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LENGTH OF STAY OF PSYCHIATRIC ADMISSIONS AND ASSOCIATED FACTORS IN REFERRAL HOSPITALS OF EASTERN ETHIOPIA: A RETROSPECTIVE STUDY

MSc THESIS

HIRKO ASSEFA TOLCHA (MPH)

COLLEGE: HEALTH AND MEDICAL SCIENCES

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MAJOR ADVISOR: MEKDES DEMISSIE (PHD, ASSISTANT PROFESSOR)

CO-ADVISOR: DEJENE TESFAYE (MSc, ASSISTANT PROFESSOR)

ABDULKARIM AMANO (MSc)

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HARAMAYA UNIVERSITY, HARAR, ETHIOPIA

Length of Stay of Psychiatric Admissions and Associated Factors in Referral Hospitals of Eastern Ethiopia: a Retrospective study

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Hirko Assefa Tolcha (MPH)

Major Advisor: Mekdes Demissie (PhD, Assistant professor)

Co-Advisors: Dejene Tesfaye (MSc, Assistant Professor)

Abdulkarim Amano (MSc)

MARCH , 2025

HARAMAYA UNIVERSITY, HARAR, ETHIOPIA

APPROVAL SHEET

HARAMAYA UNIVERSITY

POST GRADUATE PROGRAM DIRECTORATE

I hereby certify that I have read and evaluated this Thesis entitled **Length of Stay of Psychiatric admissions and Associated Factors in Referral Hospitals in Eastern Ethiopia: A Retrospective study.** Prepared under my guidance by **Hirko Assefa**. I recommend that it can be submitted as fulfilling the Thesis requirement.

Dr. Mekdes Demissie (PhD, Assistant professor) _____ _____

Major Advisor Signature Date

Mr. Dejene Tesfaye (MSc, Assistant Professor) _____ _____

Signature Date

Mr. Abdulkarim Amano (MSc) _____ _____

Co-Advisors Signature Date

As a member of the Board of Examiners of the MSc Thesis Open Defense Examination, I certify that I have read and evaluated the Thesis prepared by Hirko Assefa and examined the candidate. I recommend that the thesis be accepted as fulfilling the Thesis requirement for the degree of Masters of Sciences in Integrated clinical and community mental health.

Mr. Daniel Alemu (MSc, Assistant Professor) _____ _____

Chairperson Signature Date

Dr. Gari Hunduma (PhD, Assistant professor) _____ _____

Internal Examiner Signature Date

Professor Teleke _____ _____

External Examiner Signature Date.

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Name: Hirko Assefa Tolcha

Signature: _____Date: _____

School/Department: Psychiatry

BIOGRAPHICAL SKETCH

I was born in 1994 in Meta Robi, West Showa Zone, Oromia, Ethiopia. I completed my primary education at Inchinni Primary School and my secondary education at Holeta Preparatory School. In 2012, I enrolled at Haramaya University, where I earned a BSc in Psychiatry. After working as a junior psychiatry professional at Mekelle University Ayder Comprehensive Specialized Hospital for a year, I joined Haramaya University Hiwot Fana Comprehensive Specialized Hospital in March 2017. In June 2024, I graduated with a Master's in Public Health, specializing in Epidemiology, from Haramaya University. Later, in May 2023, I returned to Haramaya University to pursue a Master's degree in Integrated Clinical and Community Mental Health.

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ACRONYMS AND ABBREVIATIONS

CBHI	Community Based Health Insurance
HIC	High Income Country
HU-HFCSH	Haramaya University Hiwot Fana Comprehensive Specialized Hospital
IHRERC	Institutional Health Research Ethical Review Committee
LMIC	Low- and -Middle-Income Countries
LOS	Length Of Stay
STATA	Statistical Software for Data Science
UK	United Kingdom
UMIC	Upper-Middle Income countries
WHO	World Health Organization

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ABSTRACT

Background: ackground: The length of stay in psychiatric admissions significantly impacts patient outcomes and healthcare resource utilization, especially in the context of deinstitutionalized care and the shift toward community-based treatment. Determining length psychiatric admissions and identifying factors that significantly associated is crucial for optimizing treatment and improving care efficiency. However, no published data exists on the length of stay and associated factors in psychiatric admissions in the studied area.

Objective: This study aimed to assess the length of stay and its associated factors in psychiatric admissions at referral hospitals in eastern Ethiopia from June 28, 2017, to June 27, 2023, with data collection taking place from March 1 to April 20, 2024.

Method: A seven-year retrospective chart review was conducted at referral hospitals in eastern Ethiopia. Data was collected using the Kobo collect tool, and analysis was performed using STATA version 14. Linear regression with forward selection methods was used to identify factors significaty associated with the length of stay, with associations determined at a p-value <0.05.

Results: The mean length of stay was 20 days (SD $\pm$ 12.33). Factors positively associated with longer stays included: being homeless ($\beta = 0.60$), being divorced ($\beta = 0.20$), long duration of illness ($\beta = 0.05$), treatment non-adherence ($\beta = 0.215$), having comorbid medical illness ($\beta = 0.24$), a diagnosis of schizophrenia spectrum or psychotic disorders ($\beta = 0.228$), and multiple episodes of mental illness ($\beta = 0.18$). Being female was negatively associated with longer stays ($\beta = -0.11$).

Conclusions: Longer hospital stays were associated with marital status, living conditions, treatment adherence, illness duration, number of episodes, comorbidities, and clinical diagnosis. Being female was associated with shorter stays. The study suggests that interventions targeting factors contributing to prolonged hospitalizations could improve psychiatric care and reduce length of stay.

Keywords: Mental health, length of stay, psychiatric admission, associated factors, referral hospitals, Eastern Ethiopia.

1. INTRODUCTION

1.1. Background

Length of psychiatric admissions typically refers to the period of confinement of a patient to a healthcare facility which can different from one patient to another and it is a variable frequently associated with declining bed numbers and deinstitutionalization (Freeman, 2022). In hospitals, resource optimization and patient flow management are nowadays very diverse and complex issues, where anticipating patients' length of stay can play a vital role in meeting the growing healthcare demand by maximizing the usage of healthcare resources and quality of health care delivery (Fahmida et al., 2009).

Globally, 16% of the population were affected by mental or addictive disorders more than 80% of them live in low-and middle-income countries (Mathers, 2020), where the treatment gap is more than 75% (Borges et al., 2020). At least one in ten adults is affected by mental disorders, and nine in ten individuals do not access basic treatment (Lund et al., 2011). The provision of adequate, fair, and equitable mental health care for the patient in developing countries, specifically in sub-Saharan Africa, is one of the greatest challenges of the 21st century health care system (Epping-Jordan, 2004), due to a lack of infrastructure, a limited number of psychiatric beds per population (Addisu et al., 2015; Health et al., 2005), and a largely overcrowded psychiatric ward. Psychiatric admissions are mandatory for some patients and an effective mode of treatment for patients who are unmanageable at home or in the community, or if the patients have disorganized behavior, refuse to eat, are suicidal and homicidal (Bruce and Smith, 2020).

The length of stay in psychiatric admission services has become an interesting outcome for patients, care providers, and health insurance payers and it's one of the key measures of healthcare service efficiency, considered as an indicator of the quality of inpatient psychiatric care, also been widely used to assess performance psychiatric care services and the efficiencies of bed use and considered as an important factor in the planning and distribution hospital resource, patients and community health providers (Shinjo et al., 2017), and has a strong positive relationship with the cost of hospitalization (Ithman et al., 2014), and it is the most expensive categories of psychiatric services, which pushes the health care providers to discharge patient's early (Oladeji, 2012).

In some sub-Saharan Africa, the length of psychiatric admission among patients admitted to psychiatric wards ranging between 14 to 28 days was considered as a cut-off point for short or lengthier hospital stay (Adegunloye et al., 2009).

In Ethiopia, mental illness accounts for 12.4% of the burden of disease and 90 percent of people with mental disorders don't have access to care. A small number of hospitals have started to provide inpatient psychiatric services with a limited number of beds (Hailemariam et al., 2016). Were the length of stay in psychiatric admission was 22 days in a general hospital and 63 days in a mental hospital (Addisu et al,.2015).

Therefore, determining the length of stay for individuals with mental illness is crucial for establishing comprehensive treatment plans for psychiatric admissions, along with addressing factors that influence the length of stay is an effective strategy for optimizing hospital resources. This approach also significantly improves the quality of mental health services (Jenkins et al., 2011).

However, to the knowledge of the investigator, no published study that shows the length of stay of psychiatric admission and associated factors in referral hospitals of eastern Ethiopia. Therefore, this study was designed to determine the length of stay of psychiatric admission and associated factors in referral hospitals in eastern Ethiopia.

1.2. Statement of the Problem

Mental health care provision has moved from a hospital-based model to community-based services in most high-income countries,which has decreased the length of psychiatric admissions (Miettunen et al., 2006). Southeast Asia and some African countries have the lowest number of psychiatric beds per population density and the majority of them are available in major cities (WHO, 2001). Limited numbers of beds for mental health services have increased the pressure on service providers and health managers to make more efficient use of available beds; this may lead to other negative consequences such as poor quality service, inadequate staff time spent in contact with patients and increased length of psychiatric admission (Lund et al., 2001).

Inpatient psychiatric management is costly, and therefore, a longer hospital stay can lead result in catastrophic expenditure, and unavailability of already scarce beds for the need (Basnet et al., 2018). Studies showed those residual psychiatric symptoms, the need for rehabilitation, and a lack of public facilities and halfway houses were reasons for prolonged hospitalization (Koenig et al., 2014; Gopalakrishna et al., 2015). However, keeping patients longer in the hospital may weaken social support, threaten living arrangements, ongoing employment opportunities and the economy (Gopalakrishna et al., 2015), increase medical and/or psychiatric co-morbidities, increase medical costs, worsen prognosis and increase caregivers' burden, and increased suicidal ideation related to stigma (Basnet et al., 2018), in addition to putting a higher burden on hospital and government resources (Ahern et al., 2019; Barnett et al., 2019).

In contrast, some studies have reported that shorter psychiatric hospital stays are as therapeutically beneficial as longer ones and save the cost of psychiatric care and better social functioning especially because of the restricted number of psychiatric beds nowadays, rapid discharge means greater availability of such beds, which, in turn, means an opportunity to provide care to another patient (Knapp et al., 1997). On the other hand, very short hospital stays may reduce the opportunity for a comprehensive investigation and make it more difficult to address the psychosocial aspects of a patient's illness, thus compromising the chances of sustained recovery and some patients is not sufficient to stabilize their symptoms and may not be long enough to even begin to treat serious illnesses; in these cases, a longer stay would reduce the odds of rapid readmission, homelessness, and criminalization, while others have argued that shorter stays are associated with poor outcome including an increased rate of relapse and readmissions (Miettunen

et al., 2006; Saxena et al., 2007). However, studies conducted in HIC showed that there are differences in the length of stay in psychiatric admission, which is 10 days,42 days, 168 days in the USA, Japan, and Korea, respectively (Lee et al., 2012; Shinjo et al., 2017).

In low- and middle-income countries, a lack of community mental health care and rehabilitation centers leads to increased reliance on inpatient psychiatric services. This results in inappropriate longer hospital stays due to bottlenecks in care, making it difficul to access psychiatric beds for acute patients (Nagarajan et al., 2022; Connolly and Ritchie, 1997). In regions countries such as Malawi, Uganda and Nigeria the average length of stay in psychiatric admission ranged 21- 28 .7 days and higher in South Africa with 219 days (Barnett et al., 2019; Adegunloye et al., 2009; Kaggwa et al., 2022; Lund et al., 2001). In Ethiopia, access to mental healthcare is hindered by poverty, inadequate infrastructure, and a limited number of facilities. Most inpatient care is concentrated at Amanuel Hospital in Addis Ababa, where the length of psychiatric admissions ranged 22 -62 days (Fekadu et al., 2007). In addition, different socio-demographic and clinical characteristics factors have previously been identified as associated factors of length of stay in psychiatric admission in sub-Saharan African countries, such as being unmarried, unemployment, old age, and type of mental illnesses (Noohi et al., 2020; Bruce and Smith, 2020), and extra pyramidal side effect, substance use (Semman et al., 2023; Kaggwa et al., 2022c; Addisu et al., 2015). Additionally, homicidal behavior and suicidal thought (Bruce and Smith, 2020), were mentioned as associated factors of length of stay in psychiatric admission. However, There is a paucity of studies in Ethiopia addressing LOS in psychiatric admissions and its associated factors, previous studies were limited and restricted to specific settings and their associated factors were not addressed and did not provide a comprehensive picture of all current evidence of inpatient mental health services.

So determining the length of stay in psychiatric admission is much more important in the least developed and developing countries, where healthcare resources such as available beds are scarce and managerial systems are largely manual. Therefore, this study aimed to examine the length of psychiatric admissions and the associated factors in referral hospitals in eastern Ethiopia, incorporating new variables and focusing on two large referral hospitals in eatern Ethiopia .

1.3 Significant of the Study

The primary findings of this study will be valuable to various stakeholders, including health institutions (HFCSH and DRH), psychiatrists, mental health service providers, patients, and their families. These insights will facilitate more accurate predictions regarding the length of psychiatric admissions, aiding clinical decision-making and enhancing mental health service delivery.

