Overview of Blood Use in Adult Haematological Malignancies in Uyo

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ABSTRACT

Background: Patients with haematological malignancies (HMs) often receive a high number of units of blood, and transfusion practices for these cohorts of patients are increasingly being evaluated globally. However, to the best of our knowledge, studies on the transfusion statistics for this patient group in our environment are non-existent. **Aim**: This study aimed at examining the frequency of blood use by adult patients with haematological malignancies managed at the University of Uyo Teaching Hospital (UUTH) and to determine if there are any associations between the transfusion status and the haematological malignancies and age of the patients. **Methods:** Data on age, sex, type of HM and frequency of blood use by HM patients at the UUTH from January 2020 to December 2023 were retrieved from the medical records. The results collated were analyzed using Statistical Package for Social Sciences (SPSS) Windows Version 23.0 and presented in simple frequency tables. A total of 73 HM patients aged 20-89 years were included in the study, and 151 units of blood were used during the review period. **Results:** Of the 12 different HMs recorded, patients with myelodysplastic syndrome received the highest transfusions 28(18.5%) while those with polycythaemia vera and essential thrombocythaemia received no transfusion (0%). There was a significant association between blood transfusion and type of HM but not with age (p = 0.0001 and 0.172 respectively). **Conclusion**: This study presents an overview of blood use in adults with haematological malignancies. The implications of frequent transfusion of these patients are the shortage of blood supply owing to dwindling blood donor pool and increased incidence of blood transfusion complications such as transfusion-transmissible infections and immunization. Also, the financial burden on the patients and their relatives is enormous, especially in our environment where the bulk of the blood donations is from remunerated donors.

Keywords: Haematological Malignancies, Blood Use, UUTH, Myelodysplastic Syndrome, Polycythaemia Vera, Essential Thrombocythaemia.

INTRODUCTION

Haematological Malignancies (HMs) are a heterogeneous group of neoplasms that primarily affect the blood, bone marrow and lymph nodes. These neoplasms include leukaemias, lymphomas, multiple myeloma, myelodysplastic syndrome, polycythaemia vera, essential thrombocytopenia and primary myelofibrosis.[1]

Blood Transfusion is a critical component of care in the management of patients with haematological malignancies. These patients often require large units of blood, and this is a grave concern for blood transfusion establishments in Nigeria owing to the low recruitment and retention of blood nors.2 This problem is compounded by factors such as the high prevalence of transfusion–transmission infections, high frequency of commercial blood donation with its attendant risks, over-dependence on family replacement donors, resource constraints and poor attitude of the public to voluntary blood donation.2,3Unfortunately, the bulk of the blood donations is from remunerated (paid) donors, and this usually poses a difficult challenge to the patients and their relatives both socially and financially.[3]

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For instance, the cost of procuring a unit of whole blood in blood in blood centres in some parts of Nigeria iscurrently between 30 and 40 dollars, and with the prevailing economic hardship in the country, managing patients with HMs is a herculean task.[2]

Published data on the clinical use of blood in haematological malignancies in our environment are non-existent. The objectives of this study are to determine the profile of blood use among the different HMs and to determine if there are any associations between blood transfusion, the type of

HM, and patient age. Data from this study will provide a template for assessing the pattern of blood utilization in HM patients and sustaining programmes or protocols to monitor and promote its rational use. Also, it will help in improving the policy framework and intervention strategies on the management of HMs for blood use, especially in resource-poor settings like ours.

METHODS

Study Location

The study was carried out in the Department of Haematology, University of Uyo Teaching Hospital, Uyo, Nigeria. The Hospital is a 500-bed tertiary Health Facility in the South-South region of Nigeria that offers specialized healthcare services to residents of Uyo and its environs. The Department of Haematology attends to adult patients with various haematological disorders including haematological malignancies.

Study Design

This was a retrospective descriptive cross-sectional study on the pattern and frequency of blood use in adult haematological malignancies at the University of Uyo Teaching Hospital (UUTH), Uyo, Nigeria from January 2020 to December 2023. Information on the types of haematological malignancies, the age and gender of the subjects and the number of transfusions were extracted from patients' case notes and recorded in a proforma designed for the study.

Study Population

These were adult patients diagnosed with haematological cancers and treated at the Department of Haematology, UUTH. The records of 73 patients were reviewed during the study period.

Selection Criteria

The case files of patients who had confirmed diagnoses of haematological malignancies during the study period were included. The case files of patients with unconfirmed diagnosis and incomplete records regardless of their transfusion status were excluded from the study.

Data Analysis

Data obtained were analyzed using Statistical Package for Social Sciences (SPSS) Windows Version 23.0. Results were presented in simple frequency tables. Descriptive Statistics were used as appropriate, and a statistically significant level was set at $P < 0.05$.

RESULTS

A total of 73 adult patients with haematological malignancies were reviewed during the study period. The mean age of the students was 49.9 ± 18.9 years with a range of 20 – 89 years (Table 1). The subjects consisted of 40 males and 33 females (Table 2), giving a male-to-female ratio of 1:2:1. Majority of the patients were diagnosed between the ages of 50 – 69 years. The various cases of haematological malignancies reviewed over the study period are presented in Table 3. No statistically significant relationship was observed in the association between age distribution and haematological malignancies (Table 4). A total of 151 units of blood were transfused during the period under review (Table 5). There was however a statistically significant association between the different haematological malignancies and the number of units of blood received by the patients (Table 6).

Table 1: Age Distribution of the Patients

Age Range	Frequency (%)
20 – 29	12 (16.44)
30 – 39	10(13.70)
40 – 49	09 (12.33)
50 – 59	18 (24.66)
60 – 69	18 (24.66)
70 – 79	04 (5.48)
80 – 89	02 (2.74)

Table 2: **Gender Distribution of the Patients**

Gender	Frequency (%)
Male	40 (54.79)
Female	33(45.21)
Total	73(100.00)

Table 3: Haematological Malignancies

Type of malignancy	Frequency (%)
AML	5 (6.85)
ALL	4 (5.48)
CML	10(13.70)
CLL	12 (16.44)
HL	6 (8.22)
NHL	17 (23.29)
MM	7 (9.59)
PLL	2 (2.74)
MDS	3 (4.11)
PV	4 (5.48)
ET	2 (2.74)
PM	1 (1.37)
Total	73 (100.00)

AML: Acute Myeloid Leukaemia, ALL: Acute LymboplasticLeukaemia, CML: Chronic Myeloid Leukaemia, CLL: Chronic Lymphocytic Leukaemia, HL: Hodgkin Lymphoma, NHL: Non-Hodgkin Lymphoma, MM: Multiple Myeloid, PLL: Prolymphocytic Leukaemia, MDS: Myelodysplastic Syndrome, PV: Polycythaemia Vera, ET: Essential Thrombocythaemia, PM: Primary Myelofibrosis.

Table 4: Association between Age and Haematological Malignancies

Malignancy types	20 – 29	30 – 39	40 – 49	50 – 59	60 – 69	70 – 79	80 – 89	Total	X2 (P)
AML	2	2	1	0	0	0	0	5	44.689 (0.172)
ALL	3	1	0	0	0	0	0	4	
CML	3	3	1	1	2	0	0	10	
CLL	0	0	1	3	7	1	0	12	
HL	2	3	0	1	0	0	0	6	
NHL	2	1	4	6	4	0	0	17	
MM	0	0	2	3	2	0	0	7	
PLL	0	0	0	0	1	1	0	2	
MDS	0	0	0	0	0	1	2	3	
PV	0	0	0	3	1	0	0	4	
ET	0	0	0	1	1	0	0	2	
PM	0	0	0	0	0	1	0	1	
TOTAL	12	10	9	18	18	4	2	73	

Table 5: Total Blood Transfusion and Types of Haematological Malignancies

Type of malignancy	No. of Units (%)
AML	16 (10.60)
ALL	17 (11.26)
CML	14 (9.27)
CLL	18 (11.92)
HL	7 (4.64)
NHL	26 (17.22)
MM	9 (5.96)
PLL	7 (4.64)
MDS	28 (18.54)
PV	0 (0.00)
ET	0 (0.00)
PM	9 (5.96)
Total	151 (100.00)

A statistically significant association was observed in the relationship between the number of units received and the different haematological malignancies X2= 80.591, P= 0.0001 (table 6)

Table 6: Association between Types of Haematological Malignancies and Blood Transfusion

.	0	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	Total	X2(P)
AML	0	0	0	3	0	0	1	1	0	0	0	0	0	5	80.591 (0.0001)
ALL	0	0	0	0	0	0	0	0	2	2	0	0	0	4	
CML	8	0	0	0	0	0	1	0	1	0	0	0	0	10	
CLL	7	0	0	0	0	2	0	0	0	0	3	0	0	12	
HL	3	0	0	1	2	0	0	0	0	0	0	0	0	6	
NHL	10	0	0	0	0	0	1	0	2	0	0	0	4	17	
MM	4	0	1	1	1	0	0	0	0	0	0	0	0	7	
PLL	0	0	0	1	1	0	0	0	0	0	0	0	0	2	
MDS	0	0	0	0	0	0	0	1	0	1	0	0	1	3	
PV	4	0	0	0	0	0	0	0	0	0	0	0	0	4	
ET	2	0	0	0	0	0	0	0	0	0	0	0	0	2	
PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
TOTAL	38	0	1	6	4	2	3	2	5	4	3		5	73	

DISCUSSION

While chemotherapy constitutes the linchpin in the treatment modalities for patients diagnosed with haematological malignancies, supportive care with transfusion of blood and its products plays a pivotal role in mitigating the cytopaenias characteristic of these conditions.3-5 In the analysis of records of 73 patients with haematological malignancies managed in the University of Uyo Teaching Hospital, Nigeria from 2020 to 2023, we reviewed the total number of units of blood administered during the period aiming to delineate the transfusion needs of the patients and importantly, determine whether the haematological malignancies and demographic profile such as age

were significantly correlated with transfusion intensity and frequency. Our findings suggested a significant association between the number of blood transfusions and types of haematological malignancies but not with age.

This study revealed that most of the patients were below 60 years. This observation is in keeping with the report of a study in Calabar, Nigeria6 but in dissonance with findings of studies reported from developed climes in which a good number of the transfusion recipients were above 60 years.7-9 This low median age reflects the age profile of the Nigerian population which is mainly composed of young people with only 3.1% being older than 65 years.10 The life expectancy in Nigeria is presently estimated at 54 years whereas the population average is 70 years in economically developed regions of the world. The current study also showed a male-to-female ratio of 1.2:1. This finding is comparable with other publications on haematological malignancies both within and outside Nigeria.3,5,6,9 The male preponderance can be attributed to increased occupational hazards given that majority of men are breadwinners of their families.

The results of this study also showed that the patients received a large number of blood transfusions. Overall, the transfusion needs vary depending on the diagnosis. The total units of blood used during the period was one hundred and fifty-one. This observation is comparable to findings from other studies.6-9 MDS accounted for 18.5% of the total blood transfused during the period. This can be ascribed to the fact that blood transfusion therapy forms the centrepiece of its treatment paradigm. The finding of high transfusion dependency of MDS has been reported in many other studies especially those from developing countries where most patients cannot afford or access other treatment modalities such as molecular targeted therapies.5,6,8 NHL was the next in line regarding increased transfusion requirements and accounted for 17.2% of the total blood transfused. This can be attributed to late presentation and delayed diagnosis as well as the effect of cytotoxic drugs. It may also be due to the dearth of haematologists, histopathologists and facilities to aid in early diagnosis and treatment.

Acute leukaemias are aggressive diseases which affect the bone marrow, which is the main site of haemopoiesis. ALL and AML accounted for 11.3% and 10.6% respectively of the total blood utilized. Their effects on the marrow are responsible for the increased use of blood and their chemotherapy regimens are myelotoxic to the marrow.4-6 CLL accounted for 11.9% of total blood used. This may be due to late presentation given that a good number of cases are asymptomatic; in addition, CLL is mostly a disease of the elderly with low marrow reserve making it difficult for them to tolerate the effect of chemotherapy. CML patients received 9.3% of the total blood used. This observation may be due to several factors including nutritional deficiencies, the impact of an enlarged spleen (hypersplenism), cytokine release and myelosuppression.[4-8]

Prolymphocytic leukaemia accounted for 5.0% of the total blood transfused. This is an aggressive condition that is common in the elderly with impaired marrow function, and it is typically unresponsive to chemotherapeutic agents used for the treatment of other chronic lymphoproliferative disorders and has a poorer prognosis compared to CLL [12]. MM and HL accounted for 5.0% and 4.6% respectively. These lower figures are due to the chronic course of these conditions and the mildly myelotoxic effects of their chemotherapy regimens. Polycythaemia vera and essential Thrombocythaemia both accounted for 0% while PM accounted for 6.0%. The primary myelofibrosis is a myeloproliferative neoplasm characterized by progressive bone marrow failure and extramedullary haematopoiesis which may manifest as hypersplenism with sequestration of blood cells (red blood cells) and are usually transfusion dependent.13 The other myeloproliferative neoplasms (PV and ET) are mainly treated with agents that are not myelotoxic.14 This may perhaps be responsible for the non-transfusion of the PV and ET patients and the 38 patients (50.0%) reported in our series.

Limitation

Being a retrospective study, information bias is unavoidable. Some cases may have been missed due to a lack of proper documentation.

CONCLUSION

This study presents an overview of blood use in adults with haematological malignancies, revealing that 151 units of blood were transfused between January 2020 and December 2023. There was a

significant association between the type of haematological malignancy and the number of blood transfusions, with non-Hodgkin lymphoma (NHL), chronic lymphocytic leukaemia (CLL), and chronic myeloid leukaemia (CML) accounting for the highest transfusion rates. The dire consequences of frequent transfusion of these patients are the shortage of blood supply owing to dwindling blood donor pool and increased incidence of blood transfusion complications such as transfusion-transmissible infections and alloimmunization. Also, the financial burden on the patients is enormous, for instance, the cost of procuring a unit of whole blood in our environment is currently between 30 and 40 dollars, and with the prevailing economic hardship in the country, managing the patients is a herculean task.

Recommendations

There is a great need for an increased healthcare workforce and awareness concerning prompt diagnosis and treatment of adult haematological malignancies. Government and hospital managers should gear efforts toward the provision of high-end haematological cancer services, including the provision of equipment for blood component preparation and making it affordable. Policies and programs that engender robust voluntary blood donor recruitment and retention strategies should be promoted and future large multicentre prospective study to examine how transfusion practices can be influenced by other patient- and haematological malignancy diagnosis-related factors is recommended.

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Conflicts of interest

There are no conflicts of interest to declare.

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