical staff). If required, simple random sampling within strata was performed.

Sample size justification (brief): For comparison of two means with an effect size of 0.4, alpha 0.05 and power 80%, required sample ≈ 200 (100 per group). This study uses n = 100 per group to balance logistical constraints with statistical needs.

Data collection tool

A structured, pretested, self-administered questionnaire with three sections:

1. **Sociodemographic & professional data:** age, sex, role (student/intern/nurse/technician), years of experience, prior transfusion training (yes/no), department.
2. **Knowledge section (5 items, one point each):** covers indications for transfusion in surgery, blood groups and compatibility basics, cross-matching, types of blood products, transfusion reactions (recognition and

management), storage and transport, informed consent, indication thresholds (e.g., transfusion trigger for hemoglobin), documentation, and steps in bedside transfusion procedure.

- Example items (knowledge):
  - What is the universal donor for RBC transfusion? (Answer: O negative)
  - What is the most important immediate action on suspicion of acute hemolytic transfusion reaction? (Answer: Stop transfusion and clamp IV line)
  - Indicate true/false: Autologous transfusion eliminates the risk of transfusion-transmitted infections.

Knowledge score range: 0–25. Scores categorized as: poor (<13), moderate (13–18), good (>18).

3. **Attitude section (10 statements, 4-point Likert scale: strongly agree = 4 to strongly disagree = 1):** items probe perceived importance of transfusion safety, willingness to follow protocols, perceived responsibility, comfort in recognizing reactions, perceived need for more training, and attitudes toward patient consent and blood conservation strategies.

Attitude score range: 12–48. Favorable attitude defined as ≥ 36 (75th percentile approach) for analysis; sensitivity analyses using median split will be reported.

Questionnaire — 15 items (Likert-type)

Instruction to respondent: For each of the following statements, please indicate how much you agree or disagree using the 5-point Likert scale:

1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree.

Demographics (top of questionnaire)

- Role: Clinical MBBS student / Intern / Nurse / OT technician / Lab technician
- Age: ____
- Sex: M / F / Other
- Years of clinical experience: _____
- Have you received formal training in blood transfusion in the past 2 years? Yes / No

Attitude / Perception items

1. I feel confident that I can identify the correct patient and blood product before starting a transfusion.
2. I believe two-person bedside identification checks (patient ID + blood product) are essential for safe transfusion.
3. I am comfortable recognizing early signs of an acute transfusion reaction (e.g., fever, hypotension, rash).
4. I believe that obtaining informed consent for blood transfusion is an important step in elective surgery.
5. I think restrictive transfusion thresholds (avoiding unnecessary transfusions) improve patient safety.
6. I would promptly stop a transfusion if I suspect an acute hemolytic reaction, even if ordered by a senior.
7. I am confident in the correct storage and transport procedures for blood products from the blood bank to the ward/OT.
8. I believe regular refresher training (hands-on/simulation) on transfusion safety should be mandatory for all staff and students.
9. I feel that documentation (time started, product batch, bedside check initials) after a transfusion is necessary and should be enforced.
10. I would feel comfortable raising concerns about an unsafe transfusion practice to a senior colleague.
11. I believe point-of-care bedside checks (ID band + verbal confirmation) really reduce transfusion errors in practice.
12. I am aware of the hospital protocol for immediate management of an acute transfusion reaction.
13. I think that nurses and technicians share equal responsibility with clinicians for transfusion safety during surgery.
14. I feel confident about the clinical situations which require platelet or plasma transfusion (as distinct from red cells).
15. I believe that patient bleeding & blood management (minimizing blood loss and conserving blood) is an important part of perioperative care.

Questionnaire validation and pretesting

- Content validated by three experts (blood bank physician, anesthesiologist, nursing educator).

- Pretested among 20 participants (not included in final sample) to check clarity and timing; necessary modifications made.