Additionally, the results will provide critical information for Haramaya University, Harari regional state, and Dire Dawa city administration's health planners and program managers, enabling them to improve inpatient psychiatric services. This includes better resource allocation and addressing factors influencing length of stay, ultimately achieving appropriate lengths of stay for psychiatric patients.

Furthermore, the findings may prompt discussions among governmental and non-governmental organizations and civil society to enhance the current inpatient mental health care system in eastern Ethiopia. Policymakers can leverage these results to develop strategies that strengthen inpatient mental health services and refine protocols related to the length of psychiatric admissions at the national level.

Finally, the findings of this study will also serve as a reference for future researchers who might be interested in conducting similar studies and inspire studies on mental health care systems and length of stay.

1.4. Research Objectives

1.4. 1. General Objective

This study aimed to assess the length of stay of psychiatric admissions and associated factors in referral hospitals in eastern Ethiopia, from June 28, 2017 to June 27, 2023, and the data was collected from March 1 to April 20, 2024.

1.4.2 Specific Objectives

To determine the length of stay of psychiatric admission in referral hospitals in Eastern Ethiopia
To identify associated factors of length of stay in psychiatric admission in referral hospitals in Eastern Ethiopia

2. LITERATURE REVIEW

This section includes a review of the length of stay and associated factors in psychiatric admissions from different kinds of literature and categorized as socio-demographic factors, clinical characteristic factors, and behavioural factors.

2.1 Length of Stay in Psychiatric Admission

There are studies conducted globally on the length of stay in psychiatric admissions. A prospective cohort study conducted across European countries on the length of stay in psychiatric admission is varied with a mean of 17.9 and 55.1 days in Italy and Belgium respectively (Dimitri et al., 2018). In high-income countries, there are also retrospective studies conducted in the United States, Saudi Arabia, United Arab Emirates and Japan, and the sample size in these studies ranged from 391 to 34329 of patients admitted to psychiatry unit, and the length of stay in psychiatric admission was ranged from 6 to 126 days (Ithman et al., 2014). Another study, conducted in Korea, Israel, Italy and the United Kingdom. The number of participants included in these retrospective studies ranged from 446 - 11,617 and the median length of stay in psychiatric admission ranged from 28-128 days (Chung et al., 2010).

Similarly there are studied conducted in upper/low and-middle income countries (LMICs) like India, Nepal, China, and Brazil. The number of participants included in these retrospective studies ranged from 385- 3687 and the median length of stay in psychiatric admission ranged from 16-66 days (Nagarajan, 2022; Zhou, 2014). There are also retrospective studies from African countries, like as Malawi, Uganda and Nigeria, and the sample size in these studies ranged from 222-478,and the length of stay in psychiatric admission ranged from 8-29 days (Barnett, 2018) In Ethiopia, there are retrospective studies conducted in Jimma Hospital and Amanuel Mental Specialized Hospital. In these studies, the sample size ranged from 265 to 1623, and the length of hospital stay was 22 to 63 days (Mamaru, 2021), summarized in the following table (Table 1).

Table 1: Summary for literature reviews of length of stay in psychiatric admissions in high-income, Upper-middle and low-income countries, 2024.

Author &publication of year	Country	Study design	Duration of review (in years)	Sample size	Mean(SD)/median (IQR) Length of psychiatric admission
Papathanasiou,etal. 2022	Greece	Cross-sectional	10	1023	23.8 (±33.7)
Lerner and ès Sc .2010	Israel	Retrospective	3	6,985	40 (41.5-44.5)
Pauselli,et al. 2017	Italy	Retrospective	4	812	13.3 (± 13.
Bruce and Smith .2020	UK	Retrospective	8	11,617	28
Thompson, et al. 2004	England	Retrospective	2	9806	90 (±15)
Bessaha, 2017	USA	Retrospective	9	67788	10 .88 (±14.8)
Dimitri, 2018	Italy	Prospective	4	36 326	17.9, (±16.6)
Dimitri et al. 2018	Belgium	Prospective	10	36 326	55.1, (±62.4)
Shinjo et al. 2017	Japan	Retrospective	3	34 326	42, (IQR 15–60)
Aziz et al. 2021	UAE	Retrospective	4	961	14.5, (±27.45)
Al Zahrani, et al, 2013	Saudi A	Retrospective	10	430	6 (±2.32)
(Shin et al., 2022)	N/York City	Retrospective	3	521	29 (±46)
Chung, et al. 2010	Korea	Retrospective	2	446	128 (±166.2)
Basnet et al. 2018	Nepal	Retrospective	10	3687	19.36 (±13.14)
Baeza, et al. 2017	Brazil	Prospective	3	385	25 (16 -36)
Zhou et al. 2014	China	Retrospective	2	3455	65 (±66.3)
Nagarajan, et al. 2022	India	Retrospective	10	3082	14
Ithman et al 2014	Columbia	Retrospectives	4	391	14.6 (± 18.9)
Barnett .2018	Malawi	retrospective	1	427	22 (± 27.7)
Kaggwa et al., 2022	Uganda	Retrospective	1	222	18 (±22.3)
Adegunloyeetal.2022	Nigeria	Retrospectives	5	345	23 (±19.1)
Mamaru 2021	Ethiopia	Retrospective	5	265	27(±8)
Fekadu, et al 2007	Ethiopia	Cross-sectional	1	1623	63
Addisu, et al . 2015	Ethiopia	Retrospective	10	846	22 (15-36)

Keys: SD: Standard deviation; IQR: interquartile range;

2.2 Factors Associated with Length of Stay in Psychiatric Admission

There are some studies on length of stay in psychiatric admission based on different patient characteristics and associated factors are multiple and, identifying them may be use to improve the utility of data on length of stay, one might determine what variables increase or decrease the length of stay this may include Socio-demographic characteristics factors, clinical characteristics and behavioural related factors.

2.2.1 Socio-demographic Factors

There is a systematic review conducted in HICs in the United States reported that the female gender was associated with a longer length of stay, while being married was associated with shorter length of stay (Tulloch et al., 2011). There is also a retrospective cohort study conducted in England (London), Italy, Portugal and the USA (California) reported that the predictors of a longer length of stay were included older age (> 65years), being male, unmarried, unemployed and being homeless (Newman et al., 2018). Another retrospective studied from LIC like Nepal, Uganda and Ethiopia reported that socio-demographic related predictors were age more than 65 years old, single and divorced were associated with higher odds of longer length of stay, and being married being self-employed, house wife, farmers and students was associated with lower odds of shorter length of stay and patients who paid cash for the cost of the hospital care were likely to have shorter LOS (Silva et al., 2020)(Table 2).

Table 2: Summary of literature review for socio-demographic related associated factors of length of psychiatric admission in High and low-middle-income courtiers, 2024

Author and year of publication	Country/ City	Study design	Study setting	Associated factors	*P*-values
Newman, et al. 2018	London/ UK	Retrospective	Mental hospital	Males, unemployed and homeless were associated with longer HS	P < .001
Pauselli,et al. 2017	Italy	Retrospective	Referral hospital	Males, older age, and single were associated with longer HS	P < .001

McLeay et al ,2005	Californi a	Retrospective	Referral hospital	Single and old age were associated with longer HS	P=0.030, p< 0.031
Tulloch et al. 2011	USA	Systematic review		Married and Female were associated with short and longer HS respectively.	
Silva et al. 2020)	Portugal	Retrospective	Referral hospital	Married and Old age were associated with short and longer HS respectively	P< .001, < 0.037)
Vranda, et al ,2023	Indian	Cross-sectional	Referral Hospital	Male gender AOR=(1.501, 95% CI [0.072, 0.740) and employed AOR= (1.338, 95%CI [0.009, 0.572]) was associated with short LOS	P<.017,p <.043
Basnet, et al. 2018	Nepal	Retrospective	Referral hospital	Male gender, being self-employed, housewife, student and farmer was associated with Shorter LOS	P=0.023,
(Kaggwa et al., 2022)	Uganda	Cross-sectional	General Hospital	Being separated and divorced AOR(95% CI 1.09, 14.27) associated with longer Hospital stay	P=0.023
Addisu, et al . 2015	Ethiopia	Retrospective	General hospital	Paid cash for hospital services AOR = 0.57; 95% CI (0.36, 0.89) were associated with short length of stay.	P=0.005

Keys: AOR : Adjusted odd ratio; LOS: length of stay; HS: Hospital Stay

2.2.2 Clinical Characteristics and Institutional Related Factors

In a retrospective cohort study conducted in London, Italy and Portugal among 391 to 7653 patients, the primary diagnostic group of psychotic disorders, medical co-morbidity , and history

of having more than one admission were shown to be independent variables that predicted longer psychiatric admission (Newman, et al. 2018 ; Ithman et al., 2014). Another retrospective study conducted in HICs like UAE, USA and Israel reported that clinically related factors such as diagnoses of psychotic disorders, Bipolar disorders, prior hospitalization and using mood stabilizers, and use of more than two psychotropic medications were significant predictors of longer for psychiatric admission, while using antidepressants had a shorter length of psychiatric admission (Aziz et al., 2021; Lerner and ès Sc 2010).

There is also retrospective studied from upper-middle-income countries like Nepal, Columbia and Brazil among admitted psychiatric patients the clinical related associated with longer length of stay were diagnosis of schizophrenia and related disorders, having medical co-morbidity, being readmitted, history of pervious hospital admission (Basnet et al., 2018; Ithman et al 2014 ; Baeza, et al. 2017). In studies conducted in conducted in Taiwan, predictor of shorter LOS was first time visit to the hospital (Hsu and Chan, 2018). Cross-sectional studies from Malaysia, India, Greece were found to be that patients with co-morbid medical illness and previous admissions, family history of mental illness and involuntary admission status was associated with longer length of stay (Fong et al., 2010).

Findings from studies conducted in low-income countries like Uganda and Nigeria revealed that medical comorbidities, having side effects to psychotropic medications, and diagnosis of schizophrenia, was statistically significantly associated with longer length of stay in psychiatric admission (Kaggwa et al., 2022).

There are also retrospective studies conducted in Ethiopia, reported that primary diagnoses of major depressive disorder, and brief psychotic disorders have a shorter length of stay, while diagnoses of schizophrenia and the presence of extra pyramidal side effects (EPS) were factors associated with longer length of stay in psychiatric admission (Mamaru.,2021) and summarized in the following table (Table 2).

Table 3: Summary of literature review for with clinically related factors associated with of length psychiatric admissions in high and middle -income countries, Eastern Ethiopia, 2024

Author and year of publication	Country/ city	Study design	Study setting	Predictors (OR/RR/P
Newman,etal.,2018	London/ UK	Retrospective	Mental hospital	Psychosis/d/o ($p < .001$)
Pauselli,et al. 2017	Italy	Retrospective	Referral hospital	Hx>1 Admission ($p < .001$)associated with longer HS
Rodriguez etal, 2017	Portugal	Retrospective	General hospital	Psychotic disorder (P<0.001)associated with longer stay
Aziz, et al. 2021	UAE	Retrospective	General hospital	Psychotic disorder (P<0.0947),Bipolar disorders(P<0.003),and substances use,(P<0.0001)associated with longer hospital stay
Onwuamez e, et al. 2022	USA	Systematic review		Psychosis (P =0 .03), using mood stabilizers (P =0 .02), and use of more than two psychotropic medications associated with Long HS and while using antidepressants (P = 0.05), had shorter LOS.
Lerner and ès Sc 2010	Israel	Retrospective	Referral hospital	Schizophrenia and Bipolar disorders ,OR =p ≤ 0.001), prior hospitalization (p = 0.005), and more than2 medication (p = 0.031) associated longer stay
Baeza,et al. ,2017	Brazil	Prospective	Referral hospital	Pervious Admission(p<0.182 (p =0.001), and schizophrenia (,p=0.001,) associated longer stay
Ithman, et al. 2014	Columbi a	Retrospective	Referral hospital	Used ECT and involuntary admissions, previous admission (p=0.010), and psychotic disorder (P<0.001were associated with long HS

Hsu and Chan .2018	Taiwan	Retrospective	Mental hospital	First visit (AOR = 8.54, 95% CI = 2.03–35.96) associated with short LOS
Velelekou et al., 2022	Greek	Cross – sectional	Mental hospital	Previous admissions (p=0.010), associated with long LOS
(Fong et al., 2010)	Malaysian	Cross sectional	Referral hospital	Co-morbid medical illness (p=0.013) associated with long hospital stay
Basnet,et al. 2018	Nepal	Retrospective	Referral hospital	Schizophrenia (AOR=4.01, 95%CI: 1.3412.0), medical co-morbidity (AOR= 3.47; 95%CI: 2.49–4.84) and being readmitted (AOR= 1.23, 95%CI: 1.03–1.47) associated with long HS
Kaggwa, et al.,2022	Uganda	Cross-sectional	General hospital	Schizophrenia AOR(95 %CI 5.53–15.83, p<0.001) was associated Longer LOS
Addisu et al. ,2015	Ethiopia	Retrospective	Referral hospital	MDD (AOR = 0.51 (0.32 – 0.81) and brief psychotic disorder (OR = 0.52 (0.33 – 0.84)] were associated with shorter, and EPS associated with Long LOS (p= 0.036)
Mamaru et al ,2021)	Ethiopia	Retrospective	Referral hospital	Schizophrenia (p=0.0023) associated with long HS
Fekadu et al. , 2007	Ethiopia	Descriptive	Mental Hospital	Schizophrenia, AOR =(95% CI 1.93 (1.28, 2.93) (p= 0.002) associated with longer Hs

Keys: AOR: Adjusted odd ratio; LOS: length of stay; HS: Hospital stay

2.2.3 Behavioral Factors

Studies from high income countries such as Italy, Tehran, Portugal and Hong Kong also reported that the following behavioral related variable had a significant association with a longer length of psychiatric admission:- a history of aggressive behavior, involuntary hospitalization, while a history of suicidal ideation and suicidal attempt was associated with lower odds of longer length of psychiatric admission (Ithman et al., 2014)

Another studies from upper-middle income countries like Brazil and Columbia, was found to be that a history of the use of restraints in patients during admissions was significantly associated

with longer length of psychiatric admission,and previous suicidal attempts were associated with shorter length of stay in psychiatric admission (Baeza et al., 2017).

