

Healthcare workers' perceptions of targeted institutional strategies to improve Autologous Blood Donation awareness and practice in a Tertiary Healthcare Facility in Northeastern Nigeria

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Abstract

Background: Autologous blood donation (ABD) is an evidence-based strategy that minimizes exposure to allogeneic transfusions and associated risks. Despite its clinical benefits, ABD remains underutilized in low-resource settings such as northeastern Nigeria, where institutional support is limited. Healthcare workers (HCWs) are critical for policy advocacy, patient education, and operationalizing transfusion practices. Understanding their perceptions of targeted institutional strategies is essential for enhancing ABD uptake. This study assessed healthcare workers' perceptions of targeted institutional strategies to improve ABD awareness and practice in a tertiary hospital. **Methods:** A cross-sectional survey was conducted in August 2025 at FUHSTHA, Nigeria, among 237 HCWs, doctors 59 (24.9%), medical laboratory scientists 16 (6.8%), and nurses/midwives 162 (68.3%) using a validated questionnaire (Cronbach's $\alpha = 0.7$). Data were analyzed with SPSS 26, employing chi-square tests to examine associations ($p \leq 0.05$). Ethical approval and informed consent were obtained. **Results:** Cadre was significantly associated with support for in-service training ($\chi^2(6)=15.08$, $p=0.020$, $V=0.178$), formal ABD policy ($\chi^2(10)=19.63$, $p=0.033$, $V=0.204$), patient awareness campaigns ($\chi^2(10)=23.48$, $p=0.009$, $V=0.223$), departmental ABD champions ($\chi^2(6)=16.51$, $p=0.011$, $V=0.187$), inclusion in standard surgical care ($\chi^2(6)=24.30$, $p<0.001$, $V=0.226$), and institutional support preferences ($\chi^2(30)=69.65$, $p<0.001$, $V=0.383$). Collaborative decision-making ($p=0.223$) and personal willingness to participate ($p=0.698$) were not significant. Effect sizes were weak to moderate, suggesting broad support across cadres with modest differences. **Conclusion:** Healthcare workers in this tertiary facility support structured governance, training, coordination, and audit to improve ABD practice, emphasizing a comprehensive institutional approach over financial incentives.

Keywords: Autologous blood donation; Healthcare workers awareness; Transfusion practice; Institutional strategies

Introduction

Ensuring blood safety through sustained donation and effective transfusion practices remains a persistent challenge in low- and middle-income countries, including Nigeria. A safe blood supply is essential for obstetric haemorrhage, trauma, severe malaria-related anaemia, and other acute conditions.^[1-3] However, many low- and middle-income countries (LMICs) lack adequate and timely

access to safe blood.^[4,5] In most African countries, blood supply often falls below World Health Organisation (WHO) recommendations,

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with reliance mainly on family replacement and commercial donors, thereby increasing the risk of transfusion-transmissible infections.^[5,6] This risk is driven by inconsistent donor screening and weak quality control systems.^[4,5,7] Strengthening both donation capacity and safety infrastructure is thus an ongoing public health priority.

Within this broader context, **autologous blood donation (ABD)** represents a blood conservation approach that can mitigate risks associated with allogeneic transfusion by using the patient's own blood in anticipated surgical procedures.^[8-10] While ABD is most commonly applied in high-resource settings as part of comprehensive patient blood management, awareness and implementation of ABD remain limited in many LMICs, where even basic voluntary non-remunerated blood donation rates are low.^[4,11]

Autologous blood donation (ABD) reduces allogeneic transfusion risks but is underused in LMICs like Nigeria due to weak institutional support. Healthcare workers play a key role in advancing ABD through advocacy and education. Researches show that structured interventions such as guidelines, training, and leadership can improve practice more effectively.^[12,13] However, evidence on healthcare workers' perceptions in northeastern Nigeria is limited, highlighting the need for context-specific strategies

Importantly, healthcare workers are a critical target group for institutional strategies to improve ABD. As frontline clinicians, they influence patient counselling, perioperative planning, and transfusion practices. Strengthening healthcare workers' awareness, confidence, and acceptance of targeted ABD policies may enhance clinical uptake. It may also promote institutional culture change and improve patient education on blood conservation strategies.

