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St. Paul's Hospital Millennium Medical College**

School of Medicine Undergraduate Study Program

**Prevalence and Clinical Profiles of Acute Myeloid Leukemia Among Patients
Admitted to the Hematology Ward of St Paul's Hospital Millennium Medical
College In 2024–2025.**

By: Desalegn Wondmu (Medical Intern)

**A Student Research Report Submitted to The School of Public Health,
SPHMMC, In Partial Fulfillment of The Requirements for The Degree of
Doctor of Medicine**

March, 2026

Addis Ababa, Ethiopia

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Abbreviations and Acronyms

ALL: Acute Lymphocytic Leukemia

AML: Acute Myeloid Leukemia

ASIR: Age-Standardized Incidence Rate

BCL-2: B-cell lymphoma 2

BMI: Body Mass Index

CLL: Chronic Lymphocytic Leukemia

CML: Chronic Myeloid Leukemia

DNA: Deoxyribonucleic Acid

EMR: Electronic Medical Record

ETB: Ethiopian Birr

HMIS: Healthcare Management Information System

IARC: International Agency for Research on Cancer

IRB: Institutional Review Board

MD: Doctor of Medicine

MPH Master of Public Health

NCDs: Non-Communicable Diseases

SD: Standard Deviation

SPHMMC: St. Paul's Hospital Millennium Medical College

SPSS: Statistical Package for Social Sciences

WHO: World Health Organization

Abstract

Introduction: Acute Myeloid Leukemia is a severe hematologic malignancy with rising global incidence nearly doubling since 1990 and posing significant challenges, especially in resource-limited settings like Ethiopia. While hematological malignancies, including Acute Myeloid Leukemia, are prevalent in Africa, comprehensive data remains limited, particularly in Ethiopia. Despite its growing burden, specific localized data on its prevalence and clinical profiles is lacking, hindering effective patient management and resource allocation. This research aims to bridge this critical knowledge gap, providing essential data to inform evidence-based practices and improve patient care.

Objective: The objective of this study is to assess the prevalence and clinical profiles of Acute Myeloid Leukemia among patients admitted to Hematology ward of St. Paul's Hospital Millennium Medical College between January 2024 and December 2025.

Methods: A descriptive hospital-based cross-sectional study was conducted among patients admitted to the hematology ward of St. Paul's Hospital Millennium Medical College in Addis Ababa, Ethiopia. Patients were selected from the Health Management Information System (HMIS) and data was systematically extracted from the medical records of all patients admitted to the hematology ward from January 2024 to December 2025. A standardized record review checklist was utilized to collect socio-demographic and clinical information from the Electronic Medical Record. Data processing and analysis were performed using SPSS version 27, employing descriptive statistics to summarize the sociodemographic, prevalence and clinical characteristics of the study population.

Results: A total of 82 complete patient records were analyzed, among which 31 cases were confirmed as Acute Myeloid Leukemia, yielding an overall prevalence of 37.8%. The mean age of AML patients was 37.39 years (SD $\pm$ 15.83), with the majority (64.5%) falling within the 20–49 age group. A slight female predominance (58.1%) was observed, and 58.1% of the patients originated from rural areas. The most prevalent clinical manifestations were anemia-related symptoms, specifically light-headedness/blurring of vision (90.3%), easy fatigability (83.9%), and pallor (83.9%). Other significant findings included nasal or gum bleeding (51.6%), fever (48.4%), and anorexia (45.2%).

Conclusion: Acute Myeloid Leukemia represented a substantial clinical burden at SPHMMC, with a prevalence exceeding many previously reported regional estimates. The disease predominantly affects young to middle-aged adults and typically presents with advanced symptoms of bone marrow failure, highlighting potential delays in diagnosis and healthcare seeking. These results underscore the urgent necessity for strengthening early detection strategies and expanding specialized hematologic care facilities to improve patient management and outcomes in Ethiopia.

Keywords: Acute Myeloid Leukemia, Prevalence, Clinical Profiles, St. Paul's Hospital Millennium Medical College, Ethiopia.

1. Introduction

1.1 Background

Cancer is one of the major global health challenges, inflicting considerable pain and untimely mortality worldwide. In 2022, the International Agency for Research on Cancer estimated there were 20 million new cancer cases and 9.7 million cancer-related deaths globally (1). Although solid tumors such as cancer of the lungs, breasts, and colon attract significant attention, hematological malignancies, also represent a big portion of this burden. Among the hematologic malignancies, Acute myeloid leukemia (AML) is particularly aggressive and life-threatening, making it an important area of focus in hematology (2).

Acute Myeloid Leukemia (AML) is a hematological malignancy, characterized by the rapid and uncontrolled proliferation of immature myeloid cells within the bone marrow, peripheral blood, and other tissues (3). This clonal expansion of abnormal blast cells impedes the normal production of healthy blood cells, leading to a spectrum of clinical manifestations including anemia, thrombocytopenia, and variable white blood cell counts (3,4). AML is a heterogeneous disease, encompassing various subtypes with distinct genetic alterations and clinical behaviors, which are primarily classified by the World Health Organization (WHO) based on cytogenetic and molecular abnormalities, as well as morphology and immunophenotype (5,6).

The incidence and prevalence of Leukemias have shown a significant increase globally, as evidenced by recent epidemiological studies. The number of new leukemia cases worldwide had raised by about 46% between 1990 and 2017 and the global incidence of AML had nearly doubled between 1990 and 2025 (7,8). In 2017, AML had a significant proportion of all leukemia cases globally, constituting 23.1%, which reflects its increasing contribution to the overall rise in leukemia from 18.0% in 1990 (7,9). These trends show the importance of understanding and improving management strategies for AML.

The incidence of AML varies by age, showing a bimodal age distribution, with peaks in early childhood and later adulthood, and its prognosis generally worsens with increasing age (10,11). Men are more affected than women and survival rates differ substantially by region, with developed countries having a better prognosis due to early diagnosis and advanced treatment

options. However, developing regions face challenges of underdiagnosis and limited therapeutic resources, leading to poorer outcomes on average (12–14).

In Africa, and particularly Ethiopia, detailed epidemiological data on leukemia are limited, but cancer registries and hospital reports suggest a rising burden. The Addis Ababa Cancer Registry, one of the few cancer surveillance systems in the country, reports an increasing number of leukemia cases annually; however, specific data on AML prevalence and clinical profiles remain scarce (15). Among pediatric patients in Ethiopia, leukemia was the most prevalent cancer in 2015, constituting about 29% of all childhood cancers. Of these, acute leukemia subtypes made up 89%, with AML accounting for approximately 9% of childhood leukemia diagnoses (16).

