MEKELLE UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF NURSING

DEPARTMENT OF PSYCHIATRY

PREVALENCE AND FACTORS OF SUICIDAL IDEATION IN ADULTS WITH EPILEPSY ATTENDING NEUROLOGY CLINICS IN AYDER COMPREHENSIVE SPECIALIZED HOSPITAL AND MEKELLE GENERAL HOSPITAL, MEKELLE, TIGRAY, ETHIOPIA, 2024.

PRINCIPAL INVESTIGATOR: BERIHU GEREZGIHER

A THESIS SUBMITTED TO THE DEPARTMENT OF PSYCHIATRY, SCHOOL OF NURSING, COLLEGE OF HEALTH SCIENCES, MEKELLE UNIVERSITY FOR THE PARTIAL FULFILLMENT OF THE DEGREE OF MASTER SCIENCE IN INTEGRATED CLINICAL AND COMMUNITY MENTAL HEALTH.

MAIN ADVISOR: MR. HAGOS TSEGABRHAN (ASST.PROF.)

CO ADVISOR: DR ASHENAFI DAMTE (ASSOC. PROF)

JANUARY, 2025

MEKELLE, TIGRAY, ETHIOPIA

MEKELLE UNIVERSITY COLLEGE OF HEALTH SCIENCE

DEPARTMENT OF PSYCHIATRY

NAME OF PRINCIPAL INVESTIGATOR	BERIHU GEREZGIHER
NAME OF ADVISORS	MAIN ADVISOR: MR. HAGOS TSEGABRHAN (ASST.PROF.) CO ADVISOR: DR ASHENAFI DAMTE (ASSOC. PROF)
FULL TITLE OF THE RESEARCH PROJECT	PREVALENCE AND FACTORS OF SUICIDAL IDEATION IN ADULTS WITH EPILEPSY ATTENDING NEUROLOGY CLINICS IN AYDER COMPREHENSIVE SPECIALIZED HOSPITAL AND MEKELLE GENERAL HOSPITAL, MEKELLE, TIGRAY, ETHIOPIA, 2024.
DURATION OF THE RESEARCH	APRIL TO JUNUARY, 2024
STUDY AREA	AYDER COMPREHENSIVE SPECIALIZED HOSPITAL AND MEKELLE GENERAL HOSPITAL, MEKELLE, TIGRAY, ETHIOPIA, 2024
TOTAL COST OF THE PROJECT	25,000.00 ETB
ADDRESS OF THE INVESTIGATOR	cell.ph.no: 0986 28 55 40 e-mail:berihuger132@gmail.com

Advisor's approval sheet

This is to certify that the thesis entitled "PREVALENCE AND FACTORS OF SUICIDAL IDEATION IN ADULTS WITH EPILEPSY ATTENDING NEUROLOGY CLINICS IN AYDER COMPREHENSIVE SPECIALIZED HOSPITAL AND MEKELLE GENERAL HOSPITAL, MEKELLE, TIGRAY, ETHIOPIA, 2024" has been submitted to the Department of Psychiatry, College of Health Sciences, Mekelle University. The student has fulfilled the research thesis requirements for the degree of Master of Integrated Clinical and Community Mental Health and is therefore eligible to submit the thesis to the Department of Psychiatry.

Mr. Hagos Tsegabrhan (Asst. prof)	_____	_____
Name the main advisor	Signature	Date
Dr. Ashenafi Damte (Assoc. prof)	_____	_____
Name of co-advisor	Signature	Date

Assurance of Principal Investigator

I, the undersigned, agree to accept full responsibility for the scientific and ethical conduct of the research project and for providing required progress reports as per the terms and conditions of the department. Timely progress reports have been submitted to my advisors, and I have sought the necessary advice and approval from my main advisor throughout the course of the research.

Name of the MSc Student: Berihu Gerezgiher

Signature: _____

Date: _____

Approval of the Main Advisor

Name of the Main Advisor: **Mr. Hagos Tsegabrhan (Asst. Prof)**

Signature: _____

Date: _____

Approval of the Graduate Program Coordinator

Name of the Coordinator: **Mr. Yohannes T (Asst. Prof.)**

Signature: _____

Date: _____

Examiners' Approval Sheet

We, the undersigned members of the Board of Examiners for the final open thesis defense of Berihu Gerezgiher Gebresamiel, have read and evaluated his thesis titled "PREVALENCE AND FACTORS OF SUICIDAL IDEATION IN ADULTS WITH EPILEPSY ATTENDING NEUROLOGY CLINICS IN AYDER COMPREHENSIVE SPECIALIZED HOSPITAL AND MEKELLE GENERAL HOSPITAL, MEKELLE, TIGRAY, ETHIOPIA, 2024: A Cross-Sectional Study."

Based on our evaluation, we hereby certify that the thesis has been accepted in partial fulfillment of the requirements for the Master's Degree in Integrated Clinical and Community Mental Health.

Mr. Yohannes T (Asst. prof) _____ _____

Name of internal examiner Signature Date

Mr. Kiday K (Asst. prof) _____ _____

Name of Examiner Signature Date

Final approval and acceptance of the thesis are contingent upon the submission of the final copy to the candidate's department through the office of the Department Graduate Program Coordinator.

Thesis Approved by

Mr. Yohannes T (Asst. prof) _____ _____

Graduate Program Coordinator Signature Date

ACKNOWLEDGMENTS

I am deeply grateful to Mekelle University, College of Health Sciences, School of Nursing, and Department of Psychiatry for giving me this opportunity to conduct this thesis research. I extended my deepest appreciation to my advisor Mr. Hagos Tsegabrhan (Ass't Prof) and my co-advisor Dr. Ashenafi Damte (Assoc. Prof) for their effort to guide me.

I also acknowledge the invaluable contributions of the data collectors and all others involved in this research for their dedication and hard work. I am grateful to Adigrat University College of Medicine and Health Sciences for sponsoring me to conduct this research.

TABLE OF CONTENTS

List of Figures

List of tables

.

ABBREVIATION AND ACRONYMS

ACSH	Ayder Comprehensive Specialized Hospital
CDC	Center for Disease Control and Prevention
CI	Confidence Interval
CIDI	Composite International diagnostic interview
DSM	Diagnostic and Statistical Manual of Mental Disorders
HADS	Hospital Anxiety and Depression Scale
ETB	Ethiopian Birr
MGH	Mekelle General Hospital
MMAS	Morisky Medication-Taking Adherence Scale
MUCHS	Mekelle University College of Health Science
OSS	Oslo Social Support Scale
OPD	Outpatient Department
PWE	People with Epilepsy
SPSS	Statistics Packages for Social Science
US	United States
WHO	World Health Organization
WMHS	World Mental Health Survey

Abstract

Background: Suicidal ideation is a major concern for adults with epilepsy, who are more vulnerable to mental health disorders like depression and anxiety. While research on this issue exists globally, there is a significant lack of data from Ethiopia, particularly from Mekelle and Tigray. This gap in local research highlights the need for studies in these regions to inform targeted interventions and address the unique factors contributing to suicidal ideation in this population.

Objective: This study aimed to assess the prevalence and factors of suicidal ideation in adults with epilepsy attending neurology clinics at Ayder Comprehensive Specialized Hospital and Mekelle General Hospital, Mekelle, Tigray, Ethiopia, in 2024.

Methods: This study employed a cross-sectional design at Ayder Comprehensive Specialized Hospital and Mekelle General Hospital from April to January 2024. A sample of 325 adults with epilepsy was selected. Data were collected through in-person interviews. SPSS version 27 was used for data analysis, with logistic regression identifying factors related to suicidal ideation. A p-value of less than 0.05 was considered significant, and results were reported with adjusted odds ratios and 95% confidence intervals.

Results: The study revealed that 29.5% of adults with epilepsy experienced suicidal ideation (95% CI: 24.3%–34.4%). Key factors significantly associated with suicidal thoughts included being single (AOR 3.8, 95% CI: 1.26–11.47), the use of multiple antiepileptic medications (AOR 4.5, 95% CI: 1.83–11.09), inadequate social support (AOR 4.9, 95% CI: 1.47–16.29), depression (AOR 5.6, 95% CI: 2.54–12.13), anxiety (AOR 2.96, 95% CI: 1.4–6.27), a family history of mental (AOR = 4.3, 95% CI: 1.40 to 13.09), and chronic medical conditions (AOR 6.8, 95% CI: 1.63–28.63). All these factors were found to be statistically significant ($p < 0.05$) and strongly correlated with an increased risk of suicidal ideation.

Conclusion: The study revealed that 29.5% of adults with epilepsy experience suicidal thoughts. Key risk factors include being unmarried, taking several antiepileptic drugs, limited social support, depression, anxiety, history of mental illness in the family, and chronic medical issues. These findings emphasize the need for specialized mental health interventions for this group in the region.

