

# Blood Use in Haematological Malignancies in Calabar

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## Abstract

**Background:** Patients with haematological malignancies are often multiply transfused. Blood use by this patient has both medical, economic, and social implications, and the frequency of blood transfusion among this cohort of patients is being scrutinized. **Aim:** The study aimed at profiling the blood use by patients with haematological malignancies managed at the University of Calabar Teaching Hospital (UCTH). **Materials and Methods:** A retrospective study that was conducted based on the frequency of blood use among haematological malignancies patients at UCTH, Calabar. Data on blood use by haematologic malignancies (HM) patients at the UCTH from July 2019 to June 2021 were retrieved from the medical records in terms of sex, age, type of HM, and frequency of blood use during the period of review. The data and results collated were analyzed using Microsoft Excel 2016 and IBM SPSS version 21. The data were analyzed using simple statistics (frequencies and percentages), and the results were presented in tables and charts. **Results:** A total of 48 HMs patients managed in our facility were included in the cohort, and a total of 102 blood was used during the period of review. Overall, the frequency of blood transfusion varies from one type of HM to another. Patients with non-Hodgkin's lymphoma (NHL), chronic myeloid leukaemia (CML), chronic lymphatic leukaemia (CLL), and acute myeloid leukaemia (AML) account for 92.2% of blood transfused, whereas Hodgkin's lymphoma (HL), multiple myeloma (MM), and acute lymphoblastic leukaemia (ALL) represent 7.8%. The male-to-female ratio was 1.5:1. Overall age ranges from 20 to 89 years, the mode was 54 years, and the median age was 53 years. NHL is said to consume 45 units of the whole, followed by CLL and AML, both used 17 units each, whereas CML and HL were said to have used 15 units and 8 units, respectively, with MM and ALL nil. There is also a significant association between type of haematological malignancies and blood transfusion ( $P = 0.0016$ ). **Conclusion:** This study presents an overview of blood transfusion use in patients with haematological malignancies. The implication of blood utilization is the shortage of blood and increased incidence of blood complications such as transfusion-transmissible infections and alloimmunization with HM patients. Furthermore, the financial burden on the patient, the cost implication of procuring a unit of whole blood which is between 20 and 30 dollars, especially in a low-resource country, where remuneration blood donation is still the major source as compared to the standard voluntary donation in a low-resource setting like ours where the poor attitude toward blood donation still remains a great challenge.

**Keywords:** Blood transfusion, Calabar, haematologic malignancies

## INTRODUCTION

Haematologic malignancies (HM) are one condition that require large quantities of blood transfusion.<sup>[1,2]</sup> This poses a great challenge to low-resource settings both socially and financially due to scarcity and poor attitude to voluntary blood donation, respectively. Bulk of the blood donations is from remunerated donors posing a high financial burden. HM patients require large quantities of blood; this might either be due to the malignancy or following the consequence of chemotherapy.

The aim of this study is to determine the profile of blood use among the different HM. There is little or no information on the profile of blood use among HM in our environment.

Data from this study may serve as an important reference for further research questions on the variation in the pattern of blood use among HM patients and help to improve policy formulation and management strategy on the treatment of haematological malignancies with respect to blood use, especially in low-resource settings. No studies so far have presented current transfusion statistics among HM patients in Calabar.

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## MATERIALS AND METHODS

### Study design

This is a retrospective study on the pattern and frequency of blood use by adult haematological malignancies at the University of Calabar Teaching Hospital (UCTH) from July 2019 to June 2021.

**Table 1: Age distribution of the patients**

| Age range | Frequency (%) |
|-----------|---------------|
| 20-29     | 7 (14.58)     |
| 30-39     | 4 (8.33)      |
| 40-49     | 11 (22.92)    |
| 50-59     | 13 (27.08)    |
| 60-69     | 9 (20.83)     |
| 70-79     | 2 (4.17)      |
| 80-89     | 1 (2.08)      |
| Total     | 48 (100.00)   |

**Table 2: Gender distribution of the patients**

| Gender | Frequency (%) |
|--------|---------------|
| Male   | 29 (60.42)    |
| Female | 19 (39.58)    |
| Total  | 48 (100.00)   |

**Table 3: Haematological malignancies**

| Type of malignancy | Frequency (%) |
|--------------------|---------------|
| ALL                | 1 (2.08)      |
| AML                | 2 (4.17)      |
| CLL                | 10 (20.83)    |
| CML                | 12 (25.00)    |
| HL                 | 7 (14.58)     |
| MM                 | 1 (2.08)      |
| NHL                | 15 (31.25)    |
| Total              | 48 (100.00)   |

ALL: Acute lymphoblastic leukaemia, AML: Acute myeloid leukaemia, CLL: Chronic lymphatic leukaemia, CML: Chronic myeloid leukaemia, MM: Multiple myeloma, NHL: Non-Hodgkin's lymphoma, HL: Hodgkin's lymphoma

### Study area

The hospital is a 600-bed space tertiary hospital that renders specialist care to its host and neighboring communities. The haematology department comprises clinical staff, which include consultants, resident doctors, trained nurses, laboratory scientific officers, and medical record officers. The diagnosis were made by the haematologists through peripheral blood film, bone marrow cytochemistry, immunophenotyping, cytogenesis, and karyotyping.

### Subject

These are patients diagnosed with haematological malignancies and treated at the Department of Haematology, UCTH. Furthermore, the pattern of blood used by these patients is also taken into cognizance. Information on blood transfusion was retrieved from the patients' personal folders.

### Selection criteria

Inclusion criteria: Haematological malignancies patients who were transfused or had been transfused during the period of study, whereas those with diagnosis uncertainty irrespective of their transfusion status were excluded from the study.

### Analysis

The data and results collated were analyzed using Microsoft Excel 2016 and IBM SPSS version 21 (Chicago Illinois). The data were analyzed using simple statistics (frequencies and percentages), and the results are presented in [Tables 1-6].

## RESULTS

A total of 48 patients managed for haematological malignancies at the Department of Haematology and blood transfusion were included in the study. The patients were made up of 29 males and 19 females [Table 2], giving a male-to-female ratio of 1.5:1 [Table 3]. The age of the patients ranged from 20 to 89 years. The median age was 52 years; the mean age was  $49.81 \pm 15.7$  years [Table 1]. The age distribution differed considerably between all the diagnosis groups. Majority of patients were diagnosed between the ages 40 and 69 years. During the period of review, only 1 (2.1%) acute lymphoblastic leukaemia (ALL)

**Table 4: Association between type of haematological malignancy and blood transfusion**

| Malignancy | Number of transfusions |      |      |      |      |      |      |      |       |       | Total | $\chi^2$ (P)   |
|------------|------------------------|------|------|------|------|------|------|------|-------|-------|-------|----------------|
|            | 0                      | 1.00 | 3.00 | 4.00 | 5.00 | 6.00 | 7.00 | 8.00 | 10.00 | 12.00 |       |                |
| ALL        | 0                      | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0     | 0     | 1     | 78.610 (0.016) |
| AML        | 0                      | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 1     | 0     | 2     |                |
| CLL        | 6                      | 0    | 2    | 1    | 0    | 0    | 1    | 0    | 0     | 0     | 10    |                |
| CML        | 8                      | 1    | 1    | 0    | 1    | 1    | 0    | 0    | 0     | 0     | 12    |                |
| HL         | 7                      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 7     |                |
| MM         | 1                      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 1     |                |
| NHL        | 6                      | 1    | 2    | 2    | 2    | 0    | 0    | 1    | 0     | 1     | 15    |                |
| Total      | 28                     | 2    | 5    | 3    | 3    | 1    | 2    | 2    | 1     | 1     | 48    |                |

Statistically significant association was observed in the relationship between the number of blood units received and the different haematological malignancies.  $\chi^2=78.610$ ,  $P=0.016$ . ALL: Acute lymphoblastic leukaemia, AML: Acute myeloid leukaemia, CLL: Chronic lymphatic leukaemia, CML: Chronic myeloid leukaemia, MM: Multiple myeloma, NHL: Non-Hodgkin's lymphoma, HL: Hodgkin's lymphoma

patient was managed, acute myeloid leukaemia (AML) were 2 (4.2%), chronic lymphatic leukaemia (CLL) 10 (20.8%), chronic myeloid leukaemia (CML) 12 (25.0%), Hodgkin's lymphoma (HL) 7 (14.6%), multiple myeloma (MM) 1 (2.1%), and non-Hodgkin's lymphoma (NHL) 15 (31.3%) [Table 5]. No observable statistically significant was observed in the association between age distribution and the haematological malignancies diagnosis [Table 4]. A total of 102 units of blood were consumed by the haematological malignancy patients, amounting to 35% of the total blood use. NHL, CML, CLL, and AML account for 92.2%, whereas HL, MM, and ALL represent 7.8% of blood use.

## DISCUSSION

The results of this study show that adult haematological malignancies consume a significant percentage of the total blood used at the UCTH during the period of review. This study shows that adult HM constitutes 1.8% of all the HM seen at UCTH. This is less than a previous study by Akaba *et al.* on epidemiological patterns of adult HM<sup>[3,4]</sup> in a tertiary hospital in Cross River State. This can be attributed to the differences in study design. This study revealed that the age range of adult HM in the year reviewed is 20–89 years, with a median age between 50 and 59 years. This was similar to the studies conducted by Akaba *et al.* and Elidrissi Errahhali *et al.* in Nigeria and Morocco, respectively,<sup>[3,5]</sup> where the majority of the patients were 40 years and above. This can be

attributed to the cumulative effect of the continuous genetic insult manifesting over time.<sup>[5-7]</sup> The study also revealed a male-to-female ratio of 1.5:1. This finding is similar to most publications on HM both nationally and internationally.<sup>[8-10]</sup> The male predominance can be attributed to increased occupational hazards.<sup>[11]</sup> The blood used by adult HM during the period of review was 102 units and represents 35.0% of the total blood consumed during this period, with NHL, CML, CLL, and AML accounting for 92.2%, whereas HL, MM, and ALL represent 7.8%. NHL is said to account for 44.12% of the total blood consumed. This can be attributed to late presentation and delay in diagnosis and effect of chemotherapy. This is due to inadequate specialists and facilities to help in early diagnosis and treatment. Furthermore, alternatives to blood transfusion are lacking and unaffordable for people in our environment. CLL is said to account for 16.17% of total blood used. This can be attributed to late presentation due to the effect of chemotherapy; furthermore, CLL is more common in the elderly with low bone marrow reserve making it difficult for them to withstand the effect of chemotherapy. AML is an aggressive disease which originates from the bone marrow, which is the powerhouse for blood production, and it also accounts for 16%–17% of total blood used at UCTH. Its effects on the marrow are responsible for the increased use of blood and its chemotherapy regimen is myelotoxic to the marrow. CML: this accounts for 14.71%. This can be due to several factors from the disease such as nutrient deficiency, the effect of the spleen (hypersplenism), autoimmune disorders, and cytokine release. MM and HL both account for 0%. This can be attributed to the chronic course of these conditions and do not originate from the marrow, and their chemotherapy regimen is not too myelotoxic. ALL is said to account for 8%. This is also an aggressive condition which originates from the bone marrow. The incidence of transfusion is less compared to AML due to differences in demographic distribution. ALL is common in children, and so rarely they are seen at the adult haematology clinic except few adult variants of ALL, and the scope of this work is limited to adult haematological malignancies that have acute presentation.

## Limitation

The study is a retrospective study, and as such, there is the bias of missing data which suits to inappropriate data system due

**Table 5: Total blood transfusion by type of malignancy**

| Type of hematomalignancy | Frequency (%) |
|--------------------------|---------------|
| ALL                      | 8 (7.84)      |
| AML                      | 17 (16.67)    |
| CLL                      | 17 (16.67)    |
| CML                      | 15 (14.71)    |
| HL                       | 0 (0.00)      |
| MM                       | 0 (0.00)      |
| NHL                      | 45 (44.12)    |
| Total                    | 102 (100)     |

ALL: Acute lymphoblastic leukaemia, AML: Acute myeloid leukaemia, CLL: Chronic lymphatic leukaemia, CML: Chronic myeloid leukaemia, MM: Multiple myeloma, NHL: Non-Hodgkin's lymphoma, HL: Hodgkin's lymphoma

**Table 6: Association between age and haematological malignancies diagnosis**

|       | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 | Total | $\chi^2$ (P)   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|
| ALL   | 1     | 0     | 0     | 0     | 0     | 0     | 0     | 1     | 43.988 (0.169) |
| AML   | 2     | 0     | 0     | 0     | 0     | 0     | 0     | 2     |                |
| CLL   | 0     | 1     | 0     | 3     | 5     | 1     | 0     | 10    |                |
| CML   | 1     | 1     | 4     | 3     | 3     | 0     | 0     | 12    |                |
| HL    | 3     | 0     | 3     | 1     | 0     | 0     | 0     | 7     |                |
| MM    | 0     | 0     | 0     | 1     | 0     | 0     | 0     | 1     |                |
| NHL   | 0     | 2     | 4     | 5     | 2     | 1     | 1     | 15    |                |
| Total | 7     | 4     | 11    | 13    | 10    | 2     | 1     | 48    |                |

ALL: Acute lymphoblastic leukaemia, AML: Acute myeloid leukaemia, CLL: Chronic lymphatic leukaemia, CML: Chronic myeloid leukaemia, MM: Multiple myeloma, NHL: Non-Hodgkin's lymphoma, HL: Hodgkin's lymphoma

to poor document control system. These issues are peculiar to low-resource environments.

## CONCLUSION

This study presents an overview of blood transfusion use in patients with haematological malignancies. The implication of blood utilization is the shortage of blood and increased incidence of blood complications such as transfusion-transmissible infections and alloimmunization with HM patients. Furthermore, the financial burden on the patient, the cost implication of procuring a unit of whole blood is currently between 20 and 30 dollars, and with the economic hardship all over, managing the patients is challenging.

## Recommendation

There is a need for increased workforce and awareness with respect to early diagnosis and treatment of adult HM. There is also a need to provide adequate facilities for the production of blood component. Programs and policies that encourage voluntary blood donations should be conducted and future study to explore how transfusion practices can be modified by patient-and-diagnosis-specific factors is recommended.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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