Original Article

ALCM
ANNALS OF LABORATORY AND CLINICAL MEDICINE (ALCM)
ISSN: 3093-0219

Audit of Bedside Blood Transfusion Documentation Practices in a Tertiary Hospital in Zaria, North-Western Nigeria

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Abstract

Background: Proper documentation is crucial for safe blood transfusion. It acts as a clinical and legal safeguard that ensures traceability, enhances communication, and enables early detection of complications. In Nigeria and other resource-limited settings, documentation challenges such as poor training, lack of standardized protocols, and systemic constraints compromise patient safety and quality of care. This study aimed to audit bedside blood transfusion documentation practices in a tertiary health facility in North-Western Nigeria.

Materials and Methods: A retrospective descriptive cross-sectional audit was conducted at Ahmadu Bello University Teaching Hospital, Zaria, across five major clinical departments. Using a checklist-based proforma, 375 purposively selected transfusion records from 1st April to 31st July 2017 were reviewed. Ethical approval was obtained. The sample size was calculated using a standard population proportion formula. Data were analysed using SPSS version 22, and compliance levels were graded according to predefined benchmarks.

Results: The audited records revealed a median blood recipient age of 32 years, with females comprising 55.2% of the blood recipients. Full compliance was noted in documentation of transfusion indications (100%), valid blood grouping and cross-matching (100%), and informed consent (96.5%). However, partial compliance was recorded in critical safety checks: confirmation of patient identity (77%), vital-signs monitoring before (74.4%) and after transfusion (78.4%), and verification of blood bag details (79.7%).

Conclusion: Strong compliance was observed in essential areas, but key procedural gaps remain. These findings highlight the need for targeted interventions to improve staff adherence to transfusion protocols and ensure patient safety.

Keywords: Audit; bedside; record; blood transfusion; practice.

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Citation

Idi HT, Babadoko AA, Awwalu S, Mamman AI, Musa AU, Yahaya G. Audit of Bedside Blood Transfusion Documentation Practices in a Tertiary Hospital in Zaria, North-Western Nigeria. *Annals of Laboratory and Clinical Medicine.* Vol 1, No 2, Dec 2025. p19-25. https://doi.org/10.82216/alcm.vol1no2.35

Introduction

Proper documentation of blood transfusion is a critical component of safe transfusion practice. It serves as a legal, clinical, and quality-assurance tool that ensures patient safety, facilitates traceability, and enhances communication among healthcare professionals.[1]

Accurate and complete transfusion documentation is essential for monitoring the transfusion process, including patient identification, indication for transfusion, type and volume of blood product administered, vital signs before, during, and after transfusion, and the occurrence of any adverse reactions.[1,2] These steps help prevent errors such as wrong-patient transfusions, transfusing incompatible blood, and failure to recognize transfusion reactions early so they can be treated promptly.[3]

The World Health Organization (WHO) emphasizes that bedside transfusion documentation is a critical control point in transfusion safety and should be carried out meticulously.[4] This includes documenting pre-transfusion checks (vital signs such as blood pressure, pulse rate, and temperature), the start and end time of transfusion, and observations of the patient during the procedure. Inadequate documentation can result in delays

in identifying transfusion-related complications such as febrile reactions, haemolytic reactions, or transfusion-related acute lung injury (TRALI), all of which may be life-threatening if not promptly addressed.[5]

In resource-limited settings like Nigeria, where transfusion services may be fragmented or under-resourced, proper documentation plays an even greater role in ensuring continuity of care, accountability, and the ability to audit and improve practices.[6,7] Studies from sub-Saharan Africa have revealed significant documentation gaps in transfusion services, contributing to adverse events and poor clinical outcomes.[8,9]