Keywords: *Suicidal ideation, epilepsy, mental health, depression, anxiety, antiepileptic drugs, social support, Tigray, Ethiopia*

1. Introduction

1.1 Background

Suicidal ideation, as outlined in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), refers to thoughts of self-harm that involve intentional consideration or planning of methods to end one's life. This process is complex, typically unfolding over time, with individuals contemplating self-harm for varying lengths of time, ranging from days to years, before taking any action. The seriousness of suicidal ideation is often determined by the level of detail in the plans and the strength of the individual's intent (1,2).

Epilepsy is a chronic neurological condition marked by recurrent, unprovoked seizures caused by abnormal electrical activity in the brain. Affecting around 50 million individuals globally, it ranks as one of the most prevalent neurological disorders. According to the World Health Organization (WHO), epilepsy is the fourth most common neurological disorder, after stroke, Alzheimer's disease, and migraines. While seizures can be managed with appropriate medical intervention, individuals with epilepsy frequently face alterations in mental health, cognitive abilities, and involuntary physical movements, such as shaking or muscle stiffness. These symptoms can profoundly affect various aspects of their daily lives, including relationships, work, education, and social interactions (3,4).

The link between epilepsy and suicidal ideation is significant, with individuals living with epilepsy being at an increased risk of experiencing suicidal behaviors. This heightened vulnerability is influenced by biological, psychological, sociocultural, and environmental factors. Biological factors, such as the impact of the neurological disorder on mental health, contribute to this increased risk. At the same time, while psychological challenges, including the social stigma surrounding epilepsy and its physical symptoms, can intensify feelings of isolation, depression, and hopelessness. Additionally, people with epilepsy often experience comorbid psychiatric disorders, including depression, anxiety, and cognitive impairments, which, if left untreated, are strongly associated with higher rates of suicidal ideation. The emotional and social burdens of living with epilepsy, especially when combined with difficulties in maintaining relationships or achieving personal and professional goals, can create an environment conducive to suicidal thoughts (5,6).

Studies have found that individuals with epilepsy are at a much higher risk for suicidal behavior, with increased rates of suicidal thoughts among those living with the condition (7,8). This group is often neglected in mental health discussions, even though the severity and long-term nature of epilepsy contribute significantly to an elevated risk of suicidal ideation. To address this issue, a thorough understanding of the prevalence and the factors that lead to suicidal ideation in adults with epilepsy is necessary, which is the focus of this study.

The goal of this research is to investigate the prevalence of and factors contributing to suicidal thoughts in adults with epilepsy, highlighting the psychological, social, and medical factors that increase their vulnerability to suicidality. The findings of this study may offer valuable insights for developing targeted interventions to reduce suicidal behaviors and thoughts within this high-risk group.

1.2 Statement of the problem

World Health Organization (WHO) report in 2014 showed that more than 800, 000 people die by suicide every year worldwide - one person every 40 seconds, next to traffic accidents ranking as the second leading cause of death(9). In the United States, there are over 35000 deaths per year (approximately 100 per day) because of suicide. Suicide is also the tenth leading cause of death in the United States, after heart disease, cancer, chronic lower respiratory diseases, cerebrovascular diseases, accidents, Alzheimer's disease, diabetes, influenza and pneumonia, and kidney disease(10).

While mental health conditions are strongly associated with suicide, not all individuals who die by suicide have a diagnosed mental health disorder. The Centers for Disease Control and Prevention (CDC) reported in 2018 that a significant proportion of individuals who died by suicide did not have any recognized mental health issues at the time of their death. This highlights that suicide is influenced by a variety of factors, including physical health problems, stressful life events, and social or environmental conditions, in addition to mental health concerns (11).

As different studies revealed PWE are at higher risk for suicidal ideation(7,12). According to the study conducted in Iran in 2015, the magnitude of suicidal ideation among PWE was 25%; whereas from the study conducted in 2014 in Bosnia and Herzegovina about 38% of patients with epilepsy had suicidal ideation(12). Similarly in the study conducted in Cuba, the magnitude of suicidal ideation was 45.2% (13). In addition from the meta-analysis study conducted in Asia in 2019, the magnitude of suicidal ideation was 23.2%(14).

A 2018 institution-based cross-sectional study conducted at Amanuel Mental Specialized Hospital in Ethiopia revealed that 29.8% of individuals with epilepsy (PWE) experienced suicidal ideation (8). A similar study in Gondar indicated a slightly lower prevalence of 26.5% (15). It has been reported that suicide contributes to around 11% of all deaths related to epilepsy (16), and data from the Centers for Disease Control and Prevention (CDC) shows that the suicide rate among those with epilepsy is 22% higher than in the general population (17).

Several factors have been identified as strongly associated with suicidal ideation in PWE. These include early age of onset, long duration of epilepsy, high seizure

frequency, and polytherapy with antiepileptic drugs (18,19). Additionally, psychiatric disorders such as depression and anxiety are significant risk factors for suicidal ideation (20). Other contributing factors reported in various studies include poor social support, drug treatment for mental illness, low socioeconomic status, and unemployment (8).

People with epilepsy (PWE) often encounter many psychosocial difficulties, including stigma, discrimination, social isolation, and financial struggles. These challenges can deeply affect their mental well-being, raising the likelihood of developing mental health issues. Among these concerns, suicidal thoughts are especially troubling, with studies showing that suicide rates among PWE are two to three times higher than in the general population. However, the exact prevalence and the factors contributing to suicidal ideation in PWE in Ethiopia remain insufficiently explored (21).

There is a lack of research or data regarding the prevalence and contributing factors of suicidal ideation among adults with epilepsy in Ethiopia. Specifically, in Mekelle, Tigray, there is no available information on the extent of suicidal ideation and its associated factors among people with epilepsy (PWE), despite the significant burdens and consequences they face. This study aims to address this gap by examining the factors linked to suicidal ideation among PWE at Ayder Comprehensive Specialized Hospital and Mekelle General Hospital in Mekelle, Tigray, Ethiopia, in 2024.

1.3 Significance of the study

The results of this study are anticipated to have significant impact on healthcare providers, policymakers, and individuals living with epilepsy. By enhancing the early identification, management, and support of those experiencing suicidal ideation, the research can help shape targeted interventions and preventive measures, ultimately leading to better care. In addition, the study seeks to encourage collaboration between neurologists and psychiatrists, establishing a framework for tackling suicidal ideation and improving mental health outcomes for epilepsy patients.

Early detection and intervention of suicidal ideation are critical in optimizing long-term outcomes and reducing disabilities in this population. Identifying the factors associated with suicidal ideation will enable clinicians and policymakers to enhance comprehensive treatment plans for epilepsy. Specific strategies may include the integration of routine mental health screenings, the incorporation of therapy into treatment plans, and adjustments to medications to ensure optimal mental health management. Additionally, the establishment of clinical guidelines that prioritize mental health alongside neurological care will be vital in supporting a holistic approach to patient well-being.

Overall, this research serves as a vital step towards improving the quality of life for individuals living with epilepsy by addressing the intertwined challenges of mental health and neurological conditions.

2. Literature review

2.1 Overview of Suicidal ideation among people with epilepsy.

According to a study conducted in Poland in 2016, the magnitude of suicidal ideation was 10.0% out of 301 studied patients(22), and from the study in the United States (USA) on the prevalence of suicidal ideation, the magnitude of suicidal ideation was 12.2% (23)**.** Based on a community-based case-control study done in Brazil, the prevalence of suicidal ideation among PWE was 36.7% and from a study conducted in Cuba, the estimated prevalence of suicidal ideation was 45.2% (24)**.** A meta-analysis study conducted in 2019 in Asia also indicates that the prevalence of suicidal ideation was 23.2% (14)**.** Also, a study conducted in Malaysia in 2014 on Suicidal ideation amongst epilepsy patients in a tertiary Centre revealed that the magnitude of suicidal ideation was 10.0%; a study done in England also revealed that the magnitude of suicidal ideation among adult patients with epilepsy was found 26.5% and in 2014 a study conducted in Bosnia and Herzegovina on suicidal ideation and thoughts of death in epilepsy patients showed that the magnitude of suicidal ideation was 38%(12,25,26). A study from Turkey in 2020 found that the prevalence of suicidal ideation among people with epilepsy (PWE) was 32.4%. Similarly, a 2017 study in India reported a prevalence of 30.0%. In South Africa, a 2018 community-based study found that 41.7% of PWE experienced suicidal ideation (27–29). In a study conducted in Egypt, the prevalence of suicidal ideation among PWE was 23.5%(30). In Ethiopia, at Amanuel Mental Specialized Hospital, an Institution-based cross-sectional study was conducted among PWE; the prevalence of suicidal ideation was 29.8% (8)**.** A similar study was conducted at central Gondar zone primary public hospitals the overall magnitude of suicidal ideation was 26.5% (15).

2.2 Factors associated with suicidal ideation

2.2.1 Socio-demographic characteristics

Females are more in danger of suicidal ideation (31). In the US more than two times more common among age groups 18-25 than among ages ≥50 with 7.4% (32). From the study conducted in Brazil, it identified associated factors such as female sex, age greater than or equal to 42 years, and low socioeconomic status were associated with high rates of suicidal ideation (33)**.** A study from Poland also revealed that women had higher suicidal ideation than men(22)**.**

A study done in 2018 at Amanuel Mental Specialized Hospital showed also persons living alone were 3.2 times more likely to have suicidal ideation than those who live with family. A similar study conducted in the central Gondar Zone in four primary hospitals revealed that women had about 1.68 times higher suicidal ideation than men. In addition, this study also revealed that participants who lived alone were 2.4 times more likely to have suicidal ideation than those who lived with family, and single, never-married person's suicide rates nearly double that of married individuals (8,15).