A retrospective study conducted in High-income countries cities like Taiwan, Atlanta and Southampton showed that co-morbid substance use disorder, presence of alcohol use, a history of illicit substance use were consistently shown to be predictive of shorter length of stay in psychiatric admission (Hsu and Chan, 2018). There are also studies conducted in upper-middle income(UMIC) like Malaysia and Columbia reported a history of substance abuse was present in 39.3% of patients and they had a significantly longer inpatient duration compared to those without substance abuse (Fong et al., 2010)(Table 4).

Table 4: Summary of literature reviews for behavioral related associated factors of length of stay in psychiatric admission in referral hospitals of Eastern Ethiopia, 2024

Author and year of publication	**Country /city**	**Study design**	**Study setting**	**Sample size**	**Associated factors**
Rodriguez-Silva 2017	Portugal	Retrospective	General hospital	3872	Suicidal attempt (p=0.003)
Pauselli,et al. 2017	Italy	Retrospective	Referral hospital	1236	History of aggressiveness, (p<0.001), Involuntary (p=0.017) found to be associated with long LOS admission
Ithman, et al. 2014	Columbia	Retrospective	Referral hospital	391	Use of restraints in patients(p<.001)associated long HS
Noohi.et al ., 2022	Tehran	Retrospective	General hospital	961	Suicidal ideation and suicide attempts(p<0.015,AOR=0.013) associated with short HS
Choy and Dunn 2017	Hong Kong	Retrospective	Referral hospital	672	History of aggression &(p<.0012) associated with long HS

Baeza et al ,2017	Brazil	Prospective	Referral hospital	3,118	History of suicidal attempt? associated ($p<0.015$) with short hospital stay
Hsuandchan .2018	Taiwan	Retrospective	Mental hospital	200	History of substance AOR = 6.16, 95% CI = 1.37–27.62) Associated with Short LOS
Ompton et al 2006	Atlanta	Retrospective	Referral hospital	450	Co-morbid Alcohol Associated with short LOS
Sinclair et al. ,2008)	Southam pton	Retrospective	Referral hospital	649	Alcohol use ($P = 0.0008$) associated with short LOS
Gopalakrishna, et al 2015	Columbia	Retrospective	Referral hospital	4613	Substance abuse associated with shorter length of stay
Fong, et al., 2010	Malaysia	Cross sectional	Referral hospital	119	History of substance abuse($p=0.041$) was associated with longer LOS

Keys: AOR: Adjusted odd ratio; LOS: Length of Stay; HS: Hospital Stay; MDD: Major Depressive Disorders, EPS: Extrapyramidal Side effects; Hx: History

2.3 Conceptual Framework

Evidence from different literature revealed that age, sex, marital status, educational level, occupational status, place of residence, living circumstance and method of paying for services. Type of diagnoses at admission and discharge, reasons for admission, number of episodes, history of readmission, previous history of admission, family history of mental illness, drug side effects, use of physical/chemical restraint, use more than two classes' medications, co-morbid other illness. Behavioral related factors such as khat, nicotine, alcohol, hashish, shisha, and marijuana use, history of suicidal ideations, suicidal attempts , homicidal and aggressive behavior. And status or compulsory admission were factors found to be independent factors associated with length stay in of psychiatric admission. The main associated factors are reviewed from different kinds of literature and summarized in the conceptual framework **(Figure 1).**

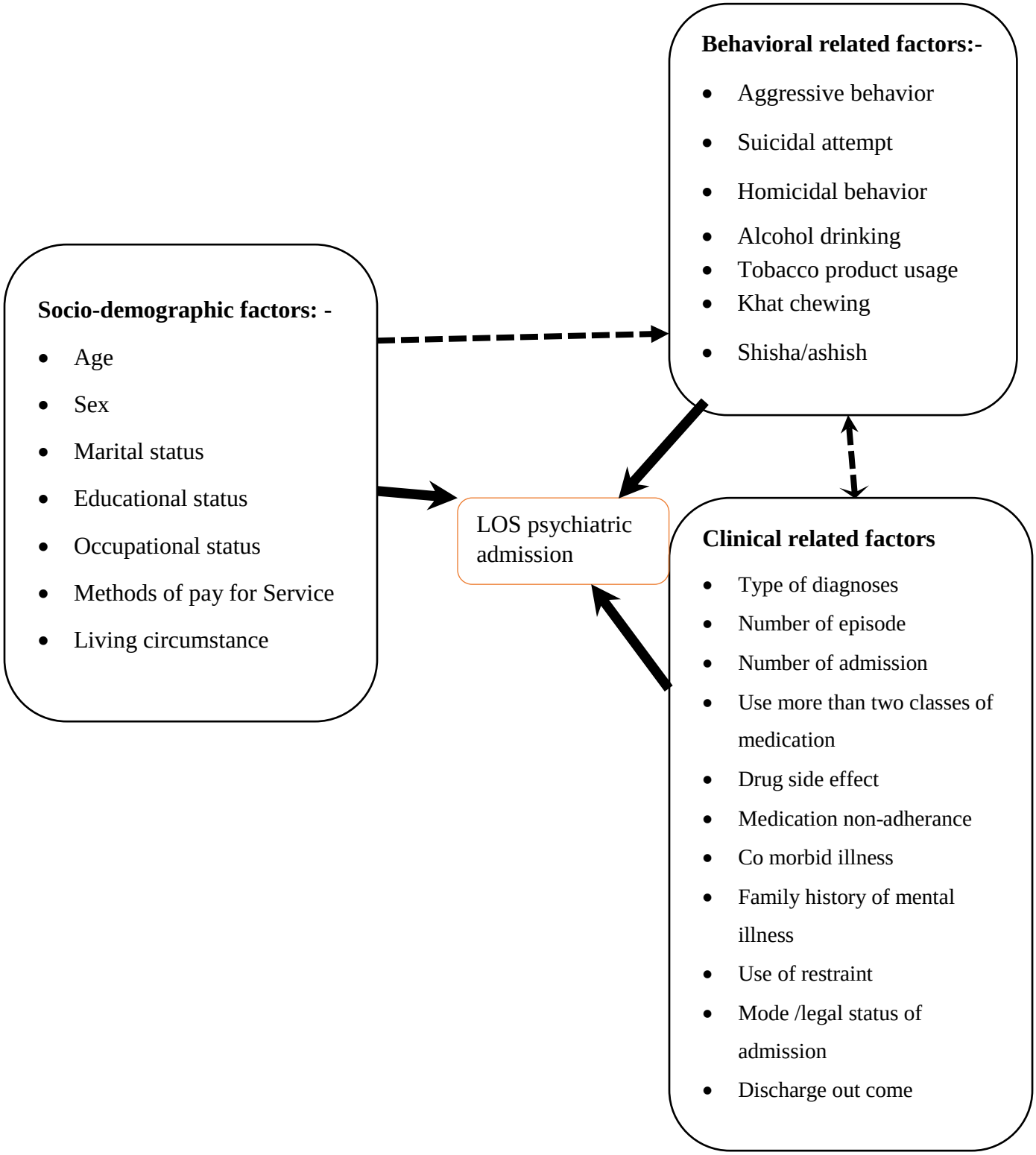

Figure 1: Conceptual framework reviewed from different kinds of literatures by principal investigator for study to assess possible factors associated with length of stay of psychiatric admissions in referral hospitals in eastern Ethiopia, 20244

3. METHODS AND MATERIAL

3.1 Study setting and period

The study was conducted in referral Hospitals in eastern Ethiopia from March 1 to April 20, 2024. There are four referral hospitals in eastern Ethiopia. Currently, only two referral hospitals provide inpatient psychiatric services which are the Hiwot Fana comprehensive Specialized Hospital (HFCSH) and the Dil-chora Referral Hospital. Hiwot Fana comprehensive Specialized Hospital is located in the Harari region Harar town. Hiwot Fana Hospital was established during the Italian occupation of Ethiopia (1928-1933 E.C) to serve Italian soldiers. It was built mainly to provide medical care for the occupying army; however, it continued to deliver health services after the expulsion of the Italians from Ethiopia. Hiwot Fana Hospital had different names in different periods (Chafe, Morate, and Prince Mekonine) and was named "Hiwot Fana Hospital" during the Derg regime. After the downfall of the derg regime, the Hospital was run by Harari Regional Health Bureau (HRHB). On July 14, 2010, HRHB handed over the administration and service provision of the hospital to Haramaya University which has since then been named Hiwot Fana Comprehensive Specialized Hospital (HFCSH). The hospital catchment population is currently about 20 million. The hospital has 523 beds and 36 outpatient departments. Among them, the psychiatry department has 13 beds, 2 OPDs, one psychiatric emergency OPD, and one Forensic psychiatry center that has 10 beds. Regarding human resources, the psychiatric department has 2 psychiatrists, 3 General practitioners, 3 MSc in ICCMH, 7 BSc psychiatry nurses,1 clinical psychologist, 5 Porters, and 3 cleaners (HUHCSH, 2022).

Dilchora Referral Hospital is found in Dire-Dawa town. Dire Dawa city is located 525 km in the east of the capital city, Addis Ababa. The hospital is one of the finest and the biggest hospitals in dire Dawa city administration established in 1952 E.C. and has undergone many processes until it was named Dire Dawa Dilchora Referral Hospital in, 2000 E.C. The hospital provides specialized medical care including psychiatric services. Currently, it serves approximately five million people in Dire Dawa and neighbouring Oromia and Somali regions. The hospital has over 150 beds and is equipped with modern medical technology including a CTscanner. The psychiatry department has 4 OPD and 7 beds for psychiatric admission run by 2 female psychiatrists, 5 psychiatry nurses, and 2 clinical nurses (Dire Dawa HMIS,. 2022). Both referral hospitals serve for neighbouring

regions particularly Ethiopian Somali and Eastern Oromia, as well as neighbouring countries especially Djibouti and Somalia land.

3.2 Study Design

A retrospective chart review was conducted.

3.3. Source Population

The source population were all patients with psychiatric admissions to the referral hospitals in eastern Ethiopia from June 28, 2017 to June 27, 2023.

3.4. Study Population

The study population were all patients with psychiatric admissions to a psychiatric in-patient unit in referral hospitals in eastern Ethiopia, from June 28, 2017 to June 27, 2023.

3.5. Inclusion and Exclusion Criteria

3.5.1. Inclusion Criteria

This study included all patients with diagnoses belonging to mental disorders admitted from June 28, 2017 to June 27, 2023

3.5.2. Exclusion Criteria

Patient's medical folders ended admission with death, LAMA and absconded, patients admitted for planned short-term admission less than 24 hours, admitted per court order for forensic evaluations and all medical records missing essential variables or hospital information like no clear admission and discharge dates were excluded from the study.

3.6. Sample Size Determination

The sample size was not calculated because all psychiatric admission cases were included in the study. In both HFSH and DCRH, a total of 1617 admission cases were recorded on the registration book for the period 2017 to 2023. Out of 1,570 medical folders reviewed, complete documentation was available for 1,491. A total of 1,204 medical records with improved outcomes were included in the final analysis. 287 medical records with incomplete data or outcomes that did not show improvement were excluded (Figure 2).

3.7. Data Collection Methods

3.7.1. Data Collection Instruments.

The data were collected from a medical recorded chart of psychiatric admission by using a pre-tested structured checklist adapted from different literature (Addisu, et al., 2015; Tadesse et al., 2017; Kaggwa et al.,2022; Vranda, et al ,2023). The checklist contains four main parts: socio-demographic characteristics, clinical characteristics, behavioural and substance-related factors. The checklist was prepared in English and used with the Kobo Collect tool as a data collection instrument.

3.7.2. Data Collectors and Supervisors

Four BSc psychiatry professionals and two MSc in ICCMH were recruited for data collection and supervision of data collectors respectively. One-day training on the Kobo collect tool and process of data collection was conducted for the data collectors and the supervisors.

3.7.3. Data Collection Procedure

The principal investigator used medical record numbers (MRNs) from the ward's admission registers to locate and retrieve medical records of all admissions and discharges from the psychiatric ward between June 28, 2017, and June 27, 2023. Then, data collectors extracted information from the patient's medical record charts using the Kobo Collect tool for data extraction.

3. 8. Variables

3.8.1. Dependent Variable

Length of stay of psychiatric admission

3.8.2 Independent variables

Socio-demographic related data such as age, sex, marital status, educational level, occupational status, place of residence, living circumstance and method of paying for services.

