

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF EMERGENCY AND SURGICAL NURSING



**REASON FOR EMERGENCY VISIT, DISPOSITION AND
ASSOCIATED FACTORS OF PEDIATRICS ONCOLOGIC
PATIENTS IN TIKUR ANBESA SPECIALIZED HOSPITAL,
ADDIS ABABA, ETHIOPIA ,2024 :(RETROSPECTIVE
CROSS-SECTIONAL)**

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LIST OF ABBREVIATIONS

ALL	Acute lymphoblastic leukemia
AIIMS	All india institute of medical sciences
AML	Acute myloid leukemia
BMT	Bonemarrow transplantation
CNS	Central nervous system
CINV	Chemotherapy induced nausea and vomiting
CPs	Cancer patients
DALYs	disability-adjusted life years
ED	emergency department
ETV	endoscopic third ventriculostomy
EVD	external ventricular drainage
ICCCPO	International Confederation of Childhood Cancer Parent Organizations
ICU	intensive care unit
LIC	low-income countries
LMICs	Low-income and middle-income countries
MICs	middle-income countries
NCPs	non- Cancer patients
SIOP	Society of Pediatric Oncology
TASH	Tikur Anbessa Specialized Hospital
UICC	Union for International Cancer Control
NHL	Non –Hodgkin lymphoma
USA	United State of America

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Abstract

Background Oncologic emergencies are acute, potentially life-threatening events related to a patient's malignancy or its treatment. Pediatric oncologic patients visit the emergency department for various reasons, including acute complications of their cancer or treatment-related side effects. The medical team assesses each case to decide on admission, treatment adjustment, or discharge with follow-up. This study aims to assess the reasons for emergency department visits, disposition, and associated factors in pediatric oncologic patients.

Objective To assess Reason for Emergency unit visit ,disposition following emergency department encounters and associated factors of Pediatric Oncolog patients kept in Tikur Anbesa Specialized Hospital pediatrics emergency department Addis Ababa, Ethiopia.

Method and Materials A hospital based retrospective cross-sectional study design employed by using data extraction tool adopted from relevant literature among all oncologic patient aged below 18 years admitted in the pediatric emergency unit of Tikur Anbesa specialized hospital (TASH) between 1st of Jan 2023 to 30th of Dec 2023 .The data was analysed by using SPSS version 26.

Result The most common reasons for ED visits among oncologic patients were neutropenic fever (51.5%), fever (34.7%), and tumor lysis syndrome (32.7%). Among these patients, 40.7% were admitted, 47.1% were discharged with improvement, and 4.4% died. Multivariate logistic from the common reasons for emergency visit Neutropenic fever, tumorlysis syndrome, and fever regression showed an increased odds of admission with P-value of (0.025,0.000 and 0.003) respectively .Patients from rural areas had increased odds of admission (AOR = 3.358, 95% CI 1.337 - 8.434 }, those with solid tumor (AOR = 3.406, 95% CI 1.160- 10.001), treatment prior to emergency visit (AOR=4.366, 95% CI 1.531-12.451) and BMT (AOR= 14.859 ,95% CI 2.469 - 89.436).

Conclusion Neutropenic fever, tumorlysis syndrome, and fever are key reasons for emergency visits among pediatric cancer patients, often leading to hospital admissions. Factors such as previous chemotherapy, bone marrow procedures, and solid tumors also contribute. Identifying these factors helps optimize care in the emergency department. **Keywords** oncology, emergency department,

1. INTRODUCTION

1.1. Background

Oncological emergencies are acute, possibly fatal incidents related to a patient's malignancy or its treatment and require immediate intervention to dodge death or irreversible damage(1). Signs and symptoms of these emergencies may appear at any time from the time before diagnosis to the end-stage of the hematologic or oncologic malignancy(2). utilization of the emergency department is more prevalent among children with cancer compared to the overall pediatric population(3).

Children with cancer belong to the highest risk populations for developing both disease- and treatment-related complications that mandate emergent and urgent medical care (4). Recognition of these problems in children may be delayed because of decreased communication ability and various pathological changes, masking the early signs of sepsis (5). More than 80% of diagnosed cases of childhood cancer occur in low-income and middle-income Due to deficient access to diagnostics and treatment, the rate of survival shall be less than 30% in low-income and lower-middle-income countries (6).

Oncology patients are managed long, strenuous treatment regimens, regularly a combination of different modalities, specifically surgery, chemotherapy, and radiotherapy, and normally each of these has its own set of complications (1). Although these oncologic emergencies can occur in any large, chemosensitive cancer mass, it is most commonly reported in patients with acute leukemias and high-grade non-Hodgkin lymphomas (NHL)(7).

Emergencies in hematology and oncology can be broadly been divided into those resulting directly from the neoplasm or the therapy given in treating disease. These two groups do not always clearly differ, however. Hematologic and oncologic emergencies may also remain under one of the general categories of hematologic, metabolic, structural, or side effects of chemotherapy(8). Healthcare providers should be aware of many, and often severe, disorders associated with the treatment of pediatric oncologic illnesses to prevent them from happening and mitigate possibly serious consequences through proactive interventions (9).

In Pediatrics emergency disposition of the patient is an important consideration in overall care, patients can be discharged home with close monitoring, or admitted to the hospital for more treatment. Factors like the seriousness of the initial condition, the requirement for supportive care or interventions, available resources, and the patient's overall clinical condition determine where the patient is sent. Recognizing patient disposition trends can help healthcare professionals assess the need for ED visits and improve care transitions and resource distribution(10). In the global population, pediatric oncology makes up between 0.5% to 4.6% of all cancer cases, with low and middle-income countries facing the greatest impact. In Ethiopia, there is a notable scarcity of dependable data concerning the burden of childhood cancers(7).

Concerns regarding oncological emergency care include crowding, lengthy wait times, and limited access to specialized care. When a cancer patient has late-stage cancer and is close to the end of their life, they also frequently visit the emergency department (ED). While not directly related to the care provided in the ED, cancer patients in the ED aid in the recognition of life-threatening presentations(11). Problems with the quality of cancer care include insufficient access to and use of preventative services, poor symptom management, fragmented healthcare delivery, inadequate and uncoordinated care, and monitoring and control of complications(12).

Children with cancer are a high-risk group requiring prompt medical intervention. Analyzing emergency department trends can help identify common causes for visits. It's important to note that these are usually related to symptoms, not the cancer itself. Improving care should focus on addressing common reasons for visits by providing education and support to parents, caregivers, and emergency department staff. This can lead to better outcomes for these vulnerable patients(4).

The study will identify the common reasons for admission to the emergency department such as fever nausea and vomiting, persistent diarrhea, abdominal pain, shortness of breath, severe anemia, bleeding disorders such as hemophilia, clotting disorders such as deep vein thrombosis swelling in the joint, unexplained bruising or petechiae and severe pain. It explores the types of emergencies encountered, such as cardiovascular emergencies, bleeding, febrile neutropenia, metabolic emergencies, tumor lysis syndrome, and others. It will also address hematologic emergencies, including anemia, sickle cell disease, myeloproliferative disorders, and a wide spectrum of bleeding pathologies.

It will also assess disposition decisions and related factors Employed for pediatric hematologic and oncologic emergency patients in TASH which could include the use of specific interventions, medications, and supportive care measures.

