



**LENGTH OF STAY IN PSYCHIATRY INPATIENT UNIT AND IT'S
ASSOCIATED
FACTORS AT ST. PAULS HOSPITAL MILLENIUM MEDICAL
COLLEGE A RETROSPECTIVE STUDY.**

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Addis Ababa, Ethiopia

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St Paul's Hospital Millennium Medical College

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**LENGTH OF STAY IN PSYCHIATRY INPATIENT AND ITS
ASSOCIATED FACTORS AT ST. PAULS HOSPITAL MILLNIUM
MEDICAL COLLEGE.**

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**A RESEARCH THESIS TO BE SUBMITTED TO SAINT PAUL'S
HOSPITAL MILLENIUM MEDICAL COLLEGE, DEPARTMENT OF
PSYCHIATRY FOR PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE SPECIALTY CERTIFICATE IN
PSYCHIATRY.**

Addis Ababa, Ethiopia, JANUARY 2026

SAINT PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE

DEPARTMENT OF PSYCHIATRY

Advisor's Approval Sheet.

This is to certify that the thesis entitled “**Length of Stay in Psychiatric Inpatient and its Associated Factors in St. Pauls Hospital Millennium Medical College**” is submitted in partial fulfilment of the requirements for the specialization certificate in psychiatry to Saint Paul's Hospital Millennium Medical College, the department of psychiatry, and has been carried out by **Dr. Mohammed Yusuf** under our supervision. Therefore, we recommend that the student fulfil the requirements and, hence, submit the thesis to the department.

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Abbreviation and Acronyms.

AOR	Adjusted Odds Ratio
EPS	extrapyramidal side effects
JUSH	Jimma University Specialised Hospital
LOS	Length of stay
SPHMMC	Saint Paul's Hospital Millennium Medical College
UK	United Kingdom
USA	United States of America
WHO	World Health Organization

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St. Paul's Hospital Millennium Medical College Graduate Study Program

Table 1: Table Summary of the project.

Name of investigator	Mohammed Yusuf, MD, PGY3
Full title of the research project	Length of stay in psychiatric inpatient unit and it's associated factors at saint Paul hospital millennium medical college: retrospective study.
Duration of the research	May 1- October 31, 2025
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ABSTRACT

Background: Hospital length of stay (LOS) is one of the stratified measures of health-care efficiency and is commonly used to assess the performance of psychiatric care. In sub-Saharan Africa, the number of psychiatric beds per population is disproportionately low. Moreover, there is a lack of data regarding the patterns of psychiatric admissions and the factors leading to long psychiatric hospitalization in this region. The results of the study will be useful for the staff members when they want to devise a treatment plan or give discharge to a patient.

Objectives: To assess the length of stay and associated factors with the psychiatry inpatient at SPHMMC, Addis Ababa, Ethiopia from 1- Oct 2019- 31 Dec 2024 GC.

Methods: Retrospective chart reviewing a cross-sectional study of 5 years duration was conducted at St. Paul's Hospital Millennium Medical College, Psychiatric inpatient acute and recovery ward. All eligible and accessed chart records of admitted patients in the study period of 240 were reviewed. For the factors associated with the length of stay, the patients' clinical documents were the source of data regarding. The data was coded, entered and then analysed using Statistical Package for Social Sciences software. The demographic and clinical data of patents were computed using descriptive statistics in percentages and frequencies. The associated factors with the outcome variable were done in bivariate and multivariable logistic regression and presented in tables.

Results: The mean age of participants was 30 ± 9.95 years, with most patients aged 18–29 years (54.2%) and male (65.4%). Schizophrenia (32.1%) was the most common primary diagnosis. The median length of hospital stay was 37 days, with 7.9% a prolonged stay. In multivariable logistic regression analysis, prolonged length of hospital stay was independently associated with female sex (AOR = 4.5; 95% CI: 1.12–18.04, $p = 0.034$), rural residence (AOR = 7.9; 95% CI: 1.75–36.42, $p = 0.007$), and having two or more previous psychiatric admissions (AOR = 6.8; 95% CI: 1.45–32.06, $p = 0.015$).

Conclusion: Prolonged psychiatric hospitalization was significantly associated with female sex, rural residence, and having multiple prior psychiatric admissions. These findings underscore the importance of considering patients' sociodemographic characteristics and pre-admission history, rather than focusing solely on primary diagnoses at the time of admission, when analysing inpatient length of stay.

Keywords: Length of Stay, Prolonged length of hospital stay, Psychiatric inpatient.

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1 Introduction

1.1 Background

Length of stay (LOS) refers to the number of days a patient remains hospitalized, from admission to discharge, and serves as a key indicator of healthcare efficiency and hospital performance, particularly in psychiatric care, it helps evaluate hospital resource management and care quality. Given the high prevalence of mental illness, examining factors influencing LOS in psychiatric settings is both relevant and important (1).

Shorter LOS is beneficial as it reduces healthcare costs by transitioning patients to more affordable community-based care. Although psychiatric LOS has generally declined, some patients still experience extended hospitalizations. In line with this, UK mental health policy emphasizes brief inpatient stays and prioritizes community-based treatment. Current evidence suggests that short hospital stays do not lead to a 'revolving door' pattern of admissions, although others have found a link between short hospital stays and an increased likelihood of readmission(2).

Literature shows considerable variation in psychiatric inpatient length of stay (LOS) across regions, with the shortest average LOS reported in the United States at approximately 10 days, longer stays in Japan at about 42 days, and the longest in South Korea at around 168 days (3–5). In sub-Saharan Africa, LOS generally ranges between 14 and 28 days among patients admitted to psychiatric facilities (1). A study conducted in Iran reported that prolonged psychiatric inpatient care is generally discouraged, as extended hospitalization may isolate patients from their social networks; the study also identified several sociodemographic and clinical factors associated with LOS, including gender, age, employment status, marital status, number of divorces, disability rate, discharge diagnosis, physical comorbidity, number of previous hospitalizations, suicidal ideation, and number of suicide attempts (6). Similarly, two studies from acute psychiatric units in teaching hospitals in Nigeria reported mean LOS of 23 days and 28.7 days, respectively (7,8). In contrast, a study conducted at Amanuel Mental Specialized Hospital in Ethiopia reported a substantially longer LOS of approximately 63 days (9).

Length of stay is likely to be multifactorial determined and growth in the number of patients admitted to inpatient psychiatric services has been reported worldwide and more similar studies examining factors associated with length of hospital stay are needed to understand the operation of psychiatric services in our country. Considering the limited resources for providing

psychiatric inpatient services, identification of the factors influencing length of stay is of great importance (6).