Clinical characteristics factors: Type of diagnoses at admission and discharge, reasons for admission, number of episodes, history of readmission, previous history of admission, family

history of mental illness, drug side effects, use of physical/chemical restraint, use more than two classes' medications, co-morbid other illness.

Behavioral related factors such as khat, nicotine, alcohol, hashish, shisha, and marijuana use, history of suicidal ideations, suicidal attempts , homicidal and aggressive behavior.

Legal basis of admission: status of admission whether voluntary or in voluntary (compulsory) admission.

3.9. Operational Definitions

Length of stay was defined as the number of days between the admission date and discharge date for each admission experience during the study period and greater than the mean was considered as a cut-off point for short or lengthier stay (Bruce and Smith, 2020).

The average length of stay refers to the average number of days that patients spend in the hospital, and it's measured by dividing the total number of days stayed by all patients during a year by the number of admissions or discharges (OECD., 2018).

Discharge diagnoses: is condition of the patient at discharge compared to the patient's condition at admission and were summarize into broad diagnostic classes according to the Diagnostic and Statistical Manual of Mental Disorders 4 or 5th revision (WHO, 2013)**.**

Substance use: referred to as the use of at least one of the psychoactive substances such as alcohol, chat (Catha edulis), cigarettes, cannabis in an individuals lifetime (Kiepek et al., 2022).

Co-morbid diseases: at least one or more chronic medical conditions or physical diseases, neurological illness and mental disorders; documented in the patient's medical records at the time of psychiatric admission.

Suicide behavior is a feeling or intention that increases a person's risk of attempting or committing suicide, which may include suicidal thoughts or wishes, suicidal plans, and suicidal attempts (WHO,. 2004).

Extrapyramidal Symptoms (EPS) are drug-induced disorders that occur due to antipsychotic blockade of the nigrostriatal dopamine tracts. These blockades can lead to increased cholinergic activity, resulting in acute dystonia, acute akathisia, antipsychotic-induced Parkinsonism, tardive dyskinesia (TD), tardive dystonia, tardive akathisia and any another sideeffects documented in patients medical folders were reviewed (Crisafulli et al., 2013).

Medication non-adherence: Missing doses of medication or discontinuing treatment without medical advice for a certain duration (two or more missed doses per week or stopping medication for at least 7 consecutive days without consultation health care providers (Demoz, 2014).

3.10. Data Quality Control

To maintain the quality of the data, a one-day training focusing on the data extraction system, data collection tools, and objectives of the study was given to data collectors and supervisors. Before actual data collection, a preliminary review was conducted in Bisidimo General Hospital on a 5% sample size two weeks before starting the actual data collection for the adequacy of an instrument, the time required to fill the checklist of tools and the completeness of data for charts. Necessary adjustments were made to the data abstraction format and there was only minimal modification (in order of questions) made depending on the pre-test study. The result from the pre-test study shows that the mean length of psychiatric admissions was 12 days. Close follow-up and supervision were carried out during the data collection period jointly by the principal investigator and the supervisors. The necessary feedback was forwarded to the data collectors daily. The collected data was reviewed for completeness before being submitted to the Kobo Collect platform. Confidentiality of the data was ensured by not recording names or any personal identity.

3.11. Data Processing and Analysis

All data extraction checklist was checked for completeness, clarity and consistency. Codes are given to the data extraction form during the data extraction to identify errors traced back using the codes. The collected data was first checked manually for completeness and clarity, then initially cleaned in Microsoft Excel before being transferred to STATA 14 version for further analysis. Assumptions of linear regression were checked prior to analysis. The normality of residuals were checked by skewness and kurtosis test for normality. The range value between -1 and 1 of skewness was considered a normal distribution of residuals. There is no heteroscedasticity, as checked by the scatter plot of residuals against fitted values. The residuals are randomly scattered

around zero without any discernible pattern, indicating constant variance across the fitted values. There were no potential outliers as checked by cook distance. Accordingly, the absolute value of cook distance < ± 1 was taken as the cut-off point and there were no observed influential outliers.

Multi-collinearity among independent variables was checked by variance inflation factor (VIF). The VIF cut-off point < 10 was used to declare Multicollinearity and there was no issue of Multicollinearity. Simple linear regression analysis was done using forward selection of each independent variable against the dependent variable. In simple linear regression analysis variables with p-value < 0.25 were considered as a candidate for multiple linear regression to establish the variables that are independently associated with length of stay of psychiatric admission through forward selection. Variable with a P-value of less than 0.05 at multiple linear regression were considered statistically significant and an unstandardized β coefficient was used for interpretation.

Descriptive statistics such as mean, standard deviation, median, interquantile range (IQR), frequency, and percentages were computed to describe the outcome and independent variables in the study. Finally, the results of this study were presented by using tables, graphs, and narrative descriptions.

3.12. Ethical Consideration

This study was approved by Haramaya University, College of Health and Medical Sciences Institutional Health Research Ethics Review Committee with a reference letter IHRERC/043/2024. A formal letter was written by the School of Postgraduate Studies to submit to HFCSH and the Dire Dawa City Administration health bureau and the Dilchora referral hospital head office ensuring the approval of the proposal. Subsequently, the principal investigator was notified the hospital's higher management's office about the study.

An informed, voluntary, written and signed permissions was obtained from medical directors of the referral hospitals before starting data collection, also formal permission was obtained from the head psychiatry department and medical record unit coordinators to retrieve data from patient medical records for the purpose of this study. To ensure confidentiality, the medical record numbers of participants in the records were replaced by code numbers.

4. RESULTS

From the 1617 medical records, 1491 (92.2%) records of psychiatric admissions were employed for this study, 79 (4.9%) were excluded due to incomplete basic information regarding the psychiatric admission and 47 (2.9%) medical records or folders not found (figure 2).

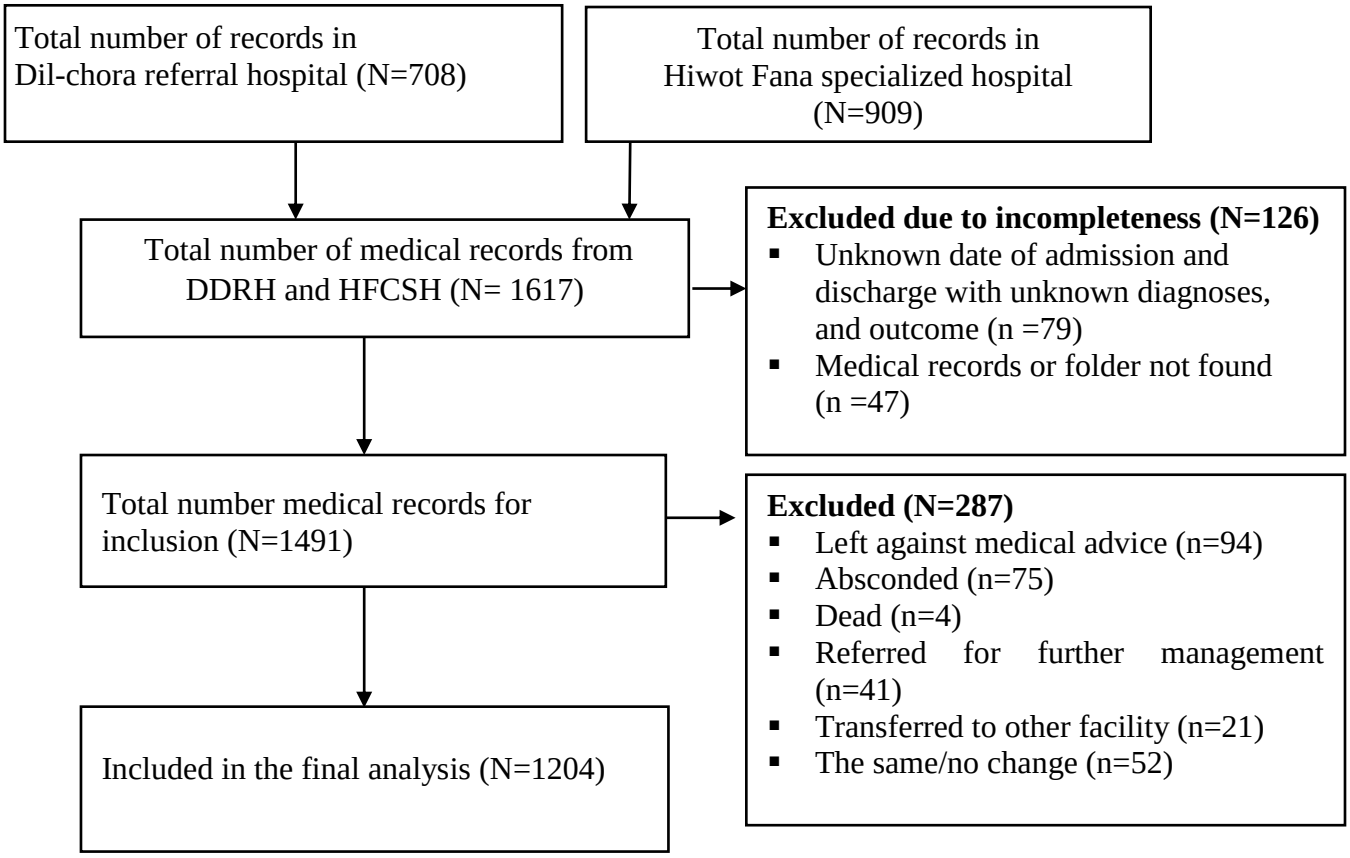

Figure 2**:** Flowdiagram for the length of stay of psychiatric admissions in referral hospitals of Eastern Ethiopia, from June 28, 2017 to June27, 2023.

4.1 Socio-demographic Characteristics

As described in Table 6, the majority of patients (70%) were male. The patients' ages ranged from 7 to 70 years, with the mean (±SD) of 26.5 (± 9.1) years. Of all, 40.51 % of patients were never married, and 14.76 % of patients lived alone. While 1.21% were homeless. Additionally, 43.26% of the patients had completed elementary school. More than half (54.93%) of admitted patients were living in rural areas. One-third of patients (33.5%) were farmers and 15.43% of patients were unemployed. Regarding the health service fees, 60.3% of the patients covered their treatment cost

out-of-pocket, 23% used CBHI, and 0.5% were exempted due to maternal-related health conditions such as postpartum psychoses (Table 5).

Table 5: Socio-demographic characteristics of length of stay in psychiatric admissions in referral hospitals in Eastern Ethiopia, from 2017-2023, 2024

Variable	**Categories**	**Frequency**	**Percent**
Sex	Male	1,055	70.76
	Female	436	29.24
Residence	Urban	672	45.1
	Rural	819	54.9
Marital status	Single	604	40.5
	Married	575	38.6
	Separated	96	6.4
	Divorced	175	11.7
	Widowed	41	2.7
Level of education	Unable to read and write	106	7.1
	Able to read and write only	215	14.4
	Elementary (Grade 1-8)	645	43.3
	Secondary (Grade 9-12)	243	16.3
	Diploma	178	11.9
	Degree and above	104	7.0
Occupational status	Civil servant	188	12.61
	Farmer	499	33.5
	Housewife	182	12.21
	Private worker	162	10.87
	Student	174	11.67
	Unemployment	230	15.43
	Others (Daily labour, housemaid, retirees)	56	3.8
Method of payment for hospital services	Community-based health insurance	390	26.2
	Cash	827	56.9
	Credit	223	15
	Others (exempted service/free)	51	3.4
Living circumstances or situation of the patient	Living alone	220	14.76
	Living with family /relatives	1,253	84.04
	Being Homeless	18	1.21

4.2 Pattern of Psychiatric Admission

A total of 909 and 708 admissions were recorded at the inpatient psychiatric unit of HFCSH DCRH, Eastern Ethiopia. The annual number of psychiatric admissions at HFCSH and DCRH increased from 88 to 169 and from 62 to 137, respectively, over the fiscal years 2017–2023, despite the number of beds remaining unchanged (Figure 3).