Poor documentation during blood transfusion poses significant risks to patient safety and healthcare delivery. Documentation is not merely a record-keeping exercise; it plays a critical role in ensuring the traceability, monitoring, and accountability of transfusion procedures.[10] When documentation is incomplete, inaccurate, or omitted, it can lead to serious clinical consequences and legal implications.[11] One of the most immediate risks of poor documentation is the failure to detect and manage transfusion reactions. Accurate recording of pre-transfusion vital signs, patient identifiers, start and end times, and observations during the transfusion is essential for early recognition of adverse events such as febrile non-haemolytic transfusion reactions, allergic reactions, acute haemolysis, or transfusion-related acute lung injury (TRALI).[1,2,12,13] Poor documentation can cause reactions to be missed or wrongly linked to other causes, resulting in delayed treatment or repeated exposure to unsafe transfusions.[1–3]

Despite the critical role of blood transfusion in saving lives, many Nigerian hospitals struggle with poor compliance with transfusion documentation standards.[7,9] This gap undermines patient safety, limits traceability, and weakens the overall quality of transfusion services. Studies have highlighted systemic issues contributing to poor documentation practices, including inadequate training, lack of standardized protocols, resource constraints, and weak supervisory mechanisms.[14,15]

Opeyemi et al., in Nigeria, found significant lapses in the documentation of key transfusion activities such as patient identity verification, pre-transfusion vital signs, start and end times of transfusion, and monitoring for adverse reactions.[7] Also, Madito et al. in South Africa revealed that less than 40% of transfusion records were complete, suggesting widespread non-adherence to best practices.[16]

Many health facilities in Nigeria lack institutionalized transfusion policies and standard operating procedures, leading to inconsistent documentation practices among healthcare workers.[17] Limited knowledge and awareness, especially among junior staff who receive little formal training on transfusion protocols, result in documentation being viewed as a low-priority administrative task.[8,18] Resource constraints such as understaffing, heavy workloads, and lack of appropriate tools further hinder proper record-keeping.[19,20] Additionally, the absence of regular auditing and monitoring systems allows documentation errors to persist unaddressed, preventing necessary improvements and training. Auditing blood transfusion documentation is vital for enhancing patient safety, standardizing practices, and guiding training and policy reforms, especially in Nigerian healthcare settings where clinical variability and resource challenges are prevalent.[21] Hence, the aim of our study was to audit bedside blood transfusion documentation practices by health workers in a tertiary health facility in North-Western Nigeria.

Materials and Methods

Study design and sampling

The study design was a retrospective descriptive cross-sectional clinical audit conducted on patients' records at Ahmadu Bello University Teaching Hospital (ABUTH), Zaria, Kaduna State. Institutional ethical and scientific approval was obtained in accordance with the Declaration of Helsinki. The research was conducted on patients' records at different departments of the hospital. The departments were grouped into five (5) based on their peculiarities for this research. The surgery department consisted of general surgery, orthopaedics, cardiothoracic, and neurosurgery. The medicine department included all units managed by physicians, including the psychiatry department; the paediatric department included all units that cared for children, either surgical or medical; the obstetrics and gynaecology department consisted of all units that cared for pregnant mothers and those with gynaecological problems, whether benign or cancerous. The last department, haemato-oncology, consisted of the haematology and oncology departments of the hospital. After blood was taken from the blood bank and transfused, a follow-up was done 48 hours later. At that point, the patients' medical files were reviewed using a checklist to see whether all the required information and procedures had been properly documented. Purposive sampling was adopted for the selection of records from 1st April to 31st July 2017.

Sample size calculation

The standard formula for sample size calculation for proportions from a large population was used:[22]

$n = Z^2 \times p(1-p)/d^2$

Z = Z-score (for 95% confidence level, Z = 1.96)

p = estimated proportion (0.5 for maximum

variability)
d = margin of error (0.05, i.e. 5%)

This yielded an approximate sample size of 384 records.

Study location

Zaria, originally known as Zazzau, was one of the original Hausa Bakwai (seven true Hausa states) established around the 11th century, and is one of the oldest and most historically significant cities in Nigeria. It lies at latitude 11.1113° N and longitude 7.7227° E in the north-western region of Nigeria, in Kaduna State. It is home to Ahmadu Bello University (ABU), established in 1962, one of the largest and most prestigious universities in sub-Saharan Africa. Ahmadu Bello University Teaching Hospital is affiliated with the university and has a capacity of about 1,000 beds. The teaching hospital is a referral centre for the whole country and neighbouring countries as well.