1.2 . Statement of the problem

Pediatric malignancies result in death throughout the world, casting a long tail over the lives of innumerable young children and their families. Compared to adult cancers, treating pediatric cancers presents different difficulties because of the severe side effects of radiation and chemotherapy, as well as a delayed diagnosis(13). The unavailability and high cost of the chemotherapy drug, the fact that patients were discharged from the hospital without any clinical improvement or against medical advice, and other factors were among the main causes of pediatric patients being discharged without any change in their condition (14).

The exact burden of childhood cancer must remain an estimate because the majority of low- and middle-income countries lack genuine population-based cancer registries. In the cases where registries are present, rates typically fall between 80 and 150 cases per million children globally. According to this estimate, there would be 200,000–160,000 new cases annually worldwide, with LMICs accounting for 80% of those cases(15).

Every year, about 250,000 children in low-income countries (LIC) get pediatric cancer; of these, 200,000 live in MICs or LICs where the public health priority is not cancer therapy(16). Furthermore, as global cancer incidence increases, the weight of cancer care is expected to fall increasingly on lower-income countries. With improving cancer treatments and survival, the primary and specialty care needs of cancer survivors will have substantial implications for health systems worldwide(17).

On the other hand, survival rates in Africa generally remain lower than 20%, and these preventable deaths are mainly due to late diagnosis, misdiagnosis, lack of access to quality therapeutic and supportive care, high treatment neglect rate, treatment adverse effects and avoidable high rate of relapse(7). Cancer patients had a from ED to in-patient admission rate of >50%, which was significantly higher than the 11.9% rate for non-CPs (NCPs). Furthermore, given the distinct aftereffects of their condition and therapy, ED doctors, both general practitioners and specialists in cancer care, must have a deeper comprehension of the requirements of CPs in emergency setups(1).

More aggressive treatment is largely responsible for the improvement in disease-free survival seen in the majority of childhood cancers. A significant rise in morbidity, resulting from more pronounced myelosuppression and immune suppression, which causes more invasive and resistant life-threatening infections, is one of the main side effects of intensified treatment regimens(18).

Moreover, investigating the factors influencing patient disposition following emergency visits is essential for enhancing care coordination and continuity for pediatric hematology and oncologic patients. By examining the outcomes of emergency department visits, including hospital admissions, discharges, and referrals, this study seeks to identify opportunities for improving care transitions(19).

1.3. Significance of the study

ED visits among pediatric oncologic patients may reflect gaps in outpatient management, symptom management, or supportive care services. Delays in accessing appropriate care can lead to adverse outcomes, including treatment delays, disease progression, and increased morbidity. Identifying modifiable factors contributing to ED presentations is essential for implementing targeted interventions to enhance the quality and timeliness of care delivery.

The study aims to identify the reason for emergency unit visits, Disposition, and Associated factors of Pediatric hematology and oncology patients encountered in Tikur Anbesa Specialized Hospital. This information is crucial for healthcare providers to improve their understanding of these emergencies and enhance their ability to provide timely and appropriate care. The disposition of pediatric hematology and oncologic patients following ED visits poses significant clinical and logistical challenges. Determining whether to admit, discharge, or transfer these patients requires careful consideration of their medical status, treatment needs, and available resources.

The study can also help in the allocation of healthcare resources by identifying the pattern of pediatric oncologic emergency patients and disposition following ED encounters, healthcare facilities can allocate resources more effectively to meet the specific needs of these patients. This study adds to the limited existing literature on pediatric oncologic emergencies in the Ethiopian context and findings can be used to address the unique challenges and develop context-specific guidelines and protocols for managing emergencies in pediatric oncology patients in Ethiopia and similar settings

In summary, the study provides valuable data and insights that can be used by researchers, healthcare providers, and policymakers to further understand and address the challenges associated with pediatric oncologic emergencies. ED visits among pediatric oncologic patients may reflect gaps in outpatient management, symptom management, or supportive care services. Delays in accessing appropriate care can lead to adverse outcomes, including treatment delays, disease progression, and increased morbidity.

2. LITERATURE REVIEW

2.1 . General concept

Childhood cancer has become a public health issue in countries that are underdeveloped, exacerbating the burden of childhood mortality from infectious diseases and malnutrition. Most pediatric malignancies result in nearly 100% mortality in low-income countries(14). Better understanding of the ED use of children with cancer may lead to customization of ED referral practices and management through targeted interventions directed at the most common causes for ED visits and admissions(4).

2.2. Prevalence of pediatric Oncologic Emergencies

A Study in the United States (US) revealed that there were a total of 294,289 emergency visits for pediatric cancer patients. This accounts for almost 0.2% of the total pediatric ED visits. It also stated that 51.9% of children with malignancy were assessed in the ED(4). Similar studies conducted at the Riley Hospital for Children ED in the US reported 598 encounters by 231 children with cancer. Additionally, it was noted that only 40.3% of children had just one ED visit, while 23.8% had two visits, 12.1% had three visits, and 23.8% had four or more visits(3).

In Brazil, the study found that 766 patients sought emergency care for various reasons, with solid tumors accounting for 49.6% of consultations. Among pediatric patients attending the institution's PE, the most common neoplasms were CNS tumors at 27.5% (19). A study in India “Management and immediate outcome of common Pediatric Oncological emergencies” comprised 83 patients with 110 visits. Among the cases, Leukemia made up 50.6% of oncologic emergencies, with 92.8% being acute lymphocytic leukemia. Additionally, intracranial malignancies accounted for 26.5% of the cases, with posterior fossa tumors representing 59% of them (20).

2.3. Reason for emergency visit

A study conducted in the USA “Characteristics of Children With Cancer Discharged or Admitted From the Emergency Department” revealed the top 10 reasons for pediatric cancer patients visiting the ED. The most prevalent reason, accounting for 11.3% of visits, was fever, with a total of 33,356 cases. Following closely behind was febrile neutropenia, which accounted for 7.9% of visits, with a total of 23,120 cases. In fact, almost one in five ED visits was attributed to fever or febrile neutropenia. Among those diagnoses leading to ED visits with increased odds of admission included neutropenia, bloodstream infection, pancytopenia, dehydration, or pneumonia (4).

Another study conducted in the USA found that 51% of children with cancer had only one chief complaint, while 30.9% had two complaints. The primary chief complaint leading to an ED visit was fever, accounting for 60.4% of cases. Pain was the second most common complaint at 6.1%, followed by nausea/vomiting at 5.1% (3).

A study conducted in Brazil, on “Pediatric emergency care for children and adolescents with Cancer” revealed that fever was the reason for seeking medical attention in 30.8% of the 766 pediatric emergency visits. The most common causes for emergency consultations were pain (16.7%), upper airway infection (14.4%), viral or bacterial infection (7.4%), nausea and vomiting (6.9%), fever with neutropenia (5.6%), and fever without neutropenia (21.4%) patients who had fever were 1.78 times more likely to be hospitalized than patients without fever (19).

According to a study in India, by “Radhika Raman”, fever (36.4%), severe anemia (18%), febrile neutropenia (16.45%), tumor-lysis syndrome (8%), and respiratory distress (4.5%) were the most frequent causes of emergency department visits (20). Another similar study conducted by M.bothra 2012, in India, specifically on pediatric oncology patients, found that fever, severe anemia, febrile neutropenia, tumor-lysis syndrome, and respiratory distress were the most common reasons for emergency consultations (21).

In a study conducted at Jimma University, neutropenic fever (79; 23.4%) was the most frequent cause of oncologic ED visits, followed by nausea and vomiting (38; 11.2%) and electrolyte abnormalities (37; 10.9%)(22).

