



Practice Patterns of Autologous Blood Donation among Healthcare Workers in a Tertiary Healthcare Facility in Azare, Northeastern, Nigeria.

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Abstract

Autologous blood donation (ABD) reduces transfusion-related risks, yet its uptake among healthcare workers (HCWs) remains poorly documented. This study assessed ABD practice patterns among HCWs in a tertiary hospital in Northeastern Nigeria. A cross-sectional survey was conducted from 1st to 31st August 2025 at the Federal University of Health Sciences Teaching Hospital, Azare. Using stratified random sampling with proportionate allocation, 249 HCWs were selected from a total workforce of 547. However, 237 completed the questionnaire. Data were collected using a pre-tested, structured, self-administered questionnaire assessing four ABD-related practices. Data were analysed using SPSS version 26. Descriptive statistics and Chi-square (or Fisher's exact) tests were applied, with significance set at $p \leq 0.05$. Self-donation for ABD was very low (3.8%) and showed no significant association with cadre ($p = 0.115$) but a significant association with gender ($p = 0.039$, Fisher's exact), with females more likely to have donated. Formal training on ABD was significantly associated with cadre and gender (both $p < 0.0001$). Recommendation of ABD to patients varied significantly by cadre ($p < 0.0001$) and gender ($p = 0.013$). Awareness of institutional ABD protocols was not significantly associated with cadre ($p = 0.12$) but was significantly associated with gender ($p < 0.0001$). ABD practice among HCWs was suboptimal, with disparities in training, recommendations, and protocol awareness. Strengthening training, awareness, and institutional protocols may improve integration of ABD into routine patient blood management practices.

Keywords: Autologous blood donation, healthcare workers, blood transfusion, practice patterns, Nigeria

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Introduction

Blood transfusion is a critical component of modern healthcare, essential for the management of severe anaemia, trauma, obstetric haemorrhage, chronic haematological

disorders, and major surgical procedures (Lotterman and Sharma, 2023; Obeagu, 2025). Timely access to safe and adequate blood products is directly associated with improved patient survival and clinical outcomes. Despite

its importance, many low- and middle-income countries (LMICs), including Nigeria, continue to experience persistent challenges in blood supply due to low donor recruitment, a high burden of transfusion-transmissible infections, and limited capacity for quality assurance and haemovigilance (Tijani *et al.*, 2025; World Health Organisation [WHO], 2024).

Autologous blood donation (ABD) involves the collection and storage of a patient's own blood for later transfusion, most commonly before elective surgery (National Blood Service, Ghana, 2013). By eliminating exposure to donor-derived pathogens and alloantigens, ABD reduces the risks of transfusion-transmissible infections and immunologic transfusion reactions (Kawasaki, 2024). Additionally, it conserves limited allogeneic blood supplies and is especially valuable in settings with high transfusion demand or restricted donor pools (Manisha *et al.*, 2022).

Autologous blood donation is a key component of patient blood management, a multidisciplinary, evidence-based approach focused on optimising a patient's own blood and minimising unnecessary transfusions (Kambali and Azmi, 2024). Patient blood management strategies, including preoperative ABD, reduce reliance on allogeneic blood, improve patient outcomes, and help preserve limited blood supplies, particularly in resource-constrained health systems (Gammon *et al.*, 2023; Rondinelli *et al.*, 2023).

Healthcare workers (HCWs) play a central role in transfusion medicine as clinicians, decision-makers, educators, and role models. Their knowledge, attitudes, and personal practices influence institutional norms and patient perceptions of transfusion safety and blood conservation. Consequently, HCW engagement in ABD is critical, as they serve both as potential donors and advocates for safe and sustainable transfusion practices.

Despite its recognised benefits, the utilisation of ABD remains extremely low both globally and in Nigeria. A study from a Nigerian tertiary hospital showed that autologous donations account for a negligible proportion of total blood donations, with reported rates as low as 0.3%, while family replacement and

remunerated donations predominate (Obed *et al.*, 2010).