Mental health care models in low-income countries, including Ethiopia now advocate for integrating psychiatric services into primary care and placing inpatient units within general hospitals. Historically, Ethiopia had only one psychiatric hospital in Addis Ababa, but more inpatient facilities have recently been established in other cities (10).

1.2 Statement of the problem

Some patients continue to experience lengthy stays in psychiatric inpatient units. Understanding factors associated with lengthy stays in hospital is important in order to better understand psychiatric service use.

The average length of stay (LOS) in psychiatric units is a key indicator of healthcare service efficiency, as shorter hospitalizations—when clinically appropriate—can reduce costs by facilitating timely transition to less expensive community-based care. In contrast, prolonged LOS is often associated with complications such as hospital-acquired conditions or deterioration in mental health, leading to increased treatment costs, greater strain on healthcare resources, and poorer patient outcomes. Extended inpatient stays may also foster institutional dependency and reduce patients' quality of life, while unnecessary admissions and delays in discharge can result in inefficient use of psychiatric beds, limiting access for patients with more urgent needs. Understanding the factors contributing to prolonged LOS is therefore essential for developing strategies that promote recovery, optimize resource utilization, and improve overall mental health service delivery(11).

Mental health services in low-income countries are often described as inadequate, unequal and inefficient with sub-Saharan Africa facing major challenges due to limited infrastructure. While hospitalization is necessary extended stays can lead to higher healthcare costs, diminished quality of life and increased risk of trauma and related symptoms.

An excessive LOS has a negative impact on not only health care outcomes but also greater patient cost burden. Thus, it is important to identify risk factors associated with prolonged LOS, which would inform policy makers and facilitate identification of high-risk patients for future targeted intervention.

Longer LOS is associated with more medical or psychiatric comorbidities, for example, nosocomial infections, depression, among others; thus, more medical costs and bills, worsening

prognosis, creating a significantly higher burden on caregivers in addition to a higher burden on hospital and government resources.

Due to the lack of information about factors associated with length of stay among patients with mental illness in SPHMMC, it will be important to address this important gap. In particular to determine whether any modifiable factors are associated with long length of stay, so that clinicians might stabilize and discharge patients more quickly, reducing financial strain on the health care system and improving access to inpatient care for patients in need.(8)

In low-income countries the absence inadequacy of community mental health and rehabilitation services makes it difficult to maintain short hospital stays, despite the construction of new acute psychiatric units. This lack of support creates a bottleneck effect, limiting efforts to reduce length of stay. Therefore, policies aimed at shortening hospitalization must be paired with the development of comprehensive community based mental health services and infrastructure (10).

Understanding the role of demographic and clinical factors influencing the length of stay (LOS) among psychiatric inpatients at Saint Paul's Hospital Millennium Medical College (SPHMMC) will contribute to improving the quality of patient management. The psychiatric department of SPHMMC serves a large catchment area while having a limited number of inpatient beds, making efficient utilization of available resources particularly important. Despite this, no study has yet been conducted to identify factors associated with the length of hospitalization among patients with mental illness at SPHMMC. Therefore, this study aims to determine the average LOS and to identify the demographic and clinical factors associated with inpatient psychiatric hospitalization at SPHMMC.

1.3 Significance of the study.

Growth in the number of patients admitted to inpatient psychiatric services has been reported worldwide. At the same time, an increase in the length of hospital stay of these patients was observed. The majority of psychiatric beds in developing regions are situated in large overcrowded mental hospitals (11).

Given the significant demand for inpatient psychiatric beds in the country, information is scarce regarding the factors that influence LOS on the psychiatric inpatient of SPHMMC, this is a difficult situation that should be addressed and this study will be important, and help. Monitoring LOS, helps evaluate the efficiency and effectiveness of psychiatric treatment. Shorter or optimized LOS can reduce hospital overcrowding and ensure better use of resources.

Understanding factors influencing LOS allows hospitals to improve discharge planning and continuity of care.

Evidence on treatment practice, length of inpatient and associated factors in patients with psychiatric disorders are rarely discussed in Ethiopia. This study will allow hospitals to reduce overcrowding by identifying patterns that influence longer stays and addressing them.

The study will help among mental health provincials to know more variables that might be modifiable through change of clinical practice and service delivery, in order to understand more LOS, and associated factors of psychiatric inpatient, as well as for the treatment team when they want to devise a care plan or give discharge to a patient.

The results of the study will be useful for the staff members when they want to devise a treatment plan or give discharge to a patient. Besides, early recognition of these factors will facilitate efficient allocation of resources to optimize care in psychiatric facilities

2 Literature Review.

2.1 Length of stay.

Globally in 2016, more than one billion people were affected by mental or addictive disorders, accounting for approximately 16% of the global population. While the global data in 2017 shows an estimated 264 million, 45 million, and 20 million people were living with depression, bipolar disorder, and schizophrenia, respectively. In Africa, including Ethiopia, nearly similar proportions have been reported from different parts of the continent.(11)

Study done at Portugal showed when considering the factors that influence LOS, research suggests an association with (1) the clinical (e.g. psychiatric diagnosis, legal status, compulsory admission, severity, comorbidities) and (2) socio-demographic characteristics of patients (e.g. age, gender, education), as well as with (3) the characteristics of hospitals or of the health care system (12).

A retrospective chart review at the Jewish General Hospital in Montreal at Canada analysed 200 patient records from a pool of 5,792 geriatric inpatients admitted between 2007 and 2018. The study identified several sociodemographic factors associated with longer hospital stays, including older age, male gender and a higher number of pre-admission medications, more medical comorbidities, and prior residence in a supervised or institutional setting (13).

Study done at UK found that longer psychiatric hospital stays were linked to factors such as male gender, certain ethnic backgrounds (particularly Caribbean or mixed heritage), unemployment or retirement, homelessness or supported housing, a primary diagnosis of psychosis and involvement with multiple care coordinators. In contrast, shorter stays were associated with being a council tenant and having diagnoses like substance use, affective, stress-related, or personality disorders. Marital status had no significant effect on length of stay. The study highlights the complex interplay of factors affecting hospitalization duration and notes that, unlike some prior research, it did not find strong evidence of a "revolving door" pattern with shorter stays (2).

A retrospective chart review study conducted in Italy found that patients with the longest psychiatric hospital stays did not significantly differ from others in terms of demographic characteristics although foreign and homeless individuals were more frequently represented, suggesting that challenging social and environmental conditions may contribute to delayed discharges. Additionally, factors such as medical comorbidities, hostility, manic excitement,

and aggressive behaviour during hospitalization were identified as significant risk factors associated with prolonged stays (14).