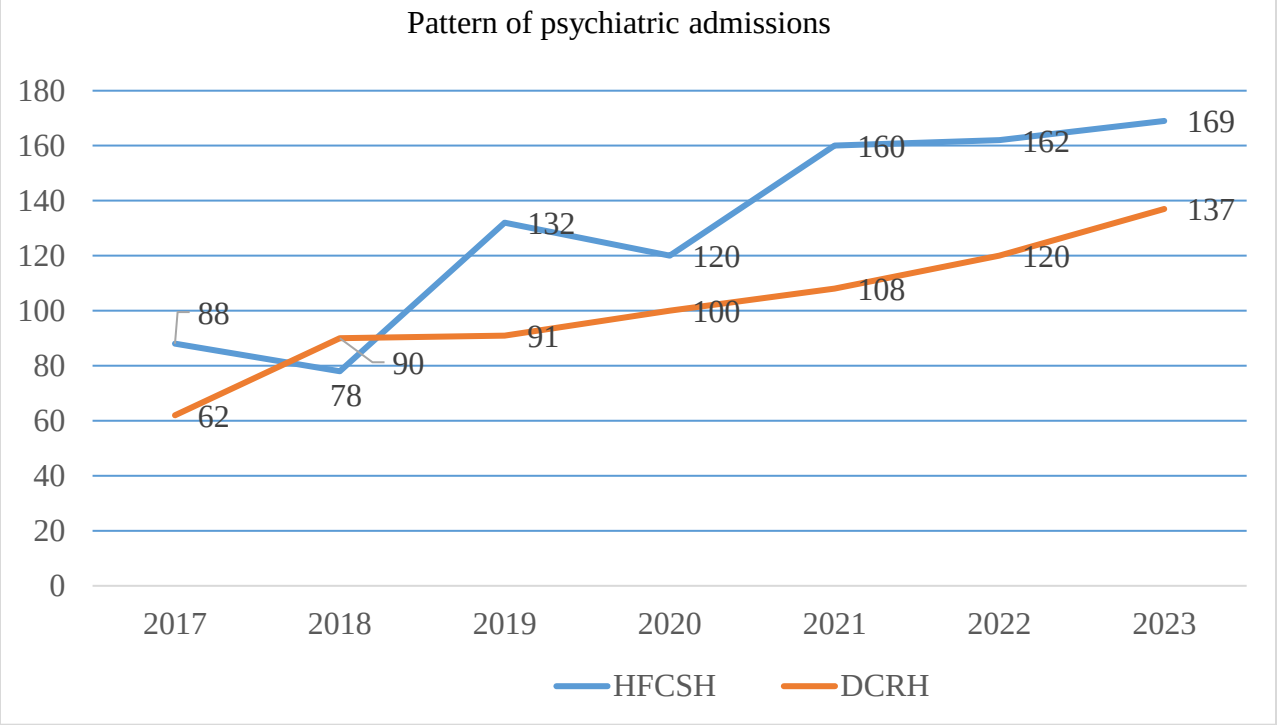

Figure 3: Pattern of psychiatric admissions per year from 2017-2023 in HFCSH and DCRH, Eastern Ethiopia, 2024.

There have been a total of 1617 admissions to inpatient psychiatric units of referral hospitals in Eastern Ethiopia, between 2017 and 2023, and the annual number of psychiatric admissions increased from 150 to 306 in the fiscal year of 2017-2023 within the same number of beds (Figure 4).

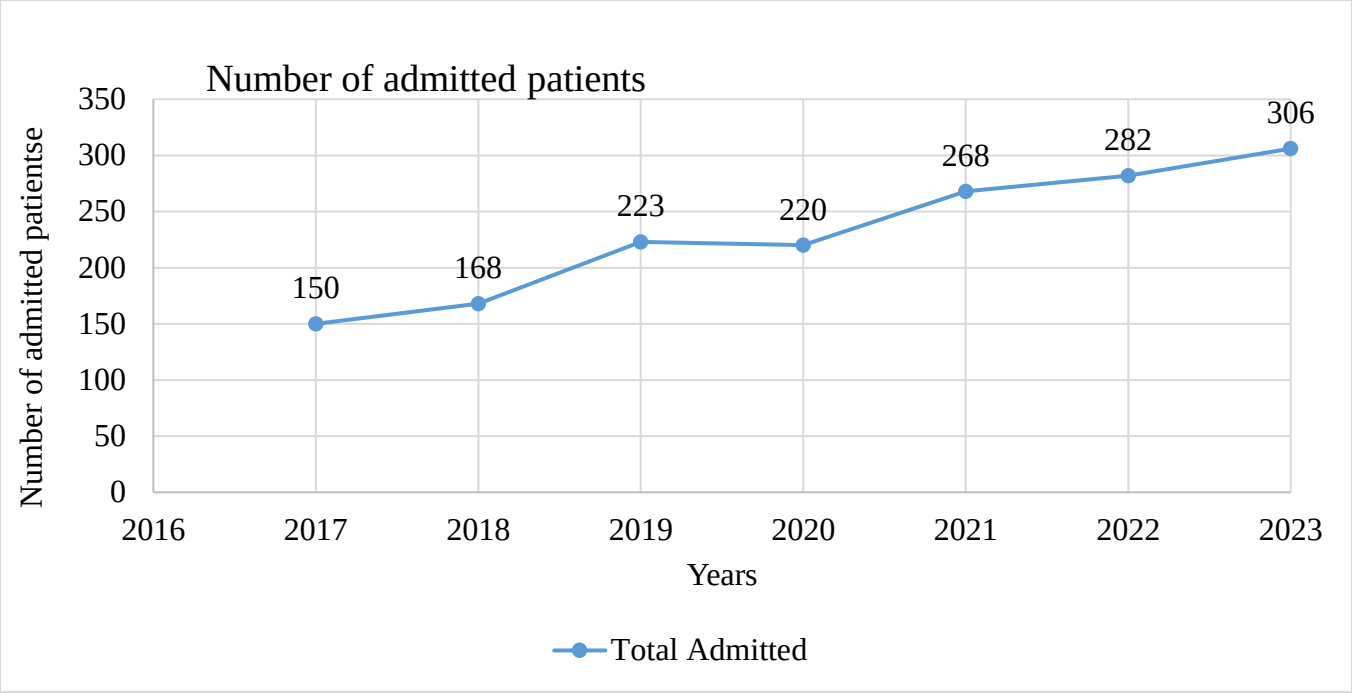

Figure 4: Pattern of psychiatric admission per year from 20217-2023 in referral hospitals of Eastern Ethiopia, 2024.

4.3 Clinical characteristics of the length of stay of psychiatric admission

Regarding clinical characteristics, the mean duration of illness was 16 months, with a range from 1 day to 15 years. About 25%, 19%, 30%, and 25% of patients had illness durations of less than three months, 3-6 months, 1 year, and more than 1 year, respectively.

Among the total psychiatric admissions, 652 (43.9%) were diagnosed by psychiatrists, 522 (35%) by MSc psychiatry professionals, 256 (17.2%) BSc psychiatry nurses, 56 (3.6%) were assessed by different professionals at different times, and 5 (0.3%) were seen by non-specialist professionals. Regarding comorbidity, 443 (30%) had comorbid psychiatric disorders, 324(73%) had comorbid substance use disorders. 112 (8.2%) had a medical illness, and 51 (3.4%) of them had a comorbid neurological illness, 96% of this has epilepsy. A total of 299 (20.05%) and 209 (14%) patients had more than two hospitalizations for psychiatric disorders and medical illnesses respectively. A total of 417 (27.97%) patients had a family history of mental illness and 286 (19.2%) had a history of relapse (Table 6).

Table 6: Clinical characteristics of patients admitted to the referral hospitals of eastern Ethiopia from June 28, 2017 to 2023, 2024

Variable	Categories	Frequency	Percent
Co-morbid psychiatric Illness (other than working diagnosis)	Yes	443	30
	No	1048	70
Family history of mental illness	Yes	417	27.97
	No	1,074	72.03
Co-morbid medical illness	Yes	122	8.2
	No	1369	91.8
History of hospitalizations for General medical conditions	Yes	209	14.02
	No	1,282	85.98
Co- morbid neurological illness	Yes	51	3.4
	No	1440	96.6
History of relapse	Yes	286	19.2
	No	1205	80.8
Use of physical restraints at admissions	Yes	59	4.1
	No	1432	95.9
History of suicidal ideation	Yes	226	15.16
	No	1,265	84.84
History of suicidal attempt	Yes	190	12.74
	No	1,301	87.26
Homicidal behaviour at admission	Yes	534	35.81
	No	957	64.19
Aggressive behaviour at admission	Yes	938	62.91
	No	553	37.09
More than two classes of medication	Yes	859	57.6
	0	632	42.4
Extrapyramidal side-effects	Yes	349	23.4
	No	1,142	76.6
History of non-compliance to medicines	Yes	425	28.5

	No	1066	71.5
Number of admissions for psychiatric disorders	Multiple	299	20.05
	Single	1,192	79.95
Number of episodes	Single	1174	79
	Multiple	317	21
Mode of admission	Voluntary	12	0.8
	Involuntary	62	4.2
	Unknown	1417	95

4.3.1 Psychiatric disorders diagnosed at admission

Admission diagnosis was available for 1491 patients; the majority of the patients had schizophrenia spectrum diagnosis, including 41.92 % for schizophrenia, 14.4% for the brief psychotic disorder, 4.56% for postpartum psychosis, and 2 % for schizoaffective disorder. About 14.7 % of the patients were diagnosed with bipolar, 9.25% with major depressive disorder, and 0.8% with anxiety disorder, as well as other mental disorders were 1.2 %, shown in figure 5 (Figure 5).

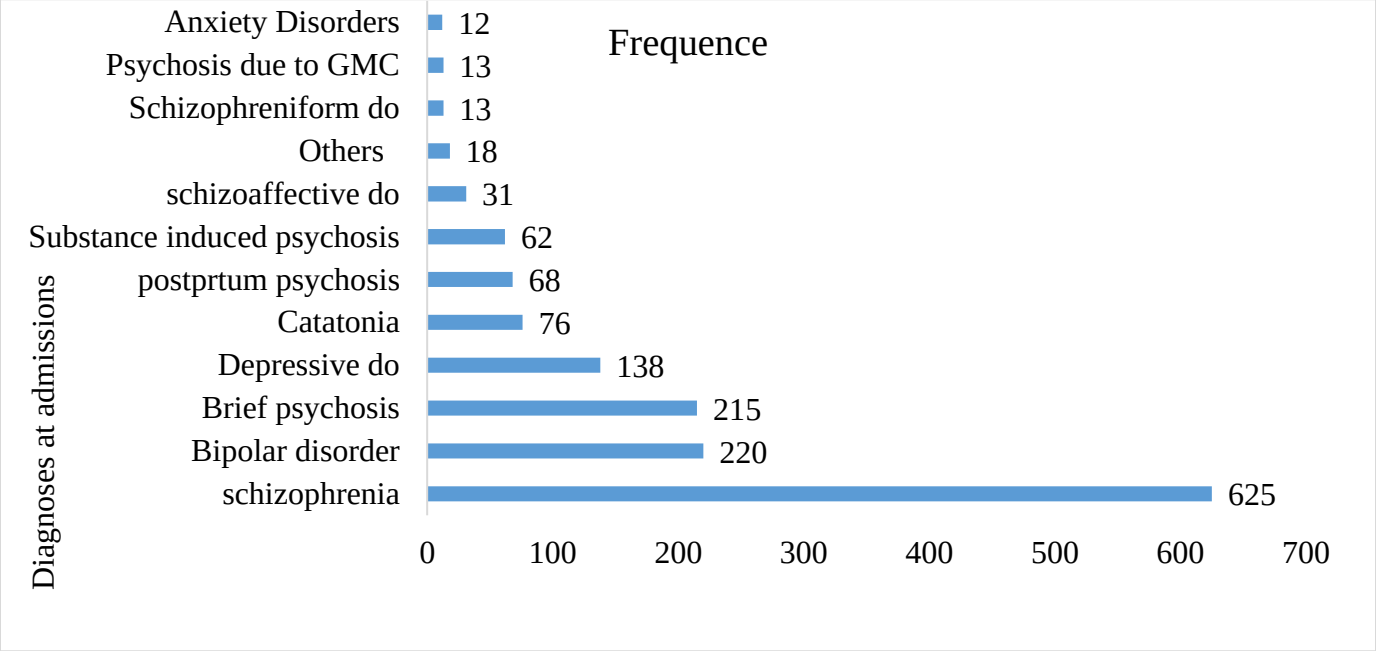

Figure 5: Diagnosis at the admission of patients in referral hospitals in Eastern Ethiopia from June 28, 2017 to 2023

4.3.2 Reasons for admissions, Out-come and Discharge diagnosis of psychiatric admissions

Regarding the reasons for admissions available for 145; one-third (31.6%) of patients admitted was due to destructive behavior, 21.2% were homicidal behavior, 16.3% due to severe psychomotor agitation /retardation, 10.8% were refuse to take medication or food, and for 32.5% reason for admission were not documented. Based on an outcome on discharge, 1204 (80.8%) showed improved outcome, 94 (6.3%) left against medical advice, 75 (50 %) absconded, 41 (2.7%) referred for further management and 21(1.4%) transferred into another facility, while 52 (3.5%) had no change or discharge with the same. The four (0.3%) deaths that occurred in the psychiatry ward were due to medical illness and neuroleptic malignant syndrome (NMS).

Regarding diagnosis stability, of 1491 admissions 90.5% of patients were diagnosed consistently between first admission and discharge**.** Schizophrenia, 640 (43%), and bipolar disorders, 98 (35.25%), were the top two discharge diagnoses followed brief psychotic disorder 240 (14.4%), major depressive disorder, 123(8.3%) and Substance induced psychoses disorders, 62 (4.2%) respectively (Table 8).

Table 7: Reason for admission and Discharge diagnosis of psychiatric admissions in referral hospitals in Eastern Ethiopia from June 28, 2017 to 2023, 2024

Variable	**Categories**	**Frequency**	**Percent**
Reason for admission (N = **1491**)	Destructive behavioural	471	31.6
	Homicidal behavioural	316	21.2
	Severe psychomotor agitation or retardation	243	16.3
	Refuse to take food /medication	161	10.8
	Severe manic symptoms	76	5.1
	Suicidal attempt	68	4.6
	Severe depression symptoms	47	3.2
	Severe catatonic symptoms	44	2.9
	For further evaluation and management	27	1.8
	Unknown(not documented)	38	2.5
	Schizophrenia	640	43
	Bipolar disorder	227	15.2
	Major depressive disorder	123	8.3
	Catatonia (MDD, schizophrenia)	74	5
	Brief psychotic disorder	210	14.1
	Schizophreniform disorder	44	3

Discharge diagnosis (N=1491)	Schizoaffective disorders	27	1.8
	Substance induced psychoses	62	4.2
	Post-partum psychoses	49	3.3
	Psychoses secondary to other medical conditions	13	0.9
	Anxiety related disorders	10	0.7
	Other mental disorders (delusional disorders, Intellectual disability	12	0.804

4.3.3 Treatment related characteristics of psychiatric admissions

Psychiatric polypharmacy was documented in more than half 856 (57.5%) of patients. Nearly one-third 417 (28.12) were non-adherent towards their medications. Reported extrapyramidal side-effects due to medications occurred in 349 (23.4%) patients. Akathisia 114 (32.66%) and acute dystonia reaction 125 (35 %) were the most commonly reported drug sides effect **(Figure 4**).