Moreover, empirical evidence on ABD practice among HCWs, particularly in local contexts such as Azare, is scarce, as existing studies largely focus on general blood donation behaviour rather than ABD uptake, frequency, and determinants.

Understanding the practice patterns of ABD among HCWs is essential. Their donation behaviours directly influence blood safety, institutional transfusion culture, and patient counselling practices. Assessing the extent of ABD practice and the factors that facilitate or hinder its uptake provides evidence to guide targeted interventions. Such insights can strengthen patient blood management strategies and promote safer, more sustainable blood transfusion services in Azare and similar settings.

This study therefore aimed to evaluate the practice patterns of ABD among healthcare workers at a tertiary healthcare facility in Azare, Bauchi State.

Materials and Methods

Study Design

The study was a cross-sectional survey conducted from 1st to 31st August 2025 at the Federal University of Health Sciences Teaching Hospital in Azare, Bauchi State. Data were collected using a structured, self-administered questionnaire.

Study Setting

The study was conducted at the Federal University of Health Sciences Teaching Hospital, Azare (FUHSTHA), located in Bauchi State, Northeastern Nigeria. The institution was originally established in 2000 as a Federal Medical Centre following the federal government's takeover of a general hospital that had served the community for more than sixty years (Kamal, 2024). In 2024, it was upgraded to a teaching hospital in affiliation with the Federal University of Health Sciences, Azare (FUHSA), Bauchi State, which was founded in 2021 (Kamal, 2024).

The teaching hospital comprises 26 departments, including 16 clinical/medical and 10 administrative units. The hospital serves all three senatorial districts of Bauchi State and provides services to neighbouring states,

particularly Yobe and Jigawa. Commissioned in 2001 with an initial capacity of 152 beds, by 2022 the hospital was expanded to 412 beds and now delivers a wide range of emergency, routine, and specialised healthcare services, in addition to its roles in training and research as a teaching institution (Federal Medical Center (Azare, Bauchi State).

Research monitoring was conducted within the clinical services and pathology departments of FUHSTHA to ensure strict adherence to the study protocol and maintain data quality.

Study Population

The study population consisted of healthcare workers employed at FUHSTHA, with a total workforce of 547. This included 137 medical doctors, 371 nurses, and 39 laboratory scientists.

Inclusion and Exclusion Criteria

Inclusion criteria:

- Registered healthcare professionals.
- Staff who had been employed at the facility for a minimum of six months.
- Individuals who provided informed consent to participate in the study.

Exclusion criteria:

- Healthcare workers who were on leave during the study period.

Sample Size Determination

Sample size was calculated using the formula for descriptive studies (Areoye, 2004):

Category	Population	Sample size
Doctors	137	62
Nurses/Midwives	371	169
Laboratory scientists	39	18
Total	547	249

Of the 249 selected participants, 12 were on leave during the data collection period (2 medical laboratory scientists, 3 doctors, and 7 nurses) and were therefore unavailable. Consequently, data from 237 healthcare workers were obtained and included in the analysis.

Data Collection Instrument

The study questionnaire was developed following a thorough review of relevant literature, World Health Organization (WHO) recommendations, and established transfusion medicine guidelines (Akingbola et al., 2022;

$$n = \frac{Z^2 \times p \times (1 - p)}{d^2}$$

where $Z = 1.96$ (95% confidence interval), $p = 0.5$ (assumed prevalence), and $d = 0.05$ (margin of error). Substituting:

$$n = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.05)^2} = \frac{3.8416 \times 0.25}{0.0025} = 384.16$$

Because the total number of HCWs in FUHSTHA was finite ($N = 547$), the finite population correction (FPC) was applied:

$$n_f = \frac{n}{1 + \frac{n-1}{N}} = \frac{384}{1 + \frac{383}{547}} = \frac{384}{1.700} \approx 226$$

To account for non-response, 10% was added: $226 \times 0.10 = 22.6 \approx 23$. The final adjusted sample size was $226 + 23 = 249$.