2.2.2 Mental illness and drug treatment factors

Individuals with mental illness are at a higher risk of suicidal behavior, with the risk being 3 to 12 times greater, and it can range from 5% to 80%. Depression stands out as the most prominent risk factor for suicidal behavior (34**).** A 2016 study from Poland found that patients experiencing suicidal thoughts often had a history of depression and were being treated with antidepressants (22).

In Turkey, depression and anxiety were identified as key contributing factors (27). In India, psychiatric comorbidities, such as depression and anxiety, were strong predictors of suicidal thoughts (28). Similarly, in South Africa, depression played a significant role in the high prevalence of suicidal ideation among PWE (29). In Italy, a 2020 study indicated a prevalence of 28.0% and, a study in Japan in 2018 reported that 21.5% of PWE experienced suicidal ideation (35,36).

In Italy, a 2020 study identified comorbid psychiatric disorders as factors associated with increased suicidal thoughts among people with epilepsy (PWE) (35). In Japan, depression was found to be a key risk factor for suicidal ideation in PWE (36).

In Ethiopia, a cross-sectional study conducted in Amanuel Mental Specialized Hospital revealed that those who had co-morbid depressive symptoms were 5.5 times more likely to have suicidal ideation compared to those who had no co-morbid depressive symptoms. This study also revealed that those who were taking treatment for mental illness had suicidal ideation 4.2 times more likely than those who had no mental illness and drug treatment for mental illness (8)**.** From the study conducted in central Gondar Zone in four primary hospitals participants with depression were 3.18 times more likely to have suicidal ideation than those who were without depression. Similarly,

participants who had anxiety were 2.9 times more likely to have suicidal ideation than participants who had no anxiety (15).

2.2.3 Medical Illness Factors

The study conducted in Brazil revealed that patients with active epilepsy and those who had recurrent visits to the emergency department (that is greater than four or more) over one year had high rates of suicidal thoughts. Also, the study showed that patients taking some antiepileptic medications reported more suicidal thoughts**.** In Poland, one study also identified factors related to epilepsy. This study showed that those who had frequent seizures had a high proportion of suicidality and those with primary generalized epilepsy and focal epilepsy had suicidality of 6% and 12.3%(22,33)**.** Similarly, a study in Malaysia also revealed that patients who had epilepsy on a daily to weekly basis had significant suicidal ideation. Also, those who were on polytherapy that is those who were on three or four antiepileptic drugs (AEDs) had an increased risk of suicidal ideation compared to those who were taking one AED(25)**.** In addition, a similar study conducted in Iran also revealed factors significantly associated with suicidal ideation such as early age onset of epilepsy, antiepileptic drug polytherapy, high seizure frequency, and duration of epilepsy(18)**.**

In Italy, a 2020 study identified poorly controlled seizures as a factor associated with increased suicidal thoughts among people with epilepsy (PWE) (35). Similarly, in India, a 2017 study found that seizure control was a strong predictor of suicidal ideation, with a reported prevalence of 30.0% (36)

A study done in Addis Ababa revealed that patients with not seizure-free within 1 year were 2.6 times more likely to have suicidal ideation relative to those who were seizure-free within 1 year (8).

2.2.4 Substance Use Factors

The lifetime risk of suicide among substance use disorders (SUD) was 5 to 10 times enlarged, and 19 % of patients continue to think about suicide despite accessing treatment. In a cross-sectional study conducted in Spain, people who sought treatment for SUD found that the rate of lifetime suicidal ideation in the patients was 43.7% and the incidence of SI in a month was 8.7% (37)**.** Also, from the study conducted in Gondar

participants who used hazardous alcohol were 2.1 times more likely to have suicidal behavior(15)

2.2.5 Psychosocial Factors

WHO report in 2004 showed that weak social ties and low support from friends or relatives have been significantly associated with suicidal ideation (38).

In South Africa, stigma played a significant role in the high prevalence of suicidal ideation among people with epilepsy (PWE)(29). Similarly, in Japan, social support and stigma were identified as key risk factors for suicidal ideation in PWE (36).

From the study conducted in Amanuel Mental Specialized Hospital those who had poor social support were 3.3 times to have suicidal ideation than those who had good social support. Also, the study in the Gondar zone revealed that poor social support is highly associated with suicidal ideation(8,15). From the study in Ethiopia, frequent seizure attacks were highly associated with stigma(39)

Conceptual framework

Suicidal thoughts in individuals with epilepsy arise from a complex combination of socio-demographic, clinical, psychological, and substance use factors. These elements, whether acting alone or together, can heighten the risk of such thoughts. By recognizing and addressing these various aspects, healthcare providers can offer more well-rounded care and interventions that enhance mental health outcomes for this group. Early identification of these contributing factors allows for the creation of tailored treatment strategies that integrate both neurological and psychological support.

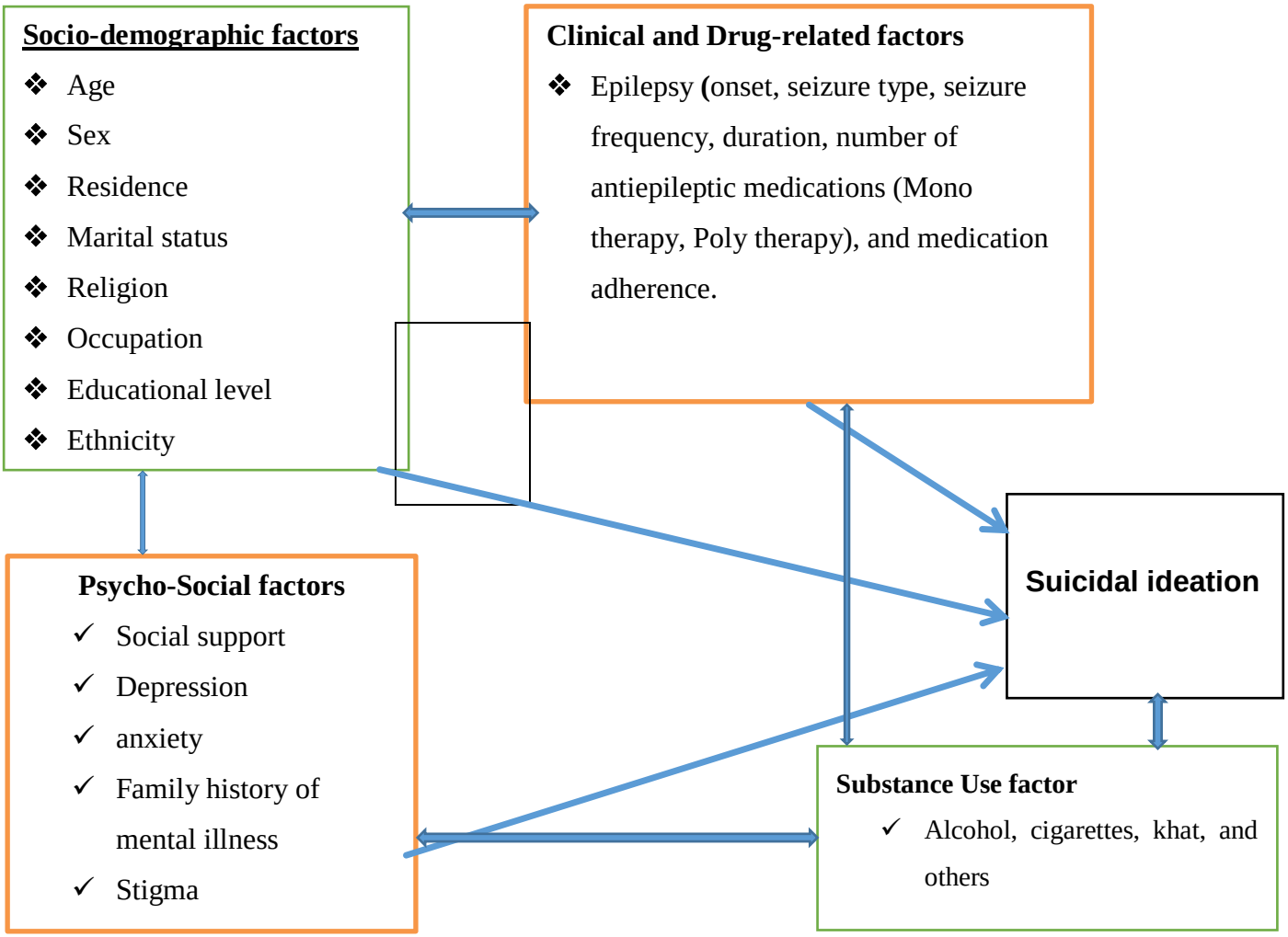

Figure 1: Conceptual framework of factors associated with Suicidal ideation among individuals with epilepsy (8, 12, 14, 15, 18 and 22-39).