2.4. Disposition of pediatrics oncologic patients

A cohort analysis conducted in the United States indicates that 51.9% of pediatric patients with cancer were assessed in the ED and then sent home, 43.6% were admitted to the same hospital, and 3.7% were transferred to another short-term medical facility (4). A separate retrospective chart in the US found that the average transfer rate for pediatric cancer patients was 3.7%. The most common reasons for transfer were seizures (9.9%), fever and neutropenia (6.5%), and neutropenia alone (6.2%) (3).

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According to the research in Brazil, “Pediatric emergency care for children and adolescents with cancer”, 34 patients experienced 43 episodes of febrile neutropenia. Six of the 34 (17.6%) patients had microbiologically confirmed infections; three (8.8%) required PICU admission in 603 consultations, patients were sent home (72.1%) or to support houses (6.7%). inpatient treatment was necessary in (21.2%) of cases, of which (19.2%) were to the ward and 15 to the PICU (19).

According to a study conducted in India by "Radhika Raman," out of 12 children who had neurosurgery procedures, 26.5% required intensive care, and 8.4% needed emergency neurosurgical treatments. Two people died, although none of them occurred in an emergency(20). A study conducted on adult cancer patients at Jimma University revealed 137 (40.5%) of them were kept in the ward and 126 (37.3%) of them were released after showing improvement while 64 (18.9%) of the cancer patients passed away (22).

2.5. Associated Factors

2.5.1. Socio demographic factors

According to a study conducted in the United States, Riley Hospital there were 67 ED visits due to pediatric cancer for every 100,000 American children aged 0 to 19 in 2010. with the lowest number of visits per 100,000 American children aged 0 to 19 in 2006 and the maximum number of visits per 100,000 in 2008 (4). Similarly a study in USA younger children, particularly those aged 0 to 4

years, had lower odds of admission compared to older counterparts. Additionally, black, non-Hispanic patients were less likely to be admitted than white, non-Hispanic patients(3).

A study conducted in Brazil “Pediatric Emergency Care for Children and Adolescents with Cancer: Causes of Consultation and Factors Associated with Hospitalization” observed that the majority of pediatric patients with cancer seen in emergency services were female (50.8%), with a median age at cancer diagnosis of 4.86. The 0–4-year-old age group (46.6%) was most frequently enrolled, followed by the 5–9-year-old age group (22.7%)(19). A Study in India showed that the 83 individuals included had a median age of 6 years, with 51 males and 32 females. Only 2.4% of the patients were less than one year old, compared to 37.34% of the patients who were in the one to five-year age range(20).

Another observational descriptive study in India revealed determinants of outcomes in febrile neutropenic episodes in pediatric oncology patients. Male children accounted for the majority of the incidents, suggesting that boys are more likely than females in the population to seek out care. The majority of the occurrences involved youngsters under the age of five (21).

A retrospective study “Factors associated with treatment outcome of pediatric cancer patients admitted with febrile neutropenia” in TASH shows out of a total of 60 patients 36 were males and 24 were females included in the study. Forty-six (76.7%) of the patients were between 1 and 10 years of age, 10 (16.7%) were between 10 and 12 years of age and 4 (6.7%) were below 1 year of age with the mean (SD) age of patients being 5.9 years(23).

A retrospective study was conducted in the USA in 2016. Patients with urban residences had lower admission chances compared with those living in a rural residency(4). According to a Retrospective observational cohort study of pediatric patients with solid tumors and malignant hematological diseases in Brazil 86.4% of patients lived ≤ 80 km away from the treatment center(19).

2.5.2. Clinical factors

A retrospective study by “Emily L. Mueller”, in the USA shows Acute lymphoblastic leukemia (ALL) was the most common cancer diagnosis (25.9%) among pediatric patients with cancer who

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visited the ED. Central nervous system tumor was the second at 8.1%, and Acute myelogenous leukemia third one being 7.5% Comparing the cancer diagnoses to the reference, none of the groups showed a significantly higher likelihood of admission(4).

A study conducted in Brazil addressed a variety of cancer types encountered in children and adolescents treated at the pediatric emergency service, with a notable prevalence of acute leukemias among actively treated patients(19).

A study conducted in India by R . Raman, shows numerous cancer forms were found among the pediatric population presenting to the emergency room, according to a study on the care and immediate result of frequent pediatric oncological crises. The most common malignancy found was leukemia, which includes acute lymphocytic leukemia, chronic myeloid leukemia, and acute myeloid leukemia. Furthermore, there was also a high incidence of central nervous system tumors, including posterior fossa and intracranial tumors. Ewing's sarcoma, hepatoblastoma, neuroblastoma, and rhabdomyosarcoma were among the other prominent cancer kinds(20).

A study in Ethiopia revealed the distribution of tumors according to the primary site was hematological malignancies in 47 children (78.4%) and solid tumors in 13 children (21.6%). Further stratification of hematological malignancies revealed 34 cases of acute lymphoblastic leukemia (ALL), 2 cases of acute myelogenous leukemia (AML), 10 cases of non-Hodgkin's lymphoma (NHL), and a single case of Hodgkin's lymphoma(23).

In the handling of pediatric oncological issues, a variety of treatments were applied as per the study's outcomes in the USA above all in CNS tumor cases with neurological symptoms the study shows those patients with a history of transplant (BMT) had increased odds of admission (OR = 1.7, 95% CI 1.4–2.1) (4). A study in Brazil shows that individuals receiving first-line treatment (2.30 times), second- or later-line treatment (AOR=2.68), and diagnostic investigations (AOR=3.89 times) also had a higher chance of being admitted to the hospital(19).

According to a study in India Presenting symptoms in 31% were neurological. 42.7% required parenteral antibiotics and 16.4% packed cell transfusion. 90.4% of blood cultures were negative. 26.5% needed intensive care, 12 required neurosurgical procedure(20)

2.6. Conceptual frame work

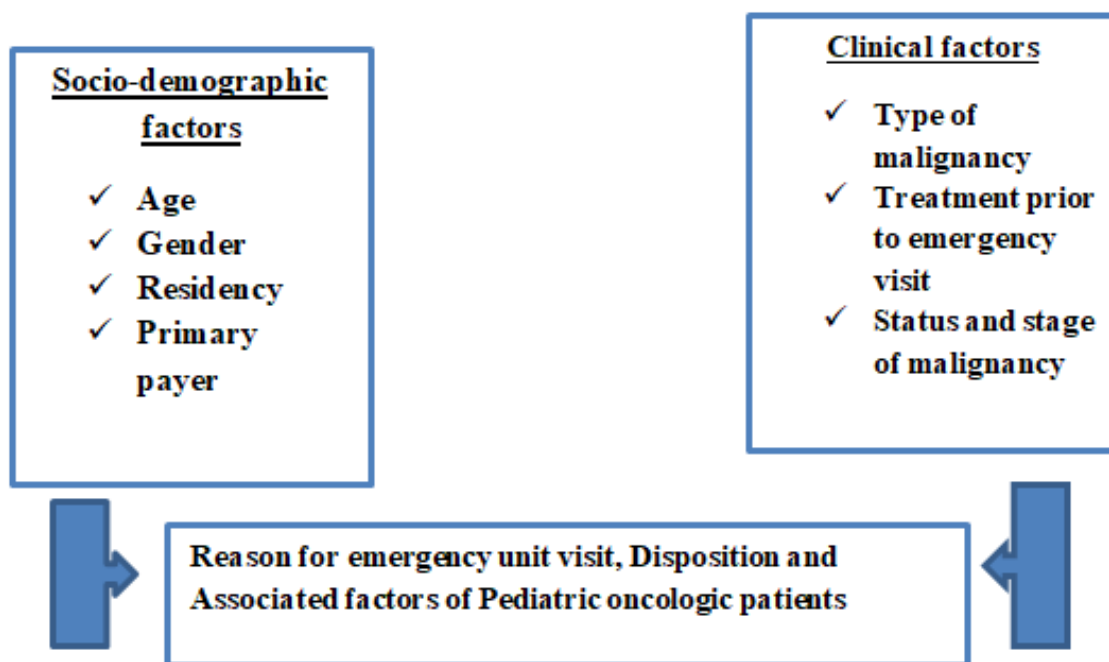


Figure 1: Conceptual Framework Adapted From different literature in Reason for ED visit, disposition and associated factor of pediatric oncologic patients. (8,10,15,16,17,18,19,20,21,22,23)

