



St. Paul's Hospital Millennium Medical College

Department of psychiatry

**Prevalence of cognitive impairment and associated factors among
patients with substance use disorder at SPHMMC, AA, Ethiopia
Institutional Based Cross-Sectional Study**

Investigator: Dr. Tigist Alehegn (PGY III)

Addis Ababa, Ethiopia

April, 2026

St. Paul's Hospital Millennium Medical College

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**A Research Thesis Submitted To The Department Of Psychiatry, Presented In Partial
Fulfillment Of The Requirements For Specialty In Psychiatry; St. Paul's Hospital
Millennium Medical College**

Addis Ababa, Ethiopia

April, 2026

Advisor's Approval Sheet

This is to certify that the proposal entitled “**Prevalence of cognitive impairment and associated factors among patients with substance use disorder at SPHMMC, AA, Ethiopia**” is submitted in partial fulfillment of the requirements for the Specialization Certificate in Psychiatry to, Saint Paul's Hospital Millennium Medical College, the Department of Psychiatry, and has been carried out by Dr Tigist Alehegn under our supervision. Therefore, we confirm that the candidate has fulfilled the necessary requirements and hereby recommend the submission of the thesis to the department.

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Abstract

Background: - Cognitive impairment is a significant concern in the field of mental health, particularly among individuals with substance use disorder. The relationship between cognitive functioning and substance use disorders is complex and it can affect the quality of life, treatment retention and risk of relapse. Prevalence of cognitive impairments in patients with substance use disorders has been estimated to be between 30% and 80% in previous studies conducted in diverse settings, including the Netherlands and China. However, there still remains a gap in knowledge regarding specific prevalence rates and associated factors among patients with Substance Use Disorder (SUD) in Ethiopia which is crucial for tailoring interventions, making this research of a great need.

Objective: - To assess the prevalence of cognitive impairment and associated factors among patients with substance use disorder at SPHMMC, AA, Ethiopia.

Methods: - Cross-sectional study was conducted in SPHMMC among total of 418 patients with substance use disorder, receiving treatment at the psychiatric OPD and inpatient settings. Data were collected by pretested interviewer administered structured questionnaire and using convenience sampling technique. The returned questionnaire was analyzed using STATA version 17. The association between cognitive impairment and independent variable was done using logistic regression using both bivariate and multivariate analysis. Statistical significance were assured at a p-value <0.05.

Results: A total of 418 patients participated in the study, with 99.05% response rate. The prevalence of cognitive impairment was 58.61% with a 95% confidence interval of (53.81, 63.25). Factors that were found to be significantly associated with cognitive impairment include: older age [AOR = 3.62; 95% CI: (1.76-5.43)], severe alcohol, khat and tobacco use disorder [AOR= 2.43; 95% CI: (1.39-4.62)], use of two substances [AOR = 2.25; 95% CI: (1.56-4.75)], use of three or more substances [AOR = 3.89; 95% CI: (1.23-5.49)], concurrent use of more than one substance [AOR = 3.04; 95% CI: (2.01-5.97)], and presence of co-morbid medical or psychiatric illness [AOR =1.96; 95% CI: (1.12-3.74)].

Conclusion: More than half of the study participants had cognitive impairment. Older age, severe and multiple substance use, particularly concurrent poly substance use, and the presence of co-morbid medical or psychiatric illnesses were key factors associated with cognitive impairment. Strengthening early screening, substance-use prevention, and integrated management of co-morbid conditions may help reduce the burden of cognitive impairment.

Keywords: - Cognitive impairment, Substance use disorder, Ethiopia, SPHMMC

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Contents

Advisor’s Approval Sheet	I
Abstract	II
Acknowledgment	III
List of tables and figures	VI
List of tables.....	VI
List of figures	VI
Abbreviation and acronyms	VII
1. Introduction.....	1
1.1Background	1
1.2 Statement of the problem	3
1.3 Significance of the study.....	5
2. Literature review	6
2.1 Cognitive impairment	6
2.2 Associated factors of cognitive impairment.....	8
2.3 Conceptual framework.....	11
3. Objective	12
3.1 General objective	12
3.2 Specific objective.....	12
4. Methodology	13
4.1 Study Setting and Period.....	13
4.2 Study Design	13
4.3. Population	13
4.3.1. Source population	13
4.3.2. Study population	14

4.4. Sample size calculation.....	14
4.5 Sampling Procedure	15
4.6 Eligibility criteria	15
4.6.1. Inclusion criteria	15
4.6.2. Exclusion Criteria	15
4.7. Study Variables	15
4.7.1 Dependent variable	15
4.7.2. Independent variables	16
4.8. Data Collection Tools and Techniques.....	16
4.9. Data Quality control.....	18
4.10 Operational definition	18
4.11. Data Entry and Analysis.....	19
4.12. Ethical consideration.....	20
5. Result	21
5.1 Sociodemographic characteristics of participants.....	21
5.2. Substance use history and health related factors.....	22
5.3. Prevalence of cognitive impairment.....	26
5.4. Factors associated with cognitive impairment	27
6. Discussion.....	31
7. Reference	36
Annex- I: Information sheet	43
Annex- II: Consent form.....	44
Annex- III: Questionnaire	45
Part I- Socio-demographic characteristics.....	25
Part II- Substance use history and clinical characteristics.....	26
Part III- Generalized Anxiety Disorder-7.....	27
Part IV-Patient Health Questionnaire- 9.....	28

Part V- Montreal Cognitive Assessment.....	29
Amharic versions of Questionnaire and tools.....	30

List of tables and figures

List of tables

Table 1: Sociodemographic characteristics among patients with substance use disorder at SPHMMC, AA, Ethiopia (N=418).....	Error! Bookmark not defined.
Table 2: Substance use history and health related factors among patients with substance use disorder at SPHMMC, AA, Ethiopia (N=418)	Error! Bookmark not defined.
Table 3: Health related factors among patients with substance use disorder at SPHMMC, AA, Ethiopia (N=418).....	24
.	
Table 4: Prevalence of cognitive impairment among patients with substance use disorder at SPHMMC, AA, Ethiopia (N=418).....	Error! Bookmark not defined.
Table 5: Factors associated with cognitive impairment among patients with substance use disorder at SPHMMC, AA, Ethiopia (N=418)	Error! Bookmark not defined.

List of figures

Figure 1. The conceptual framework on cognitive impairment adopted from reviewing different literatures.....	9
Figure 2: Prevalence of cognitive impairment among patients with substance use disorder at SPHMMC, AA, Ethiopia (N=418)	27

Abbreviation and acronyms

AUD Alcohol use disorder

CI Cognitive impairment

DSM-5 Diagnostic and Statistical Manual of Mental Disorders, 5th Edition

MA Methamphetamines

MMSE Mini-mental state examination

MoCA Montreal Cognitive Assessment

NCDs Neurocognitive disorders

NIMHANS National Institute of Mental Health and Neuro Sciences

ORs Odds Ratios

OPD Outpatient department

SPHMMC Saint Paul's Hospital Millennium Medical College

SUD Substance Use Disorders

1. Introduction

1.1 Background

Substance use disorders (SUDs) are highly prevalent worldwide and are among the leading causes of morbidity and mortality globally(1). According to the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5), SUD is defined as a pattern of substance use leading to clinically significant impairment or distress as manifested by at least two of the eleven criteria within a 12-month period(2). The chronic utilization of diverse substances has been widely linked to neural dysfunctions and associated cognitive deficits as they alter how our brain works. In the context of a mechanistic approach, it is held that neuro-adaptive and neurotoxic pathways influence the impact of substances in the brain(3).

Cognitive impairment refers to a decline in one or more cognitive domains, including complex attention, executive function, learning and memory, language, perceptual-motor abilities, and social cognition(2). These deficits can range from mild cognitive impairment, where individuals experience subtle difficulties in daily functioning, to major neurocognitive disorders (NCDs), which significantly interfere with independence and quality of life and is a commonly assumed outcome of chronic substance use. Evidence regarding the neuropathological and cognitive traits associated to- or caused by excessive use of specific substances has accumulated and these characteristics have been incorporated into substance-induced neurocognitive disorders (NCDs) (2).

The relationship between substance use disorders (SUDs), mental health and cognitive functioning is found to be complex (9-11). Executive dysfunction, and cognitive impairments in general, are suggested to be a trans diagnostic dimension in psychopathology (12). Therefore, addressing cognitive impairment is said to be a critical component of treatment for substance use disorders, as it is a significant predictor of relapse and can compromise treatment outcomes and quality of life (13).

Gross estimates for mild NCD ranges 31–70% (2, 4-6), and from almost zero for major NCD(2) to 0.7%–35% considering the lowest cutoff scores of screening measures (6, 7). The heterogeneity of these prevalences is due to many factors including sample size, age, education, substance class,

frequency, intensity and duration of use, abstinence, cognitive domain, comorbidities, and the specific screening tool employed. Importantly, the validity of these screening tools, including their sensitivity, specificity, and optimal cutoff scores varies across different populations and study settings further contributing to the observed heterogeneity in prevalence estimates.