3. Objective

3.1 General Objective

- ✓ To assess factors associated with suicidal ideation among adults with epilepsy at neurology clinics in ACSH and Mekelle General Hospital, Mekelle, Tigray, Ethiopia in 2024.

3.2 Specific Objectives

- ✓ To determine the prevalence of suicidal ideation among adults with epilepsy at neurology clinics in ACSH and MGH, Tigray, Ethiopia, 2024.
- ✓ To identify factors associated with suicidal ideation among adults with epilepsy at neurology clinics in ACSH and MGH, Tigray, Ethiopia, 2024.

4. Methods

4.1 Study area:

The research was conducted at two public hospitals in Mekelle, the administrative center of the Tigray region in northern Ethiopia. These hospitals are Ayder Comprehensive Specialized Hospital and Mekelle Hospital. Mekelle is located 783 kilometers north of Addis Ababa, the nation's capital, and was established in 1876. The city's population is expected to grow to about 611,574 by 2024, as reported by the United Nations. Spanning 259.9 square kilometers and 2084 meters above sea level, Mekelle is divided into seven sub-cities. The city's healthcare system covers 90% of the population (40).

Ayder Comprehensive Specialized Hospital, operational since 2008, serves as a medical center for an estimated 8 million people in Tigray, Afar, and parts of southeastern Amhara. It is the largest healthcare facility in northern Ethiopia and the second-largest in the country, with a capacity of around 500 inpatient beds. Ayder Hospital offers a wide range of medical services, including general surgery, internal medicine, pediatrics, obstetrics and gynecology, neurology, and psychiatry. It is particularly renowned for its specialized departments in neurology, cardiology, and nephrology. Additionally, the hospital provides essential diagnostic services, such as CT scans, MRIs, and laboratory tests. Alongside its outpatient clinics and trauma care, Ayder also offers emergency medical services. As a teaching hospital in collaboration with the College of Health Sciences at Mekelle University, Ayder has been a leader in providing neurology care since its establishment (41,42).

Mekelle Hospital mainly offers inpatient and outpatient services to the local population. Its general healthcare services include maternal and child health, infectious disease management, minor surgeries, and neurology care. The hospital also provides emergency care and operates an intensive care unit (ICU) for more severe cases. Mekelle Hospital emphasizes community-based healthcare, collaborating with local health posts to reach rural and underserved areas. It includes a pediatric department and obstetrics and gynecology services that cater to both prenatal and postnatal care for women in the region, in addition to its neurology department, which addresses neurological conditions (43).

4.2 Data Collection Period

Data were collected from June 15 to July 15, 2024.

4.3 Study design:

A hospital-based cross-sectional study was conducted to assess the prevalence and associated factors of suicidal ideation among adult patients diagnosed with epilepsy.

4.4 Population:

4.4.1 Source population

The source population included all patients diagnosed with epilepsy at the two hospitals. The study specifically focused on adult patients (aged 18 years and older) currently attending follow-up visits.

4.4.2 Study population

All adult patients diagnosed with epilepsy were on follow-up during the data collection period.

4.4.3 Inclusion criteria

Adult patients (age ≥18 years) diagnosed with epilepsy and those who were on follow-up visits were included in the study.

4.4.4 Exclusion criteria

Participants who were critically ill or unable to communicate during data collection were excluded from the study.

4.5 Sample size determination:

The sample size was determined using a single population proportion formula, based on a previously reported 26.5% prevalence of suicidal ideation among individuals with epilepsy in the central Gondar zone, northwest Ethiopia(15). With a 95% confidence interval and a 5% margin of error, a total sample size of 329 was calculated, accounting for a 10% non-response rate. The minimum numbers of samples required for this study were determined by using a single population proportion formula considering the following assumptions.

$n = [(z\alpha/2)^2 p (1-p)]/d^2$ Where

n= minimum sample size required for the study

z= standard normal distribution (z=1.96) with a confidence interval of 95% and α=0.05

p = the prevalence of suicidal ideation among people with epilepsy is 26.5% from a previously published study in northwest Ethiopia.

d= absolute precision or tolerable margin of error (d) =5%=0.05

$n= [(z\alpha/2)^2 p (1-p)]/ d^2 = \underline{(1.96)^2 \times 0.265(1-0.265)}/ (0.05)^2 = 299$

Considering non-respondent rate 10%, 299+30=329

Therefore, 329 was the calculated and final sample size.

4.6 Sampling Procedure:

The total sample size for this study was 329 adult patients with epilepsy from the outpatient departments (OPDs) of Ayder Comprehensive Specialized Hospital (ACSH) and Mekelle General Hospital (MGH)**,** allocated based on the size of the source population at each hospital. At ACSH**,** there were approximately 110 adult epilepsy patients per month, while MGH had around 220 adult epilepsy patients per month. During the data collection period, all eligible adult patients who attended the OPDs at both hospitals were interviewed.

4.7 Data Collection Instruments and Procedures

4.7.1 Data Collection Tools:

Data collection for this study relied on a range of structured tools to comprehensively assess various factors among participants.

Socio-demographic characteristics were gathered using specific structured questions, while clinical factors were examined through yes/no questions. Social support was evaluated using the Oslo 3-item social support scale, providing insights into the social networks of participants. Depression and anxiety levels were measured with the Hospital Anxiety and Depression Scale (HADS), utilizing its subscales, HADS-D for depression and HADS-A for Anxiety. Suicidal ideation was assessed through the suicidality module of the WHO Composite International Diagnostic Interview (CIDI) developed by the WMHS initiative, offering a critical look at mental health concerns. Stigma was measured with the Jakoby stigma scale, and medication adherence was evaluated using the Morisky 4-item medication adherence scale. Substance use was recorded based on current and past usage patterns.

Data collectors were health professionals and collected data using face-to-face interviews to prevent losing of study participants who could not read and write.

4.8 Study Variables

4.8.1 Dependent Variable:

Suicidal ideation (yes /no)

4.8.2 Independent Variables:

Socio-demographic variables- age, sex, religion, ethnicity, residence, marital status, education level, occupation

Clinical Variables- Onset, duration of epilepsy, frequency, duration of epilepsy treatment, type of epilepsy, chronic medical comorbidities other than epilepsy

Substance-related factors- Alcohol, Khat, cigarettes, and others (ever use, current use)

Psychosocial factors- family history of suicide, history of mental illness and its treatment, social support, Stigma

4.9 Operational Definitions:

Suicidal ideation: This was determined based on whether respondents reported seriously contemplating suicide in the past month. Those who answered "yes" were classified as having suicidal thoughts, according to the suicidality module of the Composite International Diagnostic Interview (44).

Social support: Social support was measured using the Oslo 3-item scale, which scores from 3 to 14. Participants were categorized as follows: poor social support (scores 3-8), moderate social support (scores 9-11), and strong social support (scores 12-14) (45)**.**

Depression: Depression was identified in participants who scored ≥8 on the Hospital Anxiety and Depression Scale for depression (HADS-D**)** (46)**.**

Anxiety: Anxiety was defined by scores of ≥8 on the Hospital Anxiety and Depression Scale for anxiety (HADS-A) (46).

Perceived stigma: Perceived stigma was defined as having a score of ≥1 on a three-item scale (47)**.**

Chronic medical illness: This was defined by the presence of at least one chronic condition other than epilepsy, such as diabetes, hypertension, heart disease, HIV, asthma, or cancer.

Medication non-adherence: Medication adherence was assessed using the Morisky 4-item scale (MMAS-4). A score of ≥2 indicated non-adherence to antiepileptic drugs (AEDs) (48).

Substance use: Was categorized into **current use**, defined as the use of substances (such as alcohol, khat, and cigarettes) for non-medical purposes within the last three months, and **ever use**, which referred to the lifetime use of these substances for non-medical purposes(49).

4.10 Data Quality Control:

Structured questionnaires underwent thorough checks for completeness before being distributed to respondents. To facilitate understanding, these questionnaires were translated into Tigrigna by a bilingual translator, ensuring that almost all patients could comprehend the material. To verify consistency, the questionnaires were re-translated back to the original English version. Additionally, all structured questionnaires were pretested at Wukro General Hospital to identify any potential issues.

Data collectors received one-day training to familiarize themselves with the process and enhance their data collection skills. Throughout the data collection phase, both the principal investigator and data collectors conducted close follow-ups and frequent checks to ensure the completeness and consistency of the gathered information.

4.11 Data Analysis Procedure:

The data were meticulously coded, cleaned, and analyzed using SPSS version 27. Descriptive statistics were employed to provide an overview of the dataset. To identify factors associated with suicidal ideation, both bivariate and multivariable logistic regression analyses were conducted, with a significance threshold set at $p < 0.05$.

For the bivariate analysis, variables exhibiting a significance level of $p < 0.25$ were selected for inclusion in the multivariable logistic regression model. This approach facilitated a more nuanced examination of the relationships between various factors and suicidal ideation, thereby enhancing the robustness of the study's findings.