3. OBJECTIVE

3.1. General objective

To assess the reason for an emergency visit, disposition following ED encounter, and associated factors of pediatric patients presenting with oncologic emergencies at the pediatric emergency department of TASH from 1st of January 2023 to 30th of Dec 2023

3.2. Specific objective

- ✓ To describe the common reasons for emergency visits of pediatric oncologic patients admitted to the pediatric emergency department at Tikur Anbesa Specialized Hospital. from 1st of Jan 2023 to 30th of Dec 2023
- ✓ To explain the disposition of pediatric oncologic patients visiting the pediatric emergency department of Tikur Anbesa Specialized Hospital from 1st of Jan 2023 to 30th of Dec 2023
- ✓ To identify factors associated with the reason for ED visit and disposition of pediatric oncologic emergency patients admitted to the pediatric emergency department of Tikur Anbesa Specialized Hospital from 1st of Jan 2023 to 30th of Dec 2023

4. METHODS AND MATERIALS

4.1 . Study design

A hospital-based retrospective cross-sectional study was carried out to assess the reason for emergency unit visits, disposition, and associated factors of pediatric patients presenting with oncologic emergencies.

4.2. Study area and period

The study is conducted in Tikur Anbesa Specialized hospital, Pediatric emergency department , between 1st of Jan 2023 to 30th of Dec 2023 .

The study was conducted in the pediatric emergency department of Tikur Anbessa Specialized Hospital (TASH). TASH is the largest specialized teaching hospital in Ethiopia that serves as training center for undergraduate and postgraduate students. TASH has a total area of 123,000 meter square with buildings holding 45,000 meter square. The main building is an 8-store building with 1262 rooms, which includes seven x-ray, nine surgical and twelve laboratory diagnostic rooms. The hospital has 850 beds and it also provides outpatient service. TASH has 200 doctors, 379 nurses, and 115 other health professionals and various departments' faculties and residents under specialty trainings who provide patient care in the hospital(24).

The pediatric emergency department had 42 beds and sees approximately 13,300 presentations per year. It was staffed by pediatric emergency medicine specialists, residents, and 46 nurses. Among other emergency services this department provide emergency care on the diagnosis, treatment, and management of cancer and blood disorders in children(25).

4.3. Population

4.3.1 Target population

All pediatric emergency patients who received treatment in the Tikur Anbesa specialized hospital pediatrics emergency department during the study period

4.3.2 Sample population

All pediatric oncologic patients who received treatment in the Tikur Anbesa specialized hospital emergency department during the study period

4.4. Inclusion and exclusion criteria

4.4.1. Inclusion criteria

All complete medical chart of pediatric oncologic patient below 18 years old during the study period will be included in the study.

4.4.2. Exclusion criteria

Those who died were excluded from regression analysis

4.5. Study variables

4.5.1. Dependent variables

- Disposition and Reason for ED visit

4.5.2. Independent variables:

- Type of cancer
- Status of cancer
- Stage of cancer
- Residency (urban vs. rural)
- Age:
- Primary payer
- Gender:
- Nutritional Status:
- Previous Treatment History (prior to ED)
- Comorbidities

4.6. Sample size determination and Sampling method

4.6.1. Sample size

Given that the goal of this research is to assess reason for emergency department visit, dispositions and associated factors of pediatric patients presenting with oncologic emergencies over one-year period. Consequently, all visit by pediatric cancer patient records from January 1, 2023, to December 30, 2023, are included.

4.6.2. Sampling technique

Census sampling technique employed.

With the general assumption that this study will be presented with a level of confidence of 95% and 5% precision, I used single population proportion formula to calculate the minimum sample size for this study. The expected proportion of pediatric oncologic emergencies in ED over the year of 2023 was taken from PHMIS which shows about 5.42% of all childhood malignancies were .

$$n = Z^2 * P(1-P) / d^2$$

$$n = (1.96)^2 * 0.054 * (1-0.054) / (0.05)^2$$

$$n = 185$$

where : n= the minimum sample size

p=the expected prevalence of pediatric oncologic emergencies 5.4%

d= the level of precision (margin of error) 0.05 or 5%

z= the value at 95% confidence level

Adding 10% of the calculated value for missing and incomplete data makes the final sample size required 203. To obtain the required sample size needed for this study all consecutive cases during the study period were included.

4.7. Data collection tool

The tool was adapted from previous studies which contain socio-demographic characteristics, clinical profile (reason for emergency visit, comorbidity, primary tumor site, prior ED presentation treatment, and tumor status, and outcome of the patient) By pretesting 5% the data and applying rigorous data analysis methods, it was ensured that the tool effectively captured the gathered data Annex- 1 (22) .

4.7.1. Data collection procedure

Nurses who received a one-day orientation training on data collection techniques collected the data. Initially, the card numbers of all pediatric oncologic patients admitted during the one-year time frame were collected from PHMIS and entered into an Excel spreadsheet to eliminate duplicate visits. Subsequently, the list of patient card numbers was provided to the card rooms in both the emergency unit and the chemo centers to prepare the corresponding cards. Once the cards were ready, nurses collected them. Additionally, patient data were also gathered from the online patient data registry finally the collected data was overseen by the principal investigator. Ten percent of the records were cross-checked with the hospital medical chart for validity.

4.8. Data quality assurance:

Three days before the actual data collection, the questionnaire was pretested on cards of cancer patients. Nurse data collectors received training on the tool's contents, and the lead investigator verified the correctness, consistency, and completeness of each completed questionnaire. Ultimately, computer software was used to analyse the data.

4.9. Data analysis and interpretation:

Before analysis, the collected data was checked for accuracy, consistency, and completeness. Using SPSS statistical software version 26, data entry and analysis were carried out to determine the relationship between the dependent and independent variables, and the data and interpretation were presented using descriptive analytical statistics such as frequency, percentage and proportion was conducted. The statistical methods that were employed include regression analysis to explore

relationships between variables and predict outcomes. Specifically, logistic regression analysis was utilized to assess the factors associated with admission versus discharge from the emergency department (ED) among pediatric patients with oncologic emergencies. ‘Hosmer Lemeshow’ fitness model variables with a P-value of <0.25 will be included in multivariable regression. The primary objective of this analysis was to identify significant predictors that influence the likelihood of admission versus discharge for pediatric patients presenting with oncologic emergencies.