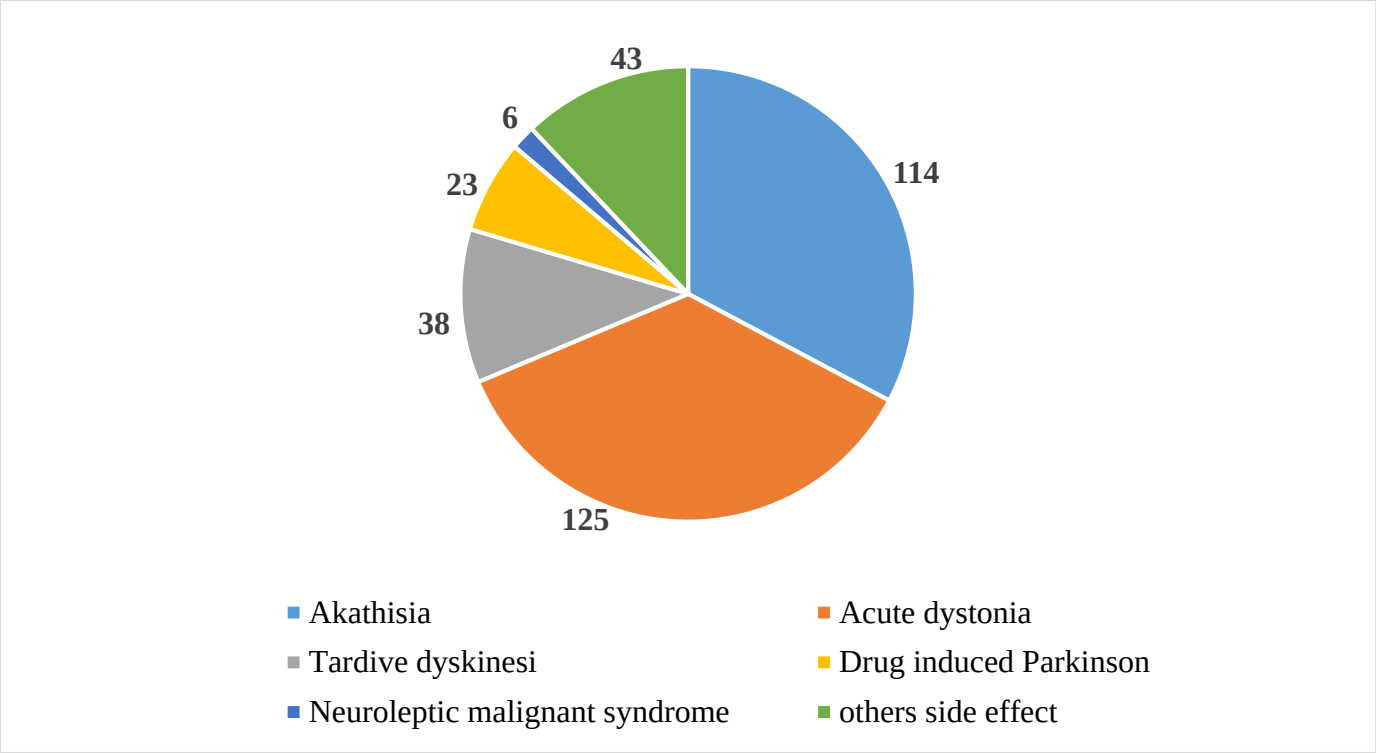

Figure 4: Show the medication side effect profiles in patients admitted to referral hospitals in eastern Ethiopia from June 28, 2017 to 2023, 2024.

4.4 Substance-related characteristics of psychiatric admissions

About two-thirds of the psychiatric ward patients had a history of substance use, with 366 (40 %) patients using more than two types of substances. Among these, the most frequently reported

substances were khat chewing, which was noted in 898 (60.2%), and tobacco smoking, which was recorded in 300 cases (33.5%). Additionally, 210 patients (14.1%) used alcoholic beverages (such as beer and wine), 75 (5.0%) used hashish or marijuana, and 72 (4.8%) smoked shish.

4.5 Length of stay in Psychiatric Admissions

The length of psychiatric admissions ranged between 2 and 120 days with a mean and median length of hospital stay in psychiatric admission was 20 (SD±12.33) and 18 (IQR 12-25) days respectively.

4.6 Factorss Associated with length of hospital stays in psychiatric admission

In the simple linear regression analysis variables such as age, sex, marital status, occupational status, living circumstance of the patient, duration of the illness, having a co-morbid physical illness, history of medication non adherance, experiencing a drug side effect, number of episode, history of relapse, type of discharge diagnosis, and history of substance use had a p-value score of less than 0.25. They were considered a candidate for multiple linear regressions (Table 8).

Table 8: Simple linear regression analysis to identify factors associated with length of stay in psychiatric admissions in admissions in Eastern Ethiopia from June 28, 2017 to 2023, 2024

Variables	Categories	Frequency	**β coef** (Std. Err)	**(95% CI)**	P-values
Sex	Male	825	1*		
	Female	379	-0.32 (0.08)	(-0.47, -0.17)	**0.00**
Age	Age of the patient (Mean and SD)	26.5 (±9.1)	0.01 (0.004)	(0.004, 0.02)	**0.00**
Residence	Urban	551	1*		
	Rural	653	0.007 (0.07)	(-0.14, 0.15)	0.92
Marital status	Married	486	1*		
	Single	467	0.002 (0.08)	(-0.17, 0.16)	0.97
	Divorced	223	0.49 (0.12)	(0.25, 0 .73)	**0.00**
	Widowed	28	0.89 (0.69)	(-0.39, 0.57)	0.90
Level of Educational	Not attending formal education	257	0. 97 (0.200)	(0 .79, 0 .81)	0.82
	Elementary (Grade 1-8)	515	0-.09 (0.20)	(-0.49, 0.29)	0.62
	Secondary school (Grade 9-12)	196	-0.28 (0.16)	(-0.61, 0.04)	**0.08**
	Diploma	148	-0.28 (0.17)	(-0.62, 0.03)	0.09
	Degree and above	88			

Occupational status	Farmer	400	0.89 (0.07)	(0.47, 0.16)	0.65
	Civil servant	161			
	Housewife	166	0.82 (0.10)	(0.79, 0.24)	**0.00**
	Private workers	131	0.29 (0.12)	(0.54 , 0.14)	0.29
	Students	137	0.48 (0.11)	(-0.7,-0.19)	0.26
	Unemployment	209	0.62 (0.10)	(-0.89,0.24)	0.98
Method of payment for hospital services	CBHI	281			
	Cash	721	-0.05(0.09)	(-0.24,0 .12)	0.51
	Credit	169	0.04 (0.12)	(-0.20, 0 .28)	0.73
	Others (Exempted service /free)	33	0.21 (0.28)	(-0.81, 0.98)	0.85
Living circumstances or situation of the patient	Living with family /relatives	1,013			
	Living alone	181	0.13 (0.40)	(-0.06, 0.34)	**0.18**
	Being homeless	10	0.66 (0.10)	(-0.14, 1.46)	**0.10**
Psychiatric diagnoses	More than two	408	0.18 (0.90)	(-2.33, 2.68	0.97
	Single	796			
Co-morbid medical illness	Yes	114	0.08 (0.12)	(0.32, 0.48)	**0.16**
	No	1092			
Co-morbid Neurological illness	Yes	55	0.12 (0.17)	(-0.23,0.46)	0.51
	No	1,149			
Family history of mental illness	Yes	340	0.07 (0.08)	(0.23, 0.09)	0.39
	No	864			
Medication non adherence	Yes	352	0.62 (0.08)	(0.46,0.77)	**0.00**
	No	852			
History of relapse	Yes	244	0.52 (0.09)	(1.34, 0.70)	**0.00**
	No	960			
More than two classes of medication	Yes	911	0.03 (0.07)	(-0.13, 0.18)	0.69
	No	729			
Extrapyramidal side effect	Yes	293	0.31 (1.28)	(0.14, 0.48)	0.72
	No	475			
History of substance use	Yes	736	0.23 (0.07)	(0.08,0.37)	**0.00**
	No	468			
Number of episodes	Single	942			
	Multiple episodes	262	0.50 (0.08)	(0.33, 0.67)	**0.00**
Discharge diagnoses	Schizophrenia and other spectrum	765	0.29 (0.07)	(0.14, 0.44)	**0.00**
	Bipolar Disorder	169	0.79 (0.10)	(0.56, 1.03)	**0.00**
	Major depressive d/o	145			
	Catatonia	55	-0.09 (0.17)	(0.44,0.25)	0.57
	Anxiety disorder	13	0.01 (0.11)	(-0.21,0.23)	0.94
Duration of illness		Mean 16.7	0.05 (0.01)	(0.05,0.05)	**0.00**
Key: 1* : indicate for reference group,					

In the multiple linear regressions analysis being female was negatively associated, martially divorced, being homeless, history of treatment non-adherence, occupational status, duration of illness, having multiple episodes of illness, having comorbid medical conditions, having a diagnoses fall in schizophrenia spectrum and other psychotic disorders, and longer duration of illness were found to be positively significantly associated with length of stay in psychiatric admissions at a p-value of < 0.05, while age, educational status, experienced extrapyramidal side effect, history of relapse and substance use, family history of mental illness were not significantly associated with length of psychiatric admissions.

Since the dependent variable was logged and independent variables were not logged so the results were interpreted in the following way.

Accordingly, adjusting for the effect of other variables the length of psychiatric admission was decreased by 11.6 percent among female patients admitted (β = -0.116, 95% CI: -0.216,-0.015) as compared to their counter parts and the length of psychiatric admission was increased by 60 percent among being homeless patients (β = 0.60, 95% CI: 0.16, 1.04) keeping other variables constant. Regarding marital status, the length of psychiatric admission was increased by 20.7 percent among divorced patients (β = 0.207, 95% CI: 0.03, 0.38) as compared to their counterparts.

Regarding the duration of illness, one month increase in the duration of illness the length of stay in psychiatric admissions was increased by 5 percent keeping the effect of other variable constant (β = 0.05, 95% CI: 0.05, 0.05). Regarding treatment non-adherence, adjusting for the effect of other variables the length of psychiatric admission was increased by 21.5 percent among those who have a history of treatment non-adherence (β = 0.215, 95% CI: 0.12, 0.30). Regarding comorbid illness, the length of psychiatric admission was increased by 24 percent among those who have a comorbid medical illness (β = 0.24, 95% CI: 0.16, 1.04) keeping other variables constant.

With regard to discharge diagnoses and the number of episodes, the length of psychiatric admission was increased by 22.8 percent among those diagnosed with schizophrenia and another psychotic spectrum (β =0.228, 95% CI: 0.05, 0.40), and the length of psychiatric admission was increased by 18 percent among those have multiple episodes of mental illness (β = 0.18, 95% CI: 0.006, 0.36) as compared to their counterparts (**Table 9**).

Table 9: Multiple linear regression to identify factors associated with length of stay in psychiatric admission in referral hospitals of eastern Ethiopia from June 28, 2017 to 2023, 2024

Variables	Categories	Frequency	β-Coef.(Std. Err)	P>t	[95% CI]
Sex	Male	822			
	Female	382	-0.11(0.05)	**0.02** *	-0.22, -0.02
Age	Age of the patient	Mean 26.5	0.06 (0.002)	0.31	-0.002, 0.01
Living circumstance	Living with family	1,013			
	Being Homeless	10	0.60 (0.22)	**0.01** *	0.16, 1.04
	Living alone	181	0.06 (0.06)	0.30	-0.06, 0.18
Marital status	Married	486			
	Never married	467	-0.09 (0.05)	0.06	-0.197, 0.005
	Separated	74	0.20 (0.09)	**0.021** *	0.03,0.38
	Divorced	149	0.03 (0.07)	0.60	0-.10 ,0.17
	Widowed	28	0.03 (0.14)	0.82	-0.26,0.32
Duration of illness		Mean 16.79	0.05 (0.01)	**0.00***	0.05, 0 .05
History of relapse	Yes	244	0.07 (0.09)	0.42	-0.11, 0.26
	No	960			
History of treatment non-adherence	Yes	355	0.21 **(**0.04)	**0.00***	0.12, 0.30
	No	849			
History of substance use	Yes	736	0.03 (0.04)	0.53	-0.06, 0.12
	No	468			
Diagnosis	Depressive disorders	145			
	Bipolar disorder	169	0.16 (0.10)	0.10	-0.005,0.37
	Catatonia	55	0.21 (0.13)	0.09	-0.04,0.46
	Schizophrenia and other spectrum	765	0.23 0.09)	**0.01***	0.05, 0.40
Comorbid medical illness	Yes	114	0.24 (0.07)	**0.00**	0.38, 1.02
	No	1,090			

Number of episodes	Single episode	942	1*		
	Multiple episodes	262	0.18 (0.09)	**0.04**	0.01,0.36
:** Significant association at P-value <0.05, **1 : indicate for reference group Model fitness test (R-squared = 0.7257 and adjusted R square=0.74215)					

5. DISCUSSION

Overall, this study aimed to determine the length of psychiatric admission in referral Hospitals of Eastern Ethiopia. The study found that the mean length of stay of psychiatric admissions was 20 days, SD (±12.33), ranging from 2 to 120 days.