The goodness of fit of the multivariable logistic regression model was evaluated using the Hosmer-Lemeshow test, which assesses how well the model predicts the observed outcomes.

4.12 Ethical Considerations:

Ethical approval for the study was granted by the Health Research Ethics Review Committee of MUCHS (MU-IRB 2198/2024). Official letters of support were received and submitted to both ACSH and MGH. Participants were thoroughly informed about the study's procedures and its importance. To ensure privacy, all information provided was kept confidential, with no personal identifiers included on the questionnaires.

4.13 Plan for dissemination of findings:

The study result will be presented to Mekelle University, college of health sciences, School of Nursing Department of Psychiatry and result documents will be disseminated to all responsible bodies in the study area. Finally, the findings will be disseminated through different meetings, workshops and publishing in the local or an international journal.

5. RESULTS

5.1. Socio-demographic characteristics of the respondents

Socio-demographic characteristics of respondents from a total of 329 samples, 325 participants were included in the study with a response rate of 98.8%. Among the majority of respondents were male 208 (64%). Age distribution indicates that the largest group falls within the 25-31 age 99 (30.5%), followed by 18-24 85 (26.2%). Of the respondents, 167 (51.4%) reside in rural areas, while 158 (48.6%) live in urban areas. Regarding marital status, the sample is predominantly single 149(45.8%) or married 137(42.2%). Most participants identify as Orthodox 285(87.7%) and reside in rural areas 167(51.4%). Ethnically, all participants belong to the Tigray ethnicity. Educational attainment varies, with the highest proportion having completed 9-10 grades 125(38.5%), while a notable number cannot read or write 26 (8%). Regarding occupation, farmers comprise the largest group 110(33.8%). Lastly, 77(23.7%) of respondents were living alone (table 1).

Table 1. Socio-demographic characteristics of the respondents in ACSH and MGH, Tigray, Ethiopia in 2024. (n=325)

Characteristics	Categories	Frequency	Percent
Sex	Female	117	36.0
	Male	208	64.0
Age	18-24	85	26.2
	25-31	99	30.5
	32-38	51	15.7
	39-45	38	11.7
	>45	52	16.0
Residence	Rural	167	51.4
	Urban	158	48.6
Marital Status	Single	149	45.8

	Married	137	42.2
	Divorced/Widowed	39	12.0
Religion	Orthodox	285	87.7
	Muslim	31	9.5
	Catholic/Protestant	9	2.8
Ethnicity	Tigray	325	100.0
Educational-level	Can't write and read	26	8.0
	1-4 grade	37	11.4
	5-8 grade	92	28.3
	9-10 grade	125	38.5
	College and above	45	13.8
Occupation	Daily laborer	28	8.6
	Farmer	110	33.8
	Government employee	52	16.0
	Housewife	24	7.4
	Merchant	42	12.9
	Private worker	18	5.5
	Student	51	15.7
Living arrangement	Alone	77	23.7
	With family	248	76.3

5.2 Frequency distribution of clinical factors

In this study, we analyzed clinical factors related to epilepsy in a sample of 325 participants. Regarding the age of onset, 214 (65.8%) had their first seizure at age 18 or older. In terms of the duration of epilepsy, 117 (36.0%) had epilepsy for 6-10 years, and 66 (20.3%) had lived with epilepsy for 16 years or more. The majority of participants had generalized tonic-clonic seizures, comprising 291(89.5%). Regarding antiepileptic drug (AED) usage, 267 (82.2%) were on a single AED. The duration of epilepsy treatment varied, with 197 (60.6%) treated for 1-6 years, and 64 (19.7%) treated for 7-12 years. Medication successfully controlled seizures in 195 (60.0%) of cases. Regarding seizure-free status, 195(60.0%) participants were free of seizures for the year. Lastly, 24 (7.4%) reported comorbid medical illnesses (table 2).

Table 2: Clinical descriptions of respondents in ACSH and MGH, Tigray, Ethiopia in 2024(n=325).

Variable	Category	Frequency	Percent
Age of onset of epilepsy	under 18	111	34.2
	18 and above	214	65.8
Duration of Epilepsy in years	up to 5	78	24.0
	6-10	117	36.0
	11-15	64	19.7
	16 and above	66	20.3
Type of epilepsy	Absence seizure	6	1.8
	Focal	21	6.5
	Generalized Tonic-Clonic Seizure	291	89.5
	Temporal Lobe Epilepsy	7	2.2
Number of AEDs	One	267	82.2
	Two and above	58	17.8

Duration of epilepsy treatment (in years)	up to 1	45	13.8
	1-6	197	60.6
	7-12	64	19.7
	>12	19	5.8
Seizure control by medication	No	130	40.0
	Yes	195	60.0
Attacks of seizures per year	Free	195	60.0
	Not free	130	40.0
Comorbid medical illness	No	301	92.6
	Yes	24	7.4

5.3 Description of psychosocial and substance use characteristics of respondents

This study examined various psychosocial and substance use factors in a sample of 325 participants. Of the participants, 83 (25.5%) reported experiencing depression, and 88 (27.1%) experienced anxiety. Additionally, 32 (9.8%) reported a family history of mental illness. Regarding medication adherence, 122 (37.5%) exhibited poor adherence. Social support was reported as poor by 91 (28.0%) and 145 44.6%) had stigma. Concerning substance use, 22 (6.8%) reported current use, and 49 (15.1%) had ever used substances (table 3).

Table 3: Psychosocial and Substance Use characteristics of adults with epilepsy at neurology clinics in ACSH and MGH, Tigray, Ethiopia in 2024(n=325).

Variable	Category	Frequency	Percent
Depression	Depression	83	25.5
	No Depression	242	74.5
Anxiety	Anxiety	88	27.1
	No anxiety	237	72.9
Family history mental illness	No	293	90.2
	Yes	32	9.8
Medication adherence	Poor adherence	122	37.5
	Good adherence	203	62.5
Social support	Poor	91	28.0
	Moderate	165	50.8
	Strong	69	21.2
Stigma	No	180	55.4
	Yes	145	44.6

Current Substance Use	No	303	93.2
	Yes	22	6.8
Ever substance use	No	276	84.9
	Yes	49	15.1

5.4 Lifetime Prevalence of suicidal ideation

The prevalence of suicidal ideation among adults with epilepsy in our study was 29.5% (96) with (95% CI: 24.3%–34.4%).

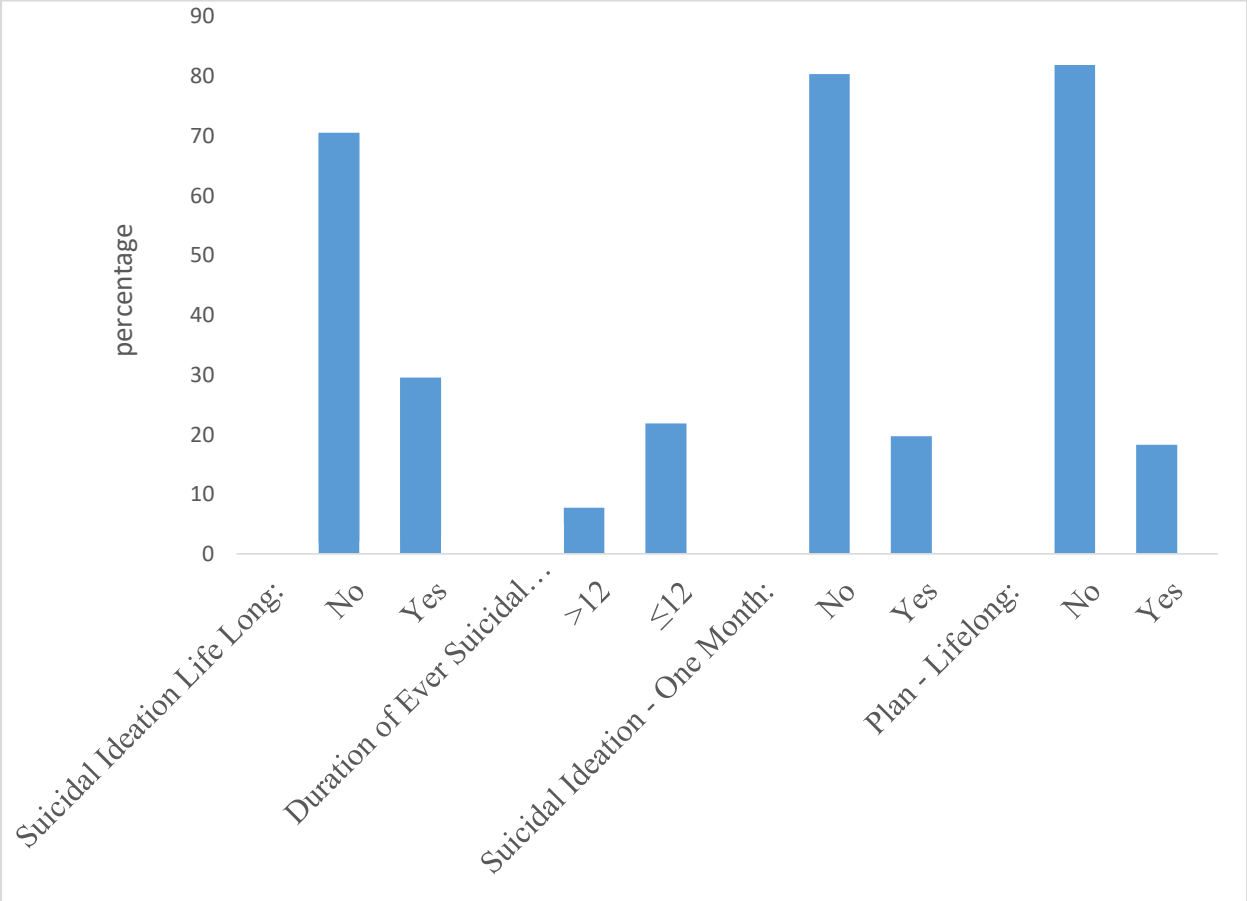

Figure 2: Prevalence of suicidal ideation among adults with epilepsy at neurology clinics in ACSH and MGH, Tigray, Ethiopia in 2024.