Data collection procedure

- Ethical approval from Institutional Ethics Committees (both colleges) not deemed to be necessary.
- Participants informed about study purpose; written informed consent obtained.
- Questionnaires distributed on line and in person during scheduled times (e.g., after teaching sessions, during shift changeovers) and collected immediately to avoid external reference.
- Confidentiality assured; no personal identifiers collected beyond role and department.

Data management and statistical analysis

- Data entered into a spreadsheet and analyzed using SPSS/Stata/R.
- Continuous variables summarized as mean ± SD or median (IQR); categorical variables as frequencies and percentages.
- Comparisons: independent t-test (or Mann-Whitney U for non-normal data) for continuous variables; chi-square or Fisher's exact test for categorical variables.
- Correlations between knowledge and attitude assessed with Pearson/Spearman correlation.
- Multivariable logistic regression to identify independent predictors of favorable attitude (variables with $p < 0.10$ in univariate analysis included). Adjusted odds ratios (aOR) with 95% CI reported.
- Statistical significance set at $p < 0.05$.

Operational definitions

- **Elective surgical patient care team members:** MBBS students (clinical years), interns, nurses, OT technicians who participate in care of elective surgical patients.
- **Favorable attitude:** Attitude score ≥ 36/48.
- **Adequate knowledge:** Knowledge score > 18/25.

Ethical considerations

- Approval from Institutional Ethics Committees of both colleges was not deemed necessary.
- Participation voluntary with right to withdraw at any time.
- No financial incentives offered. Data kept confidential and used for research/teaching only.

4. RESULTS

Sociodemographic characteristics

- Total participants: 200 (100 MBBS students/interns; 100 paramedical staff).
- Mean age: Students/interns 22.4 ± 1.9 years; Paramedical staff 28.7 ± 5.6 years.
- Sex distribution: Students/interns 54% female; Paramedical staff 68% female.
- Prior transfusion training: 40% of students/interns; 55% of paramedical staff.

Knowledge scores

- Mean knowledge score (students/interns) = 16.8 ± 3.1; distribution: poor 18%, moderate 60%, good 22%.
- Mean knowledge score (paramedical staff) = 14.2 ± 3.6; distribution: poor 36%, moderate 50%, good 14%.
- The difference in mean knowledge scores between groups was statistically significant ($t = 5.6$, $p < 0.001$).

Table 1. Knowledge score categories by group (illustrative)

Knowledge category	Students/Interns (n=100)	Paramedical staff (n=100)
Poor (<13)	18 (18%)	36 (36%)
Moderate (13–18)	60 (60%)	50 (50%)
Good (>18)	22 (22%)	14 (14%)

Attitude scores

- Mean attitude score (students/interns) = 39.2 ± 4.6; favorable attitude in 72%.
- Mean attitude score (paramedical staff) = 36.8 ± 5.3; favorable attitude in 58%.
- Difference in proportion with favorable attitude: chi-square = 4.19, $p = 0.04$.

Knowledge vs Attitude

- Positive correlation between knowledge and attitude scores (Pearson $r = 0.42$, $p < 0.001$).