According to study done at Iran the results of hierarchical regression, clinical aspects played an important role in determining patients' LOS. In addition, treatment procedures made a great contribution to the explanation of the variance in LOS. On these grounds, when investigating the factors influencing LOS, clinical aspects and treatment procedures should receive the greatest attention. It is also recommended that quantitative measures are applied at admission there by assessing a patient's level of functioning as well as severity of symptoms (6).

Study done at South Africa, showed patients with psychoses and bipolar disorder have lengthier hospital stays burdening the cost of care of psychiatric treatment in a general hospital setting. Findings call for identifying those cases quickly, attending to their needs with evidence-based efficient treatment and for improving and developing an aftercare system such that the utilization of acute inpatient beds, already a scarce resource, could achieve higher efficiency (15).

2.2 Factors associated with the length of stay.

Study done in Zhang Town, China on LOS, revealed that psychosis, especially schizophrenia and schizoaffective disorder was the most frequent psychiatric diagnosis among inpatients, with notable rates of substance abuse and personality disorders. Patients were predominantly single, unemployed and male migrants with limited education, often living with family. Although many were readmitted within a year, length of stay generally did not predict readmission risk, except for those who received electroconvulsive therapy (16).

Study done in Uganda, the average length of psychiatric inpatient stay varies, with about 21 days reported at the National Referral Mental Hospital and 14 days at regional referral hospitals. This aligns with the general range of 14 to 28 days seen across sub-Saharan Africa. Globally, lengths of stay differ significantly from as short as 10 days in the USA to 42 days in Japan and up to 168 days in South Korea. Although Uganda lacks studies specifically analysing factors influencing LOS, research from other sub-Saharan countries has identified key factors, including being unmarried, unemployed, older age, certain mental and physical health conditions, prior hospitalizations, and substance use. Longer stays have also been linked to public or teaching hospital admissions, high psychiatric bed density, and medication noncompliance, while shorter stays are associated with the use of ECT, private hospitals, and better staffing (1).

The same study in Uganda found that the presence of caregivers during psychiatric admission significantly reduced the length of stay, with patients without caregivers staying over 18 days longer. Caregivers contribute to recovery by providing emotional support, assisting with daily activities, managing practical needs, and participating in decisions about admission and discharge. These results align with previous studies, including one from Austria in 2007, which also linked caregiver involvement to shorter hospital stays. Given the consistent findings, mental health facilities are encouraged to support caregiver involvement to improve patient outcomes and reduce hospitalization time (1).

A study in South Africa reviewed 367 adult patients with schizophrenia or schizoaffective disorder, categorizing their hospital stays as short <30 days, medium 31–90 days, or long >90 days. A sample from each group was analysed for demographic and clinical differences. Results showed that males 72% and unmarried individuals 100% were more common in the long-stay group. These outcomes are consistent with a UK study that also linked male gender to longer psychiatric stays. While marital status is not always linked to length of stay, it is seen as a positive factor due to the social and emotional support it often provides (15).

A study conducted in Malawi analysed records of 417 psychiatric inpatients admitted to Bwaila Psychiatric Unit in 2011, using multivariate logistic regression to identify factors linked to longer hospital stays over 28 days. The findings revealed three significant predictors of extended stay, residing outside Lilongwe district, experiencing EPS and having limited prior contact with the healthcare system. Some of these factors or the way staff respond to them, may be adjustable and offer opportunities to improve care and reduce hospital stays (17).

Study done at South Africa on the length of stay and associated factors of bipolar, total of 215 patients were admitted during the study period. The mean LOS was 30 days. The mean age of the patients was 35.9 years. There were similar numbers of males and females admitted. Significantly more patients were not married, unemployed and had a history of substance use(18).

Length of stay in the hospital can be used as an indicator of productivity; hence reducing the length of hospital stay can increase the quality of patient care and reduce the number of

Hospital beds. Hospitals are severely constrained by shortage of beds and resources for patient care and most are under pressure due to insufficient financial resources. Also, various challenges, such as increasing the number of patients and lack of other resources including

inpatient beds and nursing staff, increase working stress and costs in different parts of a hospital.

The quality of mental health services varies across the globe. For instance, the existing mental health services in low-income countries have been characterized as inadequate, inequitable, and inefficient. In developing nations, particularly in Sub-Saharan Africa, the lack of infrastructure and the limited number of psychiatric beds per population remain a significant barrier to improving mental health services in the region. This may negatively impact patient outcomes (11).

LOS is multifactorial determined, behavioural manifestations of illness resulting from a combination of factors and lack of social support structures predict prolonged LOS. Good clinical practice does not necessarily translate to a shorter LOS. Therefore, LOS is predictable, but not readily modifiable within the clinical domain.(16).

A study done at Jimma Referral Hospital in Ethiopia found that patients with major depressive disorder and brief psychotic disorder had shorter hospital stays compared to those with schizophrenia, while bipolar disorder patients had similar lengths of stay to those with schizophrenia. Longer hospitalizations were linked to medication induced EPS, and patients who paid for their care tended to have shorter stays than those receiving free treatment. The distribution of length of stay was positively skewed, ranging from 1 to 261 days, with a median of 22 days. Only 1.2% of patients stayed longer than three months. The mean length of stay varied by diagnosis, with the longest for schizophrenia/psychotic disorders 34.2 days and the shortest for brief psychotic disorder 23.7 days (10).

Several studies have found that a diagnosis of schizophrenia or non-affective psychoses to be predictors of long hospital stays.

The chronic nature of psychotic disorders compared to mood disorders might explain this finding although at times it is hard to make a clear differentiation between the two.

In the study done at JUSH, a lengthy LOS was also reported for bipolar disorders, a unique finding when compared to other studies, which reported for example a median LOS of 18.0 days for bipolar patients on quetiapine treatment (10).

Consequently, the already small number of psychiatric beds available shrink gradually as patients with chronic mental illness fail to be discharged and continue to occupy the hospital units for several months or even years.

In general, there are only limited studies on the LOS and associated factors in the inpatient psychiatric hospitals in our country and this study will be important to know more about factors associated the length of stay at the psychiatric inpatient. This head-to-head comparison would then dictate future policies and treatment plans and perhaps vacating hospital beds earlier. So there is no more studies like this not yet conducted or published in Ethiopia or the African continent.