Data collection — research instrument

The proforma was reviewed and authenticated by two haematologists, and reliability was tested by pre-testing on two blood transfusion records from each department; records from the pre-testing were excluded from the main study. The proforma consisted of two parts, used in collecting data from the blood recipient records. The first part consisted of socio-demographics of the blood recipients, including age, sex, marital status, and occupation, as well as the ward, the patient, and the diagnosis. The second part was a checklist consisting of eight dichotomous questions. Where a patient was transfused multiple units, only one transfusion episode was audited.

Compliance (%) = (Number of standards met / Total standards audited) × 100

Statistical analysis

All statistical analyses were performed using SPSS for Windows, version 22 (SPSS Inc., Chicago, IL, USA). The results were presented in simple charts, tables, medians, and standard deviations, and the level of significance was set at $P \leq 0.05$.

Results

Three hundred and eighty-four (384) blood transfusion records were tracked for auditing from the blood bank; however, 9 blood units were stopped along the way owing to the demise of the patients before completing the transfusion, and the data were incomplete. Therefore, a total of 375 records were audited. The median age of the blood recipients was 32 years, with an age range of 1 day to 69 years, and 207 (55.2%) were female. The clinical diagnoses of the patients and the departments in which they received the transfusion are shown in Figures 1 and 2, respectively. The answers to the checklist are highlighted in Table 2.

Table 1. Clinical audit grading.[23]

Score range	Grade	Interpretation
90–100%	Fully compliant	All or nearly all standards met
70–89%	Partially compliant	Most standards met
<70%	Non-compliant	Major deficiencies present

Table 2. Compliance checklist for bedside blood transfusion documentation.

Variable	Yes n (%)	No n (%)	Compliance (%)	Interpretation
Patient identity confirmed using two identifiers	289 (77.0)	86 (23.0)	77.0	Partially compliant
Transfusion order documented and signed by doctor	299 (79.7)	76 (20.3)	79.0	Partially compliant
Blood group and cross-match report available and valid	375 (100.0)	0 (0.0)	100.0	Fully compliant
Transfusion indication clearly stated in notes	375 (100.0)	0 (0.0)	100.0	Fully compliant
Vital signs recorded before transfusion (T, BP, HR, RR)	294 (74.4)	81 (21.6)	74.4	Partially compliant
Vital signs recorded after transfusion (T, BP, HR, RR)	279 (78.4)	96 (21.6)	78.4	Partially compliant
Blood bag checked for name, unit number, group, expiry, integrity	299 (79.7)	76 (20.3)	79.7	Partially compliant
Mode of obtaining consent (verbal)	303 (80.8)	72 (19.2)	80.0	Partially compliant

T = temperature; BP = blood pressure; HR = heart rate; RR = respiratory rate.

Discussion

In this study, a total of 375 transfusion records were audited, revealing that the median age of blood recipients was 32 years, with ages ranging from infancy (1 day) to 69 years, which was lower than the finding in Calabar.[24] This relatively young median age reflects the transfusion demand patterns in low- and middle-income countries (LMICs), particularly in sub-Saharan Africa, where younger populations—especially women of reproductive age and children—are more likely to require blood transfusion owing to causes such as obstetric haemorrhage, severe anaemia, sickle cell disease, and infectious diseases.[9,25]

More than half of the recipients in our study were female. This finding is consistent with the conclusions of Okoruiwu et al. in Calabar, Nigeria.[24] This female predominance could be attributed to the higher transfusion demands in women of reproductive age due to obstetric complications such as postpartum haemorrhage, antepartum haemorrhage, and anaemia in pregnancy.[26]

In this study, sickle cell anaemia (SCA) patients represented the highest proportion of blood recipients. This finding underscores the significant transfusion needs of individuals living with SCA, a common hereditary disorder in sub-Saharan Africa, particularly in Nigeria, which bears the highest global burden of the disease. Blood transfusion is a cornerstone in the management of SCA, especially during acute crises such as severe anaemia, stroke prevention, acute chest syndrome, and perioperative periods.[27]