4.10. Operational definitions:

- ✓ **Pediatric Oncologic emergencies** - are acute, potentially life-threatening events related to a patient’s malignancy or its treatment(1)
- ✓ **Disposition** :Disposition following ED encounters pertains to the final outcome or plan for pediatric oncologic patients subsequent to their assessment and management in the ED setting. (4)

Type of cancer

- ✓ **Solid tumor** abnormal masses of tissue that result from the uncontrolled growth of cells. They can be benign (non-cancerous) or malignant (cancerous) and can originate in various organs and tissues throughout the body.. The most common type of solid tumor found in children is a brain tumor. After brain tumors, the most common types are,Neuroblastoma,Wilms tumor, Rhabdomyosarcoma, Retinoblastoma Osteosarcoma and Ewing sarcoma, two types of bone cancer (NIH)
- ✓ **Hematologic** Cancers that develop in the lymphatic system, including the blood, lymph nodes, and bone marrow. Include ALL,AML,CML,NHL and HL(26).
- ✓ **Neutropenic Fever** defined a patient with fever neutrophil count < 1000 cells/microliter

4.11. Ethical considerations

The Ethical Committee of the Pediatric and Child Health Department at Addis Ababa University School of Medicine has provided ethical clearance. The management committees of the hospitals have formally granted permission to gather data. During the data collection process, unique

identity numbers were used in place of names. Each patient's information was coded, and all collected data was kept confidential

5. Result

5.1 . Socio-Demographic Characteristics of pediatrics Oncologic Patients

A total of 13,300 presentation per year visits out of which ranging from 40-60 cancer patients visit the ED each month. A sample size of 204 children fulfilled the inclusion criteria and were recruited, out of which 91 (44.6%) were females. The age distribution shows a higher representation of patients between 1-4 age group (37.3%), followed by the 5-9 age group (33.3%). Patients in the 10-14 age group accounted for 20% of the total. A significant proportion of patients came from urban areas (73.8%) compared to rural areas (26%).

Regarding payment in TASH 162(79.4) are covered private (out of pocket) and 39(19.1%) use community-based payment. Most patients had a normal nutritional status (68.6%), while 16.7% had moderate acute malnutrition (MAM) and 14.7% had severe acute malnutrition (SAM). Most of the patients were referred from OPD of TASH (106; 52%), followed by 45 (22.1%), were transferred from other Governmental hospital. When it comes to the time of ED arrival, more than

half (174; 85.3%), of them visited the ED during the day time (from 6:00 AM to 6:00 PM) while the rest were during the night (from 6:00 PM to 6:00 AM) (Table 1)

Table 1 Socio-Demographic Characteristics of Patients with Cancer at the ED of TASH, Addis Ababa, Ethiopia, 2024

Variables n=204		Frequency	Percent
sex	Female	91	44.6%
	Male	113	55.4%
Age	<1	9	4.4
	1-4	76	37.3%
	5-9	68	33.3%
	10-14	42	20.6%
	15-19	9	4.4%
Address	Rural	54	26%
	Urban	150	73.5%
Arrival time to ED	Day	174	85.3%
	Night	30	14.7%
Primary Payer	Public/governmental	39	19.1%
	Private	162	79.4%
	Others	3	1.5%
Nutritional status	Normal	140	68.6%
	Moderate acute malnutrition(MAM)	34	16.7%
	Sever acute malnutrition(SAM)	30	14.7%
Sources of referral	Transferred from chemo center (TASH OPD)	107	52.5%
	Governmental hospital	45	22.1%
	Health center	14	6.9%
	Private hospital	17	9.3%
	Self-referral	21	10.3%

5.2. Prevalence of pediatric oncologic emergencies

At Tikur Anbesa Specialized Hospital (TASH), pediatric cancer patients made between 40 to 60 visits to the emergency department (ED) each month. After excluding certain cases based on exclusion criteria and counting each patient's repeated visits only once, there were a total of 296 ED visits by 204 children with cancer over the one-year study period. The distribution of these visits was only 5.4 % of children had just ≥ 4 times ED visits, 3.9% had 3 times ED visits, 19.1 % had 2 times ED visits and 71.6 % had only 1 times ED visit. Overall this study found there were 30.1% solid tumors and 69.9% hematological cases encountered during the study period. prevalence of ED visits by children with cancer over the one-year study period is approximately 5.42% from total 13.300 presentation per year .

5.3. Reasons for ED Visit of pediatrics Oncologic Patients Who Visited ED

The most common reason for ED visits was Neutropenic fever (105; 51.5%) followed by fever {68, 34.7%} and Tumor lysis syndrome (64; 32.7%) the lowest count was UTI (2, 1%). Variation in ED disposition was found across diagnoses. Children with cancer were admitted the majority of the time if their reasons for ED visit were Neutropenic fever (51.5%), Tumor lysis syndrome (26%), fever (32.4%), anemia (17.6%), and Acute URI (16.7%). The lowest admission rates were for principal diagnoses of venous thromboembolism (3.4%) and UTI(1%), patients with comorbidities 5(2.5%) had a retroviral infection, 24(11.8) had hypertension. patients who visited ED (121; 59.3%) metastases, (4; 2%) of them had locally advanced (not metastases) cancer(Tabel 2)

5.4. Disposition decision of pediatrics Oncologic Patients Who Visited ED

Regarding disposition, a total admission of 87(44.4%) with a confidence interval of 95% (0.373-0.516), and 109 (55.6%) were discharged home with a confidence interval of 95%(0.484-0.627), from those who were admitted 81(41.3%) of them were admitted to the ward, 6(3.1%) admitted to PICU, from those discharged 8 (4.1%) of them were directly transferred to chemo center(OPD of

TASH) and 8(4.1%) left against medical advice. lastly, pediatric patients who were dead in the emergency room accounted for 9 (4.4%)(Table 2).

Table 2 Reason for ED visit and clinical characteristics of pediatric Oncologic Patients Who Visited ED of TASH, Addis Ababa, Ethiopia, 2024

Variables(n=204)		Frequency N	Percent
Reason for ED visit NB: multiple response possible	Acute upper respiratory infection	34	16.7
	Bicytopenia	33	16.2
	pancytopenia	13	6.4
	thrombocytopenia	17	8.3
	pneumonia	32	15.7
	Tumorlysis syndrome	64	32.7
	Netropenic fever	105	51.5
	Hyperleukocytosis	20	9.3
	Urinary tract infection	2	1
	Bleeding	27	13.2
	Fever only	68	34.7
	Headache	19	9.3
	increased ICP and seizure	7	3.4
	Venous thromboembolism	4	2
	Chemo induced nausea and vomiting	22	9.8
	Anemia	35	17.9
	shock	5	2
	Dehydration	21	10.3
	sever pain	30	14.7
	Edema of body and /or parts of body	29	14.2
	Other reason for ED visit	15	7.4%
Type of Malignancy	ALL	90	44.1%

	AML	10	4.9%
	CML	7	3.4%
	Solid tumor	42	20.6
	NHL	30	14.7
	HL	5	2.5%
	CNS	17	8.3%
	Cervical cancer	2	1%
	Burkitts lymphoma	1	0.5%
Comorbidity and its type	Retroviral infection	5	2.5%
	Asthma	2	1%
	Diabetes	4	2%
	Hypertension(HTN)	24	11.8%
	Chronic kidney disease(CKD)	7	3.4%
	Chronic liver disease	4	2%
	Cardiac illness	5	2.5%
	More than one	1	0.5%
	No comorbidity/None	140	71.6%
	other	12	5.9%
Primary tumor location	Blood	107	52.5%
	Brain	15	7.4%
	Renal	24	11.8%
	Head and Neck	2	1%
	Cervical	2	1%
	lymph nodes	36	17.6%
	Soft tissue	4	2%
	liver	3	2%