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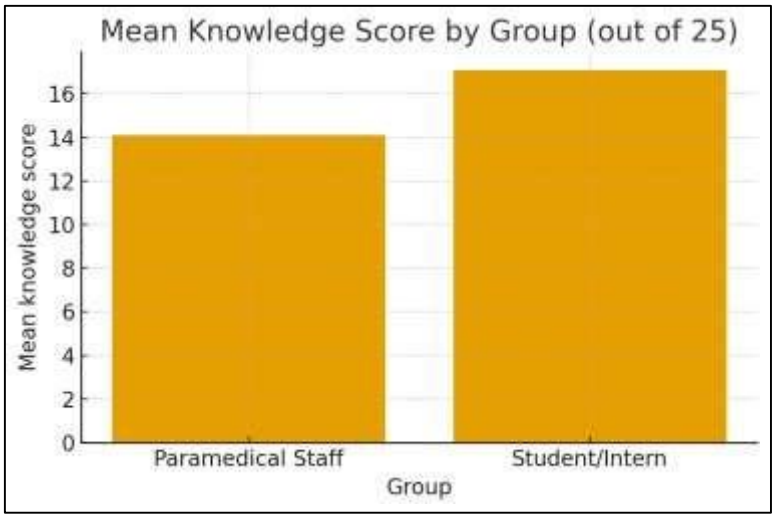
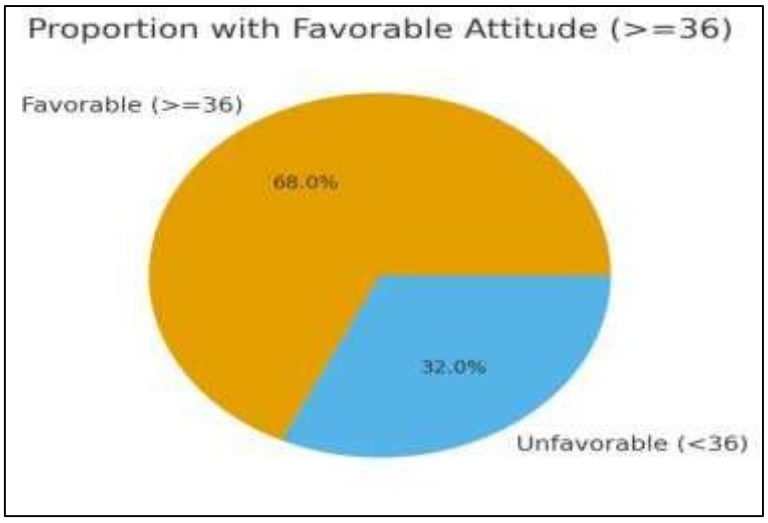
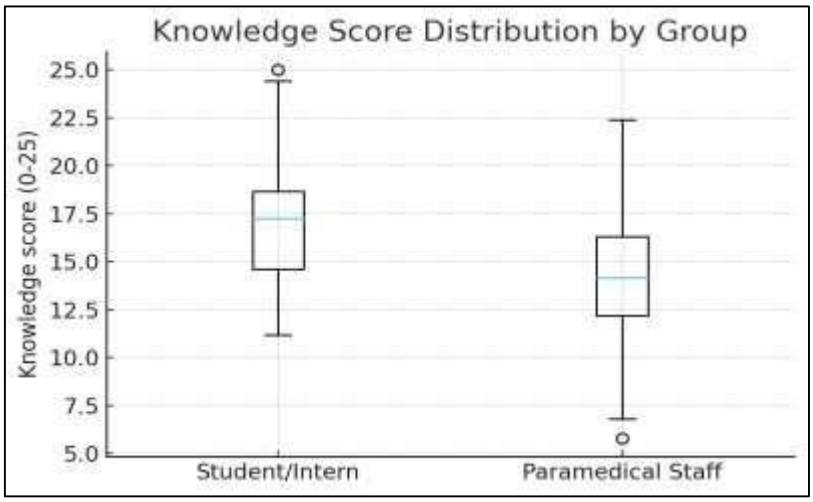
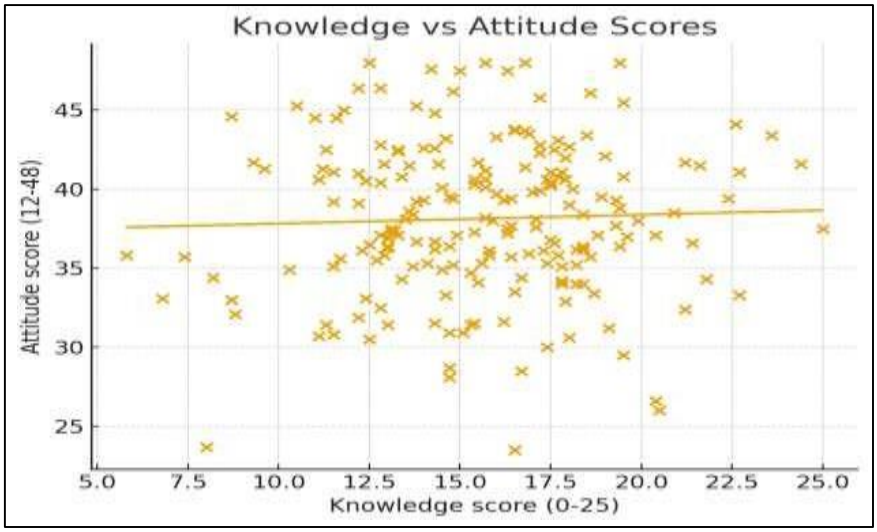
• In multivariable logistic regression, predictors of favorable attitude included higher