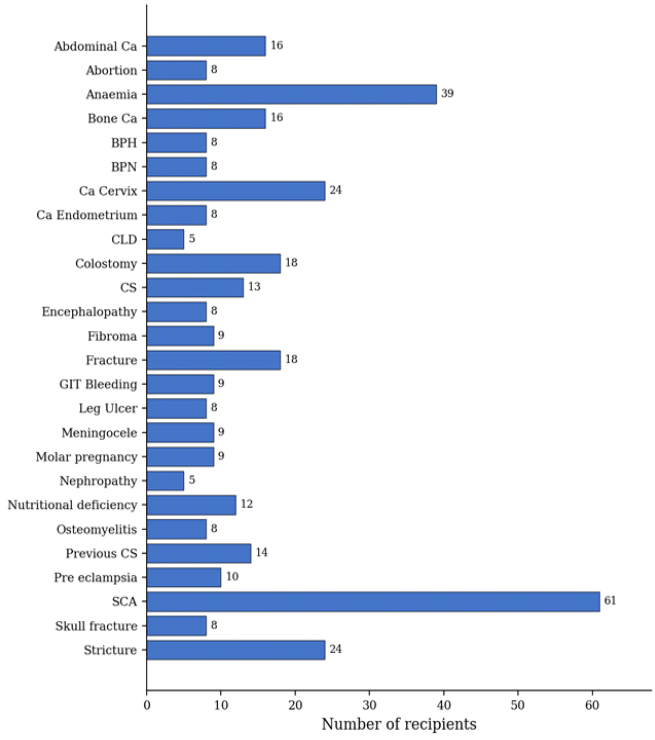

Figure 1: Clinical diagnosis of the blood recipients.
Key: Ca = cancer; BPN = bronchopneumonia; CLD = chronic liver disease; CS = caesarean section; SCA = sickle cell anaemia

The audit of blood usage across hospital departments revealed varying levels of transfusion demand, reflecting differences in clinical case profiles and patient management practices. The highest blood consumption was recorded in the Medicine department. This was contrary to the finding in Ado-Ekiti, where the paediatrics department had the highest request in a retrospective study.[28] This high demand is likely due to the broad spectrum of conditions managed in medical wards, such as chronic anaemia, haematological malignancy, sickle cell anaemia, gastrointestinal bleeding, and complications from chronic diseases like liver cirrhosis and renal failure.

The audit revealed that in the majority of transfusion cases, patient identity was confirmed using two identifiers, while a few cases failed to meet this essential safety criterion. Although the majority of cases complied, the overall performance indicates partial compliance, falling short of the 100% adherence recommended by international transfusion safety standards. Proper patient identification prior to transfusion is a critical safety step aimed at preventing wrong blood transfusions (WBITs), which are among the most serious and preventable transfusion-related errors.[29] Guidelines from the WHO and national haemovigilance systems strongly recommend the use of at least two unique identifiers, such as full name and hospital number, to confirm recipient identity at the point of transfusion.[3]

This audit found that the majority of transfusion cases had the transfusion order documented and signed by an authorized doctor, while some lacked proper documentation or signature. This represents partial compliance with established transfusion protocols, which emphasize that no blood product should be administered without a clear, written, and signed physician order.[1] The finding of 20.3% non-compliance is concerning, as undocumented transfusions pose serious risks of inappropriate indications, wrong-patient transfusions, and lack of follow-up.

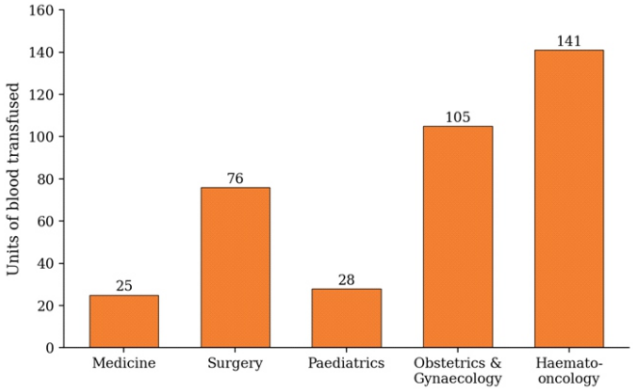

Figure 2: Departmental consumption of blood.