This wide range in cognitive impairment is said to be due to differences in the mode of action of substances, years and amount of regular use and gender(16). As each substance has different effects on brain functioning the consequences of prolonged substance use, such as cognitive impairments, will also differ between substances. For example, acute alcohol intoxication primarily acts upon cognitive functions associated with the prefrontal cortex, such as planning, verbal fluency, memory and complex motor control(17).

Furthermore, the course of recovery is also said to be variable. Around 45% of individuals with suspected substance-induced NCD will likely resolve most cognitive issues within 3 to 5 weeks of abstinence, while about 31.5% to 40.5% may experience deficits that persist for up to a year (8). The effects of alcohol on cognitive functioning post-detoxification are found to affect all cognitive domains (18). Cognitive recovery generally has occurred but impairments have still been demonstrated in the domains of visuospatial abilities and decision making which may last at least up to 1 year after abstinence (18, 19).

1.2 Statement of the problem

Globally, substance-induced cognitive impairment is a growing issue, with studies estimating that between 30% to 80% of individuals with SUD experience measurable cognitive deficits(20). Substance use disorders have a significant impairment in executive function, attention, and decision-making that are thought to contribute to SUD onset and relapse (21, 22). Moreover cognitive dysfunction has been associated with predictors of treatment failure such as reduced attendance, shorter periods of drug abstinence, and higher rates of dropout(23, 24). And this has been demonstrated as poorer performance in tasks assessing processes such as executive function, processing speed, working memory, and visuospatial ability (25, 26).

The consequences associated with this population are said to extend beyond individual health, thereby placing a disproportionate burden on public health systems and national economies. Cognitive impairment in SUD populations leads to greater healthcare utilization due to more complex clinical needs, higher rates of relapse, and longer treatment courses. This ultimately contributes to long-term disability and lost productivity, resulting a significant economic burden (16),(31),(38).

Building on global findings, a Kenyan study has shown rising substance use trends, particularly involving alcohol, cannabis, and stimulants, that has been linked to an increase in neurodegenerative disorders(16). Despite the rising prevalence of substance use across Africa, there is a noticeable research gap on cognitive impairment among people with SUD(16). In Ethiopia, where prevalence of alcohol use disorder and khat consumption is high, cognitive impairment related to SUD is an underexplored and pressing issue(27). While cognitive impairment is a core feature of neurocognitive disorders and is routinely recognized and evaluated particularly for age-related neuropathologies(28, 29), has not been nearly as much explored in SUD. Moreover, failure to address cognitive impairment among individuals with SUD has been seen to have physical, psychological, social and economical consequences(16).

In Ethiopia, although few studies have addressed issues on prevalence of substance use disorders, none have examined prevalence of cognitive impairment and its associated factors in patients with

SUD in particular(27). Furthermore at St Paul's Hospital Millennium Medical College, where a significant number of patients with SUD receive treatment, there is even more limited data on the burden of cognitive impairment in this population. Given the high prevalence and significant consequences of cognitive impairment in SUD populations, urgent efforts are needed to enhance cognitive screening, develop intervention strategies, and improve treatment outcomes. Identifying the prevalence of cognitive deficits and understanding associated factors such as type and duration of substance use, co-occurring mental health disorders, and demographic variables are crucial for designing targeted interventions, which can improve recovery and long-term functionality.

Without adequate data, efforts to optimize treatment strategies for SUD patients may fall short of addressing the cognitive barriers to recovery. So, this study seeks to fill this gap by determining the prevalence of cognitive impairment and identifying its associated factors among patients with SUD at SPHMMC.

1.3 Significance of the study

Cognitive impairment in patients with substance use disorder is underrecognized, particularly in Ethiopia. This study is the first to examine its prevalence and associated factors in our setting, and provides significant information for clinical practice, public health policy, and academic research. Understanding the prevalence and associated factors will enable health-care providers to identify patients at risk for cognitive deficits early in the treatment process. This can facilitate the development of tailored interventions, such as cognitive rehabilitation programs, which may improve treatment adherence, increase recovery outcomes, and promote long-term abstinence.

The findings of this study can give valuable information for policymakers in designing evidence-based mental health and addiction treatment strategies. Additionally, the identification of associated factors can serve as a basis for future research aimed at understanding the underlying mechanisms of cognitive impairment in this population.

By highlighting the cognitive challenges associated with substance use, this study can provide awareness and understanding among patients and their families. It can help patients get early intervention, more individualized treatment plans and can encourage families to support patients more effectively and to participate actively in their recovery journey.

Ultimately, this study aims to bridge gaps in knowledge, improve clinical outcomes, and contribute to the holistic management of patients with SUD at SPHMMC, with potential applications to similar settings across the country.

2. Literature review

2.1 Cognitive impairment

Cognitive impairment is a significant concern among individuals with substance use disorder (SUD), affecting multiple cognitive domains(14). Understanding the prevalence and underlying factors of cognitive impairment in SUD is essential for developing effective treatment interventions and rehabilitation strategies.

A study conducted in the Netherlands examined cognitive impairment among 206 individuals with SUD using the Montreal Cognitive Assessment (MoCA) and it highlighted the widespread cognitive impairment, and found that 31% of participants scored below the MoCA cutoff of 24(20). When categorized by primary substance use, the prevalence was highest among opioid users (38%), followed by alcohol users (34%), stimulant users (27%), and cannabis users (21%). Notably, alcohol users performed significantly worse on memory-related tasks than cannabis users, while opioid users exhibited pronounced deficits in visuospatial abilities(20).

Expanding on the cognitive challenges faced by substance users, a large-scale study in China assessed cognitive function among 528 chronic methamphetamine users, revealing a high prevalence (69.89%) of cognitive impairment according to MoCA scores(30). The most affected cognitive domains included executive function, working memory, and attention. These deficits align with the established neurotoxic effects of methamphetamine, which damages dopamine pathways and disrupts prefrontal cortex functioning(30).

The neurocognitive effects of alcohol have also been extensively studied. A French investigation into alcohol use disorder (AUD) inpatients found that 66.6% of participants had MoCA scores below 26, with an average of 22.2 ± 4.88 (31). Impairments were particularly evident in memory, executive function, and visuospatial abilities. Additionally, factors such as recent alcohol consumption (within the last 11 days), difficulty recalling addiction history, and underreporting of alcohol use were associated with worse cognitive outcomes(31).

Individuals who inject drugs also face significant cognitive challenges. A cross-sectional study done in Iran assessing cognitive impairment in this population reported that 28% of participants demonstrated cognitive deficits, primarily in memory and executive function. The study also

identified key risk factors, including the duration of injecting drug use, concurrent methamphetamine consumption, and alcohol use(32).

A study conducted in India assessed cognitive impairment among individuals with alcohol use disorder (AUD) using both the Mini-Mental State Examination (MMSE) and the NIMHANS neuropsychological battery(33). The research evaluated 90 participants diagnosed with AUD and found that while 87.78% scored above 25 on the MMSE, domain-specific deficits were evident. The most affected areas included fine motor skills (92.22–93.33%), memory retention (37–63%), and executive planning (42%)(33). Chronic alcohol consumption was strongly linked to impairments in delayed recall memory, additionally deficits in fine motor and executive function impairments were consistent with previous findings on alcohol-induced brain damage(33).

Polysubstance use compounds the risk of cognitive impairment, as shown in a Mexican study done on prevalence of substance-induced neurocognitive disorder among polysubstance user(34). The study revealed that from 753 participants that were analyzed; 50.5% show objective impairment, 71% and 58.5% self-reported any cognitive deficit and cognitive decline, respectively. Between 21.8%-36.5% would qualify for NCD when integrating both objective- and subjective impairment (deficit or decline)(34). Significant weak associations were found between objective impairment and subjective deficits in all cognitive domains except social cognition (34).

An investigation was also conducted in Kiambu County, Kenya, assessing the predictors of cognitive impairment among individuals with SUD, which revealed a substantial prevalence of cognitive deficits(16). The study found that alcohol users exhibited the most significant cognitive impairment (37%), followed by cannabis (22%) and khat users (22%). The research emphasized that cognitive deficits were widespread among SUD patients, affecting various domains such as executive function, memory, and attention(16).

A South African study by Ndlovu and colleagues (2022) has also examined 28 male users of 'nyaope', a heroin-cannabis combination drug prevalent in South Africa, and found extensive grey matter atrophy in fronto-temporal regions critical for impulse control, decision-making, and working memory(57).

The reviewed literatures highlight the high prevalence of cognitive impairment among individuals with SUD, with estimates ranging from 28% to nearly 70% depending on the study population and

assessment method. Alcohol, methamphetamine, opioids, and polysubstance use have been particularly associated with significant cognitive deficits, affecting executive function, memory, attention, and visuospatial abilities(14)(20)(30).