Sampling Technique

A stratified random sampling technique was adopted, with healthcare workers grouped into three strata based on professional cadre: doctors, nurses/midwives, and medical laboratory scientists. Proportionate allocation was applied to ensure equitable representation. Within each stratum, participants were selected using simple random sampling.

Getie et al., 2024; WHO, 2023, 2024b). It assessed four core ABD-related practices using single-item questions:

1. Personal donation of blood for self-use (ever donated for own use).
2. Prior recommendation of ABD to patients before surgery (*Always, Sometimes, Rarely, Never, or Not applicable to my role*).
3. Awareness of institutional ABD protocols (*Yes, No, Not aware*).
4. Receipt of formal training or education on ABD (*Yes/No*).

The questionnaire had two parts: socio-demographic information (age, gender, department, professional cadre, years of work experience, marital status) and the four practice items. The instrument was pre-tested on 24 healthcare workers (6 doctors, 16 nurses, 2 medical laboratory scientists) at the Federal Medical Centre, Misau, Bauchi State, representing 10% of the intended sample. Face validity was assessed by subject experts in transfusion medicine and public health. Feedback from experts and pilot participants was used to refine the questionnaire for clarity, relevance, and local contextualisation. The reliability of the questionnaire was evaluated using pilot data, producing a Cronbach's alpha of 0.7, which indicates acceptable internal consistency.

Potential confounders such as age, sex, professional cadre, years of experience, and prior training were identified during study design and recorded during data collection to allow stratified analysis.

Data Collection Procedure

The structured, self-administered questionnaire was distributed to selected participants across clinical, laboratory, and nursing departments. Before administration, participants were briefed on the purpose of the study, and written informed consent was obtained. Participation was voluntary, and data collection was conducted over a one-month period. Completed questionnaires were securely stored in password-protected digital files, coded to ensure participant anonymity.

Data Analysis

Data were compiled and cleaned using Microsoft Excel and analysed with SPSS version 26. Descriptive statistics (frequencies, percentages, means, standard deviations) summarised socio-demographic characteristics and practice levels. Associations between socio-demographic variables (cadre, gender) and each ABD practice were assessed using the Chi-square test. Fisher's exact test was used for 2×2 tables when expected cell frequencies were less than 5. Cramér's V was calculated to measure the strength of significant associations. Statistical significance was set at $p \leq 0.05$.

Ethical Considerations

Ethical approval was obtained from the Health Research Ethics Committee (HREC) of FUHSTHA (Approval No: NHREC/FUHSTHA/2024/11/11; approved 23rd July 2025). The study adhered to the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants, and confidentiality was strictly maintained.

Results

A total of 237 healthcare workers participated in the study (response rate 95.2%). Of these, 16 (6.7%) were medical laboratory scientists, 59 (24.9%) were doctors, and 162 (68.4%) were nurses/midwives (Figure 1). Twelve selected participants (2 laboratory scientists, 3 doctors, 7 nurses) were on leave and could not be included.

The mean age of respondents was 32.97 ± 9.6 years (range: 21–63 years). There were 105 (44.3%) males and 132 (55.7%) females. Regarding marital status, 118 (49.8%) were married, 114 (48.1%) were single, 4 (1.7%) were widowed, and 1 (0.4%) was a widower. Participants' work experience ranged from ≤ 1 year (including those with 6 months to 1 year) to ≥ 10 years, as shown in Figure 2.