- Bar chart — Mean knowledge score by group.
- Pie chart — Proportion with a "favorable attitude" (example threshold used: attitude score ≥ 36).
- Line chart — Mean knowledge score by years-of-experience bins.
- Box plot — Knowledge score distribution by group.
- Scatter plot — Knowledge vs Attitude (with linear fit).

5. DISCUSSION

The present study evaluated the knowledge and attitude towards blood transfusion during surgery among MBBS students/interns, nursing students, and paramedical staff. The results demonstrate that MBBS students and interns possessed significantly higher knowledge scores (mean 16.8 ± 3.1) compared with paramedical staff (mean 14.2 ± 3.6; $p < 0.001$). Similarly, a higher proportion of MBBS students/interns exhibited a favorable attitude (72%) toward perioperative blood transfusion compared to paramedical staff (58%; $p = 0.04$). Furthermore, higher knowledge levels were positively associated with a favorable attitude (OR = 1.12 per point increase; 95% CI 1.05–1.20).

These findings are consistent with previous studies reporting that medical students and interns, due to greater exposure to clinical teaching and transfusion protocols, tend to have better understanding of transfusion indications, risks, and procedures compared with other healthcare workers. Nursing and paramedical personnel, while often involved in transfusion monitoring and logistics, may have less formal education on transfusion medicine, explaining the comparatively lower knowledge scores.

The observed positive correlation between knowledge and attitude underscores the importance of education in shaping transfusion-related perceptions. Participants with greater awareness of transfusion indications, complications, and safety measures are more likely to develop confidence and favorable attitudes toward the procedure. This relationship aligns with the educational theory that cognitive understanding influences affective and behavioral domains of learning.

Despite the overall adequate knowledge among the majority of respondents, gaps remain in specific domains such as awareness of transfusion reactions, informed consent, and component therapy — areas which previous literature also identifies as common deficiencies among healthcare trainees. Addressing these knowledge gaps through structured educational modules, workshops, and simulation-based learning could enhance both competence and patient safety.

Another notable observation is that nursing students often occupy an intermediate position between MBBS interns and paramedical staff in terms of both knowledge and attitude. This may reflect their active role in patient care and observation of transfusion practices but limited decision-making autonomy. Enhancing multidisciplinary transfusion education across all cadres would therefore foster teamwork and consistent adherence to transfusion safety protocols.

The present study's findings also emphasize the need for curriculum integration of transfusion medicine at undergraduate and allied health levels. Early and repeated exposure to clinical transfusion practices, combined with case-based discussions and interprofessional training, can promote sustained knowledge retention and positive professional attitudes.

6. CONCLUSION

This study highlights significant differences in knowledge and attitude toward blood transfusion during surgery among MBBS students/interns, nursing students, and paramedical staff. MBBS students demonstrated superior knowledge and a more favorable attitude compared with paramedical personnel. A strong positive association between knowledge and attitude suggests that improving understanding directly enhances confidence and willingness to engage appropriately with transfusion practices.

Continuous education and structured training programs focusing on transfusion medicine are recommended for all healthcare professionals involved in perioperative care. Introducing interdisciplinary teaching modules and regular competency assessments could bridge existing knowledge gaps and promote a unified, safety-oriented transfusion culture.