2.2 Associated factors of cognitive impairment

Cognitive impairment in individuals with substance use disorder (SUD) is not a uniform condition but rather a multifaceted issue influenced by a range of factors(2)(3). While the prevalence of cognitive deficits varies depending on the substance used, duration of use, and population studied, research has consistently identified key determinants that contribute to the severity and persistence of these impairments(5)(14)(20). The following section explores the most prominent factors associated with cognitive impairment among individuals with SUD based on the reviewed literatures.

A study in the Netherlands found that alcohol users had the most severe memory deficits, while opioid users showed notable visuospatial impairments and performed worse on memory tasks than cannabis users(20). Age was negatively correlated with cognitive function overall, but stimulant users showed a slight positive correlation with MoCA scores(20). Notably, no link was found between MoCA scores and comorbid anxiety, depression, or stress(20). In contrast, another study on men undergoing first-time detox for heroin or methamphetamine dependence found that depression mediated impairments in cognitive inhibition, potentially worsening decision-making and relapse risk(45).

Building on the discussion of substance-specific cognitive effects, a large-scale study in China focused on methamphetamine users and how patterns of substance use shape cognitive function. The study identified older age, longer duration of methamphetamine use, and higher frequency of MA use (everyday) as key predictors of greater cognitive impairment, with adjusted odds ratios (ORs) of 1.58, 1.53, and 1.55, respectively(30). In contrast, individuals with higher educational attainment exhibited less cognitive decline, which suggests that education may serve as a protective factor against cognitive impairment(30).

Expanding on the impact of alcohol on cognition, the French study investigated the predictors of cognitive impairment among individuals hospitalized for alcohol use disorder (AUD). The

research identified that pathological MoCA score was positively associated with spatial–temporal disorientation, recent alcohol consumption (within the last 11 days), difficulty recalling addiction history, and underreporting of alcohol intake, and negatively associated with a reason for hospitalization due to alcohol-related health issues. No medication was associated with cognitive impairments(31).

Findings seen in the Mexican study align with previous researches demonstrating that polysubstance use exacerbates cognitive impairment compared to single-substance use(34). The majority of individuals affected by SUDs report the habitual use of multiple drugs(35). This exacerbation is attributed to cumulative neurotoxicity, as exposure to multiple distinct substance classes engages divergent and overlapping neurobiological pathways, resulting in broader and more severe neural damage than single-substance use (35).

In a large-scale longitudinal study done on treatment-seeking illicit drug abusers in Finland up to 91% were found to consume an average of 3.5 concurrent substances (36). These individuals tend to be males, young adults, and from lower socioeconomic status (37). Furthermore, polysubstance users have been found to have earlier onset of drug use, higher rates of comorbid psychiatric diagnoses and medical problems(38, 39).

Shifting focus to a different population of substance users, research conducted in Iran examined cognitive impairment among people who inject drugs (PWID), and the study found that longer durations of injecting drug use, concurrent methamphetamine use, and alcohol consumption significantly increased the risk of cognitive deficits. These findings highlight how combining stimulants with other substances may exacerbate neurocognitive impairment due to compounding neurotoxic effects on the brain(32).

Further examining predictors of cognitive impairment, a study in Kenya explored the cognitive effects of alcohol, cannabis, and khat use, identifying age, education level, and comorbid anxiety disorders as the most significant contributors to cognitive dysfunction. But the study has not identified any significant correlation between cognitive decline with depression, PTSD, psychotic and personality disorders. The study revealed that alcohol users had the highest prevalence of cognitive deficits, followed by cannabis and khat users. These findings align with previous research indicating that chronic alcohol consumption leads to widespread cognitive impairment, while cannabis and khat primarily affect attention and executive function(16).

Finally a study conducted in Ethiopia on Alcohol use disorder and associated factors among Elderly revealed that predictors of AUD were associated with cognitive impairment, poor sleep quality, chronic medical illness, and suicidal ideation(27). It was found that elderly individuals diagnosed with AUD performed worse on cognitive assessments than their non-drinking counterparts. The study also emphasized that elderly individuals with long-term alcohol dependence were particularly vulnerable to accelerated cognitive decline, possibly due to age-related neurodegeneration compounded by alcohol-related brain damage(27). This study contributes to the growing evidence that chronic alcohol consumption exacerbates cognitive decline, particularly in older adults who may already be vulnerable to age-related neurodegenerative changes(27).

The complexity of cognitive impairment in SUD extends beyond substance use itself, with various demographic, health-related, family, and substance-specific factors playing a critical role in determining cognitive outcomes. From this studies it has been indicated that older age, lower education levels, and comorbid psychiatric disorders such as anxiety and depression exacerbate cognitive deficits. Additionally, factors such as polysubstance use, duration and frequency of substance consumption, and coexisting medical conditions have been strongly linked to greater cognitive impairment(5)(14)(16)(20)(30)(34).

2.3 Conceptual framework

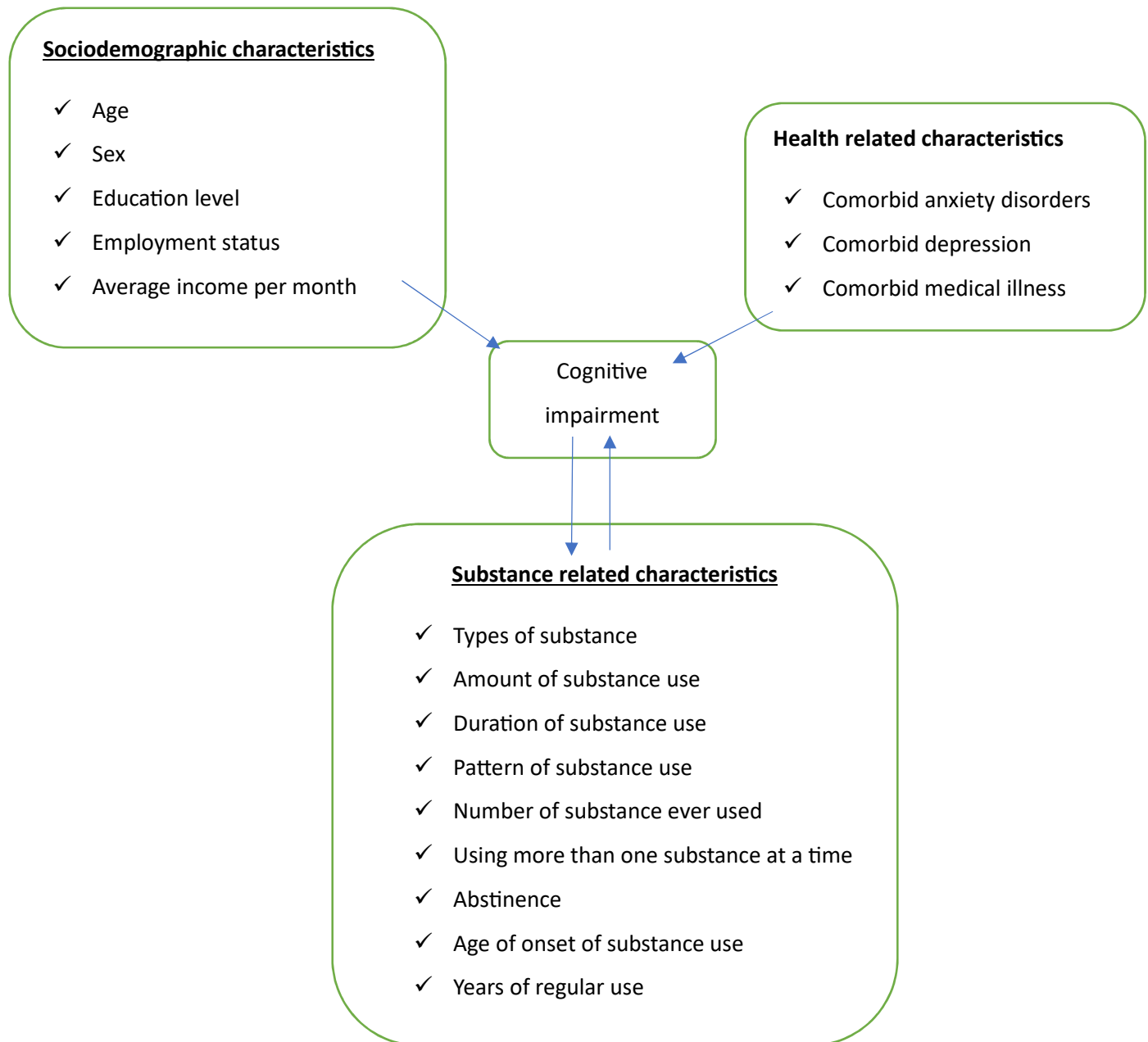


Figure 1. The conceptual framework on cognitive impairment adopted from reviewing different literatures(20), (30), (31), (32), (33), (34), (16), (35), (36)

3. Objective

3.1 General objective

- To assess the prevalence of cognitive impairment and associated factors among patients with substance use disorder at SPHMMC, AA, Ethiopia.