The audit revealed that all transfusion cases had available and valid blood group and cross-match reports, reflecting full compliance with this critical pre-transfusion requirement. This is a commendable finding, indicating that the laboratory and clinical teams consistently adhered to one of the most essential safety protocols in transfusion practice. The cross-match test is crucial for preventing adverse reactions by ensuring compatibility between donor and recipient blood.[30] An incompatible transfusion can lead to severe complications, including haemolytic anaemia and even death.[12] Therefore, the 100% compliance rate is a significant positive indicator of patient safety within the transfusion service.

The audit showed that in all transfusion cases, the indication for transfusion was clearly stated in the clinical notes, reflecting full compliance with documentation standards. This is a highly commendable outcome and demonstrates strong adherence to best clinical practice, transparency, and accountability in transfusion decision-making. The 100% compliance rate observed in this audit is similar to the findings in South Africa.[16] The perfect score suggests strong institutional protocols, effective clinical supervision, and possibly the use of standardized transfusion request forms that mandate indication fields.

The audit revealed that vital signs were recorded before and after transfusion in the majority of cases. This indicates partial compliance with standard transfusion monitoring protocols. While most patients were appropriately monitored, the gaps observed in pre- and post-transfusion monitoring represent significant areas of concern for transfusion safety. The suboptimal compliance observed in this study mirrors similar findings in other resource-limited settings. These findings were lower than those in South Africa and Brazil.[16,31] These lapses are often linked to staff shortages, high patient load, insufficient training, and inadequate monitoring tools or charts.[32,33]

In this audit, the majority of transfusion episodes included appropriate checking of the blood bag for patient name, unit number, blood group, expiry date, and bag integrity, while a few lacked this crucial safety check. This represents partial compliance with international transfusion safety standards and signals a notable gap in transfusion verification practices. This finding was higher than the finding in Iran.[34] Verifying the blood bag before transfusion is a critical safety step in the transfusion process. Common factors contributing to poor compliance in low-resource environments include work overload, absence of standardized transfusion checklists, staff fatigue, and limited supervision, especially during night shifts or emergencies.[35,36]

The audit showed that in the majority of transfusion cases, consent was obtained verbally, while a few either lacked proper documentation of the consent process or the mode was unclear. This reflects partial compliance with international best practices, which emphasize that written informed consent is the preferred and most defensible mode of obtaining consent for blood transfusion. In 1986 and 1994, the AABB made recommendations to its members for obtaining informed consent from patients for blood transfusion, which eventually became a standard in 2000.[37]

Conclusion

This audit revealed that transfusion needs were largely influenced by obstetric complications and sickle cell anaemia, with the Medicine department being the major consumer due to its broad case mix. While compliance was strong in key areas such as grouping, cross-matching, and documentation of indications, lapses were noted in patient identification, monitoring, and consent practices. These findings highlight commendable progress but also the need for stricter adherence to protocols to enhance transfusion safety and align with international standards.

Recommendations

Based on our findings, we make the following recommendations:

Strengthen training. Conduct regular refresher courses on transfusion safety covering patient identification, documentation, blood bag checks, and vital-signs monitoring.

Enforce Standard Operating Procedures (SOPs). Update SOPs to match WHO/national standards; mandate two identifiers, consent, and full monitoring; and audit compliance regularly.

Standardize consent. Shift from verbal to written informed consent using standardised forms integrated into transfusion requests.

Use checklists and charts. Adopt transfusion checklists and vital-sign charts for bedside safety, available in all transfusion wards.

Boost supervision and accountability. Assign transfusion safety officers, strengthen oversight during night/emergency shifts, and run periodic audits with feedback.

Build data systems. Set up transfusion information systems to track, analyse, and guide improvements in practice and resource use.

Review blood use. Departments with high usage should review indications regularly to ensure rational use, supported by multidisciplinary committees.

Sustain strengths. Maintain high compliance in cross-matching and indication documentation through

continuous quality assurance and recognition of staff efforts.

Financial support and sponsorship: Nil.

Conflict of interest: There are no conflicts of interest.

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