5.5 Factors Associated with Suicidal Ideation in Adults with Epilepsy

To examine the relationship between different factors and suicidal ideation, a bivariate logistic regression analysis was conducted. The findings highlighted several significant predictors, including living alone, being single (unmarried), divorced or widowed, low education level (illiterate or having completed only grades 9-10), depression, anxiety, coexisting medical conditions, polytherapy (taking multiple antiepileptic medications), not being seizure-free for a year, a family history of mental illness, stigma, and insufficient social support.

Further, a multivariate logistic regression analysis was used to identify the most impactful factors related to suicidal ideation. The results showed that being single (AOR = 3.81, 95% CI: 1.262–11.467), polytherapy (AOR = 4.48, 95% CI: 1.827–11.086), lack of social support (AOR = 4.90, 95% CI: 1.47–16.29), depression (AOR = 5.55, 95% CI: 2.542–12.129), anxiety (AOR = 2.96, 95% CI: 1.399–6.265), a family history of mental illness (AOR = 4.28, 95% CI: 1.40–13.089), and chronic medical conditions (AOR = 6.80, 95% CI: 1.634–28.630) were all significant factors associated with suicidal thoughts, with a p-value of less than 0.05 (table 4).

Table 4: Bivariate and Multivariate Analysis of Factors Associated with Suicidal Ideation.

Variables	Categories	Suicide Ideation		COR (95% CI)	AOR (95% CI)	p-valu
		Yes	No			
Marital Status	Single	62	87	5.39(2.91 to 9.97)	3.81(1.26 to11.46)*	.018
	Divorced/widowed	18	21	6.48(2.86to14.68)	1.47(0.331 to 6.472)	.615
	Married	16	121	1	1	
Living arrangement	Alone	41	36	3.99 (2.33 to 6.85)	1.158(0.19 to 6.97)	.875
	With family	55	193			
Educational-level	Can't write and read	12	14	4.65(1.53to 14.20)	0.585(0.032 to10.836)	.719
	1-4 grade	13	24	2.94 (1.03 to 8.42)	0.601(0.039 to 9.365)	.716
	5-8 grade	22	70	1.71 (0.67 to 4.36)	0.263(0.019 to 3.635)	.319

	9-10 grade	42	83	2.75 (1.13 to 6.67)	0.293(0.023 to 3.777)	.347
	College and above	7	38	1	1	
Occupation	Daily laborer	6	22	0.26 (0.09 to 0.75)	0.114 (0.024 to 1.537)	.062
	Farmer	41	69	0.57 (0.29 to 1.12)	0.759(0.255 to 2.261)	.621
	Government employee	6	46	0.13 (0.05 to 0.35)	0.076 (0.005 to 1.144)	.062
	Housewife	1	23	0.04 (0.01 to 0.33)	0.185 (0.014 to 2.366)	.194
	Merchant	10	32	0.30 (0.12 to 0.74)	0.794 (0.192 to 3.279)	.750
	Private worker	6	12	0.48 (0.16 to 1.48)	0.253 (0.051 to 1.247)	.091
	Student	26	25	1	1	
Polytherapy	One	67	200	1	1	
	Two and above	29	29	2.99 (1.66 to 5.36)	4.48(1.827to11.086)*	.001
Seizure Control by Medication	Seizure free/year	32	163	1	1	
	No seizure free/year	64	66	4.94 (2.96 to 8.24)	1.842 (0.889 to 3.820)	.100
Social Support	Poor	48	43	5.89 (2.74 to 12.65)	4.900(1.47 to 16.29)*	.010
	Moderate	37	128	1.52 (0.73 to 3.20)	1.419 (0.499 to 4.034)	.511
	Strong	11	58	1	1	
Anxiety	Yes	40	48	2.69 (1.61 to 4.51)	2.961 (1.399 to6.265)*	.005
	No	56	181	1	1	
Depression	Yes	53	30	8.18(4.69 to14.26)	5.553(2.542 to12.129)*	.001
	No	43	199	1	1	
Medication adherence	Poor	50	72	2.37 (1.46 to 3.86)	1.066(0.331 to 1.773)	.534
	Good	46	157	1	1	
Stigma	No stigma	32	148	1	1	
	Stigma	64	81	3.65 (2.21 to 6.05)	1.813(.802 to 4.097)	.153
Family history of mental illness	Yes	23	9		4.281(1.40 to 13.089)*	.011

				7.702 (3.41 to 17.40)		
	No	73	220	1	1	
Chronic medical illness	Yes	17	7	6.821(2.73to17.0)	6.84 (1.634 to 28.630)*	.008
	No	79	222	1	1	

- **Significant Variables**: Asterisks (*) indicate statistically significant variables ($p < 0.05$), References are indicated by 1.
- **df (degrees of freedom)** = 8, **Hosmer and Lemeshow Test =** 0.192
- **AOR**: Adjusted Odds Ratio, **COR**, crude OR.
- **C.I.**: Confidence Interval

6. Discussion

In our study, 325 participants with epilepsy from ACSH and MGH in Tigray, Ethiopia, were interviewed to assess various Sociodemographic, clinical, psychosocial, and substance use characteristics. The majority of respondents were male (64%). Half lived in rural areas, and most were single (unmarried). The sample predominantly identified as Orthodox Christians and belonged to the Tigray ethnicity. Education levels varied, with many having completed 9-10 grades. In terms of occupation, farmers were the largest group. Clinical factors revealed that most participants experienced generalized tonic-clonic seizures and were on a single antiepileptic drug, with a significant portion achieving seizure control. Regarding psychosocial factors, depression, anxiety, poor social support, and stigma were common, with a small percentage using substances. Additionally, 29.5% of participants reported suicidal ideation, with several factors identified as significant predictors of this, including being single(unmarried), polytherapy (using multiple antiepileptic drugs), depression, anxiety, poor social support, and comorbid medical illnesses.

The study found that the lifetime prevalence of suicidal ideation among adults with epilepsy was 29.5% with a (95% CI: 24.3%–34.4%). This result aligns with previous research conducted in Ethiopia, including a study at Amanuel Mental Specialized Hospital, which reported a prevalence of 29.8%, and another in the central Gondar zone, where the prevalence was 26.5%(8,15). Similar findings have been observed in studies from Turkey, with a reported prevalence of 32.4%(27), and in India, the prevalence was 30.0%(28).

However, the current finding of this study was lower when compared with research conducted in other parts of the world. For instance, studies in Bosnia and Herzegovina, show a prevalence of 38% (12), Cuba at 45.2% (24), Malaysia at 33.75%(25), Brazil at 36.7% (33), and South Africa at 41.7%(50). These discrepancies may be due to differences in study populations, sample sizes, and different methodologies. The current study was focused only on outpatient participants, with a sample size of 325, in contrast, other studies such as Bosnia and Herzegovina and Cuba were focused on both inpatients and outpatients. In these studies, due to the inclusion of more severely affected individuals, it may lead to higher rates. Furthermore, the sample sizes in studies from Bosnia and Herzegovina, Cuba, Malaysia, and Brazil were smaller, which could

also contribute to the differences in results. In addition, the use of different study designs might explain the variation in findings.

In contrast, the result of the present study was higher than those of studies conducted in the USA, where the prevalence of suicidal ideation ranged from 8% to 11.9% (23), and a Canadian study reported a prevalence of 12.7%(17). Similarly, studies in countries like Poland(22), Brazil(24), the Republic of China(51), and Nigeria(52) reported suicidal ideation rates of 10%, 13.3%, 14.3%, and 20.0%, respectively, all of which were lower than the current study's results. Several factors may account for these differences, such as variations in study design and the tools used for assessment. For instance, in the USA, suicidal ideation was assessed using the ninth item of the Beck Depression Inventory, a tool that was also employed in the studies conducted in Poland, and Brazil (22,24). Furthermore, the time frame in which suicidal ideation was assessed might explain some of the discrepancies; many previous studies focused on current suicidal ideation, while the current study considered lifetime suicidal ideation. Another potential factor contributing to the differences is the sample size, with previous studies having smaller sample sizes (12,25,26), compared to the 325 participants in the current study.