2.3 Conceptual framework of the study

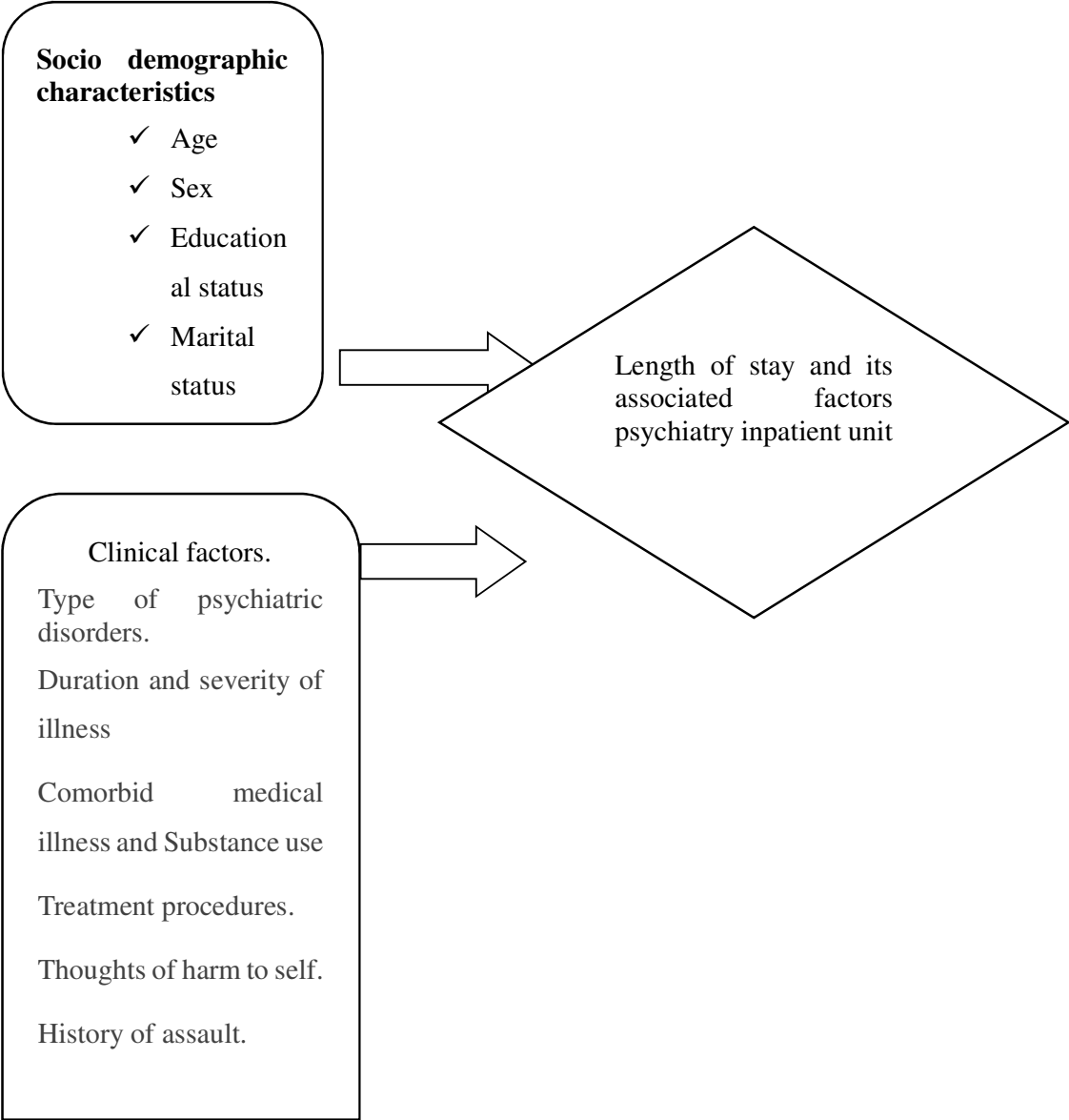


FIGURE 1. CONCEPTUAL FRAMEWORK DEVELOPED FROM LITERATURE REVIEW

3 Objectives of the study.

3.1 General objective.

- To investigate length of stay in psychiatry inpatient and its associated factors at SPHMMC, Addis Ababa, Ethiopia from 1 Oct 2019- 31 Dec 2024.

3.2 Specific objectives.

- To assess the length of hospital, stay over the study period of inpatients admitted to SPHMMC from 1 Oct 2019- 31 Dec 2024.
- To determine factors associated with length of stay of inpatients admitted to SPHMMC from 1 Oct 2019 to 31 Dec 2024.

3.3 Research Hypothesis.

We hypothesized that the length of stay in psychiatric inpatient at SPHMMC is prolonged and associated factors are being male, having poor treatment adherence, comorbid medical and mental illness, substance abuse and having a diagnosis of schizophrenia and bipolar I disorder.

4 Methods and Materials.

4.1 Study area and period:

The study was conducted in SPHMMC psychiatric inpatient acute and recovery wards. St. Paul's Hospital Millennium Medical College (SPHMMC), which is one of the largest Government hospitals in Addis Ababa, Ethiopia, was established in 1976. The hospital is a rapidly expanding, particularly after the start of the medical college in 2008. It has 19 departments, including undergraduate, 14 general specialty training, and 16 sub-specialty training departments. On average, the hospital serves about 200,000 patients annually, with a catchment population of over 5million (50,51). Psychiatry department, outpatient and Substance services was started long time before, but Acute and Recovery Inpatient Ward was recently started on 2019, GC. The current services the psychiatry department currently gives are Outpatient adult, Emergency, Recovery wards, forensic, child and adolescent, addiction psychiatry, trauma clinic and psychology services. Psychiatry department started the post graduate on 2017. GC, and currently there are 1st, 2nd and 3rd year Resident. There more than 13 Psychiatrists, 4 Psychologists and 10 psychiatry professionals.

Study Period: The study was conducted from May 1- October 31, 2025

4.2 Study Design:

Retrospective chart review cross-sectional study of 5 years duration, 1 Oct 2019 -31 Dec 2024 was conducted.

4.3 Population:

4.3.1 Source population

All patients who were admitted to the acute ward and recovery from 1 Oct 2019 -31 Dec 2024 and whose chart records are available.

4.3.2 Study population.

All patients who were admitted to an inpatient of SPHMMC, psychiatric acute and recovery wards during the study period and who fulfilled inclusion criteria.

4.4 Eligibility criteria.

4.4.1 Inclusion criteria.

The current study includes all patients who are ≥ 18 years of age

- Patient should have stayed inpatient more than at least 1-day
- Hospitalization within the specified period.

4.4.2 *Exclusion criteria*

- Incomplete charts especially those didn't have age, sex, diagnosis and any re-admissions.
- Patients admitted to substance ward

4.5 Sample Size Determination and Sampling Procedures.

4.5.1 *Sample size determination*

- Census method was used thereby surveying the case-files of all patients admitted to and later discharged from wards of SPHMMC during a five-year time-frame from 1-Oct 2019 31-Dec 2024 was reviewed

4.5.2 *Sampling procedure.*

- Patient's charts who fulfill the inclusion criteria was included in the study.
- Whole sample was used

4.6 Variables of the Study.

4.6.1 *Dependent Variable*

- Length of Stay in Psychiatric Inpatient Care.