Healthcare workers in Nigeria and other LMICs generally demonstrate good knowledge of blood donation practices, including ABD. However, actual participation remains low due to misconceptions, weak institutional support systems, and systemic barriers.^[12,14,15] Furthermore,

Evidence on targeted institutional strategies for translating knowledge into improved practice remains limited.

Persistent gaps in healthcare workers' awareness, institutional support, and structured implementation of ABD limit its uptake in northeastern Nigeria. Barriers include inadequate training, weak hospital policies, logistical constraints, and limited administrative commitment.^[6,11] In contrast, targeted institutional strategies such as guideline development, continuing education, and strengthened transfusion governance may improve practice.^[16-18] However, evidence on healthcare workers' perceptions of these strategies remains limited, justifying evaluation in tertiary hospitals. This study assessed healthcare workers' perceptions of targeted institutional strategies to improve ABD awareness and practice in a tertiary hospital.

Materials and Methods

Study Design

The study was a cross-sectional survey conducted prospectively involving the administration of a structured questionnaire to the study subjects. The study was conducted over a one-month period, from 1st to 31st August 2025, at the Federal University of Health Sciences Teaching Hospital in Azare, Bauchi State.

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. 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.

The teaching hospital consists of 26 departments, comprising 16 clinical / medical and 10 administrative units. The hospital serves all three senatorial districts of Bauchi State and also provides services to neighboring 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 specialized healthcare services, in addition to its roles in training and research as a teaching institution.

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

Study Population

The study population consisted of healthcare workers employed at the Federal University of Health Sciences Teaching Hospital, Azare, Bauchi State, with a total workforce of 547 staff members. 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:^[19]

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

Where:

n= minimum sample size

Z=Z-score (1.96 at 95% CI)

p= assumed prevalence (50% if unknown)

d=margin of error (0.05)

Substituting the values:

$$n = \frac{(1.96)^2 \times 0.5(1-0.5)}{(0.05)^2} = \frac{3.8416 \times 0.25}{0.0025} = 384.16$$

Thus, the initial sample size for the study was 384 healthcare workers. However, because the total number of HCWs in FUHSTHA was finite, estimated at 547 (137 doctors, 371 nurses, and 39 laboratory scientists), the finite population correction (FPC) was applied to adjust the sample size. The corrected sample size (nf) was then calculated using the

formula:^[19]

$$nf = \frac{n}{1 + \left(\frac{n-1}{N}\right)}$$

Where:

n=384 is the initial sample size,

N=547 is the total population of HCWs in FUHSTHA,

nf is the adjusted sample size after applying the FPC.

Substituting the values:

$$nf = \frac{384}{1 + \left(\frac{383}{547}\right)} = \frac{384}{1.700} \approx 226$$

Non-response rate $n_2 = 226 \times \frac{10}{100} = 22.6 \approx 23$

Therefore, the final adjusted sample size for this study was $226 + 23 = 249$ healthcare workers, ensuring both statistical accuracy and resource efficiency in data collection.

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 then applied to ensure equitable representation of each subgroup within the overall FUHSTHA workforce. Accordingly, the study population was divided into three proportions corresponding to the respective cadres.

Proportionate Sample Allocation

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

Finally, 249 healthcare workers were selected from a total of 547 using a simple random sampling (SRS) technique and were administered questionnaires. However, 12 selected participants were unavailable due to leave (2 medical laboratory scientists, 3 doctors, and 7 nurses). Consequently, data were obtained from 237 healthcare workers and included in the analysis.

Data Collection Instrument

The study questionnaire was designed based on a comprehensive review of relevant published literature, World Health Organization (WHO) recommendations, and established transfusion medicine guidelines on autologous blood

donation.^[4,14,17] It evaluated key domains, including in-service training need, formal policy or protocol on ABD, patient-centred awareness campaigns, collaborative decision on blood transfusion, assigning ABD champions, inclusion of ABD in surgical care, willingness to participate in awareness and campaigns, and actionable interventions to Improve Autologous Blood Donation Uptake. The questionnaire items were contextualised to align with local clinical realities and institutional practices within Nigerian tertiary healthcare facilities.

The primary data collection tool for this study was a structured, self-administered questionnaire, designed to assess the perceptions of targeted institutional strategies to improve ABD awareness and practice of HCWs regarding ABD.