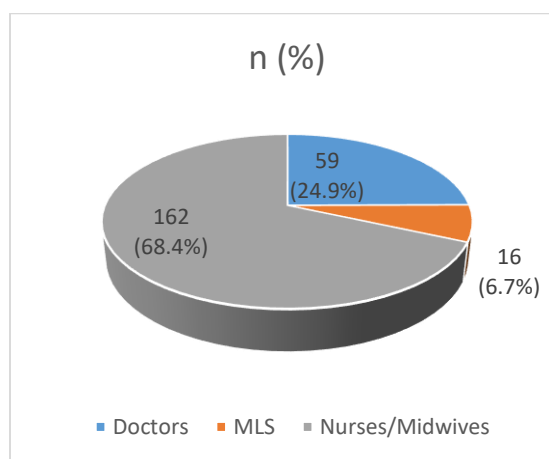


Figure 1: Pie chart showing the Cadre of the participants

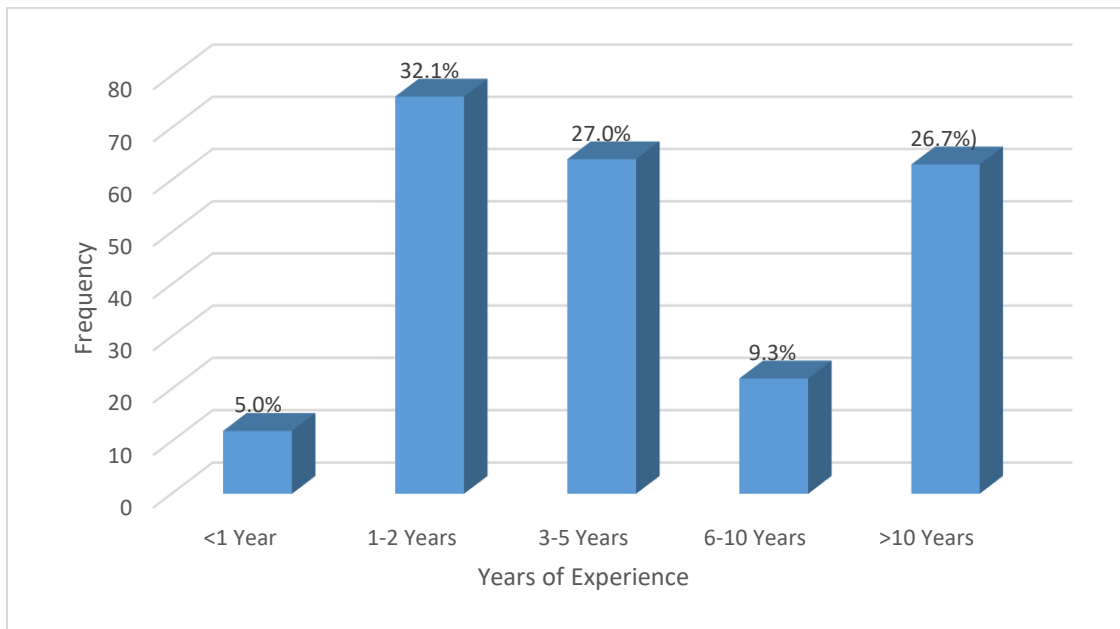


Figure 2: Bar chart showing the work experience of the participants

Table 1: Autologous Blood Donation Practice and Training by Cadre and Gender

Variable	Donated n(%)	Did not donate n(%)	Trained/educated n(%)	Not trained n(%)
Cadre				
Doctors (*n*=59)	0 (0.0)	59 (100.0)	33 (55.9)	26 (44.1)
MLS (*n*= 16)	0 (0.0)	16 (100.0)	12 (75.0)	4 (25.0)
Nurses (*n*=162)	9 (5.6)	153 (94.4)	46 (28.4)	116 (71.6)
Total (<i>N</i> = 237)	9 (3.8)	228 (96.2)	91 (38.4)	146 (61.6)
Test statistics for cadre	$\chi^2(2) = 4.33$, p = .115 ^a , V = .135		$\chi^2(2) = 23.58$, p < .0001, V = .315	
Gender				
Males (*n*=105)	1 (1.0)	104 (99.0)	57 (54.3)	48 (45.7)
Females (*n*=132)	8 (6.1)	124 (93.9)	34 (25.8)	98 (74.2)
Test statistics for gender	Fisher's exact p = .039 ^b		$\chi^2(1) = 20.12$, p < .0001, V = .221	

Note. MLS = medical laboratory scientists.

^a Chi-square test: 2 cells (33.3%) have expected count <5; interpret with caution.