3.2 Specific objective

- To determine the prevalence of cognitive impairment among patients with substance use disorder at SPHMMC, AA, Ethiopia.
- To identify the associated factors of cognitive impairment among patients with substance use disorder at SPHMMC, AA, Ethiopia.

3.3 Research Questions

- What is the prevalence of cognitive impairment among patients with substance use disorder at SPHMMC, AA, Ethiopia?
- What are associated factors of cognitive impairment among patients with substance use disorder at SPHMMC, AA, Ethiopia?

3.4 Research Hypothesis

Null Hypothesis

- There is no correlation between cognitive impairment and substance use disorder.

Alternative Hypothesis

- Prevalence of cognitive impairment is significantly higher among patients with substance use disorder.

4. Methodology

4.1 Study Setting and Period

A hospital-based cross-sectional study was conducted at St. Paul's Hospital Millennium Medical College, one of the largest healthcare institutions in Addis Ababa, Ethiopia. Established in 1968, the hospital serves a catchment population of over 5 million and provides specialized medical care to approximately 300,000 patients annually. With more than 700 inpatient beds, the hospital offers advanced medical services to patients referred from across the country. It is also a major academic center, training undergraduate and postgraduate students in more than 15 medical specialties. The institution is supported by a workforce of over 2,800 professionals, including clinical, academic, administrative, and support staff (44).

Among its many departments, the Department of Psychiatry provides specialized services in general psychiatric care, addiction treatment, child and adolescent psychiatry, forensic and geriatric psychiatry, while also offering residency training (44). A hospital-based cross-sectional study was conducted in this department from April to September 2025, focusing on patients receiving care in the outpatient psychiatric clinics and inpatient facility.

4.2 Study Design

An institution-based cross-sectional study was conducted among patients with substance use disorders attending OPD for patients with substance use disorders and those in addiction inpatient setting in SPHMMC, Addis Ababa.

4.3. Population

4.3.1. Source population

All Patients with substance use disorders at SPHMMC who presented at the psychiatric outpatient clinics and inpatient settings.

4.3.2. Study population

The study population consisted of patients with substance use disorders, including both new patients and those receiving treatment and follow-up at SPHMMC during the study period. All participants who meet the eligibility criteria selected through the sampling procedure were included.

4.4. Sample size calculation

The sample size for this study is calculated using a single population proportion formula.

$$n = \frac{Z^2 P(1 - P)}{E^2}$$

n = the required sample size

P= the proportion of patients with cognitive impairment = 50 %

$Z_{\alpha/2}$ = the critical value at 95% confidence level = 1.96

E= precision (margin of error) = 5%

Given that there were no previous studies on prevalence of cognitive impairment in the setting assuming a prevalence estimate (P-value) of 50%, a 95% confidence level ($Z = 1.96$) and a margin of error of 5% ($E = 0.05$), the calculation becomes:

$$n = \frac{(1.96)^2 * 0.5(1 - 0.5)}{0.05^2}$$

$$n = \frac{(1.96)^2 * 0.5(0.5)}{0.05^2}$$

$$n = 384$$

Hence, adding 10% non-response rate to the calculated sample size (384), the final sample size required for this study approximately becomes 422.

4.5 Sampling Procedure

Participants were recruited from psychiatric outpatient clinics and inpatient settings using a convenience sampling method. All patients diagnosed with a substance use disorder who met the inclusion criteria were enrolled consecutively until the target sample size was achieved. Proportional allocation across service areas was not feasible due to the limited number of eligible patients.

4.6 Eligibility criteria

4.6.1. Inclusion criteria

- All patients clinically diagnosed with SUD based on DSM criteria, as documented in their medical records.
- Both new and follow up patients with SUD with treatment at outpatient clinics and inpatient settings.
- Age 18 and above.
- Those who have agreed to give consent.

4.6.2. Exclusion Criteria

- Those who are seriously ill, unable to communicate or with acute exacerbation of psychiatric disorders.
- Those unable to administer MoCA due to, for instance neurological conditions (e.g. stroke, traumatic brain injury) and unstable acute psychiatric disorder.
- Those in a state of acute substance intoxication or withdrawal at the time of data collection.
- Those who refused to give consent.

4.7 Study Variables

4.7.1 Dependent variable

- ✓ Cognitive impairment

4.7.2. Independent variables

- ✓ Socio- demographic variables
 - Age
 - Sex
 - Education
 - Employment status
 - Average income per month
 - Marital status
- ✓ Health related characteristics
 - Comorbid anxiety disorders
 - Comorbid depression
 - Comorbid medical illness
- ✓ Substance related characteristics
 - Types of substance
 - Amount of substance use
 - Number of substance ever used
 - Duration of substance use
 - Using more than one substance a time
 - Years of regular use
 - Abstinence
 - Age of onset of substance use
 - Pattern of substance use
 - Severity of substance use

4.8 Data Collection Tools and Techniques

Data were collected using structured interviewer-administered questionnaire variables consisting of sociodemographic and health related factors, substance use history as well as mental health screening tools, Generalized Anxiety Disorder-7 (GAD-7), Patient Health Questionnaire-9 (PHQ-9) and Montreal Cognitive Assessment (MoCA). Interviewer-administered structured questionnaire was adopted from previous study and comments of advisors were incorporated;

checked for internal consistency; and found capable of yielding the required data for the study. Data collectors completed the Google Form from face-to-face interview and medical record review.

4.8.1. Tool for the dependent variable

MoCA is a cognitive screening measure that assesses overall cognitive function by sampling behavior across 14 performance tasks that engage multiple cognitive domains(41). The test is scored in whole numbers to obtain a total score between 0 and 30. Cognitive impairment is defined at a sum score ≤ 25 , where MoCA has demonstrated excellent sensitivity and acceptable specificity in identifying mild cognitive impairment(41). For those less than 12 years of formal education, there is one-point adjustment(42). And according to a study held in China the optimal cutoff points for illiterate individuals were adjusted to 13 (sensitivity: 92.3%, specificity: 89.6%)(46). The tool has also been tested and was found to be reliable, validating its use in the Ethiopian population with specificity and sensitivity of 74.03% and 87.18 %, respectively(43).

4.8.2. Tools for the independent variables

- The GAD-7 is a commonly used self-report measure for assessing anxiety symptoms, consisting of seven items that ask respondents to rate the frequency of specific symptoms over the past two weeks. Each item is scored on a scale of 0 to 3, and the total score ranges from 0 to 21. Based on the total score, anxiety severity is categorized as mild (scores 5-9), moderate (scores 10-14), or severe (scores 15-21). Notably, a cut-off score of 10 or higher has been found to be highly reliable, with a high sensitivity of 89% and specificity of 82%, indicating that it is effective in identifying individuals with severe anxiety symptoms(40).
- The PHQ-9 is a standardized questionnaire that evaluates the severity of depression by asking respondents to rate the frequency of specific symptoms experienced over the past two weeks. The tool consists of nine questions, each with a scoring range of 0 to 3, which are then summed to produce a total score. This total score is used to categorize the severity of depression into four levels: mild (scores 5-9), moderate (scores 10-14), moderately

severe (scores 15-19), and severe (scores 20-27), with depression typically indicated by a score of 10 or higher(47). The PHQ-9 has been validated among Ethiopian patients, with specificity and sensitivity of 67% and 86 %, respectively (56).

4.9 Data Quality control

Training was given to the data collectors on the objective of the study, how to approach participants, how to fill and collect the relevant data using the Google Form by the principal investigator. The principal investigator was supervising the data collection process, and 10% of the records were cross checked against the selected medical records. Pretest was done in 5% of the questionnaire at the psychiatric OPD of SPHMMC, and these participants were not included in the final study. The collected data was checked for completeness consistency and clarity.

4.10 Operational definition

Substance: Any of the commonly used psychoactive drugs including Alcohol, Stimulants, Tobacco, Cannabis and Opioids (20).

Substance Use: Taking any psychoactive substances as per the above description(20).

Number of substance ever used: is the total count of distinct psychoactive substances that a participant reported having used at least once in their lifetime(34).

Use of more than one substance at a time: a pattern of substance use where the participant reported frequently using two or more substances either at the exact same time (simultaneous) or within the same time period(34).

Substance use disorder: is a clinician-confirmed diagnosis of SUD documented in the participant's medical record, adhering to DSM-5 diagnostic criteria. Cases with ambiguous diagnoses were excluded. For participants with more than one diagnosed SUD, the combination and severity levels were recorded as documented.

Cognitive impairment: is defined as a total score of 25 or less on the Montreal Cognitive Assessment (MoCA) screening test, which evaluates overall cognitive function by assessing behavior across 14 performance tasks that engage multiple cognitive domains. The test is scored in

whole numbers to obtain a total score between 0 and 30. Cognitive impairment is defined at a sum score ≤ 25 , where MoCA has demonstrated excellent sensitivity and acceptable specificity in identifying mild cognitive impairment(41).

Co-morbid medical/psychiatric illness: is defined as any clinician-confirmed diagnosis of a medical condition or psychiatric disorder documented in the participant's medical record.

