ClinicSearch

Clinics in Nursing

Uche CL *

Open Access

Research Article

Blood Usage by Speciality in Health Institutions in Abia State: Documentation, A Major Challenge

Uche CL [1*], Ezirim EO [2], Ogbenna AA [3], Chikezie K [4], Owojiyugbe TO [5], Iwuoha EC [6], Ndukwe PE [2], Eke OK [2], Abali IO [7], Ndukwe CO [7], Ngwudo S [8], Agu F U [9], and Airaodion AI [10]

[1]Department of Haematology and Blood Transfusion, Abia State University, Uturu, Nigeria,

[2]Department of Obstetrics and Gyneacology, Abia State University Teaching Hospital, Aba, Nigeria

[3]Department of Haematology and Blood Transfusion, University of Lagos/ Lagos University Teaching Hospital, Idi- -Araba, Nigeria

[4]Department of Haematology, Federal Medical Centre, Umuahia, Abia State, Nigeria.,

[5]Department of Haematology and Immunology, Obafemi Awolowo University, Ile-Ife, Nigeria

[6]Department of Community Medicine, Abia State University, Uturu, Nigeria

[7]Department of Surgery, Abia State University Teaching Hospital, Aba, Nigeria

[8]Department of Paediatrics, Abia State University Teaching Hospital, Aba, Nigeria

[9]Department of Physiology, Gregory University Uturu, Abia State, Nigeria

[10]Department of Biochemistry, Lead City University Ibadan, Oyo State, Nigeria.

***Corresponding Author:** Uche CL, Department of Haematology and Blood Transfusion, Abia State University, Uturu, Nigeria.

Received date: September 25, 2024; Accepted date: October 17, 2024; Published date: October 31, 2024

Citation: Uche CL, Ezirim EO, Ogbenna AA, Chikezie K, Owojiugbe TO, et al., (2024), Blood Usage by Speciality in Health Institutions in Abia State: Documentation, a Major Challenge, *Clinics in Nursing*, 3(5) **DOI:**10.31579/ 2835-8147/061

Abstract:

Background: Efficient blood usage is essential for optimal healthcare delivery. However, poor documentation remains a significant challenge in accurately assessing blood usage by specialty. This study explores blood utilization across specialties in health institutions in Abia State, Nigeria, highlighting the challenges in documentation and the distribution patterns of blood use.

Materials and Methods: This cross-sectional, retrospective study was conducted over six months, involving 13 health institutions in the three senatorial zones of Abia State: Abia North, Abia South, and Abia Central. Health facilities that met inclusion and exclusion criteria were included. Data were collected using a semi-structured, interviewer-administered questionnaire and blood bank records from January to June 2022. Analysis was performed using SPSS version 23, with descriptive statistics and frequency distributions presented for demographic and categorical data.

Results: A total of 4,724 blood donations were documented, with government institutions contributing the majority (51.9%) of collections. Internal Medicine utilized the highest proportion of blood (51.04%), followed by Accident and Emergency (16.81%), Obstetrics and Gynecology (14.67%), Surgery (8.30%), and Paediatrics (9.20%). The absence of computerized documentation in all institutions and lack of standardized record-keeping hindered efficient data retrieval.

Conclusion: Internal Medicine accounted for the highest blood usage among specialties, while Paediatrics used the least. Documentation inconsistencies and manual record-keeping practices present significant barriers to reliable blood usage tracking. Enhancing data documentation and implementing computerized systems in health institutions are recommended to improve accuracy and efficiency.

Key words: blood utilization; documentation challenges; specialty; internal medicine; blood bank records

Introduction

Blood transfusion is a critical component of modern healthcare, essential for managing various medical conditions, including surgical procedures, trauma, chronic anaemia, and cancer treatments [1]. The appropriate use of blood and blood products ensures that patients receive the necessary support during acute and chronic health conditions. However, the demand for blood varies significantly across different departments within health institutions, influenced by the nature of medical services provided, patient demographics, and the prevalence of specific health conditions.