This study is similar to studies done among patients admitted to psychiatric wards in high-income countries like Italy and from Lower-Middle-Income Countries such as , Nepal , Uganda, Nigeria and Ethiopia, 17.8, 19, 18, 23, and 22 days (Dimitri, et al ,.2018; Kaggwa et al., 2022 ; Basnet et al. 2018 ; Adegunloye., et al.2022) respectively.

The results of the current study were lower than those found in studies conducted in high-income countries such as Israel, England, Belgium, Japan, and China, as well as in low-income countries like Malawi, and Ethiopia with the mean length of psychiatric admission was 40, 28, 90, 55 42, 60, 28 and 63 days respectively (Campbell-Hall et al., 2010; Thompson, et al. 2004; Barnett .2018; Shinjo et al. 2017; Fekadu, et al 2007). The possible explanations for variation may be due to differences in healthcare systems, resource availability, and treatment approaches higher number of beds and sample size between the two countries. In a study done in a High-income country, the study was conducted in a mental hospital with a large sample size were 6995, 9806, 34226, and 3455 respectively. Additionally, it might be due development of mental health services in all its forms and needed infrastructure which contributed to increased hospital stays to increase the probability of good outcomes, and decreased rate of relapse and readmissions. Furthermore, another possible reason for differences might be related limited numbers of beds, and lack of community mental healthcare and rehabilitation services remain major boundaries and form the bottleneck effect to keeping short psychiatric admissions in the current study area (Campbell-Hall et al., 2010; Hanlon et al., 2019; Ayano et al., 2016; Johansson et al., 2017; Thornicroft et al., 2016).

However, this finding is higher than the study conducted in High-income countries like Saud Arabia, and Upper-middle-income like, South Africa with the mean length of psychiatric admission being 6 and 8 days respectively. The possible reasons for these discrepancies may be differences in sample size and shifted psychiatric care from institutional custody of patients to deinstitutionalization. In Saud Arabia, South Africa, the study conducted was among 432 and 478 admitted psychiatric patients, while the current study was conducted among 1617 patients.

Additionally, this is reports from the countries more deinstitutionalized movement, the development of community-based mental healthcare, rehabilitation facilities and residential programs may be attributable to these discrepancies (Al Mousa et al., 2021; Qureshi et al., 2013; Grant et al., 2021; Campbell-Hall et al., 2010).

Regarding associated factors: - The result from this study indicates that there were significant negative relationships between lengths of stay in psychiatric admissions and being a female, while, being martially divorced, being homeless, history of treatment non-adherence, duration of illness, having a comorbid medical condition and having a diagnosis of schizophrenia spectrum and other psychotic disorder were positively associated with length of stay in psychiatric admissions.

Accordingly, being a female may decrease the length of psychiatric admission by 11.6 percent compared to male patients. This aligns with the study conducted in high and upper-middle-income countries like Saudi Arabia, Lebanon and South Africa (Paliweni-Zwane, 2024; Haddad, 2024) respectively. The possible explanation for this finding might be due to women might be more likely to seek help earlier more regularly and have strong social support, which can lead to earlier intervention and potentially decreased length of psychiatric admission (Locke et al., 2022). Additionally, women are often diagnosed with disorders like depression and anxiety, which may be managed with shorter hospital stays. In contrast, men are more frequently affected by severe or chronic conditions that typically require longer hospitalizations (Leung MD and Chue MRC Psych, 2000; Schuch et al., 2014).

This study revealed that the length of psychiatric admission was increased by 60 percent among homeless patients as compared to those living with their families or relatives. This finding is in line with studies conducted in middle-income countries like the UK (Tulloch et al., 2012) and low -income countries such as Ethiopia particularly in Jima (Addisu et al., 2015a; Fekadu et al., 2014) This may be attributable to the discharging being homeless mentally ill patients could be a challenging due lack of psychosocial aftercare including, gap in mental health services,supported employment or social safety net and rehabilitative services in the study area hinders a longer stay in a psychiatric ward (Saraceno et al., 2007). Another possible justification for this might be being homeless patients may have difficulty accessing consistent follow-up care and treatment after being discharged from the hospital, this can result in increased vulnerability to treatment

discontinuation and relapses or worsening symptoms, potentially leading to increased length of psychiatric admission (Canham et al., 2019 ; Grewal, 2019; Olfson et al., 2000).

Similarly, being divorced were increased the length of psychiatric admission by 20.7 percent as compared to those married psychiatric patients. This finding is consistent with a study conducted in the low-income country of Uganda (Kaggwa et al., 2022). This might be due to marital divorced can be lead to significant stress and financial difficulties which might affect the ability to secure necessary medication, follow up care and exacerbate mental illness ,this additional stress can make complicated recovery, and discharge planning which increased length of psychiatric admissions (Bourne et al., 2015). Additionally, divorced marital can affect the social support system, patient's readiness to discharge and need more time to stabilize emotionally and adjust to changes in their personal lives before transitioning back into the community, all of which can increase the length of psychiatric admissions (Tulloch et al., 2016; Robertson et al., 2024).

In addition, as the duration of illness increased, the length of psychiatric admissions rose by 5.1 percent, while keeping the effect of other variables constant. This finding is consistent with studies from high-income countries like Israel (Baruch et al., 2005),and the UK(Crossley and Sweeney, 2020), This might be due to that prolonged mental illness may require more extensive evaluation and monitoring. This helps assess treatment effectiveness, understand the condition, and develop long-term care plans, which can extend psychiatric admissions (Holley et al., 2020; Chung et al., 2013). Additionally, the chronicity and severity of long-term mental illnesses often contribute to longer stays as healthcare providers work to stabilize patients, manage symptoms, and plan for a smooth transition to outpatient care (Perlman et al., 2015; Collazo, 2021).

Likewise, the length of psychiatric admission was increased by 21 percent among those who have a history of treatment non-adherence compared to those with a history of adherence. This finding is supported by studies conducted in high-income countries, such as Austria (Rittmannsberger et al., 2004) and China (Chien et al., 2016). A possible justification might be that non-adherence can lead to exacerbations or complications that require longer treatment and stabilization periods, and may contribute to more complex clinical presentations, requiring longer hospitalization for effective management which can contribute to increased length of psychiatric admissions for individuals with a history of treatment non-adherence (Singh and Blackman, 2024; Fikreyesus et al., 2016; Demoz et al., 2014).

Furthermore, the finding from the current study revealed that the length of psychiatric admission was increased by 24 percent among those who have comorbid medical illnesses compared to patients without medical comorbidities. The results of this study are consistent with findings from high-income countries such as Portugal, the UK (Carter et al., 2016) , and Pennsylvania, USA (Sayers et al., 2007). Similar trends were also observed in upper-middle-income and low-income countries like Malaysia and Nepal (Fong et al., 2010; Basnet,et al. 2018). This may be attributable to the comorbid medical condition that can exacerbate psychiatric symptoms, complicate psychiatric treatment, worse psychiatric outcome and their treatments may interact with psychiatric medications and need more intensive monitoring, to ensure addressing comorbid issues, which can be time-consuming and require coordination between different specialists. This can involve frequent assessments, consultation, diagnostic tests, and adjustments to treatment plans, all of which can extend psychiatric admissions among individuals with comorbid medical illnesses (Siddiqui et al., 2018; Douzenis et al., 2012).

Furthermore, the finding from the current study revealed length of psychiatric admission was increased by 22.8 percent among those diagnosed with schizophrenia spectrum and other psychotic disorders. This study aligns with findings from both middle-and low-income countries, including Brazil, Colombia, Nepal, Uganda, and Ethiopia, specifically from Jima and Amanuel mental hospitals (Ithman et al., 2014; Baeza et al., 2017; Basnet et al., 2018; Fekadu et al., 2007; Mamaru, 2021). This may be related to Schizophrenia and other psychotic disorders often involve complex and severe symptoms such as delusions, hallucinations, and significant disorganized thinking, higher risk of relapse or complications, such as exacerbation of symptoms or comorbid conditions, these symptoms can be debilitating and challenging to manage, requiring extended treatment and stabilization period which contribute to increased psychiatric admissions compared to other mental health conditions (Julayanont and Suryadevara, 2021; Olfson et al., 2011; Schoepf et al., 2014).

Finally, these studies revealed that the length of psychiatric admission was increased by 18 percent among those who have multiple episodes of mental illness as compared to those who had single episodes. This finding is consistent with studies conducted in high-income countries like England (Thompson et al., 2004) upper-middle-income countries such as Brazil (Barros et al., 2016) and Taiwan (Hsu and Chan, 2018). The reasons might be the multiple episode of mental illness may have a more straightforward or more severe course of illness, complexity in diagnosis and

treatment and the need for comprehensive treatment and support and they may face significant psychosocial challenges, such as unstable living situations, lack of social support, or difficulties in adhering to treatment plans. Addressing these challenges often requires more extended psychiatric admissions, all of which increased the length of psychiatric admission (Ho et al., 2000; Jayatilleke et al., 2018).

Strengths and limitations of the study

Strengths

This study is the first of its kind to explore the length of psychiatric admission and its associated factors, incorporating unique variables not typically examined in other research. Conducted in two large facilities in eastern Ethiopia, the study enhances generalizability. Additionally, it employed an advanced statistical model and utilized a relatively larger sample size, further strengthening the findings.

Limitations of the study

Since this study was a retrospective chart review where in the data were gathered from patients' medical charts; as such, the choice of study variables was contingent on the data available. Second, Several variables were missing due to incomplete charts. This fact and the lack of information might influence the final results. Additionally, the limited findings from other studies make it difficult to compare our results with existing literature, particularly in Ethiopia.

Prone to selections bias; the study sample may not be representative of the general population because of patients records are selected based on availability rather than random sampling , measurements bias because of the data collection tool was check list and risk to survivorship bias means analysis only records of patient who shows improved outcome and exclude those who LAMA, absconded ,etc

Finally, the study used the checklist which was not validated and the design prevented the investigator from establishing cause-effect relationship

6. CONCLUSIONS AND RECOMMENDATION

6.1. CONCLUSIONS

The mean length of stay of psychiatric admission in referral hospitals in eastern Ethiopia is 20 days which is categorized as intermediate. This study identified several significant factors associated with the length of psychiatric admissions, including being homeless, and martially divorced; the duration of illness; the presence of comorbid medical conditions; having a diagnoses of schizophrenia spectrum and other psychotic disorders; multiple episodes of illness; and treatment non-adherence. The finding of this study may help clinicians in identifying patients and emphasizing enhancing treatment adherence, and providing comprehensive care for those who are more likely to spend longer length of stay in the ward.

6.2. RECOMMENDATIONS

According to the findings, the following recommendation was forwarded to the concerned bodies. These recommendations can guide each sector in addressing the key factors that contribute to the length of psychiatric admissions and ultimately help in reducing unnecessary extended length of hospital stays in psychiatric admissions

To Harari regional and Dire dawa city administrative Health Bureaus :

Develop Targeted Policies for Vulnerable Populations: Implement policies that address the needs of patients who are homeless or divorced, as these factors contribute to longer psychiatric admissions. Programs for housing support and social reintegration could be essential to reducing psychiatric hospitalization duration.

Promote Community-Based Mental Health Care: Encourage the development of community-based programs that focus on early intervention, treatment adherence, and aftercare to reduce the need for prolonged hospital stays.

To Haramaya University College of Health and Medical Sciences

Conduct Research on Mental Health Factors: Universities can conduct further research on the impact of homelessness, marital status, and chronic illnesses on the length of psychiatric admissions. This research will provide more evidence to support targeted interventions.

Collaborate with Healthcare Systems: Universities can collaborate with hospitals and healthcare providers to conduct joint research, improve treatment adherence, and develop care models based on the factors identified in this study.

Hospital Hiwot Fana comprehensive specialized and Dilchora referral hospitals :

Implement Comprehensive Care Models: Establish comprehensive care plans for patients identified with prolonged psychiatric admissions. This should include coordinated care for comorbid medical conditions, regular evaluations, and support for treatment adherence.

Enhance Patient Monitoring and Support: Develop systems to monitor and support patients who are homeless, divorced, or suffering from chronic mental illness. Addressing these social determinants can help reduce the length of hospital stays.

Strengthen Discharge Planning: Focus on developing strong discharge planning and aftercare systems for patients with long-term mental health conditions to reduce the risk of relapse and rehospitalization.

To Mental Healthcare Providers:

Enhance Patient Adherence to Treatment: Healthcare providers should prioritize improving patient adherence to prescribed treatments, especially for those with schizophrenia spectrum disorders and other psychotic illnesses. Regular follow-up and support systems can help patients stick to their treatment plans.