The clinical presentation of AML is often acute and severe, reflecting the rapid onset of bone marrow failure. Patients commonly present with symptoms related to cytopenias, such as pallor and fatigue due to anemia, bleeding tendencies (e.g., easy bruising, petechiae) from thrombocytopenia, and recurrent infections resulting from neutropenia. Other non-specific symptoms may include fever, weight loss, and lethargy (4,9). Clinical features of patients at presentation carries significant prognostic implications. For instance, the initial white blood cell count, the presence of specific cytogenetic abnormalities, and the patient's age are all crucial indicators that guide treatment decisions and predict outcomes. Patients presenting with high blast counts, certain adverse genetic mutations, or significant organ involvement often face a more aggressive disease course and require more intensive therapeutic approaches (11,17).

The etiology of AML remains largely elusive for most cases, yet several risk factors have been identified. These include exposure to ionizing radiation, certain chemicals (e.g., benzene, formaldehyde), and prior chemotherapy or radiotherapy for other malignancies. Genetic predispositions and inherited syndromes also play a role in a subset of cases (4,9,10,12). At a molecular level, the development of AML is often preceded by the accumulation of somatic mutations in hematopoietic stem and progenitor cells, a phenomenon known as age-related clonal hematopoiesis, which increases the risk of developing AML, particularly in older individuals (11).

The cornerstone of diagnosis in AML is the bone marrow examination, including aspiration and biopsy. According to WHO criteria, a diagnosis of AML is established when there is a presence of at least 20% myeloid blasts in the bone marrow or peripheral blood. However, the presence of

specific recurrent genetic abnormalities, such as t(8;21)(q22;q22.1), inv(16)(p13.1q22), or t(15;17)(q22;q12), is sufficient for a diagnosis of AML regardless of the blast percentage (18).

The clinical course of AML is often marked by severe complications arising from both the disease itself and its treatment. The most immediate and life-threatening complications are related to cytopenias. Severe neutropenia leads to a high risk of infections, which can rapidly become systemic and life-threatening. Thrombocytopenia can cause spontaneous and severe bleeding, including intracranial hemorrhage. Anemia contributes to profound fatigue, weakness, and cardiopulmonary compromise. Another serious complication is leukostasis, which occurs in patients with very high blast counts, leading to sludging in the microvasculature and potentially causing respiratory distress and neurological symptoms (19). Tumor lysis syndrome, a metabolic emergency characterized by hyperuricemia, hyperkalemia, hyperphosphatemia, and hypocalcemia, can occur spontaneously or after the initiation of chemotherapy, leading to acute kidney injury and cardiac arrhythmias (4).

The management of AML is intensive and is typically divided into two main phases: induction and consolidation therapy. The goal of induction chemotherapy is to achieve a complete remission, defined as the restoration of normal hematopoiesis with less than 5% blasts in the bone marrow. Once complete remission is achieved, consolidation therapy is administered to eliminate residual leukemia cells and prevent relapse. Supportive care, including blood product transfusions, antimicrobial prophylaxis and treatment, and management of treatment-related toxicities, is a critical component of AML management throughout all phases of therapy (4,18).

1.2 Statement of the Problem

Despite advancements in the understanding and management of acute myeloid leukemia (AML) globally, significant challenges persist, particularly in resource-limited settings (7). The global incidence of AML has been rising, with projections indicating nearly a twofold increase between 1990 and 2025, underscoring its growing public health relevance (7,8). Although developed nations generally report higher age-standardized incidence rates—likely reflecting better diagnostic and reporting systems—the true burden in low- and middle-income countries is probably underestimated due to under-ascertainment and under-diagnosis (12,20). This gap in reliable data creates critical challenges for resource allocation and the design of effective

intervention strategies in regions where the disease burden may be substantial but poorly quantified.

In Africa, hematological malignancies, including AML, are emerging as a significant public health concern. A pooled prevalence of 27.3% has been reported, with leukemia comprising more than half of these cases (53.7%). Moreover, children exhibit a disproportionately higher burden, with a pooled prevalence of 60.9% compared to 17.0% in adults (21). Despite this, comprehensive data on AML epidemiology and treatment outcomes across African settings remain scarce. Limited localized evidence hampers the development of context-specific treatment protocols and supportive care strategies. This contributes to poor outcomes, reflected in high rates of early deaths (5–96%), treatment-related mortality (11.3–47.1%), and treatment abandonment (3–50%) in the region (14).

In Ethiopia, cancer is an increasing health challenge, with leukemia identified as the leading cancer diagnosis among children aged 0–14 years in 2015 (16). However, available evidence on AML remains fragmented and derived primarily from hospital-based studies with small sample sizes. For example, AML accounted for 5.3% of leukemic cases in Northwest Ethiopia, 2.6% of hematological malignancies in Northeast Ethiopia, and 3.6% of leukemia cases in Jimma Medical Center (22–24). While informative, these data do not provide a comprehensive national picture and may not reflect the situation in major referral centers such as St. Paul’s Hospital Millennium Medical College (SPHMMC).

Currently, there is a significant lack of evidence regarding the prevalence and clinical profiles of AML among patients admitted to SPHMMC, one of the country’s largest tertiary referral hospitals with a dedicated hematology service. This absence of localized data hinders clinicians and policymakers from developing targeted diagnostic algorithms, optimizing treatment approaches, and allocating resources effectively. Addressing this gap is essential for improving AML management and patient outcomes. Therefore, this study seeks to generate evidence on the prevalence and clinical characteristics of AML at SPHMMC, thereby contributing to evidence-based practices and institutional policy planning.

1.3 Justification of the Study

The scientific and public health importance of investigating the prevalence and clinical profiles of AML cannot be overstated, particularly in settings like Ethiopia where comprehensive data are scarce. Scientifically, this study will contribute to the global understanding of AML epidemiology by providing granular, localized data from a major tertiary care center in East Africa. While global and regional trends indicate a rising incidence of AML and highlight certain risk factors and clinical presentations (7,8,12), the specific nuances within diverse populations, especially in developing countries, remain underexplored. This research will offer valuable insights into how AML manifests and is influenced by local environmental, genetic, and socioeconomic factors, thereby enriching the broader scientific discourse on this complex malignancy.