The questionnaire had two parts: Socio-demographic information, collecting data on respondents' age, gender, department, professional cadre, and years of work experience. The second part evaluated healthcare workers' perception on in-service training need, formal policy or protocol on ABD, patient-centred awareness campaigns, collaborative decision on blood transfusion, assigning ABD champions, inclusion of ABD in surgical care, willingness to participate in awareness and campaigns, and actionable interventions to Improve Autologous Blood Donation Uptake.

A pilot study was conducted at the Federal Medical Centre, Misau, Bauchi State, with 23 healthcare workers (5 doctors, 16 nurses, and 2 medical laboratory scientists), representing 10% of the intended sample, selected via simple random sampling. The reliability of the questionnaire was evaluated using pilot data, producing a Cronbach's alpha of 0.7, which was marginally acceptable.

Face validity was assessed by subject experts in transfusion medicine, public health and pre-tested on HCWs in the pilot study, assessing the relevance, coverage, and appropriateness of each item to the study objective. Feedback from experts and pilot participants was utilised to refine the questionnaire, enhance clarity, eliminate ambiguous terms, and ensure that the instrument effectively measured the

intended knowledge on ABD. Potential confounders such as age, sex, professional cadre, years of experience, prior training in transfusion medicine, or exposure to ABD are identified during study design or data collection.

Data Collection Procedure

A structured, pre-tested, self-administered paper-based questionnaire was used to collect data on the practice of ABD. The questionnaire was distributed to selected participants by simple random sampling across various departments, including clinical, laboratory, and nursing departments. Before administration, participants were briefed on the purpose, and informed consent was obtained. Participation was voluntary, and data collection was conducted over the course of one month.

Collected data was securely stored in password-protected digital files and coded to ensure participant anonymity, and was securely stored both online and offline.

Data Analysis

The completed questionnaires were compiled and analysed using Statistical Product and Service Solutions (IBM® SPSS Statistics, Chicago IL) version 26. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarise socio-demographic characteristics and the distribution of knowledge levels among respondents.

Inferential analysis was performed using the Chi-square test to assess associations between selected sociodemographic variables and practice toward ABD. Cramér's V test was used to measure the strength of significant associations, with statistical significance 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). Participation was voluntary, confidentiality was maintained and procedures were aligned with the Declaration of Helsinki. Written informed consent was obtained from all respondents. The study was a prospective

cross-sectional design involving the administration of a structured questionnaire to the study subjects.

Results

A total of 237 healthcare workers participated in the study, comprising 16 (6.8%) medical laboratory scientists, 59 (24.9%) doctors, and 162 (68.3%) nurses/midwives, as illustrated in Figure 1. The mean age of the study participants was 32.97 ± 9.6 years with a range of 21 to 63 years. The participants consisted of 105 (44.3%) males and 132 (55.7%) females.

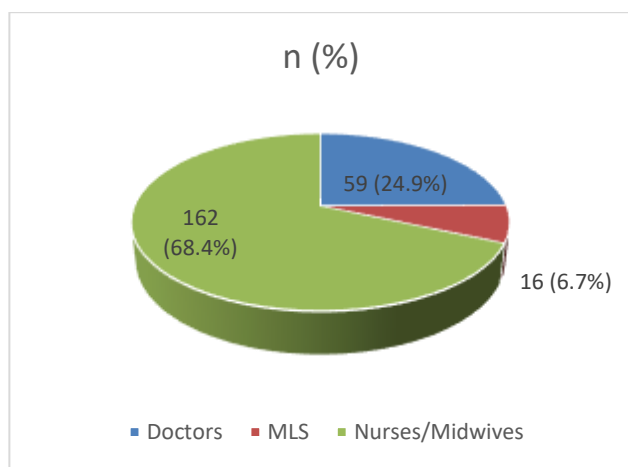


Figure 1: Pie chart showing the Cadre of the participants

The marital status of the participants showed that 118 (49.8%) were married, 114 (48.1%) were single, 4 (1.7%) were widowed, and 1 (0.4%) was a widower. The nurses/midwives were from the nursing services department, the medical laboratory scientists were from the pathology department while the doctors were from the various departments of the hospital. Figure 2 shows the participants' years of work experience, with the majority having 1–2 years of experience 76 (32.1%). Tables 1 and 2 show Healthcare Workers' Perceptions of Targeted Interventions to Improve Awareness and Practice of Autologous Blood Donation by Cadre and Healthcare Workers' Willingness and Perceived Institutional Strategies to Enhance Uptake of Autologous Blood Donation and Table 3 shows Cadre-based Preferences for institutional support as actionable interventions to Improve Autologous Blood Donation Uptake.