	Eye	7	3.9%
	Bone	1	0.5%
Treatment prior to ED	Chemotherapy	99	48.5%
	Single Surgery	2	1%
	Surgery and chemotherapy	10	4.9%
	Radiotherapy	9	4.4%
	Chemotherapy and surgery and /or radiotherapy	8	3.9%
	Intravenous antibiotics	12	5.9%
	BMT	12	5.9%
	Blood product transfused	18	8.8%
	Other(unspecified)	16	7.8%
	No treatment	21	10.3%
Status of malignancy	Not metastatic	32	15.7%
	metastatic	121	59.3%
	Not applicable	4	2%
	No information	47	23%
Region of metastasis	Lung and pleura	35	17.2%
	Liver and pleura	15	7.4%
	Lymph node	10	4.9%
	Urinary system	6	2.9%
	Bone	6	2.9%
	More than one	12	5.9%
	Other	42	20.6%
Disposition (Outcomes)	Transferd to chemo center (OPD of TASH)	8	4.1%
	PICU	6	3.1%

	Admission to ward	81	41.3%
	Discharged home	109	55.6%
	Left against medical advice	8	4.1%
	Died in the ED	9	4.4%
Frequent ED visit	yes	58	28.4%
	no	146	71.6%
Total ED visit	1	146	71.6
	2	39	19.1%
	3	8	3.9%
	≥4	11	5.4%

5.3. Factors associated to admission versus discharge among pediatric Oncologic Patients

Outcomes of oncologic patients at the emergency department were divided into admission and discharged home to compute binary logistic regression. Those predictor variables having p-value <0.25 in Hosmer Lemeshow fitness model were transferred into a multivariable logistic regression to overcome the effect of a confounding variable. In the multivariate logistic regression variables having p-value <0.05 were considered statistically significant associations.

In bivariable logistic regression, when computed the following were significant patients between the age of 1-4 years (COR 0.154; 95% CI, 0.029 - 0.819) who had decreased odds of admission when compared to 15-19 years old patients. Additionally, patients coming from rural areas (CO = 3.412, 95% CI, 1.827- 6.373) were more likely to be admitted than those who came from urban areas. Furthermore, predictor variables such as daytime ED arrival (COR 0.367; 95% CI, 0.148 - 0.909), from types of malignancy patients who had solid tumors (COR 2.370; 95% CI, 1.006- 5.587) were associated with admission. Regarding treatment prior to ED chemotherapy (CO=1.576,95% CI 0.794-3.131}, Radiotherapy (CO=5.400,95% CI 0.590- 49.466), and surgery and chemotherapy { COR=3.780, 95% CI 0.717-19.939}

In a multivariable analysis, Patients who lived in rural settings had increased odds of admission (OR = 3.358, 95% CI 1.337– 8.434) compared with those living in urban residences. Among the cancer types, only solid tumor (OR= 4.436, 95% CI 1.139- 17.284} of the categories had significantly increased odds of admission when compared to the reference of ALL patient factors associated with decreased odds of admission included being between the age of (1-4years)(OR = 0.063,95% CI 0.005- 0.777) as compared with those the age of (15- 19years) and AML from type of cancer had decreased odds of admission.

Treatment status those who had chemotherapy prior to ED visit increased odds of admission with (AOR= 4.366,95% CI 1.531 - 12.451) and those who had BMT (AOR= 14.859,95% CI 2.469- 89.436) had increased odds of admission. Reason for emergency visit associated with increased odds of admission involved tumor lysis syndrome (AOR = 5.827, 95% CI 2.194 – 15.480 }, neutropenic fever {AOR= 2.693,95% CI 1.130 – 6.420 } and Fever (AOR= 3.920, 95% CI 1.572- 9.777} (table 4).

Table 3: Bivariate and Multivariate logistic regression analysis of to evaluate factors associated with admission versus discharge from the ED among pediatric oncologic patients of TASH , Addis Ababa, Ethiopia, 2024

Variables N=204		AOR (CI 95%)	p-value
Age	15-19	Ref	
	10-14	0.875{0.053- 14.323}	0.999
	5-9	0.212{0.015- 3.086}	0.317

	1-4	0.050{ 0.003- 0.717}	0.031
	<1	0.101{0.003- 3.211}	0.193
Residency	Urban	Ref	
	Rural	3.358 { 1.337 - 8.434 }	0.010
Type of malignancy	(ALL)	Ref	
	AML	0.153{ 0.020 - 1.176}	0.020
	CML	1.253{ 0.152 - 10.307}	0.751
	Solid tumor	3.406{ 1.160- 10.001}	0.021*
	NHL	1.055{ 0.323- 3.442}	0.956
	HL	0.498{ 0.043- 5.794}	0.317
	CNS	0.510{ 0.117- 2.221}	0.527
	Cervical cancer	0.476{ 0.003- 80.383}	0.999
	Burkitts lymphoma		1.000
Treatment prior to ED	other	Ref	
	Chemotherapy	4.366{1.531-12.451}	0.006*
	Radiotherapy		0.999
	Surgery	0.867{0.04-19.006}	0.928
	Surgery and chemotherapy	3.383{0.153-74.576}	0.440
	Surgery ,chemotherapy and/or radiotherapy	0.160{0.012-2.155}	0.167
	Intravenous antibiotics	0.731{0.107-5.008}	0.749
	BMT	14.859 { 2.469 - 89.436 }	0.003*

Top 5 Reasons for ED visit Neutropenic fever		2.693 { 1.130 - 6.420 }	0.025 *
Fever		3.920 { 1.572 - 9.777 }	0.003*
TLS		5.827{ 2.194 - 15.480 }	0.000*
Anemia		0.860{0.289- 2.555}	0.786
Acute URI		0.456{0.144- 1.445}	0.093

6. Discussion

In this study overall there were 296 encounters by 204 children with cancer during the 1-year time frame investigated only 5.4 % of children had just ≥ 4 times ED visits, 3.9% had 3 times ED visits, 19.1 % had 2 times ED visits and 71.6 % had only 1 time ED visit which is relative consistency with the study conducted in Riley Hospital for Children Emergency Department at Indiana University Only 40.3% of children had just 1 ED visit, 23.8% had 2 visits, 12.1% had 3 visits, and 23.8% had ≥ 4 visits the similarity might be due to both studies focused on pediatric patients with cancer, a population that shares common healthcare needs and risks and both studies employed retrospective designs (3).

This study revealed that neutropenic fever (101; 51.5%) was the most frequent cause of ED visits thereafter fever {68, 34.7%}, tumor lysis syndrome (64; 32.7%), anemia(37,18.1%) and acute upper respiratory infection (34,16.7%) respectively. The results of this investigation were in line with the research done in the USA, India, and Brazil which revealed the most prevalent reason, accounting for 11.3% of visits, was fever, Following closely behind was febrile neutropenia, which accounted for 7.9% of visits(4)(19)(20). However, this study is inconsistent compared to a study conducted at Jimma University which stated that Neutropenia fever (79; 23.4%) was the most frequent cause of oncologic ED visits, followed by nausea/and vomiting (38; 11.2%) and electrolyte abnormality (37; 10.9%). The mere fact that adults were the subjects of this study could be the cause of this discrepancy(22).

Regarding the disposition decision following an ED encounter, 44.4% of patients at TASH were admitted, while 55.6% were discharged home. Of those discharged home, 4.1% were directly transferred to the chemotherapy center (OPD of TASH). This is relatively consistent with a study done in the United States, which found that 51.9% of pediatric patients with cancer were assessed in the ED and sent home, 43.6% were admitted to the same hospital, and 3.7% were transferred to another short-term medical facility. This similarity could be due to the need to balance hospital resources with providing safe and effective outpatient care (4). Furthermore among the top reason

of ED visits (2.9%) fever, (4%) neutropenic fever,(3.1%) tumor lysis syndrome was admitted to PICU it is inconsistent with the study done in Oncology of the National Cancer Institute(INCA) Brazil there were 43 episodes of febrile neutropenia in 34 patients Microbiologically confirmed infections occurred in six of the 34 (17.6%) patients; three (8.8%) required PICU admission,. Hospitalization was required in (21.2%) of cases, of which (19.2%) were to the ward and 15 to the PICU. The difference in patient care quality between developed and developing nations may be the cause of this disparity.(19).

This study shows that patients between the ages of 1-4 had decreased odds of admission compared to those aged 15-19, consistent with a study conducted at Riley Hospital for Children in the USA. That study indicated that younger children, particularly those aged 0 to 4 years, had lower odds of admission compared to their older counterparts (AOR, 0.53; CI 0.29-0.99). This similarity might be due to the greater susceptibility of younger children (1-4 years) to infections and respiratory issues. This age group is more prone to developing respiratory conditions such as acute bronchitis and pneumonia, which means they often need to be discharged to continue treatment on an outpatient basis (3).

Socioeconomic factors appeared to impact the disposition of children with cancer from the ED patients who came from rural settings had increased odds of admission which is consistent with a study conducted in USA patients who lived in urban settings had decreased odds of admission compared to rural (AOR = 0.7, 95% CI 0.6–0.8) this similarity might be closer urban areas are more easily able to return for re-evaluation if their condition worsens. Those who live further away, in rural areas, may experience hardship related to travel including lack of adequate means of transportation, the cost of traveling, or lodging nearby. This may result in longer hospital admissions(4)

Among cancer diagnoses solid tumors had increased odds of admission when compared to the reference of ALL showing discrepancy to the study conducted in the USA, that none of the categories had significantly increased odds of admission when compared to the reference of ALL this variability might included a variable that might affect admission such as stages of cancer

,presence of comorbidities, region of metastases additionally possible explanation include treatment protocols, and healthcare infrastructure between the study locations and variations in disease severity (4)

Treatment wise this study finds that those patients who had history of chemotherapy had increased odds of admission consistent with study conducted in USA which shows those patients undergoing first-line treatment (AOR=2.30 times), and second- or later-line treatment (AOR=2.68 times) had increased odds of admission A possible explanation for this similarity is that patients who have undergone chemotherapy are generally more vulnerable to complications and infections due to the immunosuppressive effects of the treatment. Chemotherapy can weaken the immune system, making patients more susceptible to a variety of illnesses and leading to a higher likelihood of hospital admissions Furthermore, patients receiving second- or later-line treatments may have more advanced or resistant forms of cancer, which can be associated with more aggressive treatment regimens and a higher overall disease burden. This increased disease burden and more intensive treatments contribute to a higher rate of complications and adverse effects, necessitating more frequent hospital admissions.(19).

Comparable to study conducted in USA Shows those patients with history of transplant (BMT) had increased odds of admission possible explanation for this is that BMT recipients are at a higher risk of developing complications that may require ICU admission. These complications can include infection, respiratory failure, and cardiac failure (4).This study is consistent with study conducted in USA regarding neutropenic fever as a reason for emergency department (ED) visits(AOR=8.61,95% CI 5.99–12.38) with increased odds of admission, may be explained by several factors disease burden, healthcare providers' awareness of the significance of neutropenic fever in cancer patients and the potential for rapid clinical deterioration may lead to consistent practices regarding ED evaluation and admission criteria(5).

This study shows that among the reasons for ED visits, fever without neutropenia had increased odds of admission, which is consistent with studies conducted in the USA and Brazil. A possible explanation for this could be that fever in cancer patients often indicates a potential infection, which can be life-threatening, especially in immunocompromised individuals such as those

undergoing cancer treatment. Therefore, these patients are more likely to be admitted for close monitoring and prompt management of any underlying infections or complications (3)(19).

Tumor lysis syndrome was the third most common reason for ED visits that had increased odds of admission. A possible explanation for this is that tumor lysis syndrome is a serious and potentially life-threatening condition that occurs when cancer cells break down rapidly, releasing their contents into the bloodstream. This can lead to severe electrolyte imbalances, kidney failure, and other critical complications. Due to the urgent need for intensive monitoring and treatment to manage these risks, patients presenting with tumor lysis syndrome are more likely to be admitted to the hospital. Nevertheless, this study primarily relied on literature from developed countries for comparison. This disparity in sources may stem from various reasons, such as the availability of data, differences in research focus, and accessibility to publications. Given the significance of understanding the reasons for emergency department (ED) visits among pediatric oncologic patients, researchers should prioritize conducting studies in this area.

7.Limitation

This study had several significant limitations. Firstly, it was conducted at a single institution. As a retrospective investigation, it relied on existing data, which might be incomplete, inaccurate, or biased. Additionally, there was a lack of literature locally. For future research, a prospective design is recommended to collect data specifically for research purposes, minimizing data collection bias and ensuring more accurate data.

8. Conclusion

In this retrospective review of ED visits among children with cancer who are actively receiving therapy, this study revealed that children with cancer present to ED with more than one reason. The five most common complaints for ED visits were Neutropenic fever, fever, tumor lysis syndrome, anemia, and acute upper respiratory tract infection. Factors associated with increased odds of admission include Neutropenic fever, fever without neutropenia, and TLS visit the ED.