From a public health perspective, this study is important for several reasons. The lack of specific data on AML at SPHMMC, as identified in the literature review, represents a significant blind spot in local healthcare planning and delivery. Understanding the true prevalence of AML within this institution will enable more accurate burden estimation, which is fundamental for effective resource allocation, including diagnostic facilities, treatment modalities, and specialized personnel. By delineating the clinical profiles of AML patients, the study will help clinicians at this institution to better anticipate disease progression, identify common presentations, and potentially improve diagnostic timeliness.

The anticipated uses of the study results include: they will inform the development of evidence-based clinical guidelines for AML management at St. Paul's Hospital, guide the allocation of healthcare resources, facilitate the design of targeted public health campaigns, and serve as baseline data for future, more extensive research on AML in Ethiopia. Ultimately, by shedding light on what is currently not known about AML at SPHMMC, this study aims to significantly enhance the capacity for diagnosis, treatment, and prevention of this disease, thereby improving patient outcomes and contributing to the overall health of the community.

2. Literature Review

2.1 Prevalence of AML

The global incidence of AML has shown a notable increase over the past few decades. Specifically, the global incidence of AML nearly doubled from 1990 to 2025 (8). In 2017, AML accounted for 23.1% of total leukemia cases globally, an increase from 18.0% in 1990 (7,9). The absolute number of global incidence cases surged from 79,372 to 144,645 between 1990 and 2021, while the age-standardized incidence rate (ASIR) of AML saw a slight decrease from 1.77 to 1.73 per 100,000 population. Its incidence consistently increases with age, with mortality exceeding 90% in patients diagnosed after 65 years. Developed nations generally exhibit higher ASIR of AML compared to developing nations (12). For instance, in the Western world, AML has an incidence of 3.7 per 100,000 persons and accounts for approximately 25% of all adult leukemias (10).

In Africa, hematological malignancies, including leukemia, are emerging as significant public health concerns. They accounted for 8.7% of incident cancer diagnoses and 9.9% of cancer deaths in 2016. In particular, reported rates for leukemia, which is the most common childhood cancer type in developed countries, were considerably lower in Sub-Saharan Africa. More recently, from 2015 to 2019, the incidence rate of leukemia in South Africa was 4.11 per 100,000 population, with Acute Myeloid Leukemia identified as the most common type of leukemia in the country. However, there is limited high-quality information on childhood cancer incidence patterns, particularly in Sub-Saharan Africa. This makes it challenging to ascertain whether observed differences reflect true incidence or are due to under-diagnosis and under-reporting (13,20,21).

A systematic review and meta-analysis of hematological malignancies in Africa reported a pooled prevalence of 27.30%. Among the different types, leukemia had the highest pooled prevalence (53.69%), followed by lymphoma (38.36%). Within leukemias, Acute Myeloid Leukemia showed a pooled prevalence of 19.74%, Chronic Myeloid Leukemia (CML) was 27.47%, Acute Lymphocytic Leukemia (ALL) was 23.52%, and Chronic Lymphocytic Leukemia (CLL) was 27.25%. Notably, children in Africa exhibit a significantly higher pooled prevalence of hematological malignancies (60.92%) compared to adults (17.02%) (21).

Similar to other low-income countries, the burden of noncommunicable diseases (NCDs) is increasing in Ethiopia. Cancer has become the second leading cause of death in the adult

population of Ethiopia. While overall cancer incidence is increasing, leukemia specifically is a significant concern. In 2015, leukemia was estimated to be the commonest cancer in the pediatric age group, accounting for 29% of all pediatric cancer cases, with acute leukemia representing 89% of these, and AML comprising 9% of all childhood leukemia cases (16).

Prevalence of AML in Ethiopia varies by region and population group. In a study from Jimma Medical Center (Southwest Ethiopia), the overall prevalence of leukemia among patients with abnormal hematological parameters was 9.3%. Of these, AML was the most frequent type, accounting for 38.7% of leukemia cases, followed by ALL (29.0%), CML (19.4%), and CLL (6.5%). In Northeast Ethiopia (Dessie town), the overall prevalence of hematological malignancies was 11.4%, with CML being the dominant type (3.5%) followed by AML (2.6%) which suggests regional variations in the dominant leukemia subtypes (23,24).

For pediatric AML specifically, a study in Gondar University Hospital (Northwest Ethiopia) found that hematological malignancy was the leading prevalence (60.6%) among childhood cancer cases. While this study did not disaggregate AML specifically, it noted a mean age of 7 ± 4 years, with a majority of study subjects (36.6%) being 10 years or older. Male predominance was observed, with 72.1% of hematological malignant cases being male. Overall, childhood cancer cases were increasing over the years in Gondar (25).

2.2 Clinical Profiles of AML

AML is characterized by its rapid progression, poor prognosis and with largely unclear etiology in most AML cases. It presents typically with two peaks: early childhood and later adulthood. While survival rates have seen improvement in younger age groups, the prognosis for older patients remains considerably poor (10). AML generally presents with higher prevalence in males and older individuals globally. For instance, a study encompassing patients from 2013-2023 in Southwest China noted an unbalanced distribution of age, sex, and season in AML patients (8). Age is a significant risk factor, with the incidence of AML increasing with age, and mortality rates exceeding 90% when diagnosed after 65 years. Most de novo AML cases arise without a detectable prodrome, presenting with acute complications of bone marrow failure (11). Common signs and symptoms of AML reported include pallor (79.3%), fever (63.4%), and lethargy/weakness

(53.8%). Additionally, prior exposure to therapeutic, occupational, or environmental DNA-damaging agents has been implicated in some patients (9).

In developing countries, AML presents a distinct profile. While smoking and high Body Mass Index (BMI) are more prevalent risk factors in developed countries, occupational exposure to substances such as benzene and formaldehyde emerges as a predominant risk factor in developing countries. This highlights the influence of industrialization and occupational safety standards on disease epidemiology in these regions. Data on clinical profiles in developing countries are often limited, but the unique risk factor suggests potential differences in disease presentation and progression compared to developed nations (12).

In the African context, reliable, high-quality information on childhood cancer incidence and descriptive patterns, particularly in Sub-Saharan Africa, has been limited. This scarcity of data leads to challenges in distinguishing between true incidence differences and under-diagnosis or under-reporting. For example, Symptoms of leukemia can resemble those of common infectious diseases like malaria and tuberculosis, leading to potential misdiagnosis or death before cancer is suspected. Clinical profiles from South Africa indicate a male-to-female ratio for leukemia of 1.1:1, and the mean age at diagnosis was reported as 38 years (13,20).