Anxiety: assessed by the Generalized Anxiety Disorder 7-item scale (GAD-7), and scores are categorized as: 0–4 (none), 5–9 (mild), 10–14 (moderate), and 15–21 (severe)(40).

Depression: assessed by the Patient Health Questionnaire 9-item scale (PHQ-9) scores with defined categories: 0–4 (none), 5–9 (mild), 10–14 (moderate), 15–19 (moderately severe), and 20–27 (severe) (47).

4.11 Data Entry and Analysis

Data was checked for its completeness entry by using Epi-data 4.1 exported, cleaned and analyzed by STATA version 17. The generated data was compiled by proportion, frequency tables, charts, and graphs. Bivariate logistic regression analyses were done to evaluate the association of cognitive impairment with each independent variables and those variables with $p\text{-value} < 0.25$ were transferred into the multivariable regression. Before fitting the multivariable logistic regression model, multicollinearity among the independent variables was assessed using Variance Inflation Factor (VIF) and tolerance values (TV). The analysis showed that VIF values ranged from 1.12 to 2.85, with a mean VIF of 1.94. Correspondingly, tolerance values ranged from 0.35 to 0.89, all above the minimum acceptable threshold of 0.1. Since none of the variables had a $VIF \geq 10$ and all tolerance values were within the acceptable range, there was no evidence of significant multicollinearity among the predictor variables. Therefore, all candidate variables were retained in the final multivariable logistic regression model to identify factors associated with cognitive impairment among patients with substance use disorder. In order to evaluate the strength of association, both crude and adjusted odds ratios with 95% confidence interval was calculated. Final model was taken at $P\text{-value} < 0.05$ as statistically significant.

4.12 Ethical consideration

Ethical clearance and approval letter was obtained from Saint Paul's Millennium Medical College, Department of Psychiatry Ethical Review Committees to conduct the research. Informed verbal consent was taken from each participant after describing the purpose, benefits and risks of the study. Participants were informed of their right to withdraw from the study at anytime without any consequences on their service. Anonymity was kept and no personal identifier was used; and during chart review privacy was strictly maintained. Any information concerning the participants was kept confidential. During the interview, if a participant shows signs suggestive of anxiety, depression, or any risk to self or others, they were referred to the appropriate clinical team for further assessment and clinical care.

4.13 Dissemination of the result:

The finding of the study was presented and submitted to SPHMMC Department of psychiatry for partial fulfillment of the specialty in psychiatry. And efforts will be made to publish the results in both regional and international publications.

5. Result

5.1 Sociodemographic characteristics of participants

Out of 422, a total of 418 patients with substance use disorders were included in the analysis, with 99.05% response rate. The majority of participants, 397 (94.97%) were males, while 21 (5.02%) were females. The mean of the participants were 34.37 ± 10.37 years. 223 (53.35%) of the respondents had college or above educational status while 38 (9.09%) had no formal education. The majority 256 (61.24%) were employed and 163 (39.00%) had estimated monthly income of 5,000-9,999 ETB (Table 1).

Table 1: Sociodemographic characteristics among patients with substance use disorder at SPHMMC, AA, Ethiopia (N=418)

Variable	Category	Frequency	Percentage %
Sex	Female	21	5.02
	Male	397	94.97
Age	18-29	164	39.23
	30-39	119	28.47
	40-49	94	22.49
	>=50	41	9.81
Marital status	Single	186	44.50
	Married	175	41.87
	Divorced/separated/widowed	57	13.64
Educational status	No formal education	21	5.01
	Primary	41	9.80
	Secondary	133	31.82

	College and above	223	53.35
Employment	Unemployed	162	38.76
	Employed	256	61.24
Monthly income	<5000	132	31.58
	5000-9,999	163	39.00
	10,000-14,999	67	16.03
	>=15,000	56	13.40

5.2. Substance use history and health related factors

Table 2 and table 3 feature Substance use history and health related factors of patients with substance use disorders. 236 (57.18%) of the respondents used three or more substances while 63 (15.07%) of the respondents used one substance. 185 (46.17%), 200 (47.3%), 163 (39.63%), and 14 (3.35%) of respondents used alcohol, cigarettes, khat and opioids daily respectively, regarding the age they started using substances 86 (20.57%), 85 (19.38%), 96 (22.97%), and 15 (3.59%) of participants started using alcohol, khat, cigarettes, and opioids before the age of 20 respectively.

Among the 418 participants 248 (59.33%) use more than one substance frequently at the same time or with in the same period. Regarding the amount of substance typically use in a single session 28 (6.7%) used >1 bundle of khat, 77 (18.42%) used >=11 cigarettes and 14 (3.47%) uses >=7 tab of tramadol in a single session for more Substance use history and health related factors information see table 2 and table 3.

Table 2: Substance use history and health related factors among patients with substance use disorder at SPHMMC, AA, Ethiopia (N=418)

Variable	Category	Frequency	Percentage
Substance use disorder diagnosis	Mild alcohol and khat use disorder	56	13.39
	Moderate alcohol and khat use disorder	104	24.88
	Severe alcohol, khat and tobacco use disorder	100	23.92
	Severe tobacco and mild alcohol use disorder	68	16.26
Substance ever used	1 substance	63	15.07
	2 substance	116	27.75
	>=3 substance	239	57.18
Alcohol use frequency	Not alcohol user	77	18.41
	Daily	185	46.17
	Weekly	52	12.44
	Occasionally	104	24.88
Cigarette use frequency	Not cigarette user	107	25.08
	Daily	200	47.37
	Weekly	52	12.44
	Occasionally	59	14.11
Khat use frequency	Not khat user	107	25.49

	Daily	163	39.63
	Weekly	63	15.07
	Occasionally	87	20.81
Quantity of cigarette	Not cigarette user	107	24.64
	1-5 cigar/ day	92	22.97
	6-10 cigar/day	142	33.97
	>=11 cigar/day	77	18.42
Use more than one substance at a time	Yes	248	59.33
	No	170	40.67
Years using Alcohol	Not alcohol user	77	18.18
	<10 years	140	33.73
	>=10 years	201	48.09
Years using khat	Not khat user	107	25.59
	<10 years	135	32.29
	>=10 years	176	42.10
Year using cigarette	Not cigarette user	107	25.59
	<10 years	117	29.79
	>=10 years	194	46.42
Year stopped alcohol	Not alcohol user	77	19.86
	<2 year	23	5.50
	>=2 year	117	27.99
	Did not stop	201	46.65

Year stopped khat		Not khat user	107	25.60
		<2 year	57	13.64
		>=2 year	49	11.72
		Did not stop	205	49.04
Year cigarette	stopped	Not cigarette user	107	25.60
		<2 year	54	12.92
		>=2 year	41	9.81
		Did not stop	216	51.67

Table 3: Health related factors among patients with substance use disorder at SPHMMC, AA, Ethiopia (N=418)

Co-morbid medical/psychiatric illness	Yes	77	18.42
	No	341	81.58
Generalized Anxiety disorder	None	359	85.89
	Mild	41	9.81
	Moderate	18	4.31
Depression	None	352	84.21
	Mild	48	11.48
	Moderate	18	4.31

5.3. Prevalence of cognitive impairment

The prevalence of cognitive impairment was 58.61% (95% CI: 53.81%-63.25%) while 41.39% (95% CI: 36.74%-46.18%) did not have cognitive impairment.

Table 3: Prevalence of cognitive impairment among patients with substance use disorder at SPHMMC, AA, Ethiopia (N=418)

Variable	Category	Frequency	Percentage
Cognitive impairment	Yes	245	58.61
	No	173	41.39

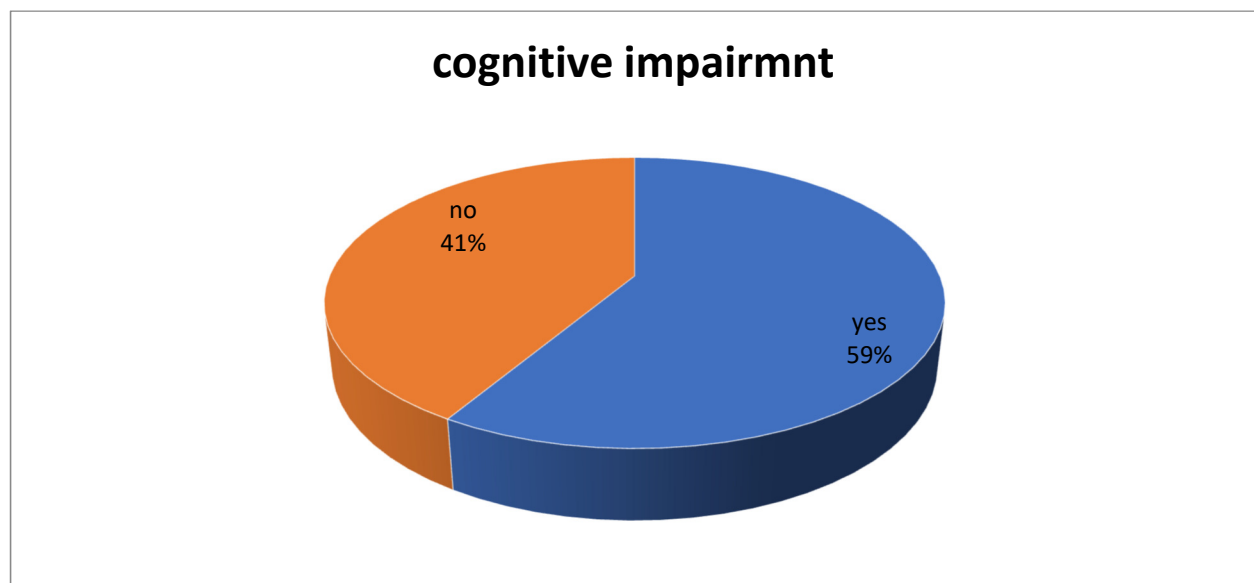


Figure 2: Prevalence of cognitive impairment among patients with substance use disorder at SPHMMC, AA, Ethiopia (N=418)

