RJNMSR
Review Journal of Neurological & Medical Sciences Review

Volume 4, Issue 3, 2026

ASSESSMENT OF DOCTORS' KNOWLEDGE AND PRACTICES REGARDING SAFE BLOOD TRANSFUSION AT NOWSHERA DHQ HOSPITAL AND QAZI HUSSAIN AHMED HOSPITAL: A DESCRIPTIVE CROSS-SECTIONAL STUDY

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DOI: http://doi.org/10.5281/zenodo.21484052

Received	Accepted	Published
22 January 2026	16 March 2026	31 March 2026

ABSTRACT

Background: *Safe blood transfusion is an essential component of quality healthcare. Inadequate knowledge and poor adherence to transfusion guidelines among doctors can lead to preventable transfusion-related complications and compromise patient safety. Limited evidence is available regarding doctors' knowledge and practices in secondary care hospitals of Khyber Pakhtunkhwa.*

Methods: *A descriptive cross-sectional study was conducted among 422 doctors working at DHQ Hospital Nowshera and Qazi Hussain Ahmed Hospital. Participants were selected using a stratified random sampling technique. Data were collected using a structured questionnaire and an observational checklist adapted from validated instruments. Data were analyzed using IBM SPSS Statistics Version 26. Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to summarize the data, while Pearson's correlation was applied to determine the relationship between knowledge and practice. A p-value of <0.05 was considered statistically significant.*

Results: *Of the 422 participants, 338 (80.1%) were female and 84 (19.9%) were male. Adequate knowledge regarding safe blood transfusion was observed among 194 (46.0%) doctors, while 165 (39.1%) had moderate knowledge and 63 (14.9%) had poor knowledge. Good transfusion practice was reported by 219 (51.9%) participants, whereas 203 (48.1%) demonstrated poor practice. A statistically significant moderate positive correlation was found between knowledge and practice ($r = 0.46$, $p = 0.001$).*

Conclusion: *Doctors demonstrated moderate knowledge and only satisfactory transfusion practices. Regular competency-based training, continuous professional education, implementation of standardized transfusion protocols, and periodic clinical audits are recommended to enhance transfusion safety and improve patient outcomes.*

Keywords: *Safe blood transfusion, Knowledge, Practice, Doctors, Patient safety, Blood transfusion, Cross-sectional study, Pakistan*

Chapter One:
INTRODUCTION

Blood transfusion is one of the most frequently performed medical procedures worldwide and is considered an essential component of modern healthcare services. It is commonly used in the treatment of trauma, surgical emergencies, severe anemia, obstetric hemorrhage, malignancies, and chronic diseases (1,2). According to the World Health Organization (WHO), millions of blood units are transfused annually to save lives and improve health outcomes (3). Although blood transfusion has enormous clinical benefits, unsafe transfusion practices can result in serious complications (4). These complications include acute hemolytic reactions, febrile non-hemolytic reactions, allergic reactions, circulatory overload, and transmission of infectious diseases such as hepatitis B, hepatitis C, and HIV (5,6). Many transfusion-related errors occur due to improper patient identification, incorrect blood matching, poor monitoring, and inadequate clinical practice (7).

Doctors are central to safe transfusion practices because they are directly responsible for ordering blood products, verifying compatibility, monitoring patients during transfusion, documenting procedures, and responding to adverse reactions (8). Therefore, doctors must possess adequate knowledge and practical competency to ensure patient safety (9). In developing countries such as Pakistan, inadequate staffing, lack of continuing education, increased workload, and limited training opportunities may compromise safe transfusion practices (10). In healthcare facilities of Nowshera, blood transfusion is a common clinical procedure, yet limited evidence exists regarding doctors' competency in this area. This study was therefore designed to assess doctors' knowledge and practice regarding safe blood transfusion at Nowshera DHQ Hospital and Qazi Hussain Ahmed Hospital.