AML patients in Ethiopia reflect a diverse demographic and present specific challenges. In Northwest Ethiopia, the mean age of individuals diagnosed with hematological malignancies was 41.49 ± 16.3 years, with a broad age range from 1 to 92 years. A gender disparity was observed, with 58.3% of cases occurring in males. The majority of cases (52.2%) fell within the 18–45 age group, and a significant proportion (80%) were residents of urban areas (22). In another study at Jimma Medical Center, several factors were significantly associated with a diagnosis of acute myeloid leukemia, including older age, male gender, the presence of anemia, and rural residency. These findings suggest that both broad societal changes and specific healthcare access issues contribute to the burden and clinical course of AML in Ethiopia (24).

3. Objectives

3.1 General Objective

To assess the prevalence and clinical profiles of Acute Myeloid Leukemia among patients admitted to the hematology ward of St. Paul's Hospital Millennium Medical College (SPHMMC), Addis Ababa, Ethiopia in 2024–2025.

3.2 Specific Objectives

To determine the prevalence of Acute Myeloid Leukemia among patients admitted to the hematology ward of SPHMMC.

To describe the clinical profiles of Acute Myeloid Leukemia patients admitted to hematology ward of SPHMMC, including their socio-demographic characteristics and presenting clinical features.

4. Methods and Materials

4.1 Study Area and Period

The study was conducted at St. Paul's Hospital Millennium Medical College (SPHMMC), located in Gulele sub city, Addis Ababa, Ethiopia. SPHMMC is one of the largest referral and teaching hospitals in Ethiopia, established in 1968 through a visionary collaboration between Emperor Haile Selassie I and the German Evangelical Church. Initially serving as a general and referral hospital, it provided essential healthcare services to patients from all corners of Ethiopia. The College was officially established in 2008 and currently offers six undergraduate programs in medicine and nursing specialty, 15 residency tracks, 16 subspecialty fellowships, and 11 master's and Ph.D. programs, training nearly 2,000 students each year. The hospital boasts a workforce of over 2800 individuals involved in clinical, academic, and administrative roles. With an inpatient capacity exceeding 700 beds, the hospital attends to an average of 1200 emergency and outpatient cases daily. Internal medicine is one of the major clinical departments comprising of 6 wards and treating more than 100 admitted patients at a time. Among these is hematology ward, providing specialized care for patient admitted with a variety of hematologic malignancies.

The study was conducted from September 20 to December 21, 2025.

4.2 Study Design

A cross-sectional study was conducted using data from past one year in the study area.

4.3 Source and Study Population

4.3.1 Source Population

The source population had consisted of all patients who were admitted to the hematology ward of SPHMMC from January, 2024 to December 2025.

4.3.2 Study Population

The study population had included all patients admitted to the hematology ward of SPHMMC that fulfilled the eligibility Criteria.

4.4 Inclusion and Exclusion Criteria

Inclusion Criteria

- Patients admitted to the hematology ward of SPHMMC within the study period (Including transfers from other wards to the hematology ward).

Exclusion Criteria:

- Patients with age <15
- Patients transferred out before initial diagnostic work up completed

4.5 Sample Size Determination and Sampling Technique

4.5.1 Sample Size Determination

Given the retrospective nature of this study and the defined study period, the study had taken all patients diagnosed with AML and admitted to the hematology ward of SPHMMC during this period and who met the inclusion criteria. Therefore, a formal sample size calculation based on statistical formulas had not been applied here, as the intent was to include the entire accessible population of interest.

4.5.2 Sampling Technique

No sampling technique had been applied. All medical records of patients admitted to the hematology ward of SPHMMC within the study period, had been systematically reviewed. Patients who met the predefined inclusion criteria had been consecutively included in the study until all eligible cases within the study period have been identified and data extracted. Consequently, no randomization had been used and all patients that fulfilled the inclusion criteria were included in the study.

4.6 Study Variables

Dependent Variable:

- Presence of AML

Independent Variables:

- Sociodemographic Characteristics (Age at diagnosis, sex, residence (urban/rural))
- Presenting Symptoms (light headedness / blurring of Vision, easy fatigability, pallor, bleeding (e.g., epistaxis, gum bleeding, petechiae, ecchymosis), Fever, anorexia, weight loss, shortness of breath, hepatosplenomegaly, night sweating, submandibular lymphadenopathy, bone pain and others).

4.7 Operational Definition

AML – documented in the patient's medical record should be the diagnosis of AML with the presence of >20% myeloblasts on an aspirate smear and an immunophenotyping by flow cytometry to confirm the blasts are of myeloid lineage after bone marrow aspiration and biopsy.

4.8 Data Collection Tools and Procedures

4.8.1 Data Collection Tools

A record review checklist had been prepared in English language to ensure consistency and accuracy in data collection. The form had been designed to capture all relevant information pertaining to the study objectives (demographic characteristics and clinical presentations of the patients) and had been included in the annex section of this research thesis. Data had been collected retrospectively from the medical records of patients admitted to the hematology ward of SPHMMC. The list of patients admitted to the ward had been obtained from the Healthcare Management Information System (HMIS) and the records were reviewed from the Electronic Medical Record (EMR) of SPHMMC.

4.8.2 Data Collection Procedures

Training of Data Collectors – data collectors from clinical year medical students were recruited and had undergone training on the study objectives, data abstraction form, definitions of variables, and ethical considerations, particularly regarding patient confidentiality and data privacy. A pilot test of the data abstraction form had been conducted on a small sample of medical records to identify and address any ambiguities or challenges before the main data collection commenced.

Medical Record Review – data collectors had systematically reviewed the medical records of all patients admitted to the hematology ward during the specified study period. Each eligible patient's

chart had been accessed from the EMR, and relevant information had been transcribed onto the data abstraction form.

Data Verification – to ensure data quality, a supervisor had routinely checked a proportion of the completed data abstraction forms against the original medical records for accuracy and completeness. Any discrepancies had been immediately addressed and corrected.