5.4. Factors associated with cognitive impairment

Both bivariable and multivariable logistic regression analyses were conducted to identify factors associated with cognitive impairment. Variables with a p-value < 0.25 in the bivariable analysis including sex, age, marital status, monthly income, substance use disorder diagnosis, number of substance ever used, alcohol use frequency, cigarette use frequency, khat use frequency, amount of alcohol used, amount of khat used, quantity of cigarettes used, using more than one substance at a time, ever stopped alcohol, ever stopped khat, comorbid medical/psychiatric illness, anxiety, and depression were entered into the multivariable logistic regression model to control for potential confounding. Following this adjustment variables age, severe alcohol, tobacco and khat use disorder, number of substance ever used, using more than one substance at a time, and comorbid medical/ psychiatric illness were found significantly associated with cognitive impairment with p-value <0.05. Adjusted odds ratios (AOR) with 95% confidence intervals (CI) were computed to identify associated factors. The goodness of fit of the logistic regression model was assessed using the Hosmer–Lemeshow test, which showed an adequate fit to the data $p = 0.145$.

Age was associated with cognitive impairment. Patients with age ≥ 50 were four times (AOR=3.62; 95% CI: 1.76-5.43) more likely to have cognitive impairment compared to that of patients who are age between 18 and 29. Regarding the substance use disorder diagnosis association with cognitive impairment Severe alcohol, khat and tobacco users were two times (AOR=2.43 95%CI: 1.39-4.62) more likely to develop cognitive impairment than that of patients with mild alcohol and khat use.

Variable number of substance ever used was associated with cognitive impairment. Patients who used two substances were two times (AOR= 2.25; 95% CI: 1.56-4.75) more likely to develop cognitive impairment than patients who only used one substance. Similarly patients who used three or more substances were four time (AOR=3.89; 95% CI: 1.23-5.49) more likely to have cognitive impairment than patients who ever used one substance.

Patients that frequently used more than one substance at the same time was associated with cognitive impairment. Patients who use more than one substance at the same time were three times

(AOR=3.04; 95% CI: 2.01-5.97) more likely to have cognitive impairment than patients who do not use more than one substance at the same time.

Co-morbid medical/psychiatric illness was associated with cognitive impairment. Patients who have Co-morbid medical/psychiatric illness are nearly two times (AOR= 1.96; 95% CI: 1.12-3.74) more likely to have cognitive impairment than patients who do not have co-morbid medical/psychiatric illness.

Table 4: Factors associated with cognitive impairment among patients with substance use disorder at SPHMMC, AA, Ethiopia (N=418)

Variable	Category	Cognitive impairment		COR	AOR	p-value
		Yes	No			
Sex	Female	6	15	1.00	1.00	
	Male	239	158	0.25 (0.06-0.39)*	0.62 (0.27-1.98)	0.057
Age	18-29	121	43	1.00	1.00	
	30-39	72	47	1.83 (1.10-3.04)*	3.92 (0.89-17.21)	0.070
	40-49	39	55	3.96 (2.31-6.79)*	3.27 (0.76-15.74)	0.068
	>=50	13	28	6.06 (2.87-12.75)*	3.62 (1.76-5.43)**	0.0001
Marital status	Single	125	61	1.00	1.00	
	Married	102	73	1.46 (0.96-2.25)*	0.40 (0.10-1.62)	0.203
	Divorced/separated/widowed	18	39	4.43 (2.34-8.39)*	4.14 (0.29-9.43)	0.289
Monthly income	<5000	66	66	1.00	3.53 (0.75-6.73)	0.061
	5000-9,999	88	75	0.85 (0.53-1.34)	1.89 (0.33-10.67)	0.653
	10,000-14,999	49	18	0.36 (0.19-0.69)*	4.3 (0.89-8.21)	0.089

		>=15,000	42	14	0.33 (0.16-0.66)*	1.00	
Substance disorder diagnosis	use	Mild alcohol and khat use disorder	42	14	1.00	1.00	
		Moderate alcohol and khat use disorder	64	40	1.87 (0.32-5.36)	1.22 (0.63-8.49)	0.174
		Severe alcohol, khat and tobacco use disorder	60	40	2.00 (1.48-4.25)*	2.43 (1.39-4.62)**	0.001
		Severe tobacco and mild alcohol use disorder	46	22	1.43 (1.17-3.26)*	1.95 (0.88-3.72)	0.063
Number of substance ever used	of	1 substance	52	11	1.00	1.00	
		2 substance	74	42	2.68 (1.26-5.69)*	2.25 (1.56-4.75)**	0.003
		>=3 substance	119	120	4.76 (2.37-9.58)*	3.89 (1.23-5.49)**	0.0001
Alcohol frequency	use	Not user	58	11	0.63 (0.28-1.39)	0.47 (0.23-3.79)	0.085
		Daily	71	122	5.72 (3.33-9.84)*	3.19 (0.83-12.25)	0.090
		Weekly	36	16	1.48 (0.70-3.12)	1.46 (0.24-8.79)	0.676
		Occasionally	80	24	1.00	1.00	
Cigarette frequency	use	Not user	74	35	1.52 (0.73-3.12)	0.07 (0.03-1.56)	0.094

	Daily	108	90	2.67 (1.38-5.19)*	1.61 (0.42-6.15)	0.485
	Weekly	18	34	6.07 (2.65-13.90)*	1.44 (0.87-9.99)	0.063
	Occasionally	45	14	1.00	1.00	
Khat use frequency	Not khat user	66	28	0.76 (0.41-1.42)	0.46 (0.21-2.34)	0.230
	Daily	84	90	1.93 (1.13-3.28)*	2.02 (0.69-6.40)	0.324
	Weekly	39	24	1.11 (0.56-2.17)	5.62 (0.99-10.56)	0.056
	Occasionally	56	31	1.00	1.00	
Amount of the alcohol	Not alcohol user	64	13	1.00	0.58 (0.21-5.89)	0.078
	1-2 drinks	69	42	2.99 (1.47-6.08)*	6.24 (0.35-29.31)	0.083
	3-4 drinks	79	72	4.48 (2.28-8.82)*	2.64 (0.73-9.53)	0.138
	>=5 drinks	33	46	6.86 (3.25-14.45)*	1.00	
Amount of khat	Not khat user	71	30	1.00	0.59 (0.03-3.83)	0.079
	<1 bundle	119	64	1.27 (0.75-2.14)*	0.07 (0.05-1.01)	0.073
	1 bundle	49	57	2.75 (1.55-4.88)*	0.10 (0.008-1.35)	0.136
	>1 bundle	6	22	8.67 (3.19-23.55)*	1.00	
Quantity of cigarette	Not cigarette user	70	33	1.00	0.46 (0.13-4.62)	0.174
	1-5 cigar/ day	33	63	4.04 (2.24-7.30)*	14.61 (0.97-35.71)	0.083
	6-10 cigar/day	89	53	1.26 (0.73-2.15)	1.12 (0.26-4.84)	0.294
	>=11 cigar/day	53	24	0.96 (0.50-1.81)	1.00	
Use more than one substance	Yes	106	142	6.00 (3.77-9.54)*	3.04 (2.01-5.97)**	0.0001
	No	139	31	1.00	1.00	

at a time						
Co-morbid medical/psychi atric illness	Yes	36	41	1.80 (1.09-2.96)*	1.96 (1.12-3.74)	0.001
	No	209	132	1.00	1.00	
Anxiety	None	208	151			
	Mild	29	12	0.56 (0.35-1.03)*	0.83 (0.59-1.82)	0.072
	Moderate	8	10	1.72 (0.89-3.41)	2.46 (0.71-4.87)	0.638
Depression	None	222	130			
	Mild	15	33	3.75 (1.34-5.62)*	2.61 (0.97-4.59)	0.061
	Moderate	8	10	2.13 (0.98-3.74)*	1.83 (0.85-3.48)	0.083

*P-value < 0.25; **P-value < 0.05; and 1-reference

P-values correspond to the multivariable logistic regression analysis

6. Discussion

This study aimed to assess the prevalence of cognitive impairment and the associated factors among patients with substance use disorder at SPHMMC, AA, and Ethiopia. The findings revealed that the prevalence of cognitive impairment was 58.61% with a 95% confidence interval of (53.81, 63.25). The study identified Age, Severe alcohol, tobacco and khat use disorder, Number of substance ever used, Use more than one substance at a time, Co-morbid medical/psychiatric illness as factors significantly associated with patients with substance use disorder.