4.6.2 *Independent Variable.*

- **Socio- demographic data:** Age, Gender, Marital status, educational level, Occupation status, Residence area.
- **Clinical factors:** Type of psychiatric disorders, Duration and severity of illness, Comorbid medical illness, Comorbid mental illness and Extrapyrarnidal side effects, Substance use history or comorbid substance use, Number of previous hospitalizations, Thoughts of harm to others, History of assault, History of self-harm/suicidal behavior, Treatment Procedures (number of ECT sessions and use of chemical restraints), Type of insurance

4.7 Data Collection Tools and Procedure.

The source of data regarding length of stay was the admissions and discharge Registers in the wards. These registers record patients' date of admission and date of discharge, as well as their discharge diagnosis.

For the factors associated with the length of stay, the patients' clinical files (with discharge summaries and clinical notes) were the source of data regarding sociodemographic and clinical factors. The clinical files, MRN numbers were requested from the admission and discharge registry log book of the Department and Hospital card room. The data for each patient was collected by the researcher and recorded on a data collection sheet. Each patient was assigned a numerical identifying study number to ensure confidentiality. Patient name and hospital number was be captured on the data collection sheet.

The first part included identifying all patients who were admitted to SPHMMC between October 2019 and 31 December 2024, who meet all of the other study inclusion criteria and none of the exclusion criteria. The admission dates and discharge dates of all these patients was recorded. The length of stay was calculated as the difference between the date of discharge and the date of admission.

The length of stay of the total study population is reported in terms of the median. It is then further reported in terms of categories: the proportion of admissions that were "short stay" (30 days or less), "medium stay" (between 31 and 90 days), and "long stay" (more than 90 days) (8). The study was conducted to explore the sociodemographic and clinical factors of a subgroup these patients, and determine whether any relationship exists between these factors and the three categories of length of stay, namely short stay, medium stay and long stay.

The factors captured include both dependent variables (length of stay) and independent variables (demographic, socioeconomic, comorbidity). Two senior psychiatric nurse professionals were recruited and trained on data collection procedures. For the data collectors, a brief one-day training was provided by the investigator to familiarize them with the data collection tool and ethical aspects of the procedure. Data was collected after obtaining consent from the Institutional review board of SPHMMC.

4.8 Operational definitions.

Length of stay was defined as the number of days between admission date and discharge date for each admission experienced during the study period (1)

Inpatient treatment is the treatment given to patient while he is admitted to the recovery and acute ward (7).

Transfers were identified as those admissions beginning the same day or the day after the discharge date of the individual's previous admission (17).

Comorbidity is the occurrence of two or more psychiatric disorders or medical illness in a single patient at the same time (15).

Incomplete chart is the chart that doesn't fulfil or contain major variables like admission date, discharge date, primary diagnosis and sex (16).

Place of residence patient's usual residence place as documented in the medical chart and classified as rural or urban.

Patients discharge diagnosis is the diagnosis of the patient at discharge compared to the Patient's diagnosis at admission (2)

Prolonged LOS, duration that the patient stayed either acute emergency opd or recovery ward which is more than 90 days (8).

Substance use, SUD diagnosis documented or current use noted in chart within 12 months (8).

Rural, those patients who came from outside of Addis Ababa and cities which don't have psychiatry service.

4.9 Data Quality Management.

The data was collected by well-trained and experienced data collectors. An orientation was provided to the data collectors on the study and the use of the study tool. Brief training for the data collectors (psychiatric nurses) about the process of data collection was provided before the actual data collection. Close supervision was provided during data collection, and questionnaires were double-checked twice weekly for consistency and completeness by data collectors and the principal investigator. Pretesting was carried out to minimize ambiguity of words as well as ensure comprehensibility, appropriateness of language, sensitivity of questions, and average duration of administration. The feedback received from this pilot study was used to modify and finalize the data collection tool.

4.10 Methods of data analysis.

Data was collected using pretested and structured questionnaires. The entire data collection process was closely supervised. The data was coded, entered, and stored in Epi Data and then statistical analysis was carried out using Statistical Package for Social Sciences (SPSS) version 26. Data were first checked for missing values using frequency analysis. Descriptive statistics were used to summarize patients' sociodemographic variables and clinical characteristics: continuous variables were presented as mean with standard deviation and median, while categorical variables were presented using frequencies and percentages. Normality of continuous variables was assessed using visual inspection of histograms and the Shapiro–Wilk test. Factors associated with the dependent variable, length of stay of psychiatric inpatients, were initially explored using bivariate logistic regression, with variables having $p < 0.25$ considered for inclusion in the multivariable model. Multicollinearity among independent variables was assessed using tolerance and Variance Inflation Factor (VIF), with all variables showing tolerance >0.2 and VIF <5 , indicating no significant multicollinearity. Multivariable logistic regression was then performed, and variables with $p < 0.05$ were considered statistically significant. Model fit was evaluated using the Hosmer–Lemeshow test, which yielded a p-value above 0.05 ($p = 0.874$), indicating a good fit of the dataset to the model.

4.11 Ethical considerations.

Ethical clearance was obtained from the Institutional Review Board of SPHMMC. A support letter was submitted to the Inpatient coordinators to facilitate data collection, before the actual data collection time. This was followed by an introduction and familiarization of the data collectors with the onsite coordinators. The data collected was utilized only for this study. Filled hard copies were kept in a locked drawer, and the dataset that was password-protected.

4.12 Dissemination of the study findings.

The findings of this study will be submitted to the Department of Psychiatry, SPHMMC in Partial Fulfillment of the Requirements for Specialty Certificate in Psychiatry. In addition to this, the findings will also be presented and disseminated to other concerned stakeholders through presentations at different professional conferences. Finally, the manuscript will be submitted to a peer reviewed scientific journal for possible publication.

5 Results

5.1 The sociodemographic characteristics of the study participants

A total of 800 patients were admitted to the psychiatric inpatient unit during the five-year study period and out of this 400 were admitted to the Substance ward. The rest were initially planned for data collection. Of these, 298 patient charts were successfully retrieved. After reviewing the retrieved charts, 240 were found to be eligible resulting in a chart inclusion rate of 60% and included in the final analysis, while 58 charts were excluded due to incomplete data.

The mean age of the participants was 30.24 ± 9.95 years, with more than half of the patients aged between 18 and 29 years. Males constituted nearly two-thirds of the study population (157, 65.4%). Most participants were single (152, 63.3%) and resided in urban areas (195, 81.3%). Regarding educational status, secondary-level education was most common (118, 49.2%), while the majority of participants were unemployed (160, 66.7%). Almost all patients lived with their family (234, 97.5%). Detailed sociodemographic characteristics are presented in Table 2.