4.9 Data Quality Assurance

To ensure the reliability and validity of the collected data, several measures had been implemented:

1. Standardized Data Abstraction Form – the use of a pre-tested and standardized data abstraction form had minimized errors and ensured consistency in data collection. A pre-test was done on 5% of the total sample size.
2. Training of Data Collectors – data collectors had received a thorough training on the study objectives, data abstraction form, definitions of variables, ethical considerations, and data collection procedures to enhance their understanding and reduce variability.
3. Supervision – close supervision had been maintained throughout the data collection period. A supervisor had been regularly reviewing completed forms for adherence to established protocols, identified any discrepancies and inconsistencies and had been checking for completeness, accuracy, and legibility of the collected data.
4. Data Cleaning and validation – before analysis, the collected data had undergone a thorough cleaning to check for inconsistencies, outliers, and missing values.

4.10 Data Processing and Analysis

After completion of data collection, all collected data had been entered into Statistical Package for Social Sciences (SPSS) version 27. Descriptive statistics had been used to summarize the demographic characteristics, clinical profiles, and prevalence of AML. Frequencies and percentages had been used for categorical variables, while means with standard deviations or medians had been used for continuous variables, as appropriate. Findings were interpreted in relation to the research objectives, theoretical framework, and existing literature. The results were presented with charts, tables and figures.

4.11 Ethical Consideration

Approval from SPHMMC school of public health and academic & research vice provost and Institutional review board had been received for this study prior to enrollment. A formal letter was submitted to the medical service vice provost requesting the conduction of this research at the hematology wards of the hospital. Since this was a retrospective study utilizing existing medical records, individual patient consent had been waived, as direct patient contact was not required and the study posed minimal risk to patients. However, strict measures had been implemented to safeguard the confidentiality and privacy of patient data throughout the research process. All patient identifiers had been removed from the data collection forms and replaced with unique study codes. Access to medical records had been limited to the research team members directly involved in data collection. The collected data was stored securely in password-protected electronic files and is only be accessible to authorized research team members. The findings of this study have been reported in an aggregated format, ensuring that no individual patient can be identified.

4.12 Dissemination of Results

The findings of this study will be submitted to SPHMMC faculty of Public Health and Internal Medicine department in partial fulfillment of the requirement for the Medical Degree from school of medicine.

5. Results

5.1. Socio-demographic Characteristics

A total of 88 patient medical records were identified for the study, of which 82 were complete, yielding a response rate of 93.2%. Among these, the majority of the patients were in the 20-49 years age group, accounting for 50 (60.9%) patients with a mean age of 38.02 years (SD±16.65). There was a slight female predominance, accounting for 43 (52.4%) of cases, while males accounted for 39 (47.6%). With respect to residence, patients coming from rural areas had a slightly representation, accounting for 45 (54.9%) patients, whereas 37 (45.1%) were from urban settings.

Among the identified study cases (n = 31), 18 patients (58.1%) were female and 13 (41.9%) were male, resulting in a male-to-female ratio of approximately 1:1.4. The patients' ages ranged from 16 to 68 years, with a mean age at diagnosis of 37.39 years (SD ±15.83).

Regarding place of residence, 18 patients (58.1%) were from rural areas, while 13 (41.9%) were from urban areas, indicating that the majority of cases originated from rural settings.

Table 1: Sociodemographic characteristics of study participants admitted to the Hematology ward of SPHMMC, Addis Ababa, Ethiopia, January 2024 – December 2025.

All patients admitted to the Hematology ward				AML patients admitted to the Hematology ward			
		Frequency	Percent			Frequency	Percent
Age group	<20	9	10.9%		<20	2	6.4%
	20-49	50	60.9%		20-49	20	64.5%
	>49	23	28.2%		>49	9	29.1%
	Mean ± SD	38.02 years ± 16.65				Mean ± SD	37.39 years ± 15.83
Sex	Male	39	47.6%		Male	13	41.9%
	Female	43	52.4%		Female	18	58.1%
Residency	Urban	37	45.1%		Urban	25	10.0%
	Rural	45	54.9%		Rural	3	1.2%

5.2 Prevalence

A total of 82 patients were admitted to the hematology ward of St. Paul's Hospital Millennium Medical College between January 2024 and December 2025. Among these admissions, 31 patients had a confirmed diagnosis of acute myeloid leukemia (AML). This corresponds to an overall prevalence of AML of 37.8% (31 out of 82 admissions) during the study period.

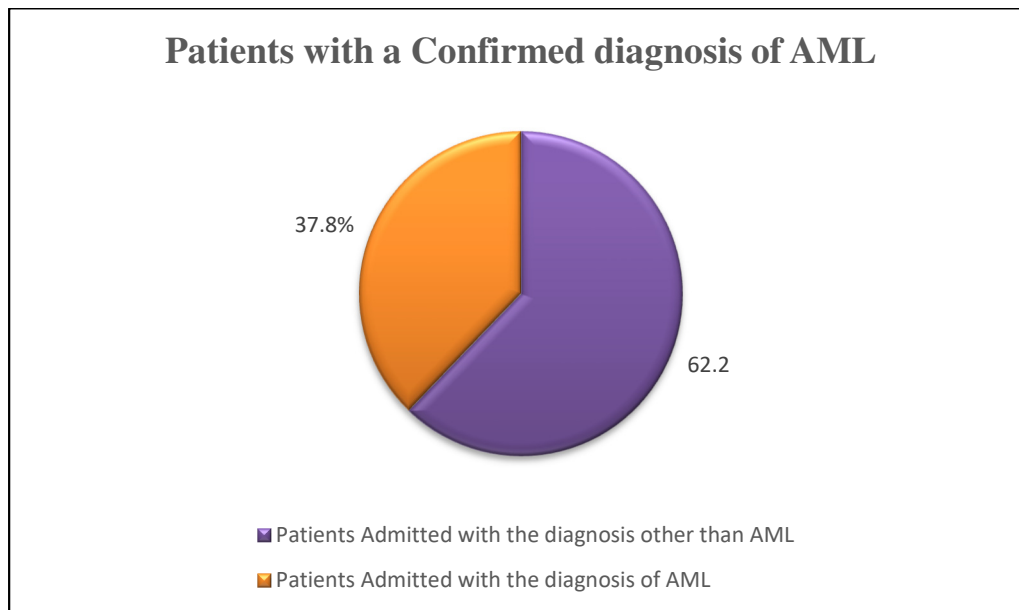


Figure 1: Prevalence of AML patients admitted to the Hematology ward of SPHMMC, Addis Ababa, Ethiopia, January 2024 – December 2025

5.3 Clinical Features of Patients with AML

Among patients admitted with a diagnosis of Acute Myeloid Leukemia, the predominant clinical manifestations were symptoms attributable to anemia. The majority of patients presented with light-headedness and blurring of vision, reported in 90.3% (28) of cases. Easy fatigability and pallor were also highly prevalent; each observed in 83.9% (26) of patients.