1.2 Problem Statement

Despite advancements in transfusion medicine and the availability of international transfusion guidelines, transfusion-related complications continue to occur in healthcare settings (4,5). Unsafe transfusion practices remain a significant concern in Pakistan due to gaps in doctors' knowledge, inadequate training, and non-compliance with standard protocols (9,10). No comprehensive study has been conducted at Nowshera DHQ Hospital and Qazi Hussain Ahmed Hospital to evaluate both doctors' knowledge and practical adherence regarding safe blood transfusion. The absence of local evidence limits the ability of healthcare institutions to identify deficiencies and improve transfusion safety practices.

1.3 Purpose of the Study

The purpose of this study was to assess doctors' knowledge and practice regarding safe blood transfusion at Nowshera DHQ Hospital and Qazi Hussain Ahmed Hospital and identify factors associated with safe transfusion practices.

1.4 Objectives of the Study

To assess doctors' knowledge and practice regarding safe blood transfusion.

To determine the relationship between doctors' knowledge and practices regarding safe blood transfusion

1.5 Research Questions

What is the level of doctors' knowledge regarding safe blood transfusion at Nowshera DHQ Hospital and Qazi Hussain Ahmed Hospital?

Is there a significant association between doctors' knowledge and their practices regarding safe blood transfusion?

1.6 Significance of the Study

This study is important for medical education, hospital administration, policymakers, and patient safety initiatives. The findings will:

Help identify gaps in doctors' knowledge and practice.

Support the development of training programs on transfusion safety.

Assist hospital management in implementing standard operating procedures.

Enhance patient safety by reducing transfusion-related complications.

Provide baseline data for future research in Pakistan.

1.7 Operational Definitions

Knowledge

The understanding possessed by doctors regarding blood transfusion procedures, complications, patient monitoring, compatibility checking, and documentation.

Practice

The actual performance of doctors during blood transfusion procedures according to standard guidelines.

Safe Blood Transfusion

The administration of blood and blood products using evidence-based protocols to minimize risks and complications.

Chapter Two: Literature Review

2.1 Literature Review

Blood transfusion is a life-saving medical intervention used worldwide for the management of various clinical conditions, including severe anemia, trauma, surgical procedures, obstetric hemorrhage, hematological disorders, and cancer treatment (11–15). Although blood transfusion can significantly improve patient outcomes, it is also associated with potential risks and complications if not performed according to established safety standards (12,16). Safe blood transfusion requires strict adherence to protocols involving patient identification, blood compatibility testing, administration procedures, monitoring, documentation, and management of adverse reactions (13,17).

Doctors play a central role in the blood transfusion process because they are directly responsible for verifying patient identity, ordering blood products, monitoring patients during transfusion, recognizing complications, and documenting procedures accurately (19,20). Consequently, doctors' knowledge and practices regarding blood transfusion safety are critical determinants of patient safety and quality of healthcare services (21,22).

Globally, healthcare organizations such as the World Health Organization emphasize the importance of competency-based training and continuous professional development to reduce transfusion-related errors and improve patient outcomes (11,12). Despite advances in healthcare systems and transfusion medicine, transfusion-related incidents continue to occur due to human error, inadequate knowledge, and non-compliance with standard operating procedures (16,18).

2.2 Concept of Blood Transfusion

Blood transfusion is the process of transferring blood or blood components from a donor to a recipient through intravenous administration (13,14). The procedure is performed to restore blood volume, improve oxygen-carrying capacity, correct coagulation abnormalities, or replace deficient blood components (15).

Blood products commonly used in clinical practice include:

Whole Blood
Packed Red Blood Cells (PRBCs)
Fresh Frozen Plasma (FFP)
Platelet Concentrates
Cryoprecipitate

Each blood component serves a specific therapeutic purpose and requires careful administration according to established clinical guidelines (13–15).

2.3 Importance of Safe Blood Transfusion

Safe blood transfusion is essential for preventing avoidable complications and ensuring positive patient outcomes (12,16). Errors during transfusion can result in serious consequences including acute hemolytic transfusion reactions, allergic reactions, febrile non-hemolytic reactions, transfusion-associated circulatory overload, transfusion-related acute lung injury, transmission of infectious diseases, increased morbidity, and mortality (16–18).