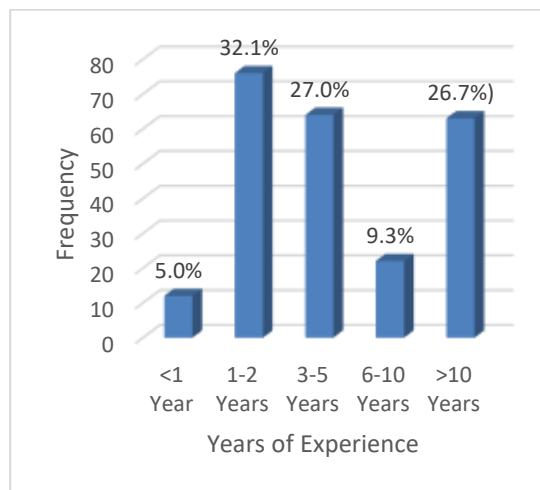


Figure 2: Bar chart showing the work experience of the participants

Table 1: Healthcare Workers' Perceptions of Targeted Interventions to Improve Awareness and Practice of Autologous Blood Donation by Cadre

Would regular in-service training on ABD improve your knowledge and confidence?									
Cadre	SA	A	N	D	SD	Total	χ^2 (df)	p-value	Cramér's V
Doctors	39	19	1	0	0	59			
MLS	12	4	0	0	0	16	15.08 (6)	0.020	0.178
Nurses	75	62	23	0	2	162			
Total	126	85	24	0	2	237			
Do you think having a formal policy or protocol on ABD would encourage usage?									
Doctors	33	25	1	0	0	59			
MLS	10	5	1	0	0	16	19.63 (10)	0.033	0.204
Nurses	53	77	24	4	4	162			
Total	96	107	26	4	4	237			
Would patient-centred awareness campaigns improve public interest in ABD?									
Doctors	37	22	0	0	0	59			
MLS	8	8	0	0	0	16	23.48 (10)	0.009	0.223
Nurses	62	63	24	10	3	162			
Total	107	93	24	10	3	237			
Should blood donation and transfusion decisions be more collaborative?									
Doctors	34	21	4	0	0	59			
MLS	8	6	2	0	0	16	13.01 (10)	0.223	0.166
Nurses	59	72	20	5	6	162			
Total	101	99	26	5	6	237			

Footnote: χ^2 = Chi-square test; SA = Strongly Agree; A = Agree; D=Disagree; SD=Strongly Disagree

Table 2: Healthcare Workers' Willingness and Perceived Institutional Strategies to Enhance Uptake of Autologous Blood Donation

Would assigning ABD champions in each department help improve practice uptake?							
Cadre	Yes	No	Not sure	Total	χ^2 (df)	p-value	Cramér's V
Doctors	52	2	5	59	16.51 (6)	0.011	0.187
MLS	11	1	4	16			
Nurses	97	15	50	162			
Total	160	18	59	237			
Should ABD be included in standard surgical care?							
Doctors	53	1	5	59	24.30 (6)	<0.001	0.226
MLS	14	2	0	16			
Nurses	98	10	54	162			
Total	165	13	59	237			
Are you personally willing to participate in awareness and campaigns or training sessions on ABD?							
	Yes	No	Maybe	Total	3.99 (6)	0.698	0.092
Doctors	45	1	13	59			
MLS	13	0	3	16			
Nurses	112	11	39	162			
Total	170	12	55	237			

Footnote: χ^2 = Chi-square test

Table 3: Cadre-based Preferences for institutional support as actionable interventions to Improve Autologous Blood Donation Uptake

Institutional support	Doctors	MLS	Nurses/ Midwives	Total	χ^2 (df)	p-value	Cramér's V
ABD coordination units	6	5	48	59	69.65 (30)	<0.001	0.383
Financial incentives	1	1	19	21			
Availability of SOPs	5	2	22	29			
Audit feedback	1	0	7	8			
Multiple responses	46	8	66	120			
Total	59	16	162	237			