Bleeding manifestations constituted the next most common group of symptoms, with nasal or gum bleeding reported in 51.6% (16) of patients. Constitutional and systemic symptoms were also frequent, including fever in 45.2% (16), anorexia in 45.2% (14), and weight loss in 35.5% (11) of cases.

Other less common clinical features included shortness of breath (35.5%, 11), hepatosplenomegaly (22.6%, 7), night sweating (19.4%, 6), and submandibular lymphadenopathy (19.4%, 6). A small proportion of patients presented with additional symptoms such as palpitations, abnormal menstrual bleeding, abdominal pain, headache, bone pain, cough, and vomiting, with prevalence ranging from 3.2% to 12.9%.

Overall, the findings indicate that anemia-related symptoms were the most prominent clinical presentations among patients with AML, followed by bleeding tendencies and constitutional features.

Table 2: Clinical characteristics of study participants admitted to the Hematology ward of SPHMMC, Addis Ababa, Ethiopia, January 2024 – December 2025.

Clinical Features	Frequency (Percent)
Light headedness/ Blurring of Vision	90.3% (28)
Easy Fatigability	83.9% (26)
Pallor	83.9% (26)
Nasal or Gum Bleeding	51.6% (16)
Fever	48.4% (15)
Anorexia	45.2% (14)
Weight loss	35.5% (11)
Shortness of Breath	26.7% (8)
Hepatosplenomegaly	22.6% (7)
Night Sweating	19.4% (6)
Submandibular Lymphadenopathy	19.4% (6)
Bone Pain	3.2% (1)
Other Clinical Features (Palpitations, Headache, Abdominal pain, Abnormal menstrual bleeding, Cough, Vomiting)	(3.2 - 12.9) % (1 - 4)

6. Discussion

This study was conducted to explore the prevalence and clinical profiles of AML among patients admitted to the hematology ward of SPHMMC during the past 2 years. As a result, it was found that AML had accounted for 37.8% of all admissions to the ward making it a significant burden. This finding was higher than both global and regional with AML accounting 23.1% globally (7,9). The regional reports had also lower reports such as the 4.2% found in Northwest Ethiopia or the 2.6% reported in Northeast Ethiopia (22,23). In contrast with this study, a systematic review and meta-analysis study done in Africa reported a higher result with a prevalence of 19.74% (21). However, it aligns more closely with the findings from Jimma Medical Center with the proportion of AML cases being 38.7% (24). The high prevalence of AML at SPHMMC compared to others might likely be due to the institution's status as a major tertiary referral center for the country where a significant number of hematological disorders are directed from across the country.

The demographic profile of patients in this study showed a slight female predominance (58.1%), with a male-to-female ratio of 1:1.4. This contrasts with studies done globally like the study done in Nepal which had a male predominance with 71.7% of the patients and also in a study done in China which slight predominance of male patients consisting of 53.75% of the patients admitted (8,9). Local studies are also in line with the global trend contrasting with this study like the study done in Northwest Ethiopia, which reported a male predominance of 58.3% (22). The mean age at diagnosis in this study was 37.39 years, which was aligns with a similar study from South Africa reporting a mean age of 37.64 and the mean age of 41.49 years found in Northwest Ethiopia (13,20,22). Around two-thirds of the AML patients (64.5%) belonged to the 20–49 age group whereas only 6.4% were less than 20 years old and 29.1% were greater than 49 years old which were quite similar to a study done at a tertiary care center in Nepal (9). A majority of patients in this study came from rural areas (58.1%), which might suggest environmental exposures or different healthcare-seeking behaviors compared to patients from the urbanized areas, in which a similar finding was also noted in a study from Jimma Medical center (24).

When it comes to the initial clinical presentations of patients, the findings of this study paint a picture of severe bone marrow failure. Signs of anemia were almost universal, with lightheadedness or blurring of vision affecting 90.3% of patients, and easy fatigability and pallor

seen in 83.9% of patients. These rates are even higher than the 79.3% pallor and 53.8% weakness or easy fatigability rate reported in a literature from a tertiary care center in Kathmandu (9). Bleeding manifestations, specifically nasal or gum bleeding, were present in 51.6% of our patients, while fever was noted in 48.4% in which both findings were in contrast with other studies where there were 63.4% patients presenting with fever and 23.4% of patients presenting with bleeding (9). These symptoms are typical of AML and reflect the rapid displacement of normal blood cells by leukemic blasts (3,4). The high frequency of these severe symptoms at the time of admission suggests that many patients are reaching to an appropriate care at an advanced stage of the disease. This is a common problem in low-resource settings like ours where delayed diagnosis and limited awareness often result in patients seeking care only when signs, symptoms and complications of the disease prevent the patients from their routine day to day life or sometimes even after they became life-threatening (12,14).

7. Strengths and Limitations

The strengths to this study include:

- To the best of our knowledge, there was no study conducted at SPHMMC addressing this issue.
- A standardized data abstraction check list was used to ensure the information collected was consistent across all patient records.

The limitations of this study include

- It was a retrospective hospital-based study with small sample size which has inherent sampling bias that makes it difficult to generalize the findings to larger populations.
- Secondary data from charts were used which has incomplete recording, missed medical charts and might have inaccurate data registrations. In addition, some important variables and demographic data couldn't be included due to unavailability of the information from the charts.

8. Conclusion

The findings of this study indicate a higher prevalence of Acute Myeloid Leukemia (AML) compared to global and regional reports, while demonstrating a pattern similar to local data, underscoring AML as a significant public health concern in the study setting. A slight predominance was observed among female patients, and a greater proportion of cases originated from rural areas.

Clinically, most patients presented with features consistent with bone marrow failure. The predominant manifestations were anemia-related symptoms, including lightheadedness, blurring of vision, easy fatigability, and pallor. These were followed by bleeding tendencies, particularly nasal or gum bleeding, and constitutional symptoms such as fever, anorexia, and weight loss.

The high prevalence of cases and the severity of symptoms at the time of presentation suggest an aggressive disease course and potentially delayed diagnosis. These findings highlight the urgent need to strengthen early detection strategies and expand access to specialized hematologic care to improve patient outcomes.