The majority of transfusion-related errors occur during patient identification, blood sampling, compatibility testing, blood administration, and patient monitoring (16,18). Therefore, adherence to safety protocols is necessary at every stage of the transfusion process (17).

2.4 Role of Doctors in Blood Transfusion Safety

Doctors are the healthcare professionals critically involved in blood transfusion administration and

oversight (19–21). Their responsibilities include executing clinical orders, confirming patient identity, checking blood group compatibility, assessing baseline vital signs, obtaining informed consent, and inspecting blood products for abnormalities before transfusion (19,20).

During transfusion, doctors are responsible for initiating transfusion according to institutional protocols, evaluating vital signs regularly, observing for signs of transfusion reactions, ensuring appropriate transfusion rates, and maintaining patient comfort and safety (20,21).

After transfusion, doctors must complete documentation accurately, evaluate patient response, report adverse events, and manage equipment protocols according to infection control guidelines (19,20). Failure to perform these responsibilities adequately may compromise patient safety and increase the risk of adverse outcomes (21).

2.5 Doctors' Knowledge Regarding Blood Transfusion

Knowledge refers to doctors' understanding of transfusion principles, blood products, compatibility testing, patient assessment, monitoring requirements, and management of transfusion reactions (22,23).

Adequate knowledge is necessary to ensure evidence-based practice and reduce the likelihood of errors (21,22). Several studies have demonstrated that deficiencies in clinicians' knowledge contribute significantly to transfusion-related incidents (22–25).

Knowledge domains commonly assessed include blood group compatibility, patient identification procedures, blood storage requirements, indications for transfusion, monitoring requirements, recognition of transfusion reactions, emergency management of complications, and documentation standards (22–24).

Studies indicate that doctors often possess adequate general knowledge but may lack detailed understanding of specific compatibility verification updates and adverse reaction management (22,23).

2.6 Doctors' Practices Regarding Blood Transfusion

Practice refers to the actual implementation of safe transfusion procedures during clinical care (19,25). Good transfusion practice requires consistent adherence to established protocols and guidelines (20).

Safe transfusion practices include accurate patient identification, verification of blood products, double-checking compatibility information, monitoring patients before, during, and after transfusion, prompt recognition of complications, and appropriate documentation (19,20).

Research indicates that discrepancies may exist between clinicians' knowledge and actual clinical practice (23,25). Factors such as workload, staffing shortages, and organizational constraints may affect adherence to recommended procedures (25).

2.7 International Evidence on Knowledge and Practice

Several international studies have investigated medical clinicians' competency regarding blood transfusion safety (22–25).

Hijji et al. reported that a substantial proportion of practitioners lacked adequate knowledge regarding blood transfusion procedures, particularly in the areas of patient identification and management of transfusion reactions (22). The study emphasized the need for regular educational interventions and competency assessments.

Bayraktar and Erdil found significant deficiencies in clinicians' understanding of blood administration procedures and transfusion monitoring requirements (23). The authors recommended continuing education programs to improve clinical competency and patient safety.

Other studies conducted in Europe, Asia, and the Middle East have consistently reported moderate knowledge levels among healthcare staff and identified gaps in documentation practices, compatibility verification, and recognition of adverse transfusion reactions (24,25).

These findings suggest that blood transfusion competency remains a global concern requiring

continuous professional development and institutional support (21,25).

2.8 Blood Transfusion Practices in Pakistan

Blood transfusion services in Pakistan face several challenges including limited resources, high patient loads, inadequate staffing, and inconsistent implementation of evidence-based guidelines (26–28).

Research conducted in Pakistani healthcare settings indicates that transfusion-related practices vary considerably across institutions (26,27). Knowledge gaps among healthcare professionals, particularly regarding compatibility testing and transfusion monitoring, have been reported in several studies (26,27).

Khan and Ali identified inadequate training opportunities, excessive workload, and limited institutional support as major barriers to safe transfusion practices among clinicians (26). The study recommended strengthening educational programs and implementing regular competency evaluations.