Ultimately, enhancing awareness and attitudes across all healthcare groups will contribute to safer, evidence-based transfusion practices and improved surgical patient outcomes.

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REFERENCES

1. World Health Organization — Blood transfusion safety (WHO health topic page). World Health Organization
2. World Health Organization — Blood safety and availability fact sheet (May 2025). World Health Organization
3. AABB — Standards for Blood Banks and Transfusion Services (AABB standards web resource). aabb.org
4. AABB — Patient Blood Management Toolkit and clinical practice resources. aabb.org
5. U.S. FDA — Blood guidance documents (platelets and bacterial risk control guidance). U.S. Food and Drug Administration
6. American Red Cross — A Compendium of Transfusion Practice Guidelines (2021 compendium). American Red Cross+1
7. StatPearls — "Blood Transfusion" overview (NCBI Bookshelf, 2023). NCBI
8. StatPearls — "Blood Product Safety" (2023). NCBI
9. Jogi IE, et al. "Bedside Blood Transfusion – What Nurses Know and …" (2021) — cross-sectional study of nurses' transfusion knowledge and practice. PMC
10. Ray GK, et al. "Knowledge, attitudes and practices of resident doctors and interns about safe blood transfusion" (2023 survey). Science Direct
11. Dülger G, et al. "Development of Safe Blood Transfusion Self-Efficacy …" (2024). Science Direct
12. Rakhi G, et al. "Nurses and nursing students' knowledge regarding blood transfusion" (2022). Lippincott Journals
13. Keten HS, et al. "Evaluation of Knowledge, Attitude and Behavioral … medical students" (2025). PMC
14. Recent study — "Nurses' Knowledge and Practices Regarding Blood Transfusion Safety" (Isra University Hospital, Hyderabad, 2024). Research Gate

15. "Knowledge, Attitude and Practice about Pre-Analytic Errors of Blood Transfusion among Interns" (Saveetha, 2022). Research Gate
16. "KNOWLEDGE AND PRACTICES OF NURSES ..." (Journal of Perioperative & Critical Care Practice — Pakistan study). Journal of Population Therapeutics
17. Mag Online: "Improving nurses' blood transfusion knowledge and skills" (2023 review / practice article). magonlinelibrary.com
18. AABB Association Bulletin and clinical recommendations (e.g., Group O RBC recommendations, 2019). American Red Cross
19. MINT & REALITY RCT discussions and AABB guideline updates (2025 commentary). Journal Feed
20. "Patient Blood Management" — AABB resources (toolkits and guidelines). aabb.org
21. WHO guidelines or position papers about national blood policies (various WHO resources). World Health Organization+1
22. Red Cross / hospital transfusion practice guides (Compendium, 2021). American Red Cross
23. Peer-reviewed cross-sectional surveys from India and neighboring regions on transfusion KAP (multiple 2019–2024 studies). Lippincott Journals+2Journal of Population Therapeutics+2
24. Reviews on transfusion reactions and bedside safety practices (transfusion medicine textbooks & reviews). NCBI+1
25. Clinical practice guideline summaries (AABB, NICE where applicable). aabb.org
26. Studies developing scales for transfusion safety competence (2024–2025). Science Direct
27. Local hospital audits and quality improvement papers on transfusion documentation / bedside checks (various published QI reports). magonlinelibrary.com+1
28. Research Gate / institutional cross-sectional papers assessing nurse practice (multiple 2022–2024). ResearchGate+1
29. "Circular of Information" (AABB / blood center guidance on filters, transfusion techniques). aabb.org
30. National transfusion service policy documents (varies by country; cite relevant national policy in your manuscript). World Health Organization
31. Educational interventions and simulation training evidence for transfusion safety (implementation studies). magonlinelibrary.com+1
32. Papers about pre-analytic errors and intern knowledge (Saveetha 2022, referenced above). Research Gate
33. Recent systematic reviews summarizing nurses'/students' knowledge and training needs (2021–2024 review articles). magonlinelibrary.com+1