^b Fisher's exact test (2-sided); Cramér's V not reported due to use of exact test.

Table 2: Recommendation of Autologous Blood Donation to Patients by Cadre and Gender

Variable	Always n (%)	Sometimes n (%)	Rarely n (%)	Never n (%)	NA n(%)
Cadre					
Doctors (59)	2 (3.4)	20 (33.9)	8 (13.6)	22 (37.3)	7 (11.9)
MLS (16)	1 (6.3)	9 (56.3)	3 (18.8)	3 (18.8)	0 (0.0)
Nurses (162)	20 (12.3)	31 (19.1)	6 (3.7)	94 (58.0)	11 (6.8)
Total (237)	23 (9.7)	60 (25.3)	17 (7.2)	119 (50.2)	18 (7.6)
Test: Cadre	$\chi^2(8) = 32.91$,				

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	p < .0001, V = .264				
Gender					
Males (105)	6 (5.7)	31 (29.5)	12 (11.4)	52 (49.5)	4 (3.8)
Females (132)	17 (12.9)	29 (22.0)	5 (3.8)	67 (50.8)	14 (10.6)
Test: Gender	$\chi^2(4) = 12.75$, p = .013, V = .232				

Note. NA = not applicable to my role.

Table 3: Awareness of Institutional Autologous Blood Donation Protocols by Cadre and Gender

Variable	Yes n (%)	No n (%)	Not aware n (%)
Cadre			
Doctors (59)	5 (8.5)	11 (18.6)	43 (72.9)
MLS (16)	4 (25.0)	3 (18.8)	9 (56.3)
Nurses (162)	52 (32.1)	23 (14.2)	87 (53.7)
Total (237)	61 (25.7)	37 (15.6)	139 (58.6)
Test: Cadre	$\chi^2(4) = 12.77$, p = .12, V = .164		
Gender			
Males (105)	15 (14.3)	27 (25.7)	63 (60.0)
Females (132)	46 (34.8)	10 (7.6)	76 (57.6)
Test: Gender	$\chi^2(2) = 21.99$, p < .0001, V = .305		

Discussion

The practice of autologous blood donation (ABD) reflects the extent to which healthcare workers translate knowledge and attitudes into routine clinical and personal transfusion-related behaviours. Examining practice patterns is essential for identifying gaps in implementation and informing targeted interventions.

Most participants were nurses, consistent with the typical pattern in many tertiary healthcare settings where nurses form the largest professional group (Jokotola and Famakinde, 2025). Most healthcare workers were relatively young, consistent with findings from studies in Nigeria indicating that a large proportion of clinical staff are in the early- to mid-career age range, commonly between 30 and 39 years (Badru *et al.*, 2024). Females constituted most participants, consistent with documented patterns in healthcare settings where female representation, particularly

among nurses, is high (Jokotola and Famakinde, 2025). The work experience distribution, with a plurality having 1–2 years of service, suggests a substantial cohort of early-career HCWs, aligning with ongoing recruitment in tertiary facilities to offset staff attrition and migration challenges affecting the Nigerian health workforce (Jokotola and Famakinde, 2025).

The present study found that only 3.8% of HCWs had ever donated blood for their own use. No significant association was observed between cadre and self-donation (p = 0.115), but a significant gender difference was found: females were more likely to have donated for autologous purposes (p = 0.039, Fisher's exact). Although the absolute numbers remain low in both groups, this finding may reflect greater health-seeking behaviour and compliance with preventive or elective medical recommendations among female health workers, as reported in recent literature

(Ogunyemi *et al.*, 2021). Comparable gender differences have been noted in studies indicating greater willingness and more positive attitudes toward blood donation among female healthcare providers (Akingbola *et al.*, 2022; Jeminusi *et al.*, 2016). The overall extremely low uptake suggests that ABD is not commonly practised even among healthcare professionals who are expected to be knowledgeable about transfusion strategies. This is consistent with findings from sub-Saharan Africa, where blood donation practices among healthcare workers remain suboptimal despite awareness of transfusion needs. For instance, a study in Ghana reported that only about 36.3% of HCWs had ever donated blood (primarily voluntary donation), highlighting a gap between professional knowledge and personal participation (Makafui & Adomah-Afari, 2026). Structural barriers, perceived inconvenience, or low perceived necessity may influence participation, even among medically trained personnel. Research on autologous transfusion programs emphasises that implementation depends heavily on institutional support, physician advocacy, and structured patient blood management systems (Xu *et al.*, 2022).