Table 2. Sociodemographic characteristics of admitted patients at psychiatric inpatient unit of SPHMMC from 2019 to 2024 and (N=240)

Variable	frequency	Percent
Age at admission		
18-29	130	54.2
30-45	87	36.3
>45	23	9.6
sex		
Male	157	65.4
Female	83	34.6
Marital status		
Single	152	63.3
Married	54	22.5
Divorced	23	9.6
Widowed	11	4.6
Educational Level		
No formal education	3	1.3
Primary	54	22.5
Secondary	118	49.2
Tertiary	65	27.1
Employment status		
Student	50	20.8
Unemployed	160	66.7
Employed	27	11.3
Retired	3	1.3

Residency		
Rural	45	18.8
Urban	195	81.3
Living with		
lives alone	6	2.5
lives with his/her family	234	97.5

5.2 The clinical characteristic of the study participants

Regarding primary psychiatric diagnoses, Schizophrenia was the most frequently diagnosed psychiatric disorder, accounting for nearly one-third of admissions (77, 32.1%), followed by bipolar disorder (58, 24.2%) and major depressive disorder (47, 19.6%). Approximately one-third of the participants had at least one documented medical or psychiatric comorbidity (79, 32.9%), with substance use disorder being the most common comorbid condition (57, 23.8%).

Most patients had been diagnosed with mental illness for more than one year, with the largest proportion having a duration of illness between 2 and 5 years (87, 36.3%). The majority had fewer than two previous psychiatric admissions (188, 78.3%) and reported outpatient follow-up prior to admission which was irregular in the majority of the patients (161, 67.1%). Chemical restraint after admission was documented in less than one-third of patients (69, 28.7%).

Regarding treatment characteristics, two or more medications were prescribed during admission for more than half of the participants (130, 54.2%). Extrapyramidal side effects were not common (22, 9.2%), and less than one-quarter of patients had a history of suicide attempt (55, 22.9%). Patients were rarely referred for electroconvulsive therapy (6, 2.5%). At discharge, three-quarters of the patients showed clinical improvement (180, 75.0%). A detailed summary of clinical characteristics is provided in Table 3.

Table 3. Clinical characteristics of admitted patients at psychiatric inpatient unit of SPHMMC from 2019 to 2024 and (N=240)

Variable	frequency	Percent
Primary Psychiatric Diagnosis		
Schizophrenia	77	32.1
Bipolar Disorders	58	24.2
Major Depressive Disorder	47	19.6
Catatonia	30	12.5
Brief psychotic disorder	20	8.3
Obsessive-compulsive disorder	8	3.3
presence of psychiatric or medical comorbidities		
Yes	79	32.9

No	161	67.1
Comorbid conditions*		
• Diabetes Mellitus	15	6.3
• HIV	10	4.2
• Hypertension	10	4.2
• Epilepsy	8	3.3
• Substance Use disorder	57	23.8
Years since first Mental illness		
<= 1 year	44	18.3
2 – 5 years	87	36.3
6– 10 years	73	30.4
>10 years	36	15.0
Number of previous Psychiatric admissions		
<2 previous admission	188	78.3
>=2 previous admission	52	21.7
History of Outpatient Follow-Up		
None	42	17.5
Regular	37	15.4
Irregular	161	67.1
Use of Chemical Restraint after admission		
Yes	69	28.7
No	171	71.3
Number of medications prescribed during admission		
1 medication	22	9.2
2 medications	130	54.2
3 medications	77	32.1
4 medications	11	4.6
Presence of extrapyramidal side effect		
Yes	22	9.2
No	218	90.8
History of Suicide Attempts		
Yes	55	22.9
No	185	77.1
Referral for ECT		
Yes	6	2.5
No	234	97.5
Discharge outcome		
Improved	180	75.0
Unchanged	57	23.8
Deteriorated	3	1.3

N.B: The reported comorbid conditions were not mutually exclusive, and individual participants could have more than one comorbid condition.

5.3 The length of hospital stays of the study participants.

Participants had a mean length of hospital stay of 42.55 ± 27.4 days. However, since the data collected on the distribution of length of hospital stay among the study participants was not normally distributed with few outliers, the median length of hospital stay was also computed to better represent the central tendency of the data. The median hospital stay was 37 days (IQR: 22–58), with lengths of stay ranging from 7 to 152 days. Accordingly, 53.3% of the patients admitted had a medium hospital stay, 38.8% of the patients admitted had short length of stay and 7.9% of the patients had prolonged hospital stay as illustrated in Figure 2.

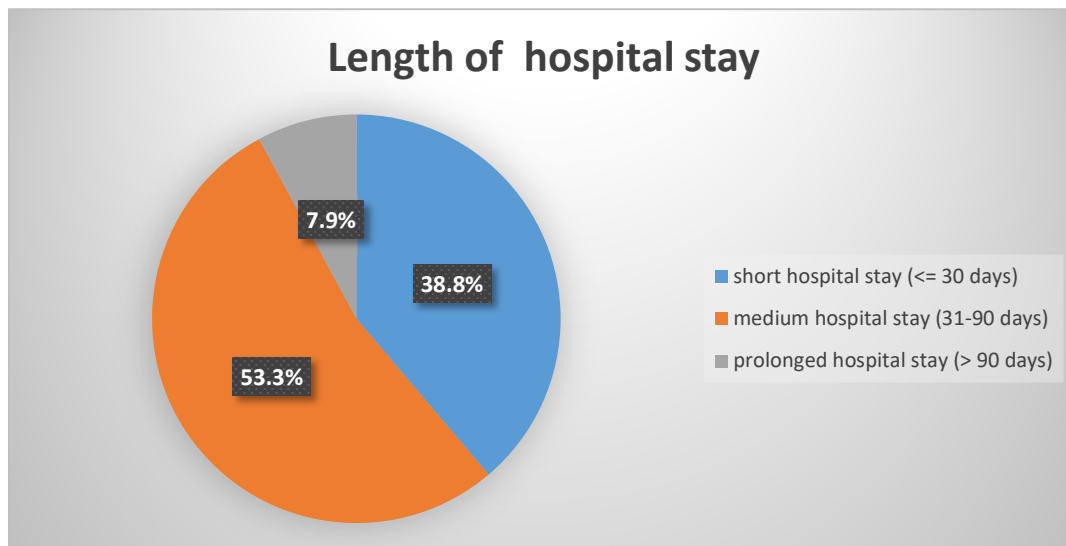


Figure 2. The length of hospital stays among admitted patients at psychiatric inpatient unit of SPHMMC from 1-Oct -2019 to 31-Dec - 2024 and (N=240)

5.4 The associated factors of length of hospital stay among study participants.

For the association factors analysis, prolonged length of hospital stay was considered as the dependent variable. This outcome was selected because prolonged hospitalization has been consistently reported in the literature as a key indicator of illness severity, treatment complexity, and increased utilization of inpatient mental health services, and it allows for meaningful comparison with previous hospital-based studies. In the bivariate logistic regression analysis, several independent variables showed potential association with prolonged length of hospital stay at a p-value threshold of <0.25 and were therefore considered eligible for inclusion in the multivariable analysis. These variables included sex, place of residence, number of previous psychiatric admissions, history of outpatient follow-up, and history of

chemical restraint use after admission. Variables that did not meet this criterion were excluded from further analysis after this stage.