9. Recommendations

For Physicians: There should be a high index of suspicion for AML among physicians in patients presenting with unexplained anemia, fever or bleeding and early referral to a specialized facility from primary health care providers should be the norm.

Ministry of Health: Focus should be given by the Ministry of Health and other policy makers to strengthening diagnostic capabilities of health care institutions to allow for more precise disease classification and to support better targeted treatment approaches. To reduce diagnostic delays, Ministry of Health, Ethiopian Public Health Institute and Other national professional medical associations should implement using public health campaigns to increase awareness of hematologic disorders to the public.

Training Institutions: Medical schools and other professional healthcare training institutions should strengthen the competence of primary healthcare providers to improve early recognition, intervention and management of the disease.

Researchers: Further large-scale studies should be conducted by the Ethiopian Public Health Institute, Universities and research institutions to better understand the true extent of disease burden. Prospective studies following patients from diagnosis through the course of treatment would provide better insights into survival rates and the effectiveness of current protocols of therapy.

10. References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA Cancer J Clin*. 2021 May;71(3):209–49. doi:10.3322/CAAC.21660, PubMed PMID: 33538338.
2. Joseph Loscalzo, Anthony Fauci, Dennis Kasper, Stephen Hauser, Dan Longo, J. Larry Jameson. *Harrisons_Principles_of_Internal_Medicine_Loscalzo,_J_,_Fauci,_A* [Internet]. 21, editor. McGraw-Hill Education; 2022 [cited 2025 Aug 7]. Available from: accesspharmacy.mhmedical.com/content.aspx?aid=1197729784
3. William Blum, Clara D. Bloomfield. Harrison's Chapter 100 Acute Myeloid Leukemia 192017732citation. In: *Harrison's Principles of Internal Medicine*, 20e [Internet]. 20th ed. New York, NY: McGraw-Hill Education; 2018 [cited 2025 Aug 1]. Available from: accessmedicine.mhmedical.com/content.aspx?aid=1160012675
4. Smith CC. American Society of Hematology Self-Assessment Program (Adam Cuker, Jessica K. Altman, Aaron T. Gerds etc.) (Z-Library). Ninth Edition. Stein BL, Patel AA, Powers JM, Smith CC, editors. American Society of Hematology; 2025.
5. Shimony S, Stahl M, Stone RM. Acute Myeloid Leukemia: 2025 Update on Diagnosis, Risk-Stratification, and Management. *Am J Hematol*. 2025 May 1;100(5):860–91. doi:10.1002/ajh.27625 PubMed PMID: 39936576.
6. Jaeschke Roman, Gajewski Piotr, O'Byrne PM. McMaster textbook of internal medicine 2019/20 [Internet]. *Medycyna Praktyczna*; 2019 [cited 2025 Aug 4]. 552 p. Available from: <https://empendium.com/mcmtextbook/chapter/B31.II.15.2>
7. Dong Y, Shi O, Zeng Q, Lu X, Wang W, Li Y, et al. Leukemia incidence trends at the global, regional, and national level between 1990 and 2017. *Exp*

- Hematol Oncol. 2020 Jun 19;9(1). doi:10.1186/s40164-020-00170-6 PubMed PMID: 32577323.
8. Wan X, Tao T, Zhang J, Li N, Gou Y, Yang W, et al. Effect of Age, Sex and Season on Acute Myeloid Leukemia Clinical Characteristics: A Retrospective Study. *Journal of Inflammation Research* . 2025;18:2363–75. doi:10.2147/JIR.S495615
 9. Chaurasiya PS, Lamsal DK, Khatri A, Parajuli A, Shrestha PR, Aryal L, et al. Prevalence of acute myeloid leukemia and its associated risk factors at a tertiary care center: a retrospective cross-sectional study. *Annals of Medicine & Surgery*. 2023 Oct;85(10):4794–8. doi:10.1097/ms9.0000000000001189
 10. Deschler B, Lübbert M. Acute myeloid leukemia: Epidemiology and etiology. *Cancer*. 2006. p. 2099–107. doi:10.1002/cncr.22233 PubMed PMID: 17019734.
 11. Abelson S, Collord G, Ng SWK, Weissbrod O, Mendelson Cohen N, Niemeyer E, et al. Prediction of acute myeloid leukaemia risk in healthy individuals. *Nature*. 2018 Jul 19;559(7714):400–4. doi:10.1038/s41586-018-0317-6 PubMed PMID: 29988082.
 12. Zhou Y, Huang G, Cai X, Liu Y, Qian B, Li D. Global, regional, and national burden of acute myeloid leukemia, 1990–2021: a systematic analysis for the global burden of disease study 2021. *Biomark Res*. 2024 Dec 1;12(1). doi:10.1186/s40364-024-00649-y
 13. Woudberg R, Meiring SM, Sinanovic E. Leukemia epidemiology and burden of disease in South Africa: 2015–2019. *Cancer Epidemiol*. 2025 Aug 1;97. doi:10.1016/j.canep.2025.102818 PubMed PMID: 40262221.
 14. Nyeko R, Kruger M, Niyonzima N, Stijn V, van Heerden J. Paediatric acute myeloid leukaemia epidemiology, treatment approaches, and outcomes in africa: A review of the literature. *BMC Cancer*. BioMed Central Ltd; 2025. doi:10.1186/s12885-025-14552-8