Address Comorbid Conditions: Providers should assess and manage comorbid medical conditions alongside mental health treatment, as this can affect the duration of psychiatric admissions. A holistic approach will contribute to better outcomes and shorter stays.

Focus on Early Intervention:Providers should focus on early detection and intervention for patients who show signs of multiple episodes of illness or those with longer illness duration, aiming to reduce the need for prolonged psychiatric hospitalization.

Incorporate Mental Health in Public Health Literacy:Integrate mental health education into public health literacy programs, focusing on the needs of vulnerable groups that contribute to prolonged psychiatric stays. This will help raise awareness and promote early intervention, treatment adherence, and comprehensive care.

To researchers, better to conduct a longitudinal study to explore the causal relationship between lengths of psychiatric admission and identify significant factors.

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8. ANNEXES

8.1. Information sheet and informed voluntary consent form for the head of the referral hospitals

My name is Hirko Assefa; I am studying a master's degree at Haramaya University College of Health and Medical Sciences. I kindly request you to lend me attention to explain to you about the study and the reason this hospital has been chosen and your role as being the manager of the referral Hospitals.

Title of the study: Length of stay and associated factors of psychiatric admission in referral hospitals in eastern Ethiopia, 2024.

Purpose: The purpose of the study is to write a thesis as a partial requirement for the fulfillment of a master's degree in Integrated clinical and community mental health for the principal investigator. Eventually, the study will provide information for policymakers to design and improve inpatient services for psychiatric patients, to efficiently the limited beds and improve the quality of psychiatry care and for mental health professionals, clinicians and police maker to predict appropriate length of stay in psychiatric admission and provide better mental health services.

Procedure: I will take the medical records of clients who ever registered on psychiatric admission Log book from June 28, 2018 to June 27,2023 and collect the available information from the medical records of the clients. The data extractions tool has 49questions and it will take about 45 minutes to complete by reviewing patient medical records.

Risk and/or Discomfort and Benefits: Risk of participating in this study is very minimal. There will not be any direct payment for participating in this study. Moreover, the finding from this research may reveal important information for the stakeholder including referral hospitals and may reveal important information for local as well as national mental health planners.

Confidentiality and Anonymity: Since the study will be conducted by taking appropriate information from the medical chart, it will not inflict any harm to the patients that means the name or any other identifying information will not be recorded on the questionnaire and all information is taken from the chart will be kept strictly confidential and in a safe place. The information retrieved will only be used for the study purpose.

The information collected during the study will be stored in a file, which will not have an individual name on it, but a code number assigned to it. And it will not be revealed to anyone except the principal investigator.

Rights: Permission for this study is on a voluntary basis. You have the full right to permit or not for the study. You have also the full right to terminate at any time if you get something wrong with the study conducted in your hospital.

Persons to contact: If there is any question about the study, you can contact any of the following addresses.

Hirko Assefa: mobile Number: 0912844785, Email: hirkoasse19@gmail.com

Institutional Health Research Ethics Review Committee (IHRERC): Tel: 0254662011, P.O.Box 235, Harar, Ethiopia

Declaration of Informed Voluntary Consent:-I have read the information sheet. I have clearly understood the purpose of the have been allowed to ask questions for things that may have been unclear. I was informed that the hospital has the right to stop the study from being conducted in the hospital if any misdeeds and unethical procedures are reported during the data collection process in the hospital's premises. Also, I understand that the hospital has the right to use the result of the study as public property. Therefore; I declare my voluntary consent on behalf of ----------referral hospital management to allow this study to be conducted in the institution with my initials signature as indicated below.

Name of the Head of the hospital: _____ Signature_____ Date

Name of the Principal Investigator: _____Signature _____Date

8.2. Data extraction check list

This tool was prepared for the collection of socio-demographic, clinical characteristics, behavioral related information about hospitalized psychiatric patients. Data extraction form prepared for the collection of important information on the medical record of individual with mental disorder for psychiatric admission, intake from medical record chart to determine length of stay and associated factors in psychiatric admission in referral hospitals in eastern Ethiopia from June28, 2018 to June 27 2023 admitted patients.

Name of the referral Hospital ---------- signature---------- date---------

Name of data collector----------signature---------- date----------

Name of supervisor----------signature----------date----------

Introduction: This study is intended to assess length of stay and associated in psychiatric admission in referral hospitals in eastern Ethiopia. Not expected to write the name of the patient or phone number on the data extraction tool .Every data obtained from patient medical record will be kept confidentially.

Instruction: The check list has four parts. It will take about 45 minutes to complete the medical chart review.

Section 1: Socio Demographic Information

Code No.	**Questions**	**Coding categories**
101	What is the age of the patient at admission	Age in years ___
102	What is the sex of the patient?	1. Male 2. Female
103	What was the occupational status of the patient?	1.Unemployment 2. Government employee 3. Private employed 4. Farmer 5. Student 6. House wife . 7. Others (please specify)-------

104	Where is the residence of the patient?	1.Urban 2.Rular
105	What was the patient living circumstance or situation?	1.Living alone 2. Living with family /relatives 3. Being Homeless
106	What was the marital status of patient at admission?	1.Single 2.Married 3. Separated 4. Divorced 5. Widowed
107	What was the education status of the patient?	1.Un able to read and write 2. able to read and write 3. Elementary (1-8) 4. High school(9-12) 5.Diploma 6.Degree and above
108	Method of payment for hospital service	1. CBHI 2. Cash 3. Credit 4 . psychosocial 5. Waive 6. Others

Section 2: Assessment of clinical characteristic of the patients

This section will assess psychiatric condition, neurological and medical illness co morbidity

s.no	Questions	Coding categories
108	Reasons for admission (write)	
109	Date of admission	---------,-----,--------D/M/Y
110	Date of discharges	-------,----,-----D/M/Y

111	What is the total duration of the patients admitted to psychiatry ward (in days)	---------- -in days
112	What is the working Diagnosis of the patients according to DSM-5 diagnostic criteria during admission?	
113	If the patients more than one in the 5 years write duration of admission	1.Admission ----------days 2.Admissions--------- days 3. Admission.....days 4. Admission ----------days
114	Within how much duration the patient was readmitted (in month)? Write for each number of readmissions.	1. 2.
115	What is the type of treatment modality provided for patient during admission (List the name of medications)	1.Firstgenerations AP 2. Second generations AP 3.. Mood stabilizers 4. Anti -depressant 5. Benzodiazepines 6. Barbiturates 7.long acting injection
116	What was the preparation of the medications given during admission?	1. Po 2. Injection 3. Not given 4. Not known

117	The patient was treated with more than two medication groups?	1.Yes 2.No
118	Is there side effect? (If yes write please write)	1.Yes 2.No
119	Patient had history of non-compliance to medicines?	1.Yes 2.No
120	The patient had Co-morbid psychiatric disorders?	1. Yes 2. No.
121	The patient had a medical illness Co morbid with mental illness?	1.Yes 2.No
122	The patient was diagnosed with neurological illness co morbid with mental illness?	1. Yes 2. No
123	Have the patient has previous hospitalizations for psychiatric disorders?	1. Yes 2. No
124	Have the patient has family history of mental illness?	1. Yes 2. No
125	Have the patient has history hospitalizations for GMC?	1. Yes 2. No
126	What is a main diagnoses of the patient at discharge	----------

127	What is the global clinical rating of patient outcome on discharge based on psychiatrics decision (discharge plan)?	1. Improved 2. Absconded 3. No change(the same) 4. Deceased (death) 5.Referredforfurther management 6.Transferred to other health facility 7.LAMA

Section 3.Behavior related and mode of admissions assessment		
s.no	**Questions**	**Alternatives**
128	Legal base status(Mode of admission)	1.Voluntary admission 2.Involuntary admission
129	Use of restraints in patient during admissions	1. Yes2. No
30	Have a patients has history of suicidal ideation	1.Yes 2.No
131	Has a patient any history of suicidal attempt at admission?	1. Yes2. No
132	Have patient history of homicidal at admission?	1. Yes 2.No
133	Have a patient history of Aggressive at admission?	1 . Yes2. No
Section: 4 Institutional related factors		

134	The total number of hospital catchment populations?		From HMIS
135	Total number of psychiatric beds in hospital		
136	Total number of psychiatrist		
137	Total number other professional serving in psychiatry unit		
138	Who was evaluate/treated the patient?	1.Psychiatrists 2.MHprofessional specialists 3.psychiatry nurses 4.Others	

Section 5: Substance use assessment

You are going to review some questions about experience of using these substances across lifetime. These substances can be smoked, swallowed, sniffed, injected or taken in the form of pills. Some of the substances listed may be prescribed by a doctor (like amphetamines, sedatives, pain medications). For these medical records reviews, you will not record medications that are used as prescribed by health professional or doctor. However, if patient have taken such medications for reasons other than prescription, or taken them more frequently or at higher doses than prescribed, please let you know it, and please be assured that information on such use will be treated as strictly confidential.

138 In his/her life, which of the following substances have patient ever used? (NON-MEDICAL USE ONLY)		NO	YES
139	Tobacco products (cigarettes, chewing tobacco, cigars, etc.)	0	1

1140	Alcoholics' beverages (beer, wine, etc.)	0	1
142	Khat	0	1
143	Shisha	0	1
144	Hashish	0	1
148	Marijuana	0	1
149	Other substance or drug specify ----------	0	1

8.3. Curriculum Vitae (CV)

Personal Information

- Full Name : Hirko Assefa Tolcha
- Place & Date of Birth : Meta Robi woreda, West Shoa Zone/ Ambo, Ethiopia, December, 1996 G.c
- Nationality : Ethiopian
- Marital Status : Married
- Gender : Male
- Current Address : Harar city, Jinela woreda, Kebele 16
- Mobile : 0912844785/0925697431
- Email : hirkoasse19@gmail.com

Academic Qualifications

- **2024:** Masters of Public Health in Epidemiology **,** Haramaya University, Harar, Ethiopia
- **2015:** Degree, Bachelor of Science in Psychiatry, Haramaya University, Harar, Ethiopia
- **2011:** Certificate, the Ethiopian Higher Education Entrance Qualification Certificate, Holeta Preparatory School, Holeta, Ethiopia
- **2008: Certificate**, Ethiopian General Secondary Education Certificate, Enchinni Secondary School, Ada'abarga, Ethiopia.
- **1999-2007**: Primary education, Enchinni primary school, Ada'aBarga, Ethiopia

Language Competence

	Speaking	Listening	Writing	Reading
Amharic	Excellent	Excellent	Excellent	Excellent
Afaan Oromo	Excellent	Excellent	Excellent	Excellent
English	Excellent	Excellent	Excellent	Excellent

Leadership Ability

- Excellent interpersonal and communication ability
- Willing to work in hard circumstance
- Able to create and work in team sprit work effectively with other levels and ,good partnering

Computers Skill

- Basic computer skills .SPSS, STATA, END NOTE, Epi info, Epi-data,

Training and Working Experience

- Nursing standard training CDC project Mekelle University, Ayder Referral Hospital, Mekelle Ethiopia, 2008E.C
- Psychotherapy training and work shop Mekelle University Ayder comprehensive referral Hospital
- STI training, CDC PROJECT, Haramaya University, Harar Ethiopia, 2009E.c
- Pain Management, Haramaya University, Hiwot Fana hospital, Harar, Ethiopia, 2009E.c
- Comprehensive HIV counseling and test training Haramaya University, and CDC project, Harar, Ethiopia 2010, E.C
- Quality Assurance training, Haramaya University, and Harari regional health bureau, Harar, Ethiopia, 2010E.C
- HMIS Training, Harari health bureau with Haramaya University, Harar Ethiopia, 2011
- Mental hGap version 1 and 2, Care Ethiopia (NGO), Adama ,Ethiopia 2012 E.c,
- Psychosocial aspects during COVI-19 outbreak or pandemics training, Haramaya University, Harar, Ethiopia, 2012

- Hospital based psychosocial support guideline preparation Training, MOH, Addis Ababa, 2013
- Community first Aid respondent TOT training by MOH and Haramaya University, Harar Ethiopia 2104
- Forensic psychiatry training, MOH, Dire dawa, 2014
- ICD 11 and NCOD training, Harari Regional health bureau, Harar, Ethiopia, 2014
- Advanced HIV/ AID treatment training, Harari Regional health bureau, Harar .Ethiopia, 2015
- Quality improvement project training by Haramaya University, Harar Ethiopia ,2016
- Leadership and management training by **JHPIEGO** and Haramaya University, Harar Ethiopia ,2016
- HU-HFCSH staff representative and hospital governor board members from 2014 to present

Hobbies

- Computer practices, movies, music, football and walking , Providing volunteer service in community development activities ,Attending club and forum events with art and social issues

Reference

1. Dr. Abdi Amin (MD, Surgeon ,MPH, Assistant professor):- Executive medical directors of Hiwot Fana comprehensive specialized hospital, Haramaya University, Harar, Ethiopia, Phone: 0915046933
2. Dr.Abdulselam Assefa (MD, Assistant professor):- Psychiatrist and school of Medicine head of psychiatry at Haramaya university College of Health and Medical science and HFCSH, Harar, Ethiopia . Phone Number: 0921541144
3. Mr. Tadesse Misgana (MSc in ICCMH, Assistant professor);-Lecturers at Haramaya University College of Health and Medical science department of Psychiatry, Harar, Ethiopia , Phone Number: 0923100463