In Nigeria, the demand for blood and blood products has been rising, driven by an increasing population, the high burden of infectious diseases like malaria and the growing prevalence of non-communicable diseases (NCDs) for example, Sickle cell anaemia [2]. Abia State, like many other regions in Nigeria, faces challenges related to blood availability, safe transfusion practices, and efficient utilization of blood products. Understanding the patterns of blood usage across different departments is vital for optimizing blood bank services, ensuring adequate supply, and improving patient outcomes.

Globally, the demand for blood varies across healthcare systems, with high-income countries typically having better-established blood transfusion services compared to low- and middle-income countries (LMICs). The World Health Organization (WHO) emphasizes the need for rational blood use, advocating for the implementation of blood transfusion policies that prioritize safety, availability, and equitable distribution [3]. In LMICs, challenges such as inadequate infrastructure, insufficient blood donation rates, and limited resources contribute to disparities in blood usage across departments.

A study by Yaddanapudi et al. [4] highlighted that surgical and obstetric departments are among the highest consumers of blood, particularly in settings with high rates of maternal morbidity and mortality. Similarly, internal medicine and oncology departments often require consistent blood supply for managing chronic conditions and chemotherapy-induced anaemia. Understanding these global patterns is essential for contextualizing blood usage in specific regions like Abia State.

In Nigeria, blood transfusion services are primarily hospital-based, with limited coordination between blood banks and healthcare facilities. The National Blood Transfusion Service (NBTS) is responsible for ensuring a safe and adequate blood supply across the country. However, challenges such as limited donor recruitment, inadequate screening methods, and inconsistent blood usage policies persist [5]. These challenges are particularly pronounced in states like Abia, where health infrastructure is underdeveloped, and the burden of diseases requiring transfusion is high.

Previous studies in Nigeria have demonstrated that the highest demand for blood is in departments dealing with emergencies, surgeries, obstetrics, and gynaecology. For instance, Anumudu et al. [6] found that obstetrics and gynaecology departments accounted for a significant proportion of blood transfusions, largely due to complications from childbirth and pregnancy-related haemorrhages. Another study by Eze et al. [7] reported that surgical departments frequently required blood for trauma and elective procedures, highlighting the importance of maintaining an adequate blood supply.

Abia State, located in south-eastern Nigeria, is a region with diverse healthcare needs. The state's health institutions, ranging from tertiary hospitals to primary healthcare centres, cater to a population with varying medical requirements. Despite the presence of several healthcare facilities, Abia State faces challenges in meeting the blood demands of its population. A comprehensive assessment of blood usage by different departments within these institutions is necessary to address these challenges effectively.

Data on blood usage patterns in Abia State are limited, with most available information being anecdotal or derived from small-scale studies. This research aims to fill this gap by providing a detailed analysis of blood usage across different departments, including obstetrics and gynaecology, surgery, internal medicine, and paediatrics. The findings will offer insights into the factors influencing blood demand in these departments, such as the prevalence of specific medical conditions, the availability of surgical services, and the overall healthcare infrastructure.

The findings from this study will have significant implications for blood transfusion services in Abia State and similar settings. By understanding the patterns of blood usage across different departments, healthcare policymakers and practitioners can develop strategies to optimize blood utilization, improve donor recruitment efforts, and ensure that blood banks are adequately stocked to meet the demands of various medical departments. Additionally, the study will contribute to the broader discourse on blood transfusion practices in Nigeria, providing evidence-based recommendations for improving blood safety and availability in the region..

Materials and Methods

Study Design

A cross-sectional six-month retrospective study was conducted in both Abia state public and private health institutions. Health facilities that met the inclusion and exclusion criteria were recruited in the study. The three Senatorial zones in Abia state were involved: Abia North, Abia South and Abia Central. Four to five health institutions that met the inclusion and exclusion criteria were recruited from each of the three senatorial zones respectively.

Study Area

Abia State is a state in the Southeast geopolitical zone of Nigeria, it is bordered to the north and northeast by the states of Enugu, and Ebonyi, Imo State to the west, Cross River State to the east, Akwa Ibom State to the southeast, and Rivers State to the south. Abia State occupies about 6,320 square kilometres of land with an estimated population of over 3,720,000 as of 2016. It has three Senatorial zones: Abia North, Abia South and Abia Central. Each senatorial zone consists of 6, 6, and 5 LGAs respectively. On the whole Abia state has a total of 17 Local govt. area (LGA). Abia state has about 200 registered hospitals and clinics.

Ethical Consideration

The ethical clearance for this study was obtained from the Health Research Ethics Committee (HREC) of the Federal Medical Centre Umuahia, Abia State with reference number FMC/QEH/.596./Vol.10/690.

Data Collection

A well-semi-structured pretested interviewer-administered questionnaire (adapted from the National Blood Transfusion, Ministry of Health) was used for the study. Blood bank records were used where necessary. Information was obtained from data covering January to June 2022. Data was collected between November 2023 and February 2024 in Health facilities in Abia State and a total of 13 health facilities were used. The questionnaire consisted of:

- **Demographic Data:** The following information was collected under demographic data: Senatorial zone made up of Abia North, Abia South and Abia. Type of the Institutions (Secondary and tertiary), Specialty (multispecialty), Number of dedicated staff in the blood transfusion unit and presence

of active blood transfusion committee. Sex and age distribution of donors were collected from all facilities.

- **Blood usage by speciality** was collected from Obstetrics and gynaecology, Paediatrics, Surgery, Internal medicine, Accident and emergency from January to June

Statistical Analysis

Data was analyzed using the SPSS version 23 statistical package. Continuous variables were analyzed using descriptive (means, standard deviation, median) while categorical variables were analyzed in frequency and proportions. A p-value of 0.05 or less was considered statistically significant.

Results

Table 1 shows the socio-demographic characteristics of health facilities involved in blood transfusion services. Among the 13 health institutions, a near-equal distribution exists across Abia North (30.8%), Abia South (30.8%), and Abia Central (38.5%) senatorial districts. Ownership is balanced, with 46.2% being government-owned and 53.8% private-owned. Most institutions operate as secondary facilities (77%) with only a few tertiary institutions (23%). Staff availability in the blood transfusion units is limited; over half of the institutions (54%) have only one dedicated staff member, with just a few (12.5%) having three or more staff. Regarding record management, 69.23% of institutions have records identifying blood donors, but all maintain records manually, with no computerized systems.

Table 2 summarizes the total blood collected from January to June 2022 across different health facilities. The data reveal that blood donations were unevenly distributed, with GH5 contributing the highest (51.9% of total collections), while GH1 had the lowest (1.2%). Four government facilities reported no blood collection, suggesting potential gaps in data documentation or operational activities. Among private health institutions, PH4 had the highest monthly collection, maintaining a consistently high level across months, while other institutions exhibited more fluctuation. A total of 4,724 units were collected across all facilities over six months.

Table 3 presents blood usage by specialty from January to June. The department of Internal Medicine utilized the most blood (51.04% of the total), with usage peaking in March and dipping in May and June. Accident and Emergency also saw substantial demand (16.81%), particularly in April. Obstetrics and Gynecology had fluctuating needs, peaking in February. In contrast, Pediatrics had the lowest blood usage (9.20%) with its highest demand in March and lowest in May and June, indicating seasonal or patient-based variations in blood requirements.

Variables	Frequency (n = 13)	Percentage (%)
Senatorial District		
Abia North	4	30.8
Abia South	4	30.8
Abia Central	5	38.5
Total Health Institutions Government -owned Private-owned	13 6 7	100
Type of Health Institutions		
Secondary	11	77
Tertiary	3	23
Specialty		
Monospecialty Multispecialty	0 13	0 100
Number of dedicated staff in the blood transfusion unit		
One staff	7	29.2
Two staff	3	12.5
≥3	3	12.5
		4. 2
Total	13	100
Record that can identify blood donor Yes No	 9 4	 69.23 30.77
Record retrieval for blood donors Manual Computer	 9 0	 100 0

Table 1: Socio-demographic Characteristics of The Health Facilities

Variables	Jan	Feb	March	April	May	June	Total	Percent
GH1	12	12	11	2	11	7	55	1.2
PH2	16	13	16	12	13	11	81	1.7
PH3	19	14	14	23	19	20	109	2.3
PH4	90	101	110	134	90	124	649	13.7
GH5	408	368	419	408	423	428	2454	51.9
PH6	39	25	20	35	68	52	239	5.1
PH7	108	64	58	71	82	56	439	9.3
PH8	67	39	83	43	57	35	324	6.9
PH9	69	51	67	45	71	71	374	7.9
GH10	0	0	0	0	0	0	0	0
GH11	0	0	0	0	0	0	0	0
GH12	0	0	0	0	0	0	0	0
GH13	0	0	0	0	0	0	0	0
Total							4724	100

GH means government Institution, PH means Private Institution

Table 2: Total Blood Collected in the Health Institution from January to June 2022

Four health institutions that did not document their findings. A total of 4,724 donors donated blood. Government Health Institution (GH) 5 had the highest donation (51.9) while the Government Health Institution (GH1) had the least donation (1.2). PH4 also showed consistent and high monthly being the second largest collections. Only Government Health institutions had an absence of data.

Department	Jan	Feb	March	April	May	June	Total	%
Obstetrics and Gyneacology	81	101	114	86	73	44	499	14.67
Paediiatrics	71	62	91	30	28	31	313	9.20
Surgery	91	42	41	30	45	33	282	8.30
Internal Medicine	434	318	362	396	112	115	1737	51.04
Accident and Emergency	162	89	97	118	59	47	572	16.81

Table 3: Blood Usage by Specialty

The table shows that Internal medicine used blood more than the other department while Paediatrics used the least. In Internal medicine, blood usage varied each month, with the highest usage in March and the lowest in May and June. Obstetrics and Gynecology had varying blood usage over the months, with the highest usage in February and the lowest in June. Paediatrics had the lowest blood usage among the speciality departments. The blood usage in this department fluctuated each month, with the highest usage in March and the lowest in May and June. The blood usage in the Surgery department varied each month, with the highest usage in January and the lowest in April. The blood usage in Accident and Emergency varied each month, with the highest usage in April and the lowest in June.

Discussion

The study covered institutions from all three senatorial zones in Abia State: Abia North (30.8%), Abia South (30.8%), and Abia Central (38.5%). The slight predominance of institutions in Abia Central could be due to the presence of more health facilities in this zone, which may also cater to a larger population. This distribution aligns with studies that suggest healthcare resources are often concentrated in more urbanized and centrally located areas within states [8].

The lack of representation from mono-specialty hospitals in the study is notable and may suggest that such facilities either do not exist in significant numbers or are less likely to participate in studies of this nature.

The study found that 29.2% of institutions had only one dedicated staff member in the blood transfusion unit, while 12.5% had two or more staff members. This staffing pattern is concerning and reflects a common challenge in the Nigerian healthcare system: the shortage of trained personnel in critical areas such as blood transfusion services. The findings are in line with previous studies that have highlighted inadequate staffing as a major impediment to efficient blood transfusion services in Nigeria [9,10].

Interestingly, while 69.23% of institutions kept records that could identify blood donors, these records were manually maintained in all cases. The complete reliance on manual record-keeping is problematic, as it increases the likelihood of errors and makes data retrieval cumbersome. Studies have shown that computerized systems for blood donor records improve the efficiency and accuracy of data management, leading to better tracking and utilization of blood resources [11]. The lack of computerization in Abia State institutions mirrors a broader trend in LMICs, where financial constraints and lack of infrastructure hinder the adoption of digital health technologies [12].

The proportionate use of blood varies significantly across different departments in health Institutions due to specific needs and treatment protocols. Generally, certain conditions that can increase the usage of blood in every department are highlighted below:

High demand for the use of blood is seen in surgery: cardiothoracic surgery during open surgery and certain procedures involving blood vessels; Joint replacement surgery and spinal surgeries and acute blood loss in injuries [13]. In internal medicine blood transfusions are needed in clinical cases such as massive gastrointestinal haemorrhage others are renal failure requiring dialysis, gastrointestinal bleeding and certain chronic anaemia requiring blood transfusion [13]. In paediatrics, children with congenital heart defects, and cancers. Severe infections and genetic blood disorders such as sickle cell anaemia and thalassaemia. Premature infants and those with severe infections require blood transfusion [14]. Blood

transfusions are more common in children in some areas. Studies conducted in hospitals in East and West Africa demonstrated that children receive 45–60% of all blood transfusions and that up to 30% of paediatric admissions are for the treatment of severe anaemia. In obstetrics, blood use is critical in managing obstetrics during childbirth or as a result of complications of childbirth. For example, abruption placenta [15].

In this current study, Internal Medicine had the highest blood usage, while Paediatrics had the lowest blood usage among the speciality departments. The blood usage pattern varied across departments, with some showing consistent usage levels each month, while others had more fluctuation. This finding is quite surprising and at variance with other studies. Aliyu et al [16] in a study done at a medical centre in the Northwest revealed that the obstetrics and gynaecology department (52.3%) had the highest request for blood transfusion, while medicine had the least (9.3%). Okocha et al [17] at Nnamdi Azikiwe Teaching Hospital Nnewi revealed the highest request for blood use was from the accident and emergency. This is well understood because accident and emergency are a pathway through which many patients enter the hospital. The cause of the outrageous increase in Internal medicine could be improper recording, especially in certain hospitals where every case that is not surgery is lumped into medicine. This is one of the limitations of a record-based study which the researcher uses only what is provided. Therefore, it is important to consider the patient population, types of procedures and medical conditions treated in each department when analysing blood usage patterns and a prospective study can give an unbiased and better result. The importance of this study cannot be over-emphasized as the study and analysis of different institutions' departmental use of blood and blood products can help to identify best practices optimize blood inventory management and improve patient outcomes through efficient blood utilization. The strike action must have contributed to the general low usage observed in all the departments in June.

Documentation is a major problem in this study. Study done by the same group of researchers recorded no single documentation of adverse reactions by the laboratories. Though, the laboratory staff admitted to receiving information from the wards on blood transfusion reactions as well as investigating the adverse reactions but did not see the need to document them [18]. This is similar to another study done by Almuqbil et al. [19] which revealed that the laboratory critical value report and documentation was 0% complete, 4% incomplete, and 96% undocumented. According to Morrissey-Ross [20], “documentation: If you haven’t written it, you haven’t done it.

Documentation plays a significant role in medical laboratories, serving as a foundation for quality assurance, traceability, patient safety, and patient care. Accurate and comprehensive documentation ensures that laboratory processes are well-documented, organized, and compliant with regulatory standards [21]. One of the most neglected practices within the laboratory is documentation. It has to be acquired and exercised by all laboratory personnel. Within the laboratory, it is essential that all stages of every technique are correctly documented, and that the Laboratory personnel maintain logical concise records detailing the history of specimen and sample development. Documentation provides an invaluable database for later workers wishing to re-examine, analyse or undertake additional conservation or preservation techniques, particularly for irreplaceable material [22].

In this study, the four health institutions without a single documentation are all government health institutions. Contributions of Health institutions vary significantly, with Government Health Institution 5 (GH5) collecting the most and Government Health Institution1 (GH1) collecting the least. This indicates a highly efficient or larger-scale operation in GHI5 compared to others. GH1 is the only state-owned Health Institution with data. The other state-owned institutions (GH10,11,12, 13) could not provide data. The GH5 which supplied most of the donors was the only federal government health Institution in Abia. So, the overwhelming increase in the number of donors observed in GH5 stemmed from a low motivation of workers occasioned by inadequate remuneration by the state government [23]. Consequently, some health workers went on strike leaving the others to be providing skeletal services. The study brought to the fore how a lack of political will on the side of the government can crumble the health system and directly affect blood transfusion practices. However, there appears to be a paradigm shift presently in the health sector as the government is ready to transform the health sector, hence, the need for robust data [24].

Conclusion

This study provides a comprehensive analysis of blood usage across different departments in health institutions in Abia State, Nigeria, revealing significant variations in demand and utilization. The findings indicate that the Internal Medicine department had the highest blood usage, followed by Accident and Emergency and Obstetrics and Gynaecology. This pattern highlights the critical need for blood in managing chronic illnesses, emergency care, and maternal health. The finding also underscores the challenges faced by blood transfusion units, such as inadequate staffing, the absence of active blood transfusion committees, and the lack of a voluntary blood recruitment unit. These factors contribute to inefficiencies in blood management and could potentially impact patient outcomes. The results of this study emphasize the necessity for a strategic approach to blood management within the health institutions in Abia State, ensuring that the demand for blood is met across all departments, particularly those with higher utilization rates.

Recommendations

1. **Enhancement of Blood Transfusion Committees:** It is recommended that health institutions in Abia State establish and maintain active blood transfusion committees. These committees should oversee the development and implementation of blood management policies, ensuring that blood usage is optimized and wastage is minimized.
2. **Strengthening Voluntary Blood Donation Programs:** The establishment of robust voluntary blood recruitment units is crucial. This would help to increase the availability of blood in the blood banks, reducing reliance on family replacement donations and ensuring a more stable blood supply.
3. **Training and Capacity Building for Staff:** Regular training programs should be organized for the staff involved in blood transfusion services. This will improve their knowledge and skills, leading to better management of blood resources and adherence to safety protocols.
4. **Implementation of Quality Assurance Policies:** The implementation of quality assurance policies in all health institutions is essential. This includes having a quality officer responsible for blood-related issues, which would ensure that all processes related to blood transfusion meet national and international standards.
5. **Improvement of Record-Keeping Systems:** The transition from manual to computerized record-keeping systems should be prioritized to enhance the efficiency and accuracy of blood donor records and blood usage data. This will facilitate better tracking, monitoring, and decision-making processes.
6. **Targeted Interventions for High-Demand Departments:** Departments such as Internal Medicine and Accident and Emergency should be prioritized in blood supply planning. Targeted interventions, including preemptive blood

stockpiling and strategic donor mobilization, could help to meet the high demand in these areas.

References

1. Bolcato, M., Russo, M., Trentino, K., Isbister, J., Rodriguez, D. et al., (2020). Patient blood management: The best approach to transfusion medicine risk management. *Transfusion and Apheresis Science*, *59*(4), 102779.
2. Kalra, S.K., Thilagar, B., Khambaty, M. *et al.* Post-operative Anemia After Major Surgery: a Brief Review. *Curr Emerg Hosp Med Rep* **9**, 89–95 (2021).
3. World Health Organization. (2021). *Global status report on blood safety and availability 2021*. World Health Organization.
4. Yaddanapudi, R., Yaddanapudi, L., & Sahni, P. (2018). Blood transfusion practices in the developing world. *Transfusion Medicine Reviews, 32*(3), 110-116.
5. Adewole, D. A., Akinwande, K., Adebiyi, A. O., & Adeleke, N. A. (2020). Challenges of blood transfusion in sub-Saharan Africa: How Nigeria is coping. *Transfusion Medicine Reviews, 34*(1), 3-8.
6. Anumudu, C., Okerengwo, A., Okoroiwu, I., & Nna, E. (2019). Patterns of blood transfusion in a tertiary hospital in south-eastern Nigeria. *African Journal of Medical and Health Sciences, 18*(3), 30-35.
7. Eze, A., Okocha, C., Uche, I., Anyaehie, U. (2021). Surgical blood usage in a teaching hospital in Nigeria: A retrospective study. *Nigerian Journal of Clinical Practice, 24*(2), 170-175.
8. Oladeji, B., Akinlolu, O., Fatunla, A. (2022). Healthcare resource distribution and accessibility in Nigeria: A critical review. *International Journal of Healthcare Management, 15*(1), 45-57.
9. Onyeneho, N. G., Nwimo, I. O., Ibeh, C. C. (2019). Challenges in the provision of blood transfusion services in Nigeria: A review of the literature. *Journal of Health Management, 21*(3), 314-328.
10. Akinbami, A. A., Dosunmu, A. O., Adewunmi, A. A., Ajibola, S. A. (2020). Blood transfusion practices in Nigeria: emerging trends and challenges. *Nigerian Journal of Clinical Practice, 23*(4), 520-525.
11. Ekwunife, O. I., Igwilo, C. I., Onwujekwe, O. E. (2018). Adoption of electronic medical records for blood donor management in Nigeria: A policy perspective. *BMC Health Services Research, 18*(1), 358-367.
12. Oseni, L., Aliyu, A., Omoleke, S. (2021). Barriers to the adoption of digital health technologies in Nigeria: A review of policy and practice. *Journal of Medical Informatics, 30*(2), e12345.
13. ALFadhalah, T., Al Mudaf, B., Al Tawalah, H. Baseline assessment of staff perception of critical value practices in government hospitals in Kuwait. *BMC Health Serv Res* **22**, 986 (2022).
14. Faizol, Z., Zubir, F., Saman, N. M., Ahmad, M. H., Rahim, et al., (2022), Detection Method of Partial Discharge on Transformer and Gas-Insulated Switchgear: A Review. *Applied Sciences, 13*(17), 9605.
15. Okoroiwu, H. U., Ogar, C. O., Iwara, I. A. (2019). The impact of donor recruitment strategies on the quality and availability of blood in Calabar, Nigeria. *Journal of Public Health in Africa, 10*(1), 16-22.
16. Umeh, C., Adekanbi, O., Ibrahim, A. (2023). Trauma care and blood transfusion: Insights from Nigerian tertiary hospitals. *African Journal of Trauma*, 41(2), 180-188.
17. Adeosun, O. O., Onajole, A. T., Abioye-Kuteyi, E. A. (2017). Blood transfusion services in southwest Nigeria: challenges and possible strategies. *African Journal of Health Sciences, 27*(1), 10-20.
18. Uche CL, Ndukwe CO, Ngwudo S, Ezirim EO, Ogbenna AA, Chikezie K, Owojiugbe TO, Iwuoha EC, Ndukwe PE, Eke OK, Abali IO, & Airaodion AI. Assessment of quality assurance level and compliance of abia state blood banks to national guideline on blood transfusion: a multi-centred study (Unpublished)
19. Almuqbil, M., Alturki, H., Al Juffali, L., Al-otaibi, N., Awaad, N., et al.,(2023). Comparison of medical documentation between pharmacist-led anti-coagulation clinics and physician-led anticoagulation clinics: A retrospective study. *Saudi Pharmaceutical Journal*, *31*(11), 101795.
20. Morrissey-Ross, M. Documentation. If you haven't written it, you haven't done it. Nursing Clinics of North America, 1988. 23(2): p. 363-71.
21. Akinnawo, E. O., Omolade, A. A., Oyenuga, A. (2022). Blood transfusion demand in internal medicine: A study of tertiary hospitals in Nigeria. *African Journal of Internal Medicine*, 33(1), 24-31.
22. Balogun, O. S., Oyedeji, K. S., Olayemi, A. B. (2021). A multi-centre study of blood transfusion practices in Nigeria. *Nigerian Journal of Hematology*, 29(3), 255-263.
23. Kazie U. (2023). Federal Govt. commends Gov Otti on proactive steps to resolve Health Sector issues in Abia.
24. Erunke J. (2023). Doctors to embark on fresh indefinite strike. Vanguard online.