The prevalence of cognitive impairment in this finding was higher than those reported in studies conducted at Kiambu, Kenya (34.8%) (16), Netherlands (31%) (20), and Mexico city (50.5%) (34). This inconsistency may be attributed to variations in the severity and patterns of substance use. Additionally, methodological differences, such as the cognitive assessment tools employed, the cut-off points used to define impairment, and the criteria for study inclusion, may have influenced the observed prevalence disparities (16)(20)(34). Socio-economic factors, along with differences in access to early diagnosis, treatment, and rehabilitation services, may also be significant, as delays in intervention and extended periods of untreated substance use in low-resource environments could exacerbate the incidence of cognitive impairment when compared to regions like the Netherlands and Mexico City (20)(34).

However this finding was lower than those reported in a study conducted in India (64%) (48), and China (69.89%) (30). This discrepancy may arise from variations in substance use patterns, cultural norms, differences in sample size, and socio-demographic factors, all of which can contribute to the variation in the prevalence of cognitive impairment (30)(48).

The findings of this study revealed that the odds of developing a cognitive impairment were near four times higher among patients who are age >50 compared to those between 18 and 29 age group (AOR=3.62; 95% CI: 1.76-5.43). This result was in line with studies conducted in Norway (49), Central India (48), Netherlands (20), and China (30). It may be aging can result in decreased cerebral blood flow (CBF), leading to a diminished delivery of oxygen and nutrients to the brain.

This reduction contributes to cognitive decline, as neurons require a continuous supply of blood to operate at their best (50).

Severe alcohol, tobacco and khat users were two times at higher odds to screen positive for cognitive impairment than that of patients with mild alcohol and khat use (AOR=2.43 95%CI: 1.39-4.62). The finding was consistent with studies conducted in London (51). The explanation could be that severe use of alcohol, tobacco, or khat is associated with greater cumulative damage to brain cells, blood flow, neurotransmission, and inflammation, leading to a much higher likelihood of cognitive impairment than mild or occasional use (52).

The result of this study revealed that the odds of screening positive for cognitive impairment was two times higher among those who used two substance ever used than patients who only used one substance (AOR= 2.25; 95% CI: 1.56-4.75), Similarly patients who used three or more substances were nearly four times at higher odds of screening positive for cognitive impairment than patients who ever used one substance (AOR=3.89; 95% CI: 1.23-5.49). This result was consistent with studies conducted in USA (53), and India (48)(54). Each substance may influence various neurotransmitter systems and distinct regions of the brain (for instance, the frontal cortex and memory centers). The use of multiple substances amplifies the overall neurotoxic load on the brain, resulting in broader and more severe cognitive impairments (48)(53). The practice of poly-substance use is frequently linked to elevated tolerance, increased frequency of use, and prolonged exposure, all of which heighten the risk of enduring brain damage (53).

The result of this study revealed that the odds of screening positive for a cognitive impairment were three times higher among those who use more than one substance at the same time compared to patients who do not use more than one substance at the same time (AOR=3.04; 95% CI: 2.01-5.97). This finding aligns with studies conducted in Mexico City (34), and India (48). The explanation could be that cognitive function deteriorates as the number of substance use disorders increases, and there is considerable evidence indicating that concurrent poly-substance use results in more significant neurocognitive impairments (including executive function, processing speed, working memory, and learning) compared to the use of a single drug or the absence of substance use (53).

The finding of this study revealed that the odds of screening positive for cognitive impairment were two times more likely with Co-morbid medical/psychiatric illness than patients who do not have co-morbid medical/psychiatric illness (AOR= 1.96; 95% CI: 1.12-3.74). The finding was in consistence with studies conducted in Kenya(16), China (45), and USA (55). This association may be explained by depression-related deficits in inhibitory control and executive function(45), as well as anxiety-induced hyperarousal and attentional biases(16). A possible explanation for the association with medical comorbidities is that conditions such as diabetes, hypertension, and cardiovascular disease, are strongly linked to elevated rates of cognitive decline. These health issues diminish cerebral blood flow, heighten oxidative stress, and result in neuronal damage, which ultimately impairs cognitive function(55). Although limited research has directly examined these mechanisms in substance use disorder populations, the high prevalence of medical comorbidities and the well-documented cognitive burden among individuals with SUD suggests these pathways are clinically relevant(27, 38, 39).

This study highlights a substantial burden of cognitive impairment among patients with substance use disorder at SPHMMC, underscoring the need to routinely integrate cognitive screening into substance use disorder care services. The identified associated factors provide important evidence for clinicians to tailor interventions, such as incorporating cognitive rehabilitation, strengthening psychosocial support, and adapting treatment approaches to patients' cognitive capacities. At the institutional and policy levels, the findings can inform the development of guidelines, capacity building for mental health professionals, and resource allocation aimed at comprehensive and patient-centered care. Overall, the study contributes locally relevant evidence that can support improved clinical outcomes, enhance treatment adherence, and guide future research and public health strategies in similar settings in Ethiopia.

Strength and Limitation of the study

This institutional-based cross-sectional study has several strengths. It addresses an under-researched area in Ethiopia by providing evidence on the prevalence of cognitive impairment among patients with substance use disorder using a standardized assessment tool. The integration of sociodemographic, clinical, and substance-related variables enabled the identification of factors associated with cognitive impairment, providing clinically useful information for SUD treatment. Conducting the research at St. Paul's Hospital Millennium Medical College (SPHMMC), a large tertiary health facility, provided access to a large and clinically diverse patient population, increasing the findings' applicability to similar hospital-based treatment settings in Ethiopia. However, the study also has limitations. The cross-sectional design limits the ability to establish causal relationships between substance use and cognitive impairment. Due to the convenience sampling method, the findings may not represent all patients with substance use disorder, particularly those with lower treatment engagement or poor follow-up adherence. Additionally, the sample was predominantly male, which limits the generalizability of findings to female patients with substance use disorder. The exclusion of severely ill patients and those with acute psychiatric exacerbations, while necessary for ethical and practical reasons, may have eliminated individuals with a potentially higher burden of cognitive impairment. And being institution-based, the findings may not be generalizable to individuals with substance use disorder in the community. Finally, reliance on self-reported information for substance use history may be subject to recall and social desirability bias.

Conclusion and Recommendation

Conclusion

More than half of the study participants were found to have cognitive impairment. Older age, diagnosis of severe alcohol, tobacco, and khat use, history of using two substances, use of three or more substances, concurrent use of multiple substances, and the presence of co-morbid medical or psychiatric illnesses were significantly associated with cognitive impairment. Strengthening early screening, substance-use prevention, and integrated management of co-morbid conditions may help reduce the burden of cognitive impairment.

Recommendation

Based on the study finding we recommend that health professionals should regularly assess patients with substance use disorder for cognitive impairments and, particularly those who are older, engage in severe and polysubstance use, or have co-existing medical or psychiatric conditions. Furthermore, it is advisable for health professionals to offer tailored interventions and referral services for substance use disorders, while also ensuring the effective management of co-existing medical and psychiatric conditions. In addition, it's advantageous for community organizations to improve awareness programs focused on the cognitive and mental health effects of substance use within the community. Furthermore, it is beneficial for these organizations to work alongside local leaders to advocate for healthy lifestyles, deter harmful substance use, and provide support for individuals facing medical or psychiatric challenges. For future research, it's preferable to carry out longitudinal and interventional studies in order to determine causal relationships and to investigate effective prevention and treatment strategies for cognitive impairment associated with substance use and co-morbid conditions. Specifically, future multi-center studies involving multiple hospitals across different regions of Ethiopia are recommended to enhance the generalizability of findings to diverse SUD patient populations

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Annexes

Annex I- Information Sheet

Title of research project: Prevalence and associated factors of cognitive impairment among patients with substance use disorder at SPHMMC, Addis Ababa, Ethiopia.

Purpose of the study: The purpose of the study is to assess prevalence and associated factors of cognitive impairment among patients with substance use disorder at SPHMMC, Addis Ababa, Ethiopia.

Procedures: Formal letter was obtained from research and ethical committee of SPHMMC and informed verbal consent was obtained from each respondent just prior to the actual data collection. If you agree to this study, you will be asked questions about you.

Risks: There are no known risks or discomforts associated with this study. Acceptance or refusal to participate will not affect the care provided.

Benefits: I understand that there are no direct benefits to the participant. The results of the study will, however, assist the researcher in gaining a better understanding of prevalence and associated factors of cognitive impairment among patients with substance use disorder.