15. Assefa M. Profile of Cancer in Addis Ababa: From the only Population Based Cancer Registry in Ethiopia (2012-2021). *The Ethiopian Journal of Health Development* . 2023 Dec 30;37(4):1–8. doi:10.20372/EJHD.V37I4.6022
16. Memirie ST, Habtemariam MK, Asefa M, Deressa BT, Abayneh G, Tsegaye B, et al. Estimates of cancer incidence in Ethiopia in 2015 using population-based registry data. *J Glob Oncol*. 2018 Mar 1;2018(4):1–11. doi:10.1200/JGO.17.00175 PubMed PMID: 30241262.
17. Döhner H, Wei AH, Appelbaum FR, Craddock C, DiNardo CD, Dombret H, et al. Diagnosis and management of AML in adults: 2022 recommendations from an international expert panel on behalf of the ELN. *Blood*. 2022 Sep 22;140(12):1345–77. doi:10.1182/BLOOD.2022016867 PubMed PMID: 35797463.
18. Döhner H, Wei AH, Appelbaum FR, Craddock C, DiNardo CD, Dombret H, et al. Diagnosis and management of AML in adults: 2022 recommendations from an international expert panel on behalf of the ELN. *Blood*. 2022 Sep 22;140(12):1345–77. doi:10.1182/blood.2022016867
19. NHS [Internet]. [cited 2025 Aug 1]. Acute Myeloid Leukemia - Complications. Available from: <https://www.nhs.uk/conditions/acute-myeloid-leukaemia/complications/>
20. Erdmann F, Kielkowski D, Schonfeld SJ, Kellett P, Stanulla M, Dickens C, et al. Childhood cancer incidence patterns by race, sex and age for 2000-2006: A report from the South African National Cancer Registry. *Int J Cancer*. 2015 Jun 1;136(11):2628–39. doi:10.1002/ijc.29308 PubMed PMID: 25363616.
21. Mulatie Z, Berta DM, Gedefie A, Ebrahim H, Eshetu B, Gessese T, et al. Prevalence of hematological malignancies in Africa: A systematic review and meta-analysis. *Sci Rep*. 2025 Dec 1;15(1). doi:10.1038/s41598-025-94428-w PubMed PMID: 40108287.
22. Enawgaw B, Aynalem M, Melku M, Asrie F, Abebe M, Yalew A, et al. Hematological malignancies in the Northwest Ethiopia. *PLoS One*. 2021 Dec 1;16(12 December). doi:10.1371/journal.pone.0260639 PubMed PMID: 34852010.

23. Ebrahim H, Fisha T, Debash H, Bisetegn H. Patterns of Bone Marrow Confirmed Malignant and Non-Malignant Hematological Disorders in Patients with Abnormal Hematological Parameters in Northeast Ethiopia. *J Blood Med.* 2022;13:51–60. doi:10.2147/JBM.S346091
24. Kassahun W, Tesfaye G, Bimerew LG, Fufa D, Adissu W, Yemane T. Prevalence of Leukemia and Associated Factors among Patients with Abnormal Hematological Parameters in Jimma Medical Center, Southwest Ethiopia: A Cross-Sectional Study. *Adv Hematol.* 2020;2020. doi:10.1155/2020/2014152
25. Yifru S, Muluye D. Childhood cancer in Gondar University Hospital, Northwest Ethiopia. *BMC Res Notes.* 2015 Sep 24;8(1). doi:10.1186/s13104-015-1440-1 PubMed PMID: 26404043.

11. Annexes

Annex 1: Data Collection Check lists for a Study on the Prevalence and Clinical Profiles of AML Among Patients Admitted to The Hematology Ward SPHMMC, 2025.

Section 1: Demographics

Variable	Type / Format
Patient Study ID	_____
Age	_____
Sex	1. Male 2. Female
Residence	1. Urban 3. Rural

Section 2: Inclusion Criteria

Variable	Type / Format
Date of Admission	_____
Confirmed Diagnosis of AML	1. Yes 2. No)

Section 3: Clinical Features

Presenting Signs / Symptoms	Type / Format
Pallor	Categorical (Yes / No / Not Documented)
Fever	Categorical (Yes / No / Not Documented)
Easy fatigability	Categorical (Yes / No / Not Documented)
Light headedness/ Blurring of Vision	Categorical (Yes / No / Not Documented)
Nasal or Gum bleeding	Categorical (Yes / No / Not Documented)
Hepatosplenomegaly	Categorical (Yes / No / Not Documented)
Anorexia	Categorical (Yes / No / Not Documented)
Weight loss	Categorical (Yes / No / Not Documented)
Night sweating	Categorical (Yes / No / Not Documented)
Shortness of Breath	Categorical (Yes / No / Not Documented)
Bone Pain	Categorical (Yes / No / Not Documented)
Submandibular Lymphadenopathy	Categorical (Yes / No / Not Documented)
Others (Specify)	Text

Annex 2: Research approval letter from the institutional review board of SPHMMC

St. Paul's Hospital Millennium Medical College Research Directorate		ቅዱስ ጳውሎስ ሆስፒታል ሚሊንየም ሜዲካል ኮሌጅ የጥናትና ምርምር ዳይሬክቶሬት
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IRERC approval letter
Protocol number: - SPHMMC-ERC-398/25

Ref.No PM23/266
Date: 17/10/2025

Protocol Title: Prevalence and clinical profiles of acute Myeloid leukemia among patients Admitted to the Hematology Ward of St Paul's Hospital Millennium Medical College in 2024-2025

Investigators: Dr. Desalegn Wondmu

Study Site: - St Paul's Hospital Millennium Medical College.

Application Type: Initial ☒ Amendment ☐ Renewal ☐

Review Procedure: Full Board ☐ Expedited ☐ Secretariat ☒

Decision of the meeting: ☒ Approved

I. Elements approved- 1. Protocol Version No V-1
2. Protocol Version Date 10/10/2025
3. Informed consent Version No. V-1
4. Informed Consent Version Date 10/10/2025
5. CRF Version No _____
6. CRF version Date _____

II. Obligations of the PI-

1. Should comply with the standard international & national scientific and ethical guidelines
2. All amendments and changes made in protocol and consent form needs IRERC approval
3. The PI should report SAE within 10 days of the event
4. End of the study, including manuscripts and thesis works should be reported to the IRERC

IRERC Approval date: 14/10/2025
Approval period from 14/10/2025 to 13/10/2026

☐ NRER (if the protocol should go to National ERC)

Follow up report expected in

3 Months _____ 6 Months _____ 1 year ☒

Signature _____
Prof Delayenu Bekelo
IRERC Chair



Dr. Yordanos Shiferaw

14/10/2025
IRERC Secretary

Cc:

- Research and Community Service Corporate Director
- IRERC

- Dr. Desalegn Wondmu

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12. Assurance Of Investigator

Declaration

I, the undersigned student, declare that this research project is my original work in partial fulfillment of the requirement for the **Degree of Doctor in Medicine, MD**. I also declare that it has never been presented in this or any other higher institution and that all resources and materials used in the research work have been duly acknowledged.

Name of the student:

Desalegn Woldeamu

Signature:

[Signature]

Date:

18/07/2018

Approval of Advisors

This research work has been submitted for examination with my approval.

Name of School of Public health advisor 1:

Samson Zegeye

Signature:

[Signature]

Date:

17/2/18

Name of Clinical advisor 2:

Dr. Eyos'el Lamma

Signature:

[Signature]

Date:

18/07/18