7. REFERENCES

1. Jha A, Abraham S, Mathew A, Ahmad A, Jacob J, Shandilya S, et al. Oncological emergencies: Profile and patient awareness of treatment. *J Curr Res Sci Med*. 2023;9(1):17.
2. Pi J, Kang Y, Smith M, Earl M, Norigian Z, McBride A. A review in the treatment of oncologic emergencies. 2015;
3. Burcham MD, Cochrane AR, Jacob SA, Carroll AE, Mueller EL. Emergency department chief complaints among children with cancer. *J Pediatr Hematol Oncol*. 2018;40(6):445–9.
4. Emily L. Mueller, MD, MSc, 1, 2* Matthew Hall, PhD, 3 Samir S. Shah, MD, MSCE, 4 Keith J. August, MD, MS, 5 Mohamed A. Radhi, MD, 5 and Michelle L. Macy, MD, MS6 7. Characteristics of Children With Cancer Discharged or Admitted From the Emergency Department. *Pediatr Blood Cancer*. 2016;63(February):853–858.
5. Emily L. Mueller, , Amber Sabbatini, , Achamyaleh Gebremariam, Rajen Mody, Lillian Sung and MLM. Why Pediatric Patients with Cancer Visit the Emergency Department: United States, 2006–2010 Emily. *Pediatr Blood Cancer*. 2013;(February):1388–9.
6. Belay A, Ali A, Ayele W, Assefa M, Jemal A, Kantelhardt EJ. Incidence and pattern of childhood cancer in Addis Ababa, Ethiopia (2012–2017). *BMC Cancer*. 2023;23(1):1–7.
7. Kiros M, Memirie ST, Tolla MTT, Palm MT, Hailu D, Norheim OF. Cost-effectiveness of running a paediatric oncology unit in Ethiopia. *BMJ Open*. 2023;13(3):1–10.
8. Halfdanarson TR, Hogan WJ, Madsen BE. Emergencies in Hematology and Oncology. *Mayo Clin Proc* [Internet]. 2017;92(4):609–41. Available from: <http://dx.doi.org/10.1016/j.mayocp.2017.02.008>
9. Leung KKY, Hon KL, Hui WF, Leung AKC, Li CK. Therapeutics for paediatric oncological emergencies. *Drugs Context*. 2021;(10):1–12.
10. Brousseau DC, Owens PL, Mosso AL, Panepinto JA, Steiner CA. Acute care utilization and rehospitalizations for sickle cell disease. *Jama*. 2010;303(13):1288–94.
11. Gultie T, Sisay F, kebede sofia, Abebe A, woldeselassie F, Sebsibie G. Treatment outcome of oncologic patients treated in emergency department at black lion specialized hospital, Ethiopia. *Women's Heal*. 2018;7(4).
12. Gri N, Longhitano Y, Zanza C, Monticone V, Fuschi D, Piccioni A, et al. Acute Oncologic Complications: Clinical–Therapeutic Management in Critical Care and Emergency Departments. *Curr Oncol*. 2023;30(8):7315–34.
13. Agarwal S. Pediatric Cancers: Insights and Novel Therapeutic Approaches. *Cancers (Basel)*. 2023;15(14):20–3.
14. Yifru S, Muluye D. Childhood cancer in Gondar University Hospital , Northwest Ethiopia.

BMC Res Notes. 2015;1–5.

15. Hopkins J, Burns E, Eden T. International twinning partnerships: An effective method of improving diagnosis, treatment and care for children with cancer in low-middle income countries. *J Cancer Policy*. 2013;1(1–2):e8–19.
16. Kellie SJ, Howard SC. Global child health priorities: What role for paediatric oncologists? *Eur J Cancer*. 2008;44(16):2388–96.
17. Lash RS, Hong AS, Bell JF, Reed SC, Pettit N. Recognizing the emergency department’s role in oncologic care: a review of the literature on unplanned acute care. *Emerg Cancer Care* [Internet]. 2022;1(1):1–10. Available from: <https://doi.org/10.1186/s44201-022-00007-4>
18. Owens C, Mannion D, O’Marcaigh A, Waldron M, Butler K, O’Meara A. Indications for admission, treatment and improved outcome of paediatric haematology/oncology patients admitted to a tertiary paediatric ICU. *Ir J Med Sci*. 2011;180(1):85–9.
19. Cunha MOM da, Lima FF da S, Graboio MF, Silva ARA da, Ferman S. Pediatric Emergency Care for Children and Adolescents with Cancer: Causes of Consultation and Factors Associated with Hospitalization. *Rev Bras Cancerol*. 2023;69(4):1–10.
20. Raman R, Ramakrishna S, Muthukrishnan L. Management and Immediate Outcome of Common Pediatric Oncological Emergencies from a Single Centre. 2023;(November).
21. BothMeenakshira, Seth R, Kapil A, Dwivedi SN, Bhatnagar S, Xess I. Evaluation of predictors of adverse outcome in febrile neutropenic episodes in pediatric oncology patients. *Indian J Pediatr*. 2013;80(4):297–302.
22. Workina A, Habtamu A, Zewdie W. Reasons for Emergency Department Visit, Outcomes, and Associated Factors of Oncologic Patients at Emergency Department of Jimma University Medical Centre. *Open Access Emerg Med*. 2022;14(October):581–90.
23. Assefa S, Alemayehu T, Abebe W. Factors Associated With Treatment Outcome of Pediatric Cancerpatients Admitted With Febrile Neutropenia in Tikuranbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia. *Ethiop Med J*. 2017;55(1):43–7.
24. Hawaze S, Negash G, Kebede Y. Medication errors in the adult emergency unit of a tertiary care teaching hospital in Addis Ababa. *Arch Pharm Pract*. 2013;4(4):147.
25. Jofiro G, Jemal K, Beza L, Bacha Heye T. Prevalence and associated factors of pediatric emergency mortality at Tikur Anbessa specialized tertiary hospital: A 5 year retrospective case review study. *BMC Pediatr*. 2018;18(1):1–10.
26. Zhang N, Wu J, Wang Q, Liang Y, Li X, Chen G, et al. Global burden of hematologic malignancies and evolution patterns over the past 30 years. *Blood Cancer J*. 2023;13(1):1–13.

8. ANNEX I Data extraction tool adapted from previous studies.

Sex	Age	Nutritional Status	Residency	Payer	ED arrival time	Source of referral	Status of CA	Stage of CA	Type of cancer	Primary tumor location	Region of metastasis	Treatment prior to presentation	Reason for visit	Comorbidity	Disposition decision	Frequent visit	Total ED visit

9. ANNEX II

Information sheet and informed voluntary consent form for the head of cancer registry office

My name is Alem Adamu , I am conducting a research in Addis AbabaTASH from Pediatric HMIS (medical chart) data base for my Master's Degree in Addis Ababa University College of Health and Medical Sciences. I kindly request you to help me by giving your attention to explaining to you about this study.

Title of the study: Reason for emergency visit, disposition and associated factors for pediatric oncologic emergencies at Tikur Anbesa Specialized Hospital Pediatric Emergency department ,AddisAbaba, Ethiopia.2024

Purpose: The purpose of this study is to write a thesis as a partial requirement for the fulfillment of a Master's Department of emergency and surgical nursing

Procedure and duration: data from the medical chart database used in will be extracted and entered to excel and for SPSS analysis and this may take not more than two weeks.

Risk and benefits: this study will be conducted on secondary data, there is no risk on clients, andthere is the only minimal risk on key informants, it may cost some time.

Confidentiality and Anonymity: The information that I will get from the registry will be kept confidential. There will be no information that will identify the participants in particular. The findings of the study will be general for the study and will not reflectanything particular of individual persons. No reference will be made in oral or written reports that could link participants to the research.

APPROVAL SHEET
ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCE
SCHOOL OF NURSING AND MIDWIFERY

I, the undersigned MSc student, declare that I have submitted my original work on a title _____ for the examination.

Submitted by:

_____	_____	_____
Name of student	Signature	Date

This thesis work has been submitted for examination with my approval as an advisor.

Approved by:

1. _____	_____	_____
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Name of Major Advisor	Signature	Date
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2. _____	_____	_____
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Name of Co-Advisor	Signature	Date
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3 _____	_____	_____
Name of Co-Advisor	Signature	Date

APPROVAL BY THE BOARD OF EXAMINATION

This thesis by _____ is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of masters in _____.

INTERNAL EXAMINER:

_____ NAME	_____ RANK	_____ SIGNATURE	_____ DATE
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External EXAMINER:

_____ NAME	_____ RANK	_____ SIGNATURE	_____ DATE
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RESEARCH ADVISORS:

_____ NAME	_____ RANK	_____ SIGNATURE	_____ DATE
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_____ NAME	_____ RANK	_____ SIGNATURE	_____ DATE
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DEPARTMENT HEAD

_____ NAME	_____ RANK	_____ SIGNATURE	_____ DATE
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