For the multivariable logistic regression analysis, variables with a p-value of <0.25 in the bivariate analysis were entered into the model together with selected potential confounding variables, such as age, confirmed psychiatric diagnosis, presence of comorbid conditions, and duration since initial psychiatric diagnosis. Multicollinearity among independent variables was assessed using tolerance and Variance Inflation Factor (VIF), with all variables showing tolerance >0.2 and VIF <5, indicating no significant multicollinearity.

In the multivariable logistic regression analysis, sex, place of residence, and number of previous psychiatric admissions remained independently associated with prolonged hospital stay with having p values of <0.05. Female patients had 4.5 times higher odds of experiencing prolonged hospitalization compared with male patients (AOR = 4.5; 95% CI: 1.12, 18.04, p = 0.034). Patients residing in rural areas were nearly eight times more likely to have prolonged hospital stays compared with those from urban areas (AOR = 7.9; 95% CI: 1.75, 36.42, p = 0.007). Additionally, patients with two or more previous psychiatric admissions had significantly higher odds of prolonged length of stay compared with those with fewer than two admissions (AOR = 6.8; 95% CI: 1.45, 32.06, p = 0.015). Notably, the confidence intervals for the significant associations were relatively wide, reflecting the limited number of prolonged LOS events in subgroups. While this indicates imprecision in the exact magnitude of effect, the direction and statistical significance of these associations remain clear. Although outpatient follow-up status and use of chemical restraints after admission were included in the multivariable model, they did not demonstrate statistically significant associations with prolonged hospital stay after adjustment for other variables. Model fitness was evaluated using the Hosmer–Lemeshow goodness-of-fit test, which demonstrated an adequate model fit (p-value >0.05). Detailed regression results are shown in Table 4.

Table 4. The bivariate and multivariable logistic regression of association between outcome and independent variable

Variable	Prolonged LOS		P-value	COR with 95% CI	P-value	AOR with 95% CI
	Yes	No				
Sex						
Male	10	147	1		1	
Female	9	74	0.227	1.8 (0.69, 4.59)	0.034*	4.5 (1.12, 18.04)
Residency						
Urban	12	183	1		1	

Rural	7	38	0.042	2.8 (1.04, 7.61)	0.007*	7.9 (1.75, 36.42)
Previous Psychiatric Admissions						
<2 previous admission	10	178	1		1	
>=2 previous admission	9	43	0.007	3.7 (1.43, 9.73)	0.015*	6.8 (1.45, 32.06)
Outpatient Follow-Ups						
Regular	5	32	1		1	
Irregular	13	148	0.305	0.6 (0.19, 1.69)	0.152	0.3 (0.05, 1.59)
None	1	41	0.097	0.2 (0.02, 1.41)	0.216	0.2 (0.011, 2.77)
Use of Chemical restraints						
No	16	155	1		1	
Yes	3	66	0.204	0.4 (0.12, 1.56)	0.068	0.2 (0.024, 1.14)

*N.B: p – value less than 0.05 in the multivariate logistic regression model were taken as showing significant association. * show variables with significant p value*

6 Discussion

This retrospective study assessed the length of stay (LOS) and associated factors among psychiatric inpatients admitted to St. Paul's Hospital Millennium Medical College (SPHMMC) over a five-year period. A total of 240 patient records were analysed.

The median LOS was 37 days (IQR: 22–58). Using the South African categorization of LOS, slightly more than half of the patients (53.3%) had a medium stay (31–90 days), while 7.9% experienced prolonged hospitalization (>90 days) (8). Multivariate logistic regression identified female sex, rural residence, and having two or more previous psychiatric admissions as independent predictors of prolonged LOS. These findings highlight that LOS at SPHMMC is influenced by a combination of demographic and clinical service-use factors, rather than diagnosis alone, and reflect systemic challenges common to psychiatric inpatient care in low-income settings.

The median LOS of 37 days observed in this study is longer than LOS reported in several other sub-Saharan African settings but shorter than that reported in some Ethiopian state psychiatric facilities. For instance, a study conducted in Uganda reported an average LOS of 14 days in regional referral hospitals and about 21 days at the National Referral Mental Hospital(1), which is substantially shorter than the median LOS observed at SPHMMC. Similarly, different studies from acute psychiatric units of teaching hospitals in Nigeria reported LOS of 23 days and 28.7 days(7,8), which is also lower than the findings in this study. Conversely, the LOS reported in this study is shorter than the 63-day average LOS reported at the state mental hospital in Amanuel hospital Addis Ababa (9), Ethiopia. This difference may reflect variations in service structure, patient case mix, discharge planning efficiency, the availability of acute inpatient units within general hospitals as well as the time each research was conducted might reflect only on the status of hospitals during the period and recent developments in hospital capacity as well as increasing attention on reducing psychiatric morbidities might have an impact. SPHMMC operates as a tertiary hospital with dedicated psychiatric unit, which aligns with Ethiopia's current mental health policy emphasizing integration of mental health services into general healthcare systems, potentially facilitating relatively shorter stays compared to standalone psychiatric hospitals.

In comparison to Global literatures, the LOS at SPHMMC remains considerably longer than that reported in some high-income countries such as the United States, where LOS averages around 10 days(5), but is comparable to Japan which is 42 days(3), and remarkably lower than

that of Korea which can reach up to 168 days(4). These international differences, as noted in the literature, might reflect differences in mental health policy, availability of community-based services, and inpatient bed management strategies.