Participant's rights: The participant may withdraw from participating in the study at any time.

Confidentiality: I understand that all information that is collected from me was kept anonymous. However, I give my permission that information collected from me may be used for research and publication.

Principal investigator: Tigist Alehegn, MD, Tel: +251918261526

Signature of participant Date.....

Signature of researcher..... Date.....

Annex II: Consent Form

Dear participant: I am..... I'm a resident at SPHMMC and I'm collecting data for a study I'm conducting for partial fulfillment of specialty in psychiatry. The study is on prevalence and associated factors of cognitive impairments among patients with substance use disorder. Your participation is very helpful and here are some questions for you to answer which are important for the study. For your participation in this study, no payment was granted. Besides, you're not obligated to answer any question which you do not wish to answer and you are free to withdraw at any point. The information that you gave was kept confidential and won't be accessed to a third party; only be used for the research purpose. If you are not going to be involved or withdrawn from the study, the right to get the service will not be compromised.

Annex- III- Questionnaire

Part I: General and Socio-demographic characteristics

Code Number:- ____			
No.	Question	Answer	Remark
1	Age		
2	Sex	1. Male 2. Female	
3	Marital status	1. Married 2. Unmarried 3. Divorced/separated 4. Widow/Widower 5. Cohabiting(living with a partner without legal marriage)	
4	Educational level	1. No formal education 2. Only primary school 3. High school 4. College and above	
5	Employment status	1. Employed 2. Unemployed 3. Student 4. Retired 5. Self-employed 6. Other_____	
6	Average monthly income (in Birr)		

Part II: Substance use history and health-related factors

S.N	Questions	Answers	Remark
1.	Type of substance use disorder diagnosis recorded on the patients medical chart?		
2.	In your life, which of the following substances have you ever used?(multiple answer possible)	1.Alcohol 2.Khat 3.Opoid 4.Cannabis 5.Cigarette 6.Sedatives/Sleeping pills 7.Inhalants 8.Hallucinogens 9.Others	
3.	How frequently do you use the substances?	1.Daily 2.Weekly 3.Monthly 4.Occasionally	
4.	How much of the substances do you typically use in a single session?	1.Alcohol_____ 2.Khat_____ _____ 3.Opioids_____ 4.Cannabis_____ 5.Cigarette_____ 6.Sedatives/sleeping pills_____ 7.Inhalants_____ 8.Hallucinogens_____ 9.Others_____	
5.	Do you frequently use more than one substance at the same time or with in the same period?	1.Yes 2.No	
6.	For how many years have you been using the substances?	1.Alcohol_____ 2.Khat_____ _____ 3.Opioids_____ 4.Cannabis_____ 5.Cigarette_____ 6.Sedatives/sleeping pills_____ 7.Inhalants_____ 8.Hallucinogens_____	

		9.Others_____	
7.	How many years have you been using the substances regularly?	1.Alcohol_____ 2.Khat_____ _____ 3.Opoids_____ 4.Cannabis_____ 5.Cigarette_____ 6.Sedatives/sleeping pills_____ 7.Inhalants_____ 8.Hallucinogens_____ 9.Others_____	
8.	Is there a time that you have stopped using the substances? And for how long?	1.Alcohol_____ 2.Khat_____ _____ 3.Opoids_____ 4.Cannabis_____ 5.Cigarette_____ 6.Sedatives/sleeping pills_____ 7.Inhalants_____ 8.Hallucinogens_____ 9.Others_____	
9.	At what age did you first use any substance?		
10.	Co-morbid medical/psychiatric illness?	1.Yes 2.No	
11.	If yes to question number 10, Specify type of co-morbid medical/psychiatric illness		

PART III: Generalized Anxiety disorder-7

Over the last two weeks how often have you been bothered by any of the following problems?				
	None (0)	Several days (1)	More than half the days (2)	Nearly every day (3)
1. Feeling nervous anxious or on edge?				

2. Not being able to stop or control worrying?				
3. Worrying too much about different things?				
4. Trouble relaxing?				
5. Being so restless that it is hard to sit still?				
6. Becoming easily annoyed or irritable?				
7. Feeling afraid as if Something awful might happen?				

PART IV: Patient Health Questionnaire - 9

Over the past two weeks how often have you been bothered by any of the following problems?				
	None (0)	Several days (1)	More than half the days (2)	Nearly every day (3)
1. Little interest or pleasure in doing things?				
2. Feeling down, depressed or hopeless?				

3. Trouble falling or staying asleep or sleeping too much?				
4. Feeling tired or having little energy?				
5. Poor appetite or Overeating?				
6. Feeling bad about yourself or that you are a failure or have let yourself or your family down?				
7. Trouble concentrating on things such as reading the newspaper or watching Television?				
8. Going or speaking so slowly that other people could have noticed? Or the opposite - being so fidgety or restless that you have been moving around a lot more than usual?				
9. Thoughts that you would be better off dead, or of hurting yourself in some way?				

PART V: Montreal Cognitive Assessment

MONTREAL COGNITIVE ASSESSMENT (MoCA®)

Version 8.3 English

Name:

Education:

Sex:

Date of birth:

DATE:

VISUOSPATIAL / EXECUTIVE

Draw a similar shape Begin End	Draw a similar shape	Draw CLOCK (point to five past ten) (3 points) [] Contour [] Numbers [] Hands	POINTS ___/5
--	------------------------------------	---	----------------------------

NAMING

[]	[]	[]	POINTS ___/3
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MEMORY

Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes.	LEG	COTTON	SCHOOL	TOMATO	WHITE	NO POINTS
1st TRIAL						
2nd TRIAL						

ATTENTION

Read list of digits (1 digit/sec.).	Subject has to repeat them in the forward order. [] 2 4 8 1 5 Subject has to repeat them in the backward order. [] 4 2 7	POINTS ___/2
Read list of letters. The subject must tap with his hand at each letter A. No points if ≥ 2 errors. [] F B A C M N A A J K L B A F A K D E A A A J A M O F A A B		POINTS ___/1
Serial 7 subtraction starting at 60. [] 53 [] 46 [] 39 [] 32 [] 25 4 or 5 correct subtractions: 3 pts, 2 or 3 correct: 2 pts, 1 correct: 1 pt, 0 correct: 0 pt		POINTS ___/3

LANGUAGE

Repeat: The shepherd put the goats in the animal shelter after midnight. The tailor finished her dress at the right moment for the holiday.	[] []	POINTS ___/2
Language Fluency. Name maximum number of words in one minute that begin with the letter B. [] _____ (N $\geq$ 11 words)		POINTS ___/1

ABSTRACTION

Similarity between e.g. banana - orange = fruit [] hammer - screwdriver [] matches - lamp		POINTS ___/2
--	--	----------------------------

DELAYED RECALL		(MIS)	Has to recall words	LEG	COTTON	SCHOOL	TOMATO	WHITE	Points for UNCUE recall only	POINTS
Memory Index Score (MIS)	X3	WITH NO CUE	[]	[]	[]	[]	[]	[]	MIS = ___/15	
	X2	Category cue								
	X1	Multiple choice cue								

ORIENTATION

[] Date	[] Month	[] Year	[] Day	[] Place	[] City	POINTS ___/6
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www.mocatest.org

MIS: /15
(Normal $\geq$ 26/30)

Administered by: _____

Training and Certification are required to ensure accuracy.

Add 1 point if $\leq$ 12 yr education

TOTAL ___/30

Amharic Version of Questionnaires

የመረጃ ቅጽ

እኔ ስሜ.....ይባላል ። በቅዱስ ጳውሎስ ሆስፒታል ሚሊኒየም የህክምና ኮሌጅ የአእምሮ ህክምና ክፍል ሰልጣኝ ሐኪም በሆነችው ዶ/ር ትዕግስት አለኸኝ ለሚሰራው ጥናት መረጃ በመሰብሰብ ላይ ነኝ ። ስለጥናቱ ሁኔታ ፣ አላማ ፣ ጥቅም እና ተያያዥ አይጋ መረጃውን ካገኙ በኋላ በጥናቱ ላይ ለመሳተፍ ፈቃደኛ መሆን ወይም አለመሆንዎን ይገልጹልኛል።

የጥናቱ ርዕስ ፡- በቅዱስ ጳውሎስ ሆስፒታል ሚሊኒየም ሜዲካል ኮሌጅ የሱስ ህመም ባለባቸው ታካሚዎች ላይ የማገናዘብ(ኮግኒቲቭ) ችግሮች ስፋት እና ተያያዥ ምክንያቶች ጥናት

የጥናቱ አላማ፡-በቅዱስ ጳውሎስ ሆስፒታል ሚሊኒየም ሜዲካል ኮሌጅ የሱስ ህመም ባለባቸው ታካሚዎች ላይ የማገናዘብ(ኮግኒቲቭ) ችግሮች ስፋት እና ተያያዥ ምክንያቶች የሚያጠና ጥናት ