

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCE
DEPARTMENT OF EMERGENCY MEDICINE AND CRITICAL CARE



**CLINICAL PROFILE OF PATIENTS WITH HEMATOLOGIC
MALIGNANCY IN TIKUR ANBESA SPECIALIZED HOSPITAL
EMERGENCY DEPARTMENT.**

RESEARCH THESIS

BY ASTAWESEGN ESHETE

(MD, EMERGENCY MEDICINE AND CRITICAL CARE RESIDENT)

ADVISORS: -

DR. TILAHUN JIRU, ASSISTANT PROFESSOR OF EMERGENCY MEDICINE AND CRITICAL CARE

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A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCE, DEPARTMENT OF EMERGENCY MEDICINE AND CRITICAL CARE FOR THE PARTIAL FULFILLMENT OF THE REQUIREMENTS IN THE SPECIALITY PROGRAM.

OCTOBER 2021, ADDIS ABABA, ETHIOPIA

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Name of advisors	Dr. Tilahun Jiru Dr. Merah Kefyalew
The full title of the research project	Clinical profile of patients with hematologic malignancy in Tikur Anbesa specialized hospital Emergency Department.
Duration of the project	March 2021 to September 2021
Study area	Tikur Anbesa specialized hospital
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ABBREVIATIONS AND ACRONYMS

AAU---Addis Ababa university

ALL...acute lymphocytic leukemia

AML...acute myelocytic leukemia

CLL.... chronic lymphocytic leukemia

CML...chronic myelogenous leukemia

ECOG-Eastern cooperative oncology group

ED—emergency department

EMCC----emergency medicine and critical care

HAI---hospital-acquired infection

HIV-human immunodeficient virus

HL...Hodgkin's lymphoma

HM-----hematologic malignancy

MDS----myelodysplastic syndrome

MOH--Minister of health

MPN---myeloproliferative neoplasm

NHL...non-Hodgkin's lymphoma

PM----peripheral morphology

RVI-retroviral infection

TASH---Tikur-Anbessa specialized hospital

TABLE OF CONTENTS

ACKNOWLEDGEMENT	i
ABBREVIATIONS AND ACRONYMS	ii
TABLE OF CONTENTS.....	iii
LIST OF TABLES	v
LIST OF FIGURES.....	vi
ABSTRACT	vii
1. INTRODUCTION	1
1.1 BACKGROUND	1
1.2 STATEMENT OF THE PROBLEM.....	2
1.3 SIGNIFICANCE OF THE STUDY	2
2. LITERATURE REVIEW	3
3. OBJECTIVE	8
3.1. GENERAL OBJECTIVE.....	8
3.2. SPECIFIC OBJECTIVES	8
4. METHODOLOGY	9
4.1 STUDY SETTING	9
4.2 STUDY DESIGN AND PERIOD	9
4.3 SOURCE POPULATION	9
4.4 STUDY POPULATION	9
4.5 METHOD OF DATA COLLECTION	10
4.6 METHOD OF STUDY	10
4.7 SAMPLE SIZE	10
4.8 INCLUSION AND EXCLUSION CRITERIA	10
4.9 DATA COLLECTION AND STATICAL METHOD.....	11
4.10 DATA QUALITY AND ASSURANCE.....	11
4.11 VARIABLES	11
4.12 OPERATIONAL DEFINITIONS.....	12
4.13 ETHICAL CONSIDERATIONS.....	13
4.14 DISSEMINATION OF THE RESULT.....	13
CHAPTER 5	14

RESULT	14
CHAPTER 6	25
DISCUSSION.....	25
CHAPTER 7	28
CONCLUSION	28
RECOMMENDATION	29
LIMITATION	30
CHAPTER 8. ANNEX	31
ANNEX 8.1 REFERENCES.....	31
ANNEX 8.2: CONSENT FORM	33
ANNEX 8.3: QUESTIONNAIRES.....	34

LIST OF TABLES

Table -1 variables of the study of clinical profile of hematologic malignancy patients from March 2021 to September 2021 G.C in TASH adult ED

Table -2 sociodemographic characteristics of patients with hematologic malignancy visiting ED of TASH from March 2021 to September 2021

Table -3 presenting symptoms of patients with hematologic malignancy visiting ED of TASH from March 2021 to September 2021

Table-4 Relationship between factors and outcome of patients with hematologic malignancy visiting ED of TASH from March 2021 to September 2021

Table-5 Binary logistic regression analysis for association of factors and ED outcome of patients with HM visiting ED of TASH from March 2021 to September 2021

LIST OF FIGURES

Figure 1- *Source of referral for patients with hematologic malignancy visiting ED of TASH from March 2021 to September 2021*

Figure 2 -*Type of transport to hospital for patients with hematologic malignancy visiting ED of TASH from March 2021 to September 2021*

Figure 3 -*Duration of a symptom of patients with hematologic malignancy visiting ED of TASH from March 2021 to September 2021*

Figure 4- *A physical finding of patients with hematologic malignancy visiting ED of TASH from March 2021 to September 2021*

Figure 5 -*Common identified hematologic malignancies in patients visiting ED of TASH from March 2021 to September 2021*

ABSTRACT

Background: Hematologic malignancies are among the top non-communicable issues that become a concern for our society and health care system. Tikur Anbesa specialized hospital is one of the hematologic centers and the only referral in the country for hematologic malignancy. The main aim of this study is to know the clinical profile of hematologic malignancy patients present to the adult emergency department of Tikur Anbesa specialized hospital.

Methods. A prospective study was conducted on hematologic malignancy patients who presented to ED from March 2021 to September 2021 by using a pretested standard questionnaire in the adult emergency department of Tikur Anbesa Hospital. A total of 168 patients were found during the study period and included in this study.

Result and discussion: Out of 168 patients 103(61.3%) were males. The age group between 20 to 40 years old was the most frequent 66(39.4%) and the age group above 60 years was the least 19(11.3%). The travel time to the hospital was more than two hours for 76.8% of patients. Easy fatigability was the most common presenting complaint 69(41.1%) followed by fever and weight loss/loss of appetite (14.9%). A total of 46.4% patients presents after two months of symptom onset. The most common hematologic malignancy was ALL (44,26.2%) followed by CML, AML, and NHL 22%,20.8%, and 11.9% respectively.128(76.2%) of patients have stayed in the ED for more than 24 hours and lack of bed in the wards were the main reason for ED stay for the majority of patients which account 47.6%.

Conclusion: Hematologic malignancy is common in TASH ED and most of the patients travel more than two hours from rural areas and stay longer in ED to get beds in the wards and start treatment so it is important to consider opening other hematologic centers to address these issues. Most of the patients present late with advanced disease and complications so community health education and awareness creation are very important to overcome this issue.

1. INTRODUCTION

1.1 BACKGROUND

Cancer is a group of diseases characterized by uncontrolled growth and the spread of abnormal cells and it can start in almost any organ or tissue of the body. Neoplasm and malignant tumor are other names for cancer. Cancer is increasingly recognized as a critical public health problem in Africa. Despite the growing burden, cancer is receiving low attention from policymakers, especially in developing countries. This could be due to either limited resources, the higher burdens of communicable diseases, and other pressing public health problems, or it may be due to a lack of awareness about the magnitude and burden of the diseases both in the present and future. (1)

According to Tikur Anbessa specialized hospital statistical data in 2010/2011 neoplasm is one of the first admission diagnoses followed by, diseases of the circulatory system, diseases of the nervous system, Diabetes mellitus, disorders of the genitourinary system, diseases of the digestive system, diseases of the musculoskeletal system and connective tissue, diseases of the respiratory system, Trauma, Hypertension, and related diseases. The number of patients with cancer increased dramatically from 1997/1998 every year and reached around 2000 new patients per the year 2010. (2)

Hematologic malignancies (HM) originate from the uncontrolled growth of hematopoietic and lymphoid tissues. These biologically and clinically heterogeneous disorders account for 6.5% of all cancers around the world, including approximately 9.0% in the United States and Europe. They comprise largely of malignancies like leukemia, lymphoma, and multiple myeloma, of which leukemia and lymphoma are the most common globally. Hematologic malignancies comprise a fifth of the most commonly occurring cancers and the second leading cause of cancer death. Leukemia was the fifth most common cause of cancer deaths in men and the sixth most common in women in the U.S in a five-year study between 2007 and 2011. (3)

From 2015 population-based cancer registry in Ethiopia show that cancer is the second leading cause of death from non-communicable disease following cardiovascular disorders. The reasons for the increasing burden of cancer incidence include a fast and aging population, risk factors such as obesity and physical inactivity, the changes in the reproductive pattern due to

urbanization. In this report, 21,563 females and 42,722 male cancer cases were diagnosed. The most common cancer in males above the age of 15 years was NHL and leukemia while in females leukemias were the most common malignancies following breast, cervical and ovarian cancer. (4)

1.2 STATEMENT OF THE PROBLEM

As Ethiopia is still a developing country communicable disease is the leading cause of morbidity and mortality but nowadays noncommunicable disease is becoming the other wing of health care concern. Hematologic malignancies are among the top non-communicable issues that become a concern for our society and health care system. TASH is one of the hematologic centers and the only referral in the country for hematologic malignancy. We see a lot of HM patients in our ED and one of our major difficulties is the disposition of these patients from the emergency. During ED stay patients are complicated with HAIs and side effects from the underlying HM. Understanding hematologic malignancy and major presenting symptoms in ED are vital for deciding on the disposition of patients and reducing unnecessary ED stay.

So far, there was no publication on the clinical profile of patients with hematologic malignancy visiting an emergency department in TASH, and addressing these issues may help emergency physicians as well as concerning stakeholders on the disposition of patients with hematologic malignancy and prevent unnecessary referrals and admission in the ED. This study may address these issues and give a hint for further investigation and allow emergency physicians to screen reasons for referrals and avoid unnecessary admissions of hematologic malignancy to ED and stakeholders to plan opening other hematologic centers with full facilities to reduce the delay in the management of hematologic malignancy including chemotherapy.

1.3 SIGNIFICANCE OF THE STUDY

Knowing the clinical profile, disposition, and factors associated with the disposition of patients with hematologic malignancy visiting the emergency department is quite important in the risk stratification and early identification of life-threatening complications of patients with hematologic malignancy and reducing the emergency department burden.

This study shows the major clinical profile of hematologic malignancy patients and factors that associate with patient disposition in the emergency department.

2. LITERATURE REVIEW

2.1 Sociodemography of hematologic malignancy

A retrospective study which was done between 2011 and 2014 in Chile by Gloria et.al among a total of 92 cases 52 cases were female and 40 cases were males, and in terms of age distribution, 21.7% were >75 years,14.1% were between 55-59 years, and lowest frequency which was 5.4% in 45-49 years and 70-74 years of age. HL was more common in the age group of 15-39 years and MM in 55-59 years and above 75 years. Based on sex distribution ALL(n=1;50%), CLL(n=3;60%), AML(n=4;66.7%), CML(n=4;80%) in females whereas ALL (50%), CLL (40%), AML (33.3%) and CML (20%) were males. According to these studies, Leukemia and MM were more prevalent in females than in males. Leukemias were the most common HM in the population older than 60 years and MM was most common in patients older than 55 years. (5)

Another prospective case series analysis by A M N Danjou and et.al at in South Africa in 2014 and 2015 a total of 556 HM was diagnosed among which 51.9% were male and 48.1% were female. According to these studies, the age distribution was 14.3% between 18-30 years,28% between 31-40 years,14.3% between 41-50 years,21.2% between 51-60 years, and 22.2% of cases were above 60 years of age. In this study, 84(44.4%) were referred from government clinics,46(24.3%) from referral hospitals,38(20.1%) from a private hospital, and 21(11.1%) from other. Regarding the type of transport used to reach the hospital 104(18%) use taxi,53(9.5%) uses their vehicle,10(5.3%) uses the bus, and 22(11.6%) use other. The travel time to reach the hospital were <1hour for 145(76.7%),1-2 hours for 32(16.9%), and > 2 hours for 12(6.3%) patients. (6)

A retrospective cohort analysis by OChaka et al in Nigeria was done on 60 patients among which 61.7% were male and the mean age at presentation was 43+17years,65.5% were married,50.8% were employed.(7)

A retrospective multicenter study in Morocco by Elidrissi Errahhali et al from a total of 660 patients 535 were male and 47% were female with male to female ratio of 1.1. From the total 32% of NHL,14.4% of HL,12.7% MM,8.1% CLL,4.3% AML and 2.6% ALL were diagnosed in males and NHL (27.2%), HL (17.6%), MM (12.1%), AML (5.4%), CLL (3.2%) and ALL (2.2%)

were diagnosed in females. In this study 263(39.8%) of patients were more than 60 years old,218(33%) between 40-59 years old,119(18%) between 20-39 years old and 51(7.7%) were less than 20 years old. According to this study HL(39.2%) was common in <20 years of age followed by NHL(29.4%),AML(5.9%),ALL(2%) and MM (2%) with male predominance and male to female ratio of 1.8 whereas in those age groups between 20-39 years old HL (31.9%),NHL(18.5%),AML (8.4%),ALL and MM (2%) each with male to female ratio of 1.2.In those age groups between 40 and 59 years old NHL(36.2%),MM(11.9%),HL(9.6%),CLL (5%),AML (4.6%) and ALL (1.8%) with male to female ratio of 1.3.In the age group above 60 years old NHL (29.3%),MM (19%),CLL (9.5%),HL (9.1%),AML(3.4%) and ALL(2.3%) with female predominance and male to female ratio of 0.9.(8)

A retrospective descriptive study by Natnael Belai et al in Eretria from October 2015 to July 2017 from 52 bone marrow confirmed HM patients (10,19.23%) of acute leukemia, (7,13.46%) of CLL, (7,13.46%) of CML, and (2,3.84%) of MM patients were males whereas (8,15.38%) of acute leukemia, (5,9.6%) of CLL, (8,15.38%) of CML, (4,7.6%) of MDS and (1,1.92%) of MPN patients were females. The age distribution was (14,26.9%) of acute leukemia, (1,1.92%) of CLL and MDS, (3,5.76%) of CML were below 20 years old whereas (3,5.76% of acute leukemia, (4,7.6%) of CML and (1,1.96%) of MDS patients were between 21 and 40 years old. Of the 52 HM patients 11.5% of CLL,13.46% of CML, and 3.84% of MDS patients were in the age group of 41 to 60 years. Patients with CLL (9.6%), CML, MM, and MPN 1.92% each were in the age group of 61 to 80 years. (9)

A cross-sectional study which was done by Woldeteklhaymanot Kassahun et al in Jima medical college from January to April 2019 of 322 patients 180 (54.2%) were female,179 (53.9%) were 15-49 years with a mean age of 23+-16years,188 (57%) were urban residents,19.88% were government employees and students and 11.75% were private workers. (10)

2.2 Clinical profile of hematologic malignancy

In a multicenter retrospective by Paul Barreiro et al a study in Latin America hemato oncology between January 1, 2006, and December 31, 2015, in 30 oncology hospitals among 5140 patients 57.7% were NHL,29.5% MM, and 12.7% CLL. Of patients with MM, 53% of

patients had one or more comorbidities and 15% had more than two comorbidities. 36.5% of patients with MM were hypertensive, 12.6% were diabetic and 11.5% had cardiac disease. According to these at the time of diagnosis 27.2% of patients with MM were an ECOG performance status of 0, 31.7% were 1 and 20.4% were 2. Of patients with CLL 46.1% were hypertensive, 15.1% diabetic, and 15.7% had heart disease. According to these reports on CLL patients 66.5% Binet stage A and 63.4% of patients with CLL take chemotherapy. (11)

A retrospective study in Chile by Gloria et.al among 92 cases of HM 52 cases were NHL (56.5%), 18 cases were leukemia (19.6%), 11(12%) cases were HL and MM. In these study leukemia subtypes were ALL (2;11.1%), CLL (5;27.7%), AML (6;33.3%), CML (5;27.7%). (5)

A study on pattern of hematologic malignancy which was a descriptive observational study by Khan S et al in Pakistan from December 2014 to December 2017 show that out of 571 suspected hematologic malignancy patients 259 were diagnosed with hematologic malignancy from which 71.8% were male, 22.3% AML, 21.6% ALL, 18.9% CLL, 10.4% lymphoma, 9.7% MM, 7.3% CML and 2.7% were MDS and primary myelofibrosis. (12)

Another study in Pakistan was a retrospective chart review by Sharaf Maqsood et al from January 2010 to January 2015 out of 213 patients with hematologic malignancy 70.4% were males and 59.6% were NHL, 12.7% HL, and 7.5% AML. According to this report, 72.3% of patients were on chemotherapy and 13.1% of the cases were newly diagnosed with hematologic malignancy. (13)

A prospective case series analysis by A M N Danjou and et.al in South Africa in 2014 and 2015 shows that the most frequent HM were NHL (37.6%) followed by leukemia (32.8%), HL (13.8%), and myeloma (13.2%). According to these reports, 39.2% of HM patients were HIV positive mostly in NHL and HL which account for 70.4% and 53.9% respectively. (6)

A cross-sectional descriptive study by Valery Refeno et al in Antananarivo, Madagascar from December 2012 to August 2015 among 57 cases of HM (23, 40.4%) were NHL, (11, 19.3%) MM, (7, 12.3%) AML, (7, 12.3%) HL, (6, 10.5%) CML and (1, 1.8%) of each were CLL, ALL and myelofibrosis. According to this study, 18(31.6%) of patients had lymphadenopathy, 9(15.8%) had medullary insufficiency syndrome, 8(14%) had pain syndrome, 5(8.8%) splenomegaly, 5(8.8%) neurologic disorder. (14)

A retrospective cohort analysis by OChaka et al in Nigeria was done on 60 patients among which 61.7% were male and the mean age at presentation was 43+17years,65.5% were married,50.8% were employed. According to this study, 63.2% had lymphadenopathy,48.3% had fever,47.4% splenomegaly,42.1% had hepatomegaly. In this study 31(51.7%) were leukemia,38.3% were NHL,26.7% were CML,20% were CLL and 3.3% were MM. From the total cases 42(70%) of patients present with advanced disease. Of 60 patients 5(6.7%) were HIV positive in which all of them were lymphoma patients. In this study leukocytosis was the major laboratory finding followed by anemia and thrombocytopenia. (7)

In a retrospective cross-sectional study by Leak et al in Tanzania from a total of 209 patients, 44% were NHL and 20% MM. Of the total cases 36% of NHL,16% of MM, and 63% of CML patients were below 45 years old.NHL and CML were majorly seen in males and the median age at presentation were 58 years for MM and 42 years for CML patients. (15)

A retrospective study by Natnael Belai et al in Eretria of 52 bone marrow confirmed HM 34.6% were acute leukemia,28.8% CML,23.1% CLL,7.7% MDS,3.8% MM, and 1.9% myeloproliferative neoplasm. According to these reports 26.7% of CML patients present with left upper quadrant pressure sensation and swelling. Generalized body weakness and fatigue was the presenting symptom for acute leukemia (44.4%), CLL (41.7%), CML (33.3%) and MDS (75%). Fever was the presenting symptom for 44.4% CLL, 41.7% acute leukemia, and 26.7% of CML patients. Hepatomegaly was found in 11% of patients with acute leukemia and 13.3% of patients with CML. Lymphadenopathy in 16.7% of patients with acute leukemia and 50% of patients with CLL. From the total cases, splenomegaly was found in 74% of CML,39% of acute leukemia, and 9% of CLL patients. According to these studies, anemia was a common presentation in the majority of patients with HM. From this study, 68.8% of patients had a WBC count >10,000,87.5% had hemoglobin levels below 12g/dl and 60.4% of patients had a platelet count of below 150,000. (9)

In another retrospective study at Gondar university hospital by Weldetsadik et al from January 2008 to December 2011 from a total of 67 patients, 32.8% were NHL,25.4% were CML,19.4% were CLL. Fatigue was the presenting symptom in all patients with CML and ALL and 62% of patients with CLL while 88% of CML and 77% of CLL patients present with fever and weight loss. Bone pain was a presenting symptom in 24% of CML and 29% of ALL while

mucosal bleeding was seen in 29% of CML, 15% of CLL, and 57% of ALL patients. Abdominal swelling in 94% of CML, 38% of CLL, and 29 % of ALL cases. According to these reports, pallor was seen in 88% of CML and 62 % of CLL cases. Lymphadenopathy in 53% of CML and 57% of ALL and hepatomegaly in 59% of CML, 62% of CLL, and 71% of ALL patients. Bone tenderness in 12% of CML, 43% of ALL, and 81% of CLL patients. Petechiae/purpura was seen in 14% of ALL and 81% of CLL patients. Lymphadenopathy was the presenting symptom in 95% of patients with NHL while fever and B-symptoms in 73% and organomegaly in 45% of the cases. HIV test was done for 14 patients with lymphoma cases and 36% had HIV infection. According to these study patients with CLL, 69% were Binet C at the time of diagnosis. The average duration of symptoms was 12 months for CML, 7 months for CLL, 6 months for NHL, and 2 months for ALL. Marked anemia and thrombocytopenia were seen in patients with acute leukemia and markedly high white cell count in seen chronic leukemia. (16)

The study from Jima medical college by Woldeteklhaymanot Kassahun et al from a total of 332 patients 70.96% was acute leukemia, 25.8% were chronic leukemia and 3.2% were MDS. This study shows that leukemia was high in patients from rural areas 23 (6.9%). Of the acute leukemia patients, 60% were neutropenic and 76.2% were thrombocytopenic. In terms of laboratory findings 60.9% of males, 56.5% of female patients had leukocytosis, 21.9% of male and 14.5% of female patients had leukopenia, 57.8% of male and 54.8% of female patients had anemia, and 50% of male and 74.2% of female patients had thrombocytopenia. (10)

A retrospective study by Wondmagegnhu et al which was a 14 years revision of the cancer registry in an oncology center in TASH from 1998 to 2010 on the pattern of cancer shows that 9% of the malignancies were hematologic. According to these reports, the most common hematologic malignancies were NHL and MM. Among these NHL which account for 3.8% of the hematologic malignancies were the most common for both males and females. (2)

2.3 Outcome of hematologic malignancy

A retrospective cohort study in Democratic Republic of Congo, out of 105 HM patients 57.1% (n=60) experienced case fatality. Lack of chemotherapy (HR=6.9,95%CI, $P<0.002$), bacteremia (HR=4.2,95%CI, $P=0.020$) are independent predictors of mortality. The mortality rates did not vary ($p>0.05$) across HM subtypes;71.4% (n=10/14) in MM,84.3% (n=15/18) in AML,70% (n=7/10) in MDS,80% (n=8/10) in CML,33.3% (n=2/6) in CLL and 80% (n=4/5) in ALL. There is also no significant ($P>0.05$) association between gender 60.7% male, n=34/56 and 53.1%female, n=26/49, $p=0.426$, residency rural 51.6% (n=16/31),urban=52.7%,n=39/74. There is significant association between aging, bone pain,splenomegaly,abdominal pain,neutropenia,thrombocytopenia and mortality($p<0.0001$) (17).

In a retrospective study from Nigeria from 60 patients, 4 (6.7%) patients died. Disease group and fever at presentation had a significant association with survival function with a P-value of 0.01 and 0.02 respectively(7)

3. OBJECTIVE

3.1. GENERAL OBJECTIVE

- ❖ To assess the clinical profile of patients with hematologic malignancy visiting TASH ED from March 2021 to September 2021

3.2. SPECIFIC OBJECTIVES

- ❖ To assess the sociodemographic characteristics of patients with hematologic malignancy visiting TASH ED from March 2021 to September 2021
- ❖ To describe the clinical profile of patients with hematologic malignancy visiting TASH ED from March 2021 to September 2021
- ❖ To describe the ED outcome of patients with hematologic malignancy visiting TASH ED from March 2021 to September 2021
- ❖ To determine factors associated with the outcome of patients with hematologic malignancy visiting TASH ED from March 2021 to September 2021

4. METHODOLOGY

4.1 STUDY SETTING

The study was conducted in Tikur- Anbessa Specialized Hospital (TASH) located in Addis Ababa, the capital city of Ethiopia, which is one of the biggest specialized hospitals in the country. currently, it is the only functional hematooncologic center in the country which gives service to more than 110 million people. The emergency department of black lion hospital is one of few emergency centers in Africa which is established in August 2009 and was transformed into the Emergency Medicine department in October 2010. It is used to be the only emergency center in the country but now we have 3 additional emergency centers in the country. TASH has an emergency and critical care medicine specialty program, which started eight years back. Currently, the ED is giving service as an independent department. The ED is staffed with residents, nurses, seniors, and guest instructors.

4.2 STUDY DESIGN AND PERIOD

The study was a prospective institutional-based cross-sectional study at the emergency unit, TASH, in Addis Ababa, Ethiopia which was carried out from March 2021 to September 2021 G.C. All adult hematologic malignancy patients presented to the ED with a medical complaint will be enrolled in the study.

4.3 SOURCE POPULATION

The source population was all patients attending the adult Emergency Department of TASH during the study period.

4.4 STUDY POPULATION

All clinically confirmed hematologic malignancy patients who seek emergency care in TASH adult ED from March 2021 to September 2021 GC.

4.5 METHOD OF DATA COLLECTION

Data were collected using pretested structured tools by the investigator. The tools included the card number, socio-demographic variables, presenting symptom, emergency stay time (hours), diagnosis at emergency admission, serostatus, type, stage, Location of metastasis, treatment, co-morbidities, disposition.

4.6 METHOD OF STUDY

Institution-based Prospective cross-sectional descriptive studies were used during the implementation of the research

4.7 SAMPLE SIZE

By using single proportion formula

$n = (Z)^2 P(1-P)/d^2$, n=minimum sample size , Z=normal deviate at 95%CI,

d=margin of error (5%)

P=Proportion or prevalence

P=50% since there is no previous study in emergency set up

n=384

nonresponse rate of 5% and final sample size=403

Non-random sampling technique, consecutive sampling was used and due to short study period and covid pandemic that decrease patient flow we get 168 patients that fulfill the inclusion criteria and all were included in this study.

4.8 INCLUSION AND EXCLUSION CRITERIA

Inclusion:

All clinically confirmed hematologic malignancy patients above the age of 13 years who were admitted to the adult ED in the seven months study period enrolled in the research.

Exclusion:

Hematologic malignancy patients who present to adult ED with complaints other than their illness (e.g., trauma, poisoning)

4.9 DATA COLLECTION AND STATICAL METHOD

This prospective study was carried out on statistical data from Tikur-Anbessa specialized hospital registry book, patient medical records, and face to face patient interviews using a structured questioner from March 2021 to September 2021 G.C. Training on how to collect the data was given for the data collectors who were assigned to TASH ED.

The data was checked for completeness, entered and analyzed using Statistical Package for Social Sciences (SPSS) Version 26. Descriptive statistics (frequency, percentage, mean, median) were used to describe the patient characteristics. Additionally, the relationships between clinical and demographic variables (such as age, sex, marital status, travel time, type of transport, performance status by Eastern Cooperative Oncology Group (ECOG), comorbidities, location of metastases, serostatus,) and ED disposition were determined using Fisher's exact test and binary logistic regression. The results were displayed by tables and graphs.

4.10 DATA QUALITY AND ASSURANCE

The data quality control measures were taken including pre-testing of data collection tools and checking completeness and internal consistencies of data. Before data collection, the questionnaire was pretested on 5% of the sample size on a population similar to the study population.

4.11 VARIABLES

Table 1

Variables of the study of clinical profile of hematologic malignancy patients from March 2021 to September 2021 GC.

INDEPENDENT VARIABLE	DEPENDENT VARIABLE
Age in years	Death in ED
Sex	Discharge from ED
Marital status	Admission from ED
Occupation	

Educational status

Residency

Source of referral

Type of transport

Travel time

Symptom

Duration of symptom

Physical finding

Laboratory finding

Serostatus

Disease group

Performance status

Reason for ED stay

Complication in ED

Comorbidity

Treatment

4.12 OPERATIONAL DEFINITIONS

- ❖ Adult refers to those above the age of 13 years which was the cut point for the adult emergency department of Tikur Anbesa specialized hospital.
- ❖ Hematologic malignancy means in this study patients who had at least peripheral morphology to be included in the study.
- ❖ Travel time-the time required to reach hospital (TASH) from the referral institutions.

4.13 ETHICAL CONSIDERATIONS

I believe my research is not contrary to the ethical principle of the 1975” Declaration of Helsinki,” and all the subjects under the study were informed participants.

Written legal permission regarding the study was obtained by submitting a proposal to the Department of Emergency medicine and the ethical approval committee of the AAU-medical faculty institutional review board before the study.

4.14 DISSEMINATION OF THE RESULT

The paper will be submitted to Addis Ababa University, Faculty of Medicine, Department of emergency medicine and critical care, and the haemato-oncology unit. The thesis will be submitted in different national and international journals for publication. It will be submitted to different conferences and symposiums for discussions and appraisal.

CHAPTER 5

RESULT

1. Sociodemographic data

In this study out of 168 patients who visited the emergency department during the study period, 103 (61.3%) were male with a male to female ratio of 1.6. The age group with frequent visit were between 20 and 40 years which account 66/168(39.35%) and the least frequent visit was seen in the age group above 60 years which account 19/168(11.3%).

Out of 168 patients, 107 (63.7%) were married, 58 (34.5%) were single and 3(1.8%) were divorced. Of the total 91(54.2%) were unemployed, 64(38.1%) were self-employed and 13(7.7%) were civil servants. On the other hand, 33(19.6%) patients had no formal education, 66(39.3%) patients complete primary school, 52(31%) patients complete secondary school and only 17(10.1%) patients had diplomas and above. When we see the residency 97(57.7%) patients were from a rural area.

The majority of the patients were referred from referral hospitals which account for 131(78%) **(Figure 1)**. The major type of transport to the hospital was taxi 87(51.8%) **(Figure 2)**. The travel time to the hospital was more than two hours for the majority of patients 129(76.8%) and less than one hour for 28(16.7%) of patients and between one and two hours for the rest 11(6.5%) patients.

Table-2

Sociodemographic characteristics of patients with hematologic malignancy visiting ED of TASH from March 2021 to September 2021

Variable	Sub-variable	Frequency	Percent
Age	<20yrs	31	18.5
	20-40yrs	66	39.35
	40-60yrs	52	31
	>60yrs	19	11.3
Sex	Male	103	61.3
	Female	65	38.7
Marital status	Married	107	63.7
	Single	58	34.5
	Divorced	3	1.8
Occupation	Unemployed	91	54.3
	Self-employed	64	38.1
	Civil servant	13	7.7
Educational status	No formal education	33	19.6
	Primary school	66	39.3
	Secondary school	52	31
	Diploma and above	17	10.1

Residency	Rural	97	57.7
	Urban	71	42.3
Travel time to hospital	<1 hour	28	16.7
	1-2 hour	11	6.5
	>2 hour	129	76.8

Figure 1

Source of referral for patients with hematologic malignancy visiting ED of TASH from March 2021 to September 2021

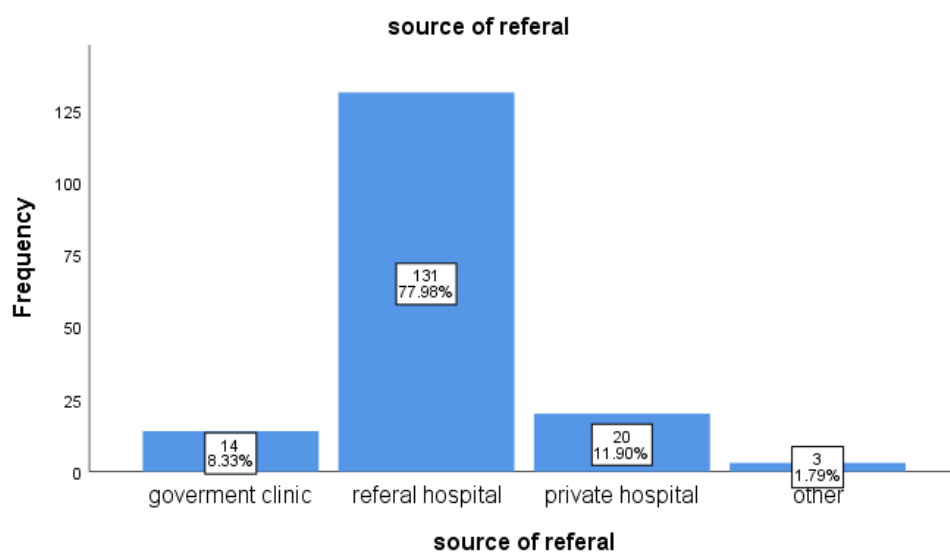
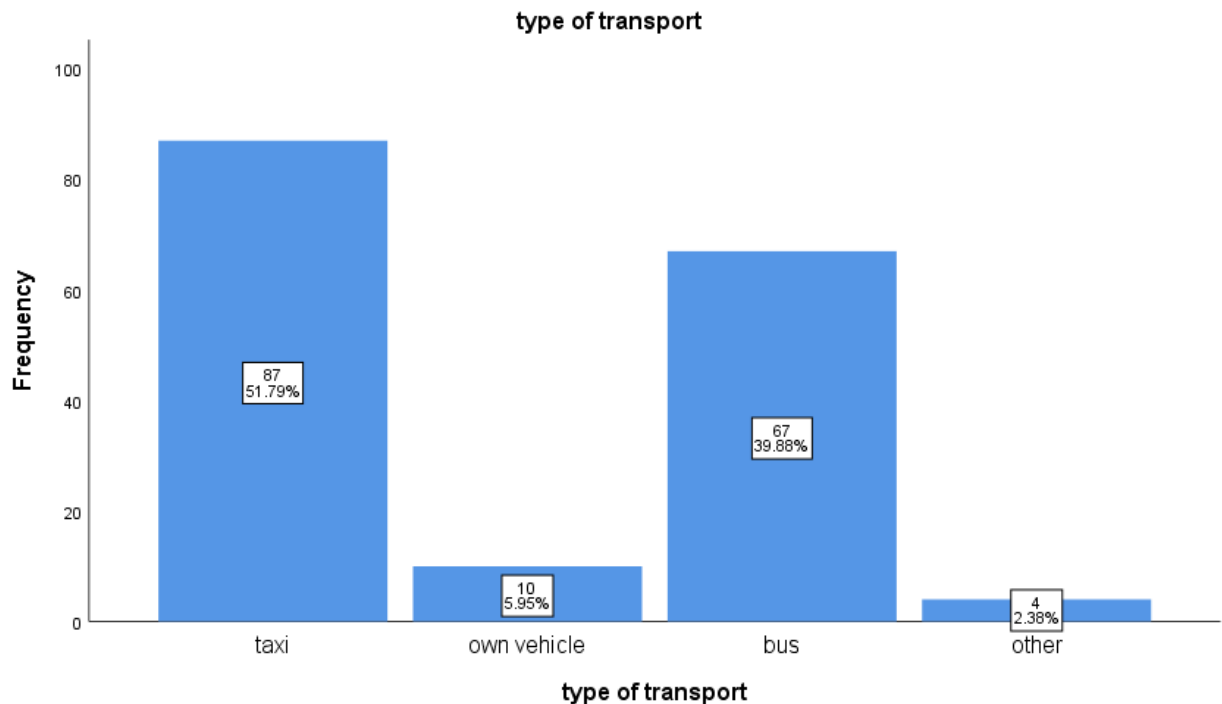


Figure 2

Type of transport to hospital for patients with hematologic malignancy visiting ED of TASH from March 2021 to September 2021



2. Clinical profile of patients with hematologic malignancy

The most common presenting symptom to the ED was easy fatigability which was 69(41.1%) of the total followed by fever and weight loss/loss of appetite which account for 14.9% of each(**Table 3**). Most of the patients present after two months of symptom onset which accounts for 78(46.4%) while 35(20.83%) of patients visit after four months of symptom onset (**Figure 3**). The majority of patients had lymphadenopathy on physical examination which accounts for 31(18.45%) followed by splenomegaly 29(17.26%) (**Figure 4**).

Table -3

Presenting symptoms of patients with hematologic malignancy in ED of TASH from March 2021 to September 2021

Presenting symptom	Frequency	Percentage
Fever	25	14.9
Sweating	3	1.8
Easy fatigability	69	41.1
Bleeding	17	10.1
Abdominal swelling	8	4.8
Weight loss/loss of appetite	25	14.9
Bone/joint pain	3	1.8
Cough/SOB	15	8.9
Others	3	1.8

Of the total of 168 patients 56.5% had leukocytosis, 80.4% had anaemia with hemoglobin level less than 12 gm/dl, 63.7% were thrombocytopenic with platelet count less than 150000 and 30 (17.86%) were neutropenic with 17(10.1%) of patients had severe neutropenia with absolute neutrophil count <500. From the total cases, 68(40.5%) patients had LDH value above 280U/L, 31(18.5%) had a uric acid value above 6 mg/dl and 15(8.9%) of the total patients had serum creatinine level above 1.2 mg/dl. From 168 HM cases, 4(2.4%) of patients had hyperkalemia with potassium levels above 5.5 mmol/L and 29(17.3%) of patients were hypokalemic with potassium level <3.5 mmol/L. Most of the patients were hypocalcemic 114(67.9%) with a total calcium level less than 8.6 mg/dl while 6(3.6%) patients were hypercalcemic with calcium levels

above 10.3 mg/dl. Serostatus for HIV was done for 65(38.7%) patients and 8(4.8%) of the total patients were positive.

Figure 3

Duration of the symptom of patients with hematologic malignancy visiting ED of TASH from March 2021 to September 2021.

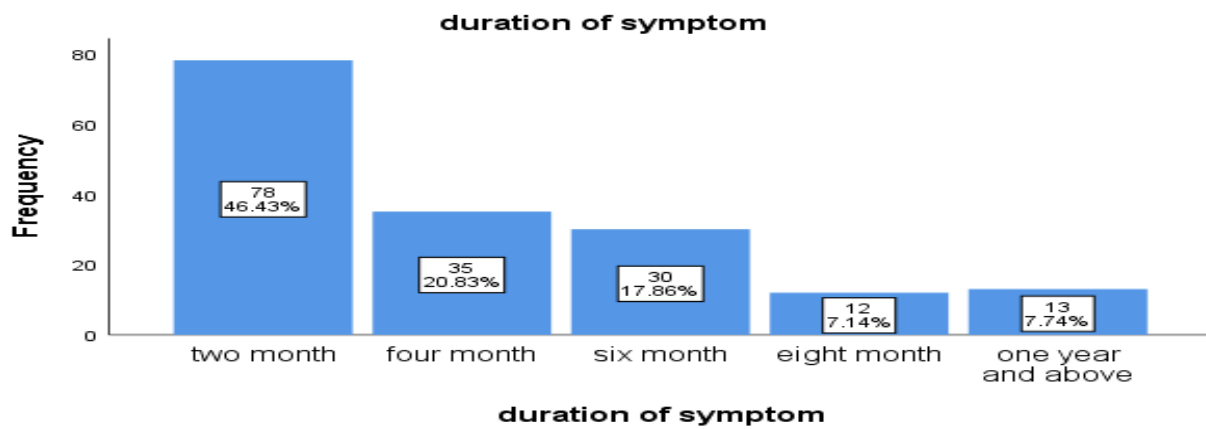
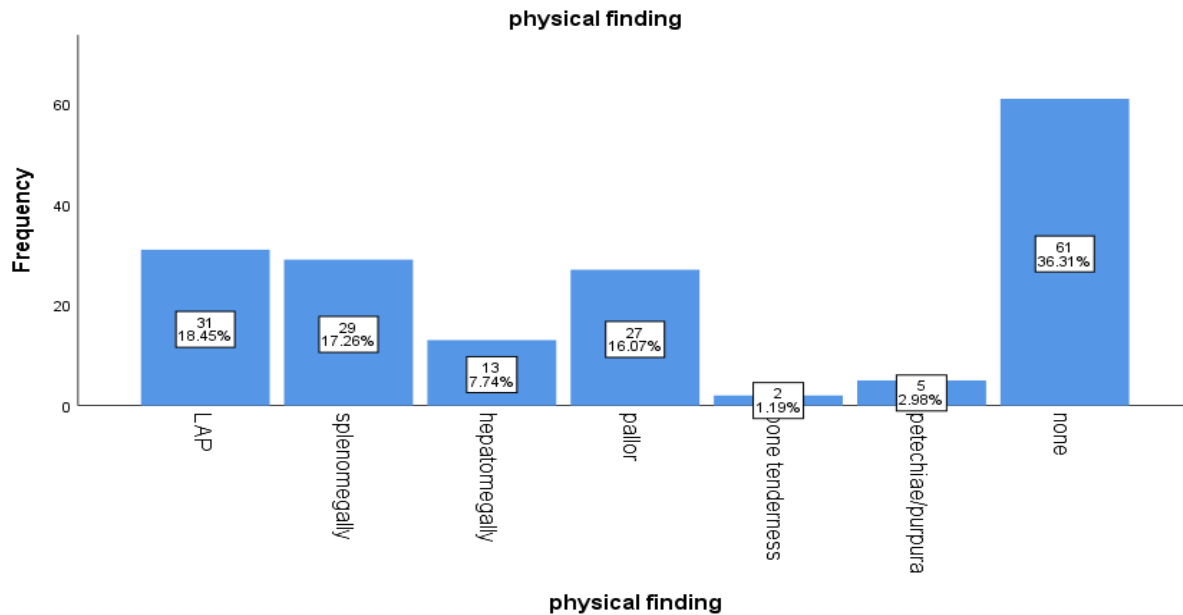


Figure- 4

A physical finding of patients with hematologic malignancy visiting ED of TASH from March 2021 to September 2021



The most common hematologic malignancy identified were acute leukemias 79(47.02%) followed by chronic leukemias (51,30.36%), lymphoma (24,14.28%), and myeloma (2,1.2%). From the acute leukemias ALL was the most common (n=44,55.7%) and remaining 35(44.3%) were AML. From the chronic leukemias CML was the most common which account 37(72.55%) and the remaining 14(27.45%) were CLL cases. From the lymphoma cases NHL was the most frequent (n=20,83.33%) followed by HL (n=4,16.67%). Based on the age distribution majority of the acute leukemia cases were in the age group of 20 to 40 years (n=38,48.1%) followed by those less than 20 years (n=19,24.05%), 40 to 60 years (n=18,22.78%) and the least frequent were in the age group above 60 years (n=4,5.06%). For chronic leukemias the age group between 40 and 60 years were the most frequent (n=21,41.17%) followed by the age group between 20 and 40 years (n=16,31.37%) and least frequency in the age group above 60 years (n=11,21.56%) and

less than 20 years of age (n=3,5.9%).The age distribution for lymphoma cases shows most frequent in the age group 40 to 60 years of age (n=10,41.7%) followed by those less than 20 years (n=7,29.2%),20 to 40 years (n=4,16.7%) and above 60 years (n=3,12.5%).Cases with MM had equal distribution in the age group of 20 to 40 years (n=1,50%) and 40 to 60 years (n=1,50%).

The age distribution for acute leukemia subtypes shows (n=16,36.36%) of ALL and (n=3,8.57%) of AML were below 20 years ,(n=19,43.18%) of ALL and (n=19,54.28%) of AML were in the age group between 20 to 40 years,(n=8,18.18%) of ALL and (n=10,28.6%) of AML were in the age group 40 to 60 years ,(n=1,2,27%) of ALL and (n=3,8.6%) of AML cases were in the age group above 60 years.

From the chronic leukemias (n=3,8.1%) of CML cases were below 20 years old and (n=16,43.2%) of CML patients were in the age group of 20 to 40 years old.40.54% (n=15) of CML cases and (n=6, 42.86%) of CLL cases were in the age group 40 to 69 years old while (n=8,57.14%) of CLL and (n=3, 8.1%) of CML cases were in the age group above 60 years old.

The age distribution for HL shows 75% of the case were less than 20 years old and the remaining 25% were in the age group above 60 years old. For NHL cases there is equal distribution between those less than 20 years and between 20 and 40 years old which account 20% of NHL cases and most frequent in the age group of 40 to 60 years (n=10,50%) and least frequent in those above 60 years of age(n=2,10%).

Analysis based on sex shows that acute leukemias (n=42,53.16%), chronic leukemias (n=16,70.6%) and lymphoma (n=17,70.83%) were more common in males than females but MM case had equal distribution between male and female. The occurrence of ALL(n=26,59%), CLL(n=9,64%), CML(n=27,72.9%) and NHL(n=15,75%) were higher in males compared with females whereas HL had equal distribution between male and female. AML was the most common in females which account for 54.2% (n=19).

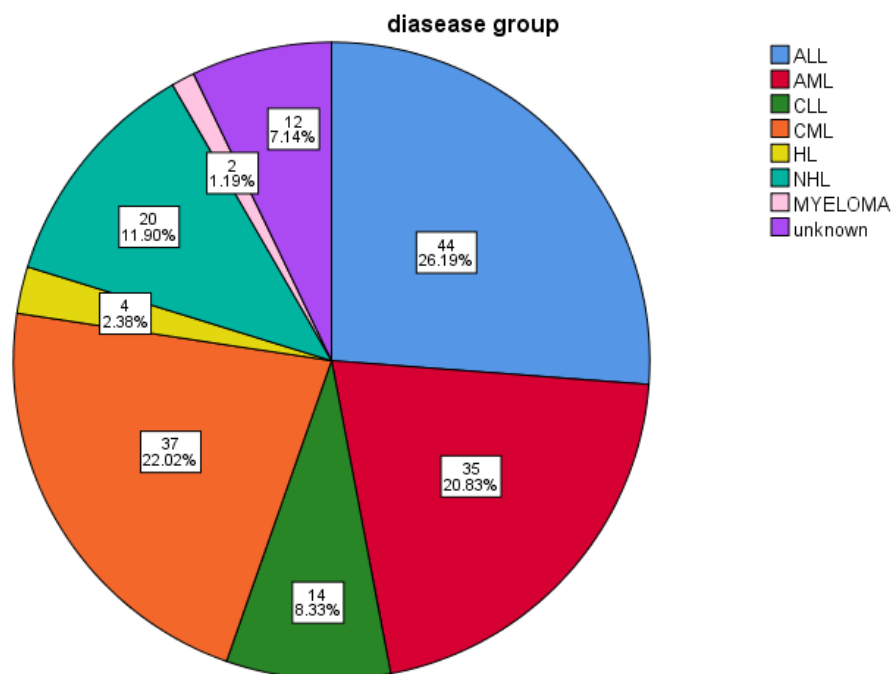
Analysis of disease group and residency shows 56.92% of leukemia and 70.8% of lymphoma cases were from rural areas. More than half of patients with acute leukemia (54.6%), lymphoma and MM (50%) of each were unemployed. Fatigue was the presenting symptom for 39% of ALL,50% CLL and 54% of CML patients.42.8% of CLL,21.6% of CML and 21.5% of acute leukemia patients present with fever and weight loss. Bleeding was the presenting complaint for 13.6% of ALL,11.4% of AML and 8.1% of CML patients.10.8% of CML,5.7% of

AML and 5% of NHL patients present with abdominal swelling. Patients with AML (28.6%), ALL (18.18%) and CML (8.1%) had pallor on physical examination. 50% of CLL, HL, MM and 30% of NHL, 13.6% of AML and 10.8% of CML patients had lymphadenopathy. Hepatomegaly was found in 14.2% of CLL, 10.8% of CML, 10% of NHL and 9% of ALL patients. Patients with CML (32.4%), ALL (15.9%) and CLL (14.3%) had splenomegaly. Bone tenderness were appreciated only in 2.9% of patients with AML and 5.7% of AML and 4.5% of ALL patients had petechia/purpura rash.

From the total of 14 CLL patients, 4.2% were BINET B and C while 1.2 % were BINET A.

Figure 5

Common identified hematologic malignancies in patients visiting ED of TASH from March 2021 to September 2021



The performance status (ECOG) was ECOG 1 for 90(53.6%) of patients, ECOG 2 for 53(31.5%), and the remaining 18(10.7%) and 7(4.2%) were ECOG 3 and ECOG 4 respectively.

From the total cases, 128 (76.2%) of patients stayed in the ED for more than 24 hours and the major reason for ED stay for more than 24 hours were lack of bed in the wards 80 (47.6%) followed by not settled diagnosis which accounts 64 (38.1%). The major complications identified were bleeding 5 (3%) followed by HAI 4 (2.4%). Analysis of disease group and comorbidity shows 2.9 % of AML patients had diabetic, hypertension and cardiac disease while 5.4% of CML, 2.27% of ALL and 7.14% of CLL patients had diabetes. 5 % of patients with NHL had renal issues.

Of the total 168 patients, one patient (0.6%) had lymph node metastasis and one patient with liver metastasis. 26 (15.5%) of patients took chemotherapy and 6 (3.6 %) took radiotherapy while 23.2% of patients stayed in ED with no treatment.

3. ED outcome and associated factors

The majority of patients were admitted to ward 103 (61.3%) and 57 (33.9%) were discharged from ED to home and there were 8 deaths in the ED which account for 4.8% of the total patients. 79.2% of lymphoma patients were admitted to the ward and 20.8% were discharged to home. The majority of the deaths in the ED were from acute leukemias which account for 3.6% of the total deaths. From the total deaths in the ED, sepsis was the major cause of death which accounts for 37.5%. There is a significant association between ED outcome and performance status ($p=0.004$). There is also a significant association between the reason for ED stay more than 24 hours ($p=0.046$) and ED outcome (**Table 5**).

Table 4

Relationship between factors and ED outcome of patients with hematologic malignancy from March 2021 to September 2021

Factors	ED outcome	
	<i>Fishers exact test value</i>	P-value
Age	1.775	0.653
Sex	--	0.626
Marital status	8.080	0.015
Occupation	1.727	0.349
Educational status	4.639	0.15
Residency	--	0.061
Source of referral	2.923	0.363
Type of transport	5.800	0.098
Travel time to hospital	0.688	0.789
Presenting symptom	10.709	0.131
Duration of symptom	3.718	0.358
Physical finding	11.098	0.038
Disease group	7.621	0.285
Performance status	18.560	0.000
Length of ED stay		0.397
Reason for ED stay>24 hours	7.771	0.012
Complication in ED	7.923	0.030
Comorbidity	4.323	1
White blood cell count	1.209	0.564
Hemoglobin level	0.138	1
Platelet count	3.925	0.186

Table 5

Binary logistic regression analysis for correlations between factors and ED outcome of patients with HM from March 2021 to September 2021

Factors	ED outcome			
	COR (95%CI)	P-value	AOR (95%CI)	P-value
Marital status	3.268(0.002-0.613)	0.021	0.796(0.065-75.259)	0.658
Performance status	4.201(5.618-793.079)	0.001	1.791(1.781-20.196)	0.004
Reason for ED stay>24 hour	2.760(0.007-0.568)	0.016	1.368(1.024-15.080)	0.046
Complication in ED	2.833(2.379-121.458)	0.005	1.002(0.122-1.107)	0.075

COR-crude odds ratio, AOR-adjusted odds ratio

CHAPTER 6

DISCUSSION

1. Sociodemography

In this study out of 168 hematologic malignancy patients who visit ED of TASH during the study period 103(61.3%) were male which is comparable with the previous studies in South Africa where 51.9% were male(6) and study from Pakistan which shows 71.8% were males (12) and Nigeria 61.7% were male(7) .This result is also consistent with studies from Pakistan and Morocco where male predominance were seen(8,13) but studies from Chile and Jima medical college shows female predominance(5,10).

In this study the age group between 20 and 40 years were the most frequent visit which account 39.35% of the total but studies from Morocco shows the most frequent visit were the age group above 60 years (8). According to this study the age group 40 to 60 years account 33% of the total which is in line with our study which account 31% of patients were in this age group. From the total cases in this study 63.7% of patients were married which is consistent with a study in Nigeria where 65.5% patients were married (7).Majority of the patients in our study were

unemployed (54.3%) which is the opposite of the study in Nigeria where 50.8% were employed (7). In this study 57.7% of patients were from rural residency which is the opposite of the report from Jima medical college where 57% of patients were from urban area and this can be due to study area and the labeling of rural and urban areas by study participants since our study is in the capital city (10).

In this study majority of patients were referred from referral hospitals 131(78%) while a study from South Africa shows the majority of patients (44.4%) were referred from government clinics(6) these differences could be due to the referral system we have and most of our patients are from rural areas. Regarding the type of transport to reach the hospital 87(51.8%) use taxis which is consistent with the study done in South Africa 104(28%)(6). The majority of patients take more than two hours 129(76.8%) to reach the hospital while the study in South Africa shows most of the patients reach the hospital within one hour (76.7%) which can be explained by most of our patients come from rural areas.

In our study from the leukemia subtypes AML was more common in the female which accounts for 54.2% which was comparable with the study in Chile which shows 66.7% of AML patients were female(5). Of the total HM patients, 25% of acute leukemia and 16% of CML patients were male which is closely comparable in the study from Eritrea where 19.23% acute leukemia and 13.5% of CML patients were male (9). A study from Morocco shows that 8.1% of CLL patients were male which is comparable with our study in which 8.6% of CLL patients were male(8). When we see the age distribution (19,24%) of acute leukemia and (3,8.1%) of CML cases were below 20 years of age which was comparable with the study by Natnael Belai et al in Eritrea where (14,26.9%) of patients were acute leukemia and (3,5.76%) were CML(9).

2. Clinical profile

In this study, the most common presenting symptom was easy fatigability which accounts for 41.1% of the total which is consistent with the study done in Eritrea which was 41.7%(9) and study from Gonder university hospital(62%)(16). In this study, 50% of CLL and 13.9% of acute leukemia patients had lymphadenopathy which is comparable to a study done in Eritrea which is 50% and 16.7% respectively(9). A study from Nigeria shows lymphadenopathy and

splenomegaly were the most common physical finding which is comparable with our study in which lymphadenopathy followed by splenomegaly were the most common physical finding (7).

Of 168 patients 56.5% had leukocytosis, 80.4% were anemic and 63.7% were thrombocytopenic which is comparable with the previous studies in Eritrea and Nigeria in which leukocytosis, anemia, and thrombocytopenia were the major laboratory findings (9)(7). In this study, 63% of female and 54.4% of male patients had leukocytosis which is also comparable to the previous study in Jima medical college which shows 60.9% of males and 56.5% of females had leukocytosis (10).

Acute leukemias were the most common hematologic malignancy which accounts for 47% of the total which is comparable to the study in Eritrea which was 34.6% (9). NHL was the most common hematologic malignancy in South Africa, Morocco, Chile, Latin America, Pakistan, and Madagascar^(6,8,5,11,13,14). A study from Jima medical college by Woldeteklaymanot Kassahun et al shows that 70.96% of leukemia were acute and 25.8% were chronic which is closely comparable to our study in which 60.8% were acute leukemia and 39.2% were chronic leukemia. 46(5.8%) patients with acute leukemia were from the rural area which is also consistent with the study in Jima medical college 23(6.9%) of patients with acute leukemia were from rural areas (10). A study from Pakistan by Khan S et al shows 10.4% of HM were lymphoma which is closely comparable with our study in which lymphoma accounts for 14.3% of the total cases (12). In this study, 4.8% of HM patients were HIV positive which is closely comparable with the study from Nigeria in which 6.7% of patients were HIV positive (7) but a study from South Africa shows that 39.2% of HM patients were HIV positive and this difference is probably due to low screening for HIV in our study. In this study, 50% of CLL patients took chemotherapy which is closely comparable with the study in Latin America by Paul Barreiro et al in which 63.4% of CLL patients took chemotherapy (11).

3. ED outcome and associated factors

In our study, only 33.9% of patients were discharged to home while the majorities were admitted to ward (61.3%) or died (4.8%). Of the deaths, two-third of patients were with advanced disease 6 (75%). A retrospective study in the Democratic Republic of Congo shows there is no association between type of hematologic malignancy, gender, and residency but there is a strong association between bacteremia, aging, bone pain, neutropenia, thrombocytopenia,

and mortality(17). In our study strong association is seen between ED outcome and performance status($p=0.004$) and also there is a strong association between ED outcome and reason for ED stay more than 24 hours($P=0.046$) which shows most of the patients 128(76.2%) stayed in ED more than 24 hours and the main reason for ED stay were lack of bed in the ward 80(47.6%). This result proves that most hematologic malignancy patients present after prolonged symptom onset and advanced disease state and also due to prolonged ED length of stay they develop complications like bleeding (3%) and HAI (2.4%). In this study, there is no association between outcome and type of hematologic malignancy, gender, and residency. Most of our patients in this study are younger age group and aging does not affect the outcome. There is also no association between outcome and white cell count, hemoglobin level, platelet count, and absolute neutrophil count.

CHAPTER 7

CONCLUSION

In conclusion, hematologic malignancies are common in TASH ED and the most common hematologic malignancies are acute leukemias from which ALL is the top one. Most of our patients are from rural areas after traveling long distances and staying home for longer periods with their symptoms. Lack of bed in the ward is the main reason for longer ED stay followed by unsettled diagnosis. The majority of patients are admitted to the ward and 57 patients are discharged to home. There are 8 deaths from which sepsis is the major cause of death. Of the total patients four develop HAI and 5 patients have bleeding while in ED. This shows that the development of complications is one factor that affects the disposition of patients from ED. The length of stay and complications in ED can be reduced by opening other hematologic centers and ED physicians should screen those patients who need priority admission and avoid unnecessary admissions as we see most of the patients are waiting for ward beds with no treatment in the ED. Another important implication of this study was since most of our patients were low educational status and from rural areas so awareness creation and health education are vital in reducing the disease burden. Further study is required with a large sample size, longer study period, and better study design to identify other factors that affect ED disposition and outcome of hematologic malignancy patients.

RECOMMENDATION

1. FOR THE GOVERNMENT OF ETHIOPIA(MOH):

- The absence of an additional hematooncologic center in the country is the main problem for the delay in diagnosis of hematologic malignancy cases and long-term appointments after diagnosis where the patient waits for longer to get definitive care and will develop a complication in the meantime.
- Emergency care of patients with hematologic malignancy-related problems cannot be optimized without changes in other areas of primary, secondary, and tertiary care.
- The other finding of this study is that most of our patients came late after the onset of illness which could be from lack of knowledge or the distance from the health care facility so awareness creation and health education is very important.

2. FOR AAU-TASH:

- In our study patients with hematologic malignancy stayed in ED for longer periods due to the lack of beds in the wards So to decrease ED overburdening and complications it will be better to have more beds in the wards and open other centers.
- There are also limitations of investigations since most of our patients are from rural areas and the second reason for the long period of ED stay is unsettled diagnosis so it is better to have investigations like bone marrow.
- Since Emergency department admissions of hematologic malignancy patients present a challenge to the hematooncologic and the emergency physicians as well, there must be close collaboration between the teams regarding the care of patients. This necessitates the development of a consensus algorithm of management.

3. FOR EMERGENCY AND CRITICAL CARE PHYSICIANS

Since patients with hematologic malignancy are our major cause of ED overcrowding and most of the patients start to complicate it is important to screen patients who need ED admission, early discharge of patients and facilitate ward admissions to start treatment early.

LIMITATION

In this study period only 168 patients were found which was due to decreased patient flow because of the covid 19 pandemic. Another limitation is this was a small study conducted at a single, urban, academic center, and our findings, may not be generalizable to other regions. The external validity of this study is really limited. Firstly, the study was done at the TASH which is a high level/tertiary hospital in which the cases are more complicated and diseases are at the very extreme end. Additionally, pediatric patients are not included in the study (where type and incidence of hematologic malignancy are likely different). Another limitation arises due to the sampling. It was a consecutive sampling; which might increase the selection bias, so it is better to use a random sampling method. No matter generalizing to other general or primary hospital ED might be premature, the results of this survey, however, are a great input in revising policies and switching the plans of ED.

CHAPTER 8. ANNEX

ANNEX 8.1 REFERENCES

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ANNEX 8.2: CONSENT FORM

Dear participant, I, Dr. Astawesegn Eshete (MD, EMCC, resident) currently working on a research project on clinical profile of patients with hematologic malignancy patients of the Emergency department of TASH as a fulfillment of my post-graduate specialty training in Emergency and Critical care medicine. I believe this research will contribute a lot to the management and disposition of patients with hematologic malignancy. Hereby, I ask you to be part of the research and respond accordingly to the questions. I will assure you that your information will be kept confidential.

I, Ato/Wro.....has confirmed by my signature below to enroll in the study.

Signature

ANNEX 8.3: QUESTIONNAIRES

QUESTIONNAIRES

A). Sociodemographic data

1. Age (In years)

2. Sex

I. Male

II. Female

3. Marital Status

i. Single

ii. Married

iii. Divorced

iv. widowed:

4. occupation

a) Unemployed

b) self-employed

c) civil servant

5. Educational status

i. no formal education

ii. primary school

iii. secondary school

iv. diploma and above

6. Residency

a) Urban

b) Rural

7. Source of referral

a. Government clinic

- b. Referral hospital
- c. Private hospital
- d. Other

8. Type of transport to TASH¹

- a. Taxi
- b. Own vehicle
- c. Bus
- d. Other

9. Travel time to hospital

- a. <1 hour
- b. 1-2 hour
- c. >2 hour

B) clinical presentation

1. symptom

- 1. Fever
- 2. sweating
- 3. Easy fatigability/generalized body weakness
- 4. Bleeding
- 5. Abdominal swelling
- 6. Weight loss/loss of appetite
- 7. Bone/joint pain
- 8. Cough, shortness of breath
- 9. Other (specify...)

1.1 Duration of symptoms

- 1. two months
- 2. four-month
- 3. six months
- 4. eight-month
- 5. one year and above

¹

2. physical findings

1. Lymphadenopathy
2. Splenomegaly
3. Hepatomegaly
4. Pallor
5. Bone tenderness
6. Petechiae/purpura
7. Other (specify...)

D) laboratory findings

1. WBC count
2. Hemoglobin(gm/dl)
3. ANC
4. Platelets
5. LDH
6. Uric acid
7. Serum creatinine
8. Serum potassium
9. Serum calcium

E) serostatus for HIV

- I. Positive
- II. Negative
- III. Unknown

1. Disease group

- 1.1. leukemia (ALL, AML, CLL, CML)
- 1.2. lymphoma (HL/NHL)
- 1.3. myeloma
- 1.4. unknown

2. Disease stage (for diagnosed CLL patients)

1. BINET stage A

2. BINET stage B
3. BINET stage C

3. Performance status (ECOG)

0 1 2 3 4

G) outcome of the patient in the ED

1. admitted
2. discharged
3. dead
4. other (specify...)

If the outcome is death what was the cause of death

- i. Sepsis
- ii. Bleeding
- iii. Other ...

H) How long the patient stayed in ED

1-24 hours

2->24 hours

I) Reason for ED stay

1. lack of bed in the ward
2. diagnosis not settled
3. other (specify)

J) Complications in the ED

1. HAI
2. Bleeding
3. Other (specify...)

L) location of metastases

1. Lymph node
2. Lung
3. Liver
4. Bone
5. Brain
6. Other (specify....)

M) comorbidity

1. DM
2. HTN
3. Renal
4. Cardiac
5. Other (specify....)

N) treatment

1. chemotherapy
2. radiotherapy
3. other (specify....)

Staging of hematologic malignancy

➤ CLL BINET staging

1. Binet stage A: Fewer than 3 areas of lymphoid tissue are enlarged, with no anemia or thrombocytopenia.
2. Binet stage B: 3 or more areas of lymphoid tissue are enlarged, with no anemia or thrombocytopenia.
3. Binet stage C: Anemia and/or thrombocytopenia are present. Any number of lymphoid tissue areas may be enlarged

ECOG PERFORMANCE STATUS SCORE

Grade	ECOG Performance Status
0	Fully active, able to carry on all pre-disease performance without restriction.
1	Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g., light house work, office work.
2	Ambulatory and capable of all self-care but unable to carry out any work activities. Up and about more than 50% of waking hours.
3	Capable of only limited self-care, confined to bed or chair more than 50% of waking hours.
4	Completely disabled. Cannot carry on any self-care. Totally confined to bed or chair.