In this study, individuals who were single or unmarried had an increased risk of suicidal ideation compared to those who were married (AOR = 3.81, 95% CI: 1.26 to11.47, p = 0.018). This finding is consistent with earlier studies conducted in Ethiopia, in the central Gondar zone, and also aligns with research from Poland. A study conducted in Poland found that unmarried individuals were more likely to experience suicidal thoughts than those who were married or in a partnership. The study emphasized that the absence of social support and the emotional distress associated with being single may contribute to an increased risk of suicidal ideation. These findings from both Ethiopia and Poland underscore the potential role of marital status as a factor in mental health, particularly regarding the risk of suicide (15,22).

Respondents with poor social support were found to be 4.9 times more likely to experience suicidal ideation compared to those with good social support (AOR = 4.900, 95% CI = 1.47 to 16.29, p = 0.010). This finding is consistent with research from Ethiopia, where individuals with poor social support were 3.3 times more likely to have

suicidal ideation (9, 16), and studies in South Africa and Japan, which also identified weak social ties as a major risk factor for suicidal ideation in PWE (29,36). The possible reason might be emotional isolation and loneliness often result from inadequate social support, leading individuals to feel disconnected and unsupported during times of emotional distress, which increases vulnerability to suicidal thoughts. Additionally, a lack of social support can heighten stress levels, as individuals may have fewer resources or people to turn to for help or comfort, exacerbating feelings of hopelessness. Social support also provides crucial emotional validation, and without it, individuals may feel their struggles are unacknowledged, intensifying their distress. Furthermore, poor social support may be linked to stigma, particularly in populations with chronic conditions like epilepsy.

Depression, particularly when occurring alongside other conditions, was found to be a significant factor, with individuals experiencing depression being 5.6 times more likely to have suicidal thoughts compared to those without depression (AOR = 5.553, 95% CI = 2.54 to 12.13, $p < 0.001$). Depression is widely recognized as a major contributor to suicidal behavior, with research indicating that people with depression are 3 to 12 times more likely to engage in suicidal actions (34). These findings are consistent with studies from Poland, Turkey, India, and South Africa, which also pointed to depression and other psychiatric disorders as key factors in suicidal ideation among individuals with epilepsy (PWE) (22,27–29). Similarly, in Ethiopia, depressive symptoms were closely linked to a higher likelihood of suicidal ideation, with those suffering from depression being 5.5 times more likely to experience suicidal thoughts (8). Various factors may explain this relationship: depression can disrupt emotional and cognitive functioning, often resulting in feelings of hopelessness and worthlessness that increase the risk of suicidal thoughts. Additionally, depression may distort an individual's perception of their situation, intensifying emotional distress and limiting their ability to find solutions. When depression coexists with a chronic condition like epilepsy, the combined psychological burden can exacerbate the likelihood of suicidal ideation due to its impact on brain function and overall mental health.

Anxiety was found to significantly increase the likelihood of suicidal ideation, with participants experiencing nearly three times higher of having suicidal thoughts (AOR = 2.96, 95% CI: 1.39 to 6.27). This result is in line with the Gondar study, where

individuals with anxiety were also 2.9 times more likely to experience suicidal ideation. Similar findings have been reported in studies from Canada**,** Brazil**,** Korea**,** and Nigeria**,** demonstrating a consistent global trend. The association may be attributed to factors such as anxiety about adapting to the illness, concerns over medication and seizures, and the overall psychological stress related to living with epilepsy, all of which likely contribute to an increased risk of suicidal ideation(15,33,52–54).

The study also found that individuals taking two or more antiepileptic drugs (AEDs) had increased suicidal ideation compared to those on a single AED (AOR = 4.488, 95% CI = 1.83 to 11.09, p =0.001). This result is consistent with studies from Brazil, Malaysia, and Iran, which also identified polytherapy (using multiple AEDs) as a major risk factor for suicidal ideation among PW. The possible reason might be the cumulative side effects associated with polytherapy. Multiple AEDs can lead to a higher incidence of adverse effects, including mood disturbances such as irritability, depression, and anxiety, all of which are well-known risk factors for suicidal thoughts. The combination of these side effects from multiple medications may intensify psychological distress, increasing the likelihood of suicidal ideation (18,25,33).

Additionally, a family history of mental illness increased the likelihood of suicidal ideation (AOR = 4.281, 95% CI: 1.40 to 13.09), a finding consistent with existing research from the United States**,** and China**.** Studies from these countries confirm that individuals with a family history of mental health issues, including depression, anxiety, and suicide attempts, are at a heightened risk of suicidal ideation Genetic vulnerabilities, combined with potential environmental stressors within the family dynamic, likely contribute to this increased risk (55,56).

Similarly, chronic medical illness was found to have a strong association with suicidal ideation (AOR = 6.8, 95% CI: 1.634 to 28.630), which aligns with studies conducted in South Korea**,** and India, Research from these countries suggests that individuals with chronic illnesses, (such as cancer, diabetes) are at higher risk for suicide due to the psychological and emotional burdens associated with their conditions. A study from South Korea highlighted that chronic medical conditions often lead to heightened feelings of hopelessness, isolation, and psychological distress, which can escalate into suicidal thoughts(57,58).

7. Limitation of study

Due to the use of a cross-sectional study design, establishing causal relationships between the variables, especially those concerning mental health (such as depression, anxiety, and suicidal thoughts) and treatment factors (such as antiepileptic drug use), is challenging, as the data were collected at only one point in time. Additionally, social desirability bias may have influenced the results, as participants could have underreported sensitive topics, like suicidal ideation or their use of antiepileptic medications, to align with social norms or expectations. Moreover, recall bias might have compromised the accuracy of self-reported data, particularly about the duration and severity of mental health conditions and the adherence to prescribed treatments.

8. Conclusion and Recommendation

8.1 Conclusion

This study found that 29.5% of adults with epilepsy experience suicidal ideation. Factors such as being single, using multiple antiepileptic medications, poor social support, depression, anxiety, and chronic medical conditions were linked to higher suicide risk. These results highlight the need for tailored mental health interventions for individuals with epilepsy in the region.

8.2 Recommendation

Based on the findings of this study, several key recommendations are made for responsible bodies to consider. Regional health bureaus should integrate mental health screenings into routine epilepsy care, focusing on depression and suicidal ideation, while training healthcare providers to detect and intervene early. Healthcare professionals must regularly assess mental health in patients with epilepsy, provide referrals, and monitor for suicidal thoughts. Epilepsy care programs should strengthen social support networks and promote a holistic approach that includes both neurological and psychological care. Researchers are encouraged to explore the link between antiepileptic drugs, particularly polytherapy, and suicidal ideation to identify effective interventions. Public health initiatives should raise awareness about the importance of mental health in epilepsy care, enhance access to mental health services, and advocate for early intervention. Awareness and education campaigns should also be launched to ensure comprehensive care, ultimately improving the quality of life for individuals living with epilepsy.

9. References

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed.. Arlington, VA.: American Psychiatric Publishing.; 2013.
2. Sadock BJ. Kaplan & Sadock's synopsis of psychiatry: behavioral sciences/clinical psychiatry. Vol. 2015. Wolters Kluwer Philadelphia; 2015.
3. Epilepsy WHO. A public health imperative. Geneva, Switz WHO. 2019;
4. Engel J, Pedley TA, Aicardi J. Epilepsy: a comprehensive textbook. Vol. 3. Lippincott Williams & Wilkins; 2007.
5. Josephson CB, Jetté N. Psychiatric comorbidities in epilepsy. Int Rev psychiatry. 2017;29(5):409–24.
6. Alsaadi T, Zamel K, Sameer A, Fathalla W, Koudier I. Depressive disorders in patients with epilepsy: Why should neurologists care? Vol. 05, Health. 2013. p. 14–20.
7. Pack AM. Epilepsy and suicidality: What's the relationship? Epilepsy Curr. 2016;16(4):236–8.
8. Haile K, Awoke T, Ayano G, Tareke M, Abate A, Nega M. Suicide ideation and attempts among people with epilepsy in Addis Ababa, Ethiopia. Ann Gen Psychiatry [Internet]. 2018;17(1):1–8. Available from: https://doi.org/10.1186/s12991-018-0174-6
9. OMS OM de la S. Preventing suicide Preventing suicide. WHO Libr Cat Data. 2014;89.
10. Viera Valencia LF, Garcia Giraldo D. Synopsis of Psychiatry Behavioral Sciences/Clinical Psychiatry. Vol. 2, Angewandte Chemie International Edition, 6(11), 951–952. 2019.
11. Centers for Disease Control and Prevention (CDC). Suicide mortality in the United States, 2018. 2018.
12. Andrijić NL, Alajbegović A, Zec SL, Loga S. Suicidal ideation and thoughts of death in epilepsy patients. Psychiatr Danub. 2014;26(1):52–5.
13. MacHado RA, Espinosa AG, Melendrez D, González YR, García VF, Rodríguez

YQ. Suicidal risk and suicide attempts in people treated with antiepileptic drugs for epilepsy. Seizure. 2011;20(4):280–4.