Footnote: χ^2 = Chi-square test

Discussion

Nurses and midwives predominated, reflecting typical staffing patterns in Nigerian tertiary hospitals and their central role in transfusion practice and donor mobilization.^[20–22] The relatively young, early-career workforce (mean age 32.5 ± 9.8 years; 1–2 years' experience) may influence ABD competence, as transfusion expertise increases with clinical exposure.^[23,24]

Regular in-service training was significantly associated with cadre, with near-unanimous agreement among doctors and MLS and slightly

greater variability among nurses, reflecting broad cross-cadre recognition. This is consistent with guidance from the World Health Organization (2024), which states that structured professional education is essential for improving patient blood management and autologous blood donation practices in low- and middle-income countries.^[17]

Across cadres, structured institutional strategies were consistently prioritized. In-service training, formal ABD policies, awareness campaigns, departmental champions, and surgical integration showed significant cadre associations, with doctors generally demonstrating stronger endorsement. These findings align with frameworks from the World Health Organization and Patient Blood Management (PBM) that emphasize professional training, standardized protocols, leadership support, and integration of autologous strategies into routine surgical care as key elements for sustainable implementation in low- and middle-income countries.^[4,17,25,26]

In contrast, collaborative decision-making and personal willingness to participate showed no significant differences across cadres, reflecting broad multidisciplinary agreement in line with PBM models that promote team-based transfusion governance.^[17] Coordination units were most preferred, particularly among nurses, mirroring WHO and ISBT recommendations that structured governance mechanisms strengthen compliance and haemovigilance systems.^[17,27] Although SOPs and audit feedback were less frequently selected, their recognized importance parallels with established quality system principles and evidence that audit improves guideline adherence and reduces inappropriate transfusion.^[28,29]

Financial incentives were least endorsed, supporting WHO guidance that sustainable transfusion reform relies on systems strengthening, leadership, and education rather than monetary motivation.^[17,30] Overall, the strong endorsement of multiple concurrent strategies reflects recognition that ABD uptake requires a coordinated, multidimensional implementation approach.^[17,31]

Conclusion

Healthcare workers in this tertiary facility in northeastern Nigeria, predominantly young and nurse-led, demonstrated strong support for structured, system-level strategies to enhance ABD awareness and perceived readiness for ABD implementation. Despite cadre-based differences in support for policies, champions, surgical integration, and coordination units, there was broad consensus on multidisciplinary collaboration and advocacy. Overall, respondents prioritized governance, training, coordination, and audit over financial incentives, emphasizing the need for a comprehensive, multidimensional institutional approach.

Limitations of the Study

1. **Single-centre design:** The study was conducted in a single tertiary hospital, which may limit the generalization of the findings to other hospitals or regions with different institutional structures, resources, or healthcare worker profiles.
2. **Cross-sectional design:** The survey captured perceptions and self-reported practices at a single point in time, making it difficult to infer causal relationships between targeted interventions and changes in ABD practice.
3. **Self-reported data:** Reliance on questionnaires may introduce social desirability or recall bias, with participants potentially overestimating their willingness, knowledge, or engagement in ABD-related activities.
4. **Limited focus on actual behaviour:** The study assessed awareness, perceptions, and willingness rather than directly measuring changes in donation behaviour or uptake following interventions.
5. **Cadre representation imbalance:** Nurses and midwives constituted the majority of participants, which may have influenced overall results and limited the ability to detect differences in perceptions among smaller cadres like doctors and medical laboratory scientists.
6. **Lack of longitudinal follow-up:** Without follow-up, the study cannot assess the

sustained impact of proposed interventions or whether reported willingness translates into long-term practice improvements.

7. **Context-specific interventions:** The findings may reflect the specific policies, resources, and culture of the hospital studied, which may differ from other tertiary or secondary healthcare settings in Nigeria or other LMICs.

Further research using methodologies that confirm our findings and address some of these limitations will go a long way in advancing the practice of autologous blood donation practices in our communities.

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Authors Contribution Details (to be ticked marked as applicable):

	Contributor 1	Contributor 2	Contributor 3	Contributor 4	Contributor 5	Contributor 6
Concepts	X	X	X			
Design	X	X	X	X		
Definition of intellectual content	X	X	X	X	X	X
Literature search	X	X	X	X	X	X
Clinical studies	X	X		X	X	X
Experimental studies	X					

Conflict of Interest

There are no conflicts of interest

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