In this study, males constituted the majority of admissions (65.4%), which is consistent with findings from the UK, South Africa, and China, where male patients dominate psychiatric inpatient admissions(2,15,16). However, opposite to several previous studies, female sex was independently associated with prolonged LOS at SPHMMC. This finding contrasts with studies from the UK and South Africa, which consistently reported male gender as a predictor of longer psychiatric hospital stays. For example, the UK study found that male gender was significantly associated with longer LOS, particularly among patients with psychotic disorders (2). Similarly, the South African study involving patients with schizophrenia and schizoaffective disorder found that males were overrepresented in the long-stay group (15). The discrepancy observed in the current study may be explained by contextual and cultural factors. Female patients in Ethiopia may experience delayed presentation, limited social support, or increased caregiving challenges following discharge, which could prolong inpatient stays. Additionally, clinicians may adopt more cautious discharge practices for female patients due to concerns related to family acceptance, safety, or caregiving arrangements, especially in cases where community mental health support is limited.

One of the strongest predictors of prolonged LOS in this study was rural residence, with rural patients being nearly eight times more likely to experience prolonged hospitalization compared to urban residents. This finding aligns with the Malawi study, which reported that patients residing outside the hospital's catchment area had significantly longer hospital stays (17). Similarly, the Ugandan study highlighted geographical barriers and lack of local support systems as contributors to extended hospitalization (1). In the Ethiopian context, rural residence is often associated with poor access to outpatient psychiatric services, limited transportation, low mental health literacy, and absence of structured community-based care. These factors may delay discharge readiness and complicate follow-up planning, leading clinicians to retain patients longer in inpatient care. Additionally, patients from urban side might prefer being discharged early from hospital inpatient management and continue their follow-up as an outpatient, which might increase the proportion of rural patients staying for prolonged duration compared to their urban counterparts. This finding underscores the critical role of geographic and infrastructural factors in determining LOS, beyond individual clinical characteristics.

Schizophrenia was the most common diagnosis among admitted patients (32.1%), followed by bipolar disorder and major depressive disorder. This diagnostic distribution is consistent with findings from China, South Africa, and Jimma Referral Hospital, where psychotic disorders dominate inpatient admissions (10,15,16). Although schizophrenia and bipolar disorder have been consistently associated with longer LOS in prior studies, psychiatric diagnosis did not emerge as an independent predictor of prolonged LOS in the multivariable analysis in this study. This contrasts with findings from South Africa, where psychosis and bipolar disorder were strongly linked to longer hospitalization (15). The lack of independent association in the current study may be due to overlapping effects of illness chronicity, previous admissions, and social factors, which were controlled for in the regression model.

Having two or more previous psychiatric admissions was independently associated with prolonged LOS in this study. This finding is consistent with studies from Uganda, and Malawi, which identified prior hospitalizations as a strong predictor of extended inpatient stays (1,17). Repeated admissions often indicate chronic illness, poor treatment adherence, inadequate outpatient follow-up, or insufficient community support. At SPHMMC, patients with multiple prior admissions may require longer stabilization periods and more intensive discharge planning, particularly in the absence of active community mental health and rehabilitation services. This reinforces the notion that LOS is influenced not only by acute symptom severity but also by long-term illness profile and system-level care gaps.

7 Conclusion

This study found that the median length of psychiatric inpatient stay at SPHMMC was 37 days, with a substantial proportion of patients experiencing medium to prolonged hospitalization. Female sex, rural residence, and having two or more previous psychiatric admissions were statistically significant associations with prolonged LOS. Overall, these findings underscore that prolonged psychiatric hospitalization in this setting reflects broader social and service-related factors in addition to clinical diagnoses.

8 Strengths of the Study

This study provides one of the few hospital-based assessments of psychiatric inpatient length of stay in Ethiopia, using data from a large tertiary referral center with a high patient turnover. The inclusion of a relatively extended study period allowed for a more stable estimation of length of stay and reduced the influence of short-term service fluctuations.

Furthermore, the application of multivariable logistic regression helped to control for potential confounding factors, strengthening the validity of the identified associations. By focusing on prolonged length of stay as a clinically meaningful outcome, the study provides evidence that may inform inpatient service planning and continuity of psychiatric care within similar tertiary hospital settings.

9 Limitations of the Study

The patients chart retrieval rate was not effective in this research with about one fourth of the charts being not found from the outset, which might decrease the generalizability of the findings in this study. This study used a retrospective design, which relied on the completeness and accuracy of medical records, leading to the exclusion of some charts due to missing data. The study was conducted at a single institution, which may limit the generalizability of the findings to other psychiatric settings in Ethiopia. Additionally, some potentially relevant factors, such as illness severity and detailed social support systems, were not collected and therefore could not be analysed.

10 Recommendations

- **Service-Related:** Strengthen discharge planning and structured outpatient follow-up, linking to the nearest available psychiatric service hospital, particularly for patients from rural areas and those with recurrent admissions.
- **Institutional / Administrative:** Develop standardized discharge and follow-up protocols to improve continuity of care and reduce unnecessary prolongation of hospitalization.
- **Policy-Related:** Support policies that strengthen integration between tertiary hospitals and community-based mental health services, especially for rural populations.
- **Capacity Building:** Provide targeted training for mental health professionals on discharge planning and management of patients with repeated admissions.
- **Patient-Related:** Implement targeted interventions for patients with multiple prior psychiatric admissions, poor drug adherence and incorporate gender-sensitive approaches in inpatient management.
- **Research-Related:** Conduct prospective and multicenter studies to further examine determinants of prolonged psychiatric inpatient stay and post-discharge outcomes.

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12 Annexes.

12.1 Annexe 1: Structured Questionnaire for Retrospective Chart Review

Section A: Socio-Demographic Information

1. Patient ID:
2. Age at Admission:
3. Sex: A. Male B. Female
4. Marital Status: A. Single B. Married C. Divorced D. Widowed.
5. Employment Status: A. Employed B. Unemployed C. Student D. Retired
6. Educational Level: A. No formal education B. Primary C. Secondary. D. Tertiary
7. Residence: A. Urban B. Rural
8. Living condition. A. lives alone B. lives with his/her family

Section B: Clinical and Hospitalization Information

9. Date of Admission
10. Date of Discharge:
11. Length of Hospital Stay: (Number of Days)
12. Primary Psychiatric Diagnosis. A. Schizophrenia B. Major Depressive disorder. C. Catatonia. D. OCD. E. Others
13. Comorbid Medical Conditions A. Diabetes B. HIV C. Hypertension. D. SUD. E. others
14. History of Suicide Attempts: A. Yes B. No
15. Years Since First Mental Illness Diagnosis
16. Number of Previous Psychiatric Admissions
17. History of Outpatient Follow-Ups: A. Regular B. Irregular D. None
18. Use of Chemical restraints during Admission: A. Yes B. No
19. Use of Electroconvulsive Therapy (ECT): A. Yes B. No
20. Presence of Extrapyramidal Side Effects: A. Yes B. No
21. Number of Medications Prescribed During Admission
22. Discharge Outcome: A. Improved B. Unchanged C. Deteriorated