14. Abraham N, Buvanaswari P, Rathakrishnan R, Tran BX, Thu GV, Nguyen LH, et al. A meta-analysis of the rates of suicide ideation, attempts and deaths in people with epilepsy. Int J Environ Res Public Health. 2019;16(8).

15. Nigussie K, Tesfaye B, Lemma A, Kerebih H. Magnitude and associated factors of suicidal ideation and attempt among people with epilepsy attending outpatient treatment at primary public hospitals in northwest Ethiopia: a multicentre cross-sectional study. BMJ Open. 2021;11(1):1–10.

16. Kanner AM. Suicidality and epilepsy: a complex relationship. In: A Concise Guide to Understanding Suicide. Cambridge Univ Press; 2014. p. 130–7.

17. Jones JE, Bordenave JM. Suicide in children and adults with epilepsy: a complex relationship. Suicide Prev A Pract Guid Pract. 2018;119–42.

18. Delavar Kasmaei H, Hesami O, Jabbehdari S, Bostani A. Prevalence of Suicidal Ideation and Attempts in Patients With Epilepsy. Thrita. 2015;4(2):2–5.

19. Rosenman SJ. Suicide prevention. Vol. 54, Australian and New Zealand Journal of Psychiatry. 2020. 109 p.

20. Staniszewska A, Dąbrowska-Bender M, Sobiecki M, Juszczyk G, Olejniczak D, Czerw A, et al. Epidemiology and risk factors for suicide among adult patients with epilepsy. In: Epileptology-The Modern State of Science. IntechOpen; 2016.

21. Liu X, Zhang L, Wang X et al. The psychosocial challenges and mental health concerns of people with epilepsy: a review of recent literature. Epilepsy Behav. 2022;127.

22. Bosak M, Turaj W, Dudek D, Siwek M, Szczudlik A. Suicidality and its determinants among Polish patients with epilepsy. Neurol Neurochir Pol [Internet]. 2016;50(6):432–8. Available from: http://dx.doi.org/10.1016/j.pjnns.2016.07.009

23. Jones JE, Hermann BP, Barry JJ, Gilliam FG, Kanner AM, Meador KJ. Rates and risk factors for suicide, suicidal ideation, and suicide attempts in chronic epilepsy. Epilepsy Behav. 2003;4(SUPPL. 3):31–8.

24. MacHado RA, Espinosa AG, Melendrez D, González YR, García VF, Rodríguez YQ. Suicidal risk and suicide attempts in people treated with antiepileptic drugs for epilepsy. Vol. 20, Seizure. 2011. p. 280–4.

25. Rani RA, Razali R, Hod R, Mohamad K, Rani SAM, Yahya WNNW, et al. Suicidal ideation amongst epilepsy patients in a tertiary centre. Neurol Asia. 2014;19(2):129–36.

26. Rai D, Kerr MP, McManus S, Jordanova V, Lewis G, Brugha TS. Epilepsy and psychiatric comorbidity: A nationally representative population-based study. Epilepsia. 2012;53(6):1095–103.

27. Yılmaz S, Şahin EM ÖÖ. Prevalence and predictors of suicidal ideation among people with epilepsy in Turkey. Epilepsy Behav. 2020;105:106935.

28. Kumar N, Prasad C TS. Suicidal ideation and depression in people with epilepsy: A study from North India. Seizure. 2017;46:52–56.

29. Mothupi M, Okumu MA MM. Suicidal ideation and associated factors in people with epilepsy in a South African itle. South African J Psychiatry. 2018;24:1–6.

30. Hamed SA. Risks of suicidality in adult patients with epilepsy. World J Psychiatry. 2012;2(2):33.

31. Sadock BJ. Kaplan & sadock's synopsis of psychiatry: behavioral sciences/clinical psychiatry. PsychiatristCom. 2007;(3):139–78.

32. CDC. Suicide Facts at a Glance 2015 Nonfatal Suicidal Thoughts and Behavior. Natl Cent Inj Prev Control [Internet]. 2015;3–4. Available from: http://www.cdc.gov/violenceprevention/pdf/suicide-datasheet-a.PDF

33. Stefanello S, Marín-Léon L, Fernandes PT, Min LL, Botega NJ. Suicidal thoughts in epilepsy: A community-based study in Brazil. Epilepsy Behav [Internet]. 2010;17(4):483–8. Available from: http://dx.doi.org/10.1016/j.yebeh.2009.12.029

34. Frank JB. Synopsis of Psychiatry: Behavioral Sciences, Clinical Psychiatry. Vol. 267, JAMA: The Journal of the American Medical Association. 1992. p. 2112.

35. Giovannetti AM, Vignoli A SP. Psychological impact of epilepsy: A study on the prevalence of suicidal ideation in Italian people with epilepsy. Epilepsy

Behav. 2020;103:106872.

36. Shimizu S, Suzuki S TM. Suicidal ideation and associated factors in patients with epilepsy in Japan. J Epilepsy Res. 2018;8(2):77–83.

37. López-Goñi, J.J., Fernández-Montalvo, J., Arteaga, A. y Haro, B. (2018). Suicidal ideation and attempts in patients who seek treatment for substance use disorder. 2018;542–8.

38. (WHO) WHO. Suicide prevention: A global imperative. 2019.

39. Tegegne MT, Awoke AA. Perception of stigma and associated factors in people with epilepsy at Amanuel Specialized Mental Hospital, Addis Ababa, Ethiopia. Int J Psychiatry Clin Pract. 2017;21(1):58–63.

40. Nations U. Urbanization prospects. [Internet]. 2024. Available from: https://www.un.org

41. (WHO) WHO. Health service delivery in Ethiopia's northern regions. 2021.

42. Health EM of. Report on health service infrastructure in northern Ethiopia. 2021.

43. Hospital M. Mekelle Hospital services and healthcare initiatives [Internet]. 2020. Available from: https://www.mekellehospital.gov.et

44. Wittchen, H. U., Kessler, R. C., & Beesdo K. The Composite International Diagnostic Interview (CIDI): Overview and history. In: International Handbook of Depression. Springer; 2018. p. 355–73.

45. Abiola T, Udofia O, Zakari M. Psychometric Properties of the 3-Item Oslo Social Support Scale among Clinical Students of Bayero University Kano , Nigeria. 2013;22(2):32–41.

46. Zigmond, A. S., & Snaith RP. The Hospital Anxiety and Depression Scale. Acta Psychiatr Scand. 2021;143(1):80–2.

47. Jacoby A. Felt versus enacted stigma: A concept revisited. Evidence from a study of people with epilepsy in remission. Soc Sci Med. 1994;38(2):269–74.

48. The MMAS is a generic self-reported , medication-taking behavior scale in which the specific health issue (high blood pressure , diabetes , elevated cholesterol , HIV , contraception , etc .) is inserted for the " health concern ".

The MMAS consists of f. :4.

49. Henry-Edwards S, Humeniuk R, Ali R, Poznyak V, Monteiro M. The alcohol, smoking and substance involvement screening test (ASSIST): Guidelines for use in primary care (draft version 1.1 for field testing). Geneva World Heal Organ. 2003;

50. Mthembu, S. et al. Exploring the prevalence of suicidal ideation among adults with epilepsy in South Africa: A community-based study. Afr J Psychiatry. 2023;26(2):105–12.

51. Ding S, Li X, Hua Y, Dong F, Lin J, Du Y, et al. Risk factors for suicidal tendency in adult patients with epilepsy in China. Epilepsy Behav. 2019;97:118–22.

52. Nuhu FT, Lasisi MD, Yusuf AJ, Aremu SB. Suicide risk among adults with epilepsy in Kaduna, Nigeria. Gen Hosp Psychiatry. 2013;35(5):517–20.

53. Altura KC, Patten SB, Fiest KM, Atta C, Bulloch AG, Jetté N. Suicidal ideation in persons with neurological conditions: prevalence, associations and validation of the PHQ-9 for suicidal ideation. Gen Hosp Psychiatry. 2016;42:22–6.

54. Lim HW, Song HS, Hwang YH, Lee HW, Suh CK, Park SP, et al. Predictors of suicidal ideation in people with epilepsy living in Korea. J Clin Neurol. 2010;6(2):81.

55. Qin, P.; Agerbo, E.; Mortensen PB. Suicide risk in relation to family history of suicide and psychiatric disorders. Am J Psychiatry. 2003;160(4):741–8.

56. X Z, X L, H S. The role of family history of depression and anxiety disorders in predicting suicidal ideation. J Affect Disord. 2023;282(333–340).

57. H L, J P, Y C. Chronic illness and the risk of suicidal ideation: Findings from a nationwide survey in South Korea. Psychiatry Res. 2024;325:114–21.

58. S G, S K, A S. Chronic medical conditions and suicide risk: Evidence from India. Indian J Psychiatry. 2023;65(4):354–61.