Other studies conducted in regional hospitals have similarly highlighted the need for structured transfusion training and stronger adherence to national and international guidelines (27,28).

2.9 Factors Affecting Doctors' Knowledge and Practice

Several factors influence clinical competency regarding blood transfusion safety (21,23–27).

Educational Qualification: Specialized medical background is associated with better understanding of transfusion principles and evidence-based practice (23,25).

Clinical Experience: Years of clinical experience contribute to skill development and practical competency (21,24).

Continuing Professional Education: Training programs and refresher courses significantly improve knowledge and practice (11,20).

Workload and Staffing Levels: Heavy workload and staff shortages may reduce adherence to safety procedures (25,26).

Institutional Policies: The availability of clear guidelines, supervision, and quality assurance programs promotes safe transfusion practices and reduces procedural errors (17,20,28).

2.10 Theoretical Framework

This study is based on the Knowledge-Practice Framework, which suggests that increased knowledge leads to improved clinical practice. According to this framework, doctors who possess adequate knowledge regarding blood transfusion procedures are more likely to implement safe and evidence-based practices (22,25). The framework assumes that educational interventions enhance knowledge, which subsequently influences attitudes and behaviors, ultimately improving patient outcomes and healthcare quality (11,25).

2.11 Summary of Literature Review

The reviewed literature demonstrates that blood transfusion safety remains a major concern in healthcare systems worldwide (11,12,16). Doctors play a critical role in ensuring safe transfusion practices through patient assessment, blood verification, monitoring, documentation, and management of transfusion reactions (19–21).

Previous studies consistently report moderate levels of knowledge among clinicians, with significant deficiencies in compatibility verification, patient identification, monitoring procedures, and recognition of adverse reactions (22–25). Educational qualification, clinical experience, workload, institutional support, and continuing professional development have been identified as important factors influencing competency (21,23–28).

Although several international studies have examined blood transfusion safety, limited evidence is available from healthcare structures in Nowshera (26–28). Therefore, the present study aims to assess doctors' knowledge and practices regarding safe blood transfusion at Nowshera DHQ Hospital and Qazi Hussain Ahmed Hospital to identify existing gaps and provide evidence for improving clinical practice and patient safety (26–28).

Chapter Three: Methodology

3.1 Study Design

A descriptive cross-sectional study design was used.

3.2 Study Setting
The study was conducted in the following hospitals:
Nowshera DHQ Hospital
Qazi Hussain Ahmed Hospital

3.3 Study Population
The target population consisted of doctors working in medical, surgical, ICU, emergency, and critical care units.

3.4 Sample Size
A sample size of 422 doctors was calculated using the WHO sample size determination formula with:
95% confidence interval
5% margin of error

3.5 Sampling Technique
Stratified random sampling technique was used to ensure representation from all departments.

3.6 Inclusion Criteria
Registered PMDC Doctors
Minimum 6 months clinical experience
Doctors involved in blood transfusion procedures

3.7 Exclusion Criteria
Medical students
Purely administrative medical staff
Doctors on leave during data collection

3.8 Data Collection Instruments
Data were collected using:
A. Structured Questionnaire: Demographic information and knowledge-related multiple-choice questions.
B. Observational Checklist: Practice was assessed using direct observation during transfusion procedures.
The instruments were adapted from validated studies conducted by Hijji et al. and Aslani et al.

3.9 Reliability and Validity
Content validity was ensured through expert review by medical researchers and clinical specialists. A pilot study was conducted on 10% of the sample population. Cronbach's alpha coefficient greater than 0.70 was considered acceptable.

3.10 Data Collection Procedure
After obtaining ethical approval and hospital permission, participants were approached in their respective departments. Written informed consent was obtained before participation. Questionnaires were distributed personally, and observational assessments were conducted during routine transfusion procedures.

3.11 Data Analysis
Data were entered and analyzed using IBM SPSS Statistics.
Descriptive Statistics: Frequency, Percentage, Mean, Standard deviation.
Inferential Statistics: Chi-square test, Independent t-test, Pearson correlation.
A p-value less than 0.05 was considered statistically significant.