Receipt of formal training on ABD showed highly significant differences by cadre ($p < 0.0001$) and gender ($p < 0.0001$). Doctors and medical laboratory scientists were substantially more likely to have received training compared to nurses, among whom over 70% reported no formal exposure. This disparity likely explains the observed differences in recommendation practices and reflects broader inequities in access to continuing professional development. Recent studies have demonstrated that structured training in patient blood management, including ABD, significantly improves clinicians' transfusion practices and willingness to adopt blood conservation strategies (Karpinos *et al.*, 2025; Shander *et al.*, 2022). The gender disparity in training—males more likely trained—may be linked to differential access to professional development opportunities, as women often

face greater workload and institutional constraints (Shander *et al.*, 2022).

Recommendations of ABD to patients before surgery differed significantly by cadre ($p < 0.0001$) and gender ($p = 0.013$). Doctors and MLS were more likely to report “always” or “sometimes” recommending ABD, whereas “never” was the most common response among nurses. This aligns with the clinical roles of doctors and laboratory professionals, who are more directly involved in preoperative planning and transfusion decision-making. However, even among doctors, consistent recommendations were low, suggesting that ABD is not embedded in routine preoperative counselling. Limited familiarity with patient blood management principles and inadequate exposure during training contribute substantially to this gap (Karpinos *et al.*, 2025; Wu *et al.*, 2024). The gender difference—female respondents more likely to “always” recommend—may reflect differences in patient engagement styles, with female health workers often playing more active roles in patient counselling and advocacy, particularly in perioperative care (Cooper *et al.*, 2023; Lim *et al.*, 2023).

Awareness of institutional ABD protocols was generally poor, with the majority of respondents across all cadres indicating they were “not aware” of any existing protocol. Cadre was not significantly associated with awareness ($p = 0.12$), but a highly significant gender association was observed ($p < 0.0001$). Female respondents were more likely to report existence of protocols, while a larger proportion of males were unaware. This may reflect differential exposure to ward-based protocols and operational guidelines, as nurses and midwives—who are predominantly female in many Nigerian settings—are more routinely involved in protocol-driven clinical activities. Overall, the low awareness is consistent with reports that many Nigerian health facilities either lack formal ABD guidelines or have protocols that are poorly disseminated and weakly enforced (WHO, 2021). The absence of clear protocols limits the standardisation of practice and discourages health workers from recommending or

implementing ABD (Chaudhry *et al.*, 2022; Ismail *et al.*, 2022).

Limitations

The use of a self-administered questionnaire may have introduced recall and social desirability bias, potentially leading to over- or under-reporting of ABD practices. The cross-sectional design limits the ability to establish causal relationships between training, awareness, and practice of ABD. The study was conducted in a single health facility, which may restrict the generalizability of the findings to other settings with different institutional policies and resource levels. Some contingency tables had small, expected cell frequencies, necessitating cautious interpretation of chi-square results and use of exact tests where appropriate.

Conclusion

Autologous blood donation practice among healthcare workers in this setting is suboptimal, characterised by very low self-donation, inconsistent patient recommendation, insufficient training, and limited awareness of institutional protocols. Significant disparities exist by cadre and gender, confirming that ABD is not yet integrated into routine clinical practice. Strengthening institutional protocols, expanding formal training for all professional groups, and implementing cadre- and gender-sensitive capacity-building interventions are essential to address these gaps and promote the integration of ABD into patient blood management strategies in resource-limited settings.

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Conflict of interest

There are no conflicts of interest

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