3.12 Ethical Considerations
Ethical approval was obtained from the university ethical review committee.
Permission was obtained from hospital administration.
Written informed consent was taken from all participants.
Confidentiality and anonymity were maintained.
Participants had the right to withdraw at any time.

Chapter Four: Results
4.1 Demographic Characteristics
Out of 422 doctors:
80% were females
Majority were aged between 20–40 years.
55% held specialized certifications.
Most participants had 1–5 years of experience.

4.2 Knowledge Regarding Blood Transfusion
46% had adequate knowledge.
39% had moderate knowledge.
15% had poor knowledge.
Knowledge gaps were mainly observed in:
Blood compatibility checks
Identification procedures
Recognition of transfusion reactions

4.3 Clinical Practice During Blood Transfusion

52% followed proper transfusion procedures.

48% missed one or more important safety steps.

Common deficiencies included:

Incomplete documentation

Inadequate monitoring

Delayed identification of adverse reactions

4.4 Relationship Between Knowledge and Practice

A positive statistically significant relationship was observed between doctors' knowledge and practice.

r=0.46, p=0.001

This indicates that higher knowledge levels contributed to safer transfusion practices.

4.5 Factors Affecting Knowledge and Practice

Knowledge and practice scores were significantly associated with:

Previous training

Educational qualification

Years of clinical experience

Statistical Tables

Table 4.1 Gender Distribution of Doctors (n = 422)

Gender	Frequency (f)	Percentage (%)
Male	84	19.9
Female	338	80.1
Total	**422**	**100**

Interpretation: The majority of participants were female doctors (80.1%), while male doctors constituted 19.9% of the study sample.

Table 4.2 Age Categories of Doctors (n = 422)

Age Group	Frequency (f)	Percentage (%)
20–30 Years	188	44.5
31–40 Years	156	37.0
41–50 Years	58	13.7
Above 50 Years	20	4.8
Total	**422**	**100**

Interpretation: Most participants belonged to the 20–30 years age group (44.5%), followed by 31–40 years (37.0%).

Table 4.5 Knowledge Level of Doctors (n = 422)

Knowledge Level	Frequency (f)	Percentage (%)
Adequate Knowledge	194	46.0
Moderate Knowledge	165	39.1
Poor Knowledge	63	14.9
Total	**422**	**100**

Interpretation: Nearly half of the participants (46.0%) demonstrated adequate knowledge regarding safe blood transfusion practices.

Table 4.6 Practice Level of Doctors (n = 422)

Practice Level	Frequency (f)	Percentage (%)
Good Practice	219	51.9

Practice Level	Frequency (f)	Percentage (%)
Poor Practice	203	48.1
Total	**422**	**100**

Interpretation: Good blood transfusion practice was observed among 51.9% of doctors.

Table 4.8 Correlation Between Knowledge and Practice

Variables	Correlation Coefficient (r)	p-value
Knowledge and Practice	0.46	0.001

Interpretation: A moderate positive correlation was found between doctors' knowledge and practice regarding safe blood transfusion (r=0.46, p=0.001). Doctors with higher knowledge scores demonstrated better transfusion practices.

Chapter Five: Discussion

The present study assessed doctors' knowledge and practices regarding safe blood transfusion at Nowshera DHQ Hospital and Qazi Hussain Ahmed Hospital. Blood transfusion is a critical component of patient care and, when performed incorrectly, may lead to serious complications including transfusion reactions, infections, prolonged hospitalization, and even death. Therefore, doctors play a pivotal role in ensuring transfusion safety through proper patient

assessment, blood verification, monitoring, documentation, and timely recognition of adverse reactions.

The findings of the study revealed that the majority of doctors possessed a moderate level of knowledge regarding safe blood transfusion practices. Although most participants demonstrated awareness of basic transfusion procedures, notable deficiencies were identified in specific areas such as blood compatibility verification, patient monitoring during transfusion, recognition of transfusion reactions, and post-transfusion documentation. These findings suggest that while doctors are generally familiar with blood transfusion procedures, gaps remain in critical aspects that directly affect patient safety.

The findings are consistent with studies conducted by Hijji et al. (2018), who reported that clinicians demonstrated satisfactory knowledge in general transfusion practices but lacked adequate understanding of transfusion-related complications and evidence-based transfusion guidelines. Similarly, Bayraktar and Erdil (2000) found that practitioners often possessed insufficient knowledge regarding blood product administration and monitoring requirements, thereby increasing the risk of transfusion-related errors. The consistency of the present findings with previous research indicates that knowledge deficiencies in transfusion safety remain a global concern and require ongoing educational interventions.

Regarding transfusion practices, the study demonstrated that most doctors reported following standard transfusion procedures. However, deficiencies were observed in areas such as continuous patient monitoring, accurate documentation, and timely reporting of adverse transfusion reactions. These findings are important because safe transfusion practice extends beyond the administration of blood products and requires comprehensive patient assessment before, during, and after transfusion. Failure to adequately monitor patients may delay the identification and management of life-saving complications.

The present study also identified a positive association between doctors' knowledge and their transfusion practices. Doctors who demonstrated higher levels of knowledge were more likely to report adherence to recommended transfusion guidelines and safety protocols. This finding supports the assumption that knowledge serves as a foundation for competent clinical practice. When clinicians possess a clear understanding of transfusion principles and safety measures, they are more likely to apply this knowledge effectively

in clinical settings. Similar findings have been reported in previous studies, where educational preparation and competency-based training were associated with improved clinical performance and reduced medical errors.

Furthermore, doctors who had attended blood transfusion training programs or continuing professional development activities demonstrated significantly better knowledge and practice scores compared to those who had not received such training. This finding highlights the effectiveness of structured educational programs in improving clinical competency. Continuous professional education enables doctors to remain updated with current transfusion guidelines, enhances clinical decision-making, and promotes evidence-based practice. These findings emphasize the need for regular refresher courses and competency assessments within healthcare institutions.

Clinical experience also appeared to influence doctors' competency regarding safe blood transfusion. Doctors with longer years of professional experience generally demonstrated better understanding of transfusion procedures and greater confidence in managing transfusion-related complications. This may be attributed to repeated exposure to transfusion practices and opportunities for experiential learning in clinical settings. Nevertheless, experience alone cannot guarantee competency, and ongoing education remains essential to ensure that physicians remain aligned with current standards and best practices.

Several barriers affecting safe transfusion practices were identified by the participants. Heavy workload, clinical staffing shortages, high patient turnover, and limited access to refresher training programs were among the most frequently reported challenges. These organizational factors may negatively affect compliance with transfusion protocols and increase the likelihood of errors. Similar barriers have been reported in previous studies conducted in developing countries, where healthcare systems often face resource constraints and workforce shortages. Addressing these barriers requires institutional commitment, adequate staffing, supportive supervision, and continuous professional development opportunities.

The findings of this study have important implications for clinical practice, medical education, and healthcare management. Strengthening doctors' knowledge and practical skills regarding blood transfusion safety can contribute to improved patient outcomes, reduction in transfusion-related complications, and enhancement of overall quality of care. Healthcare organizations should prioritize competency-based training, regular monitoring of transfusion practices, and implementation of evidence-based transfusion guidelines.

Overall, the findings suggest that while doctors working at Nowshera DHQ Hospital and Qazi Hussain Ahmed Hospital possess a moderate level of knowledge and generally acceptable practices regarding safe blood transfusion, significant opportunities remain for improvement. Addressing identified knowledge gaps and organizational barriers through structured educational interventions and supportive institutional policies may substantially enhance transfusion safety and patient care outcomes.

Chapter Six: Conclusion and Recommendations

6.1 Conclusion

This study was conducted to assess doctors' knowledge and practices regarding safe blood transfusion at Nowshera DHQ Hospital and Qazi Hussain Ahmed Hospital. Blood transfusion remains a critical and potentially high-risk clinical procedure that requires strict adherence to established safety protocols to prevent adverse events and ensure optimal patient outcomes.

The findings of the study revealed that the majority of doctors possessed a moderate level of knowledge regarding safe blood transfusion. Most participants demonstrated awareness of general transfusion procedures; however, deficiencies were identified in important areas such as blood compatibility verification, recognition and management of transfusion reactions, patient monitoring during transfusion, and documentation of transfusion-related procedures. These knowledge gaps indicate the need for

further educational interventions to enhance doctors' competency in transfusion safety.

Similarly, the study found that doctors generally reported satisfactory transfusion practices; however, weaknesses remained in the consistent implementation of recommended monitoring procedures and accurate documentation practices. Such deficiencies may increase the risk of transfusion-related complications and compromise patient safety if not adequately addressed.

The study further demonstrated that doctors who had received formal training related to blood transfusion exhibited significantly better knowledge and practice levels than those who had not attended such training programs. Moreover, increased clinical experience was associated with improved competency regarding transfusion safety. These findings emphasize the importance of continuing professional development and experiential learning in enhancing medical performance.

A positive relationship was observed between knowledge and practice, indicating that doctors with better theoretical understanding were more likely to demonstrate safe transfusion practices. Therefore, improving doctors' knowledge through structured educational programs may contribute directly to improvements in clinical performance and patient safety.

The study also identified several barriers affecting safe transfusion practices, including heavy workload, shortage of medical staff, lack of refresher training opportunities, and limited institutional support. These factors may hinder adherence to standard transfusion guidelines and increase the likelihood of procedural errors.

In conclusion, although doctors working at Nowshera DHQ Hospital and Qazi Hussain Ahmed Hospital possess moderate competency regarding safe blood transfusion, there remains a considerable need for strengthening both knowledge and clinical practice through ongoing education, competency-based training, institutional monitoring, and supportive healthcare policies. Enhancing transfusion safety practices among doctors is essential for reducing transfusion-related complications and promoting high-quality patient care.

6.2 Recommendations

Recommendations for Clinical Practice

Regular workshops, seminars, and refresher training programs on safe blood transfusion practices should be organized for all medical staff.

Doctors should receive periodic competency assessments to evaluate their knowledge and practical skills related to blood transfusion.

Standardized blood transfusion protocols and clinical guidelines should be readily available in all wards and departments.

Doctors should strictly adhere to patient identification procedures, compatibility verification processes, and monitoring protocols before, during, and after blood transfusion.

Comprehensive documentation of all transfusion-related procedures should be emphasized to improve patient safety and accountability.

Hospital management should ensure adequate staffing levels to reduce workload and allow clinicians sufficient time to follow transfusion safety procedures.

Regular clinical audits should be conducted to monitor compliance with transfusion standards and identify areas requiring improvement.

Hospitals should establish continuous professional development programs focusing on transfusion safety and patient care quality.

Institutional policies should support reporting and management of transfusion-related incidents without fear of blame or punishment.

Quality assurance committees should regularly review transfusion practices and implement corrective actions where necessary.

Recommendations for Medical Education

Medical school curricula should include comprehensive and updated content on blood transfusion safety and transfusion-relat complications.

Simulation-based training and clinical skill laboratories should be utilized to enhance students' competency in blood transfusion procedures.

Educational institutions should collaborate with healthcare facilities to ensure that medical students receive adequate practical exposure to safe transfusion practices.

Recommendations for Future Research

Future studies should evaluate the effectiveness of educational and training interventions on doctors' knowledge and practice regarding blood transfusion safety.

Qualitative studies may be conducted to explore doctors' perceptions, experiences, and challenges related to blood transfusion practices.

Comparative studies involving different healthcare settings and provinces may provide broader insights into transfusion safety practices in Pakistan.

Future research should examine the relationship between doctors' transfusion competency and patient outcomes.

Longitudinal studies are recommended to assess the sustainability of educational interventions and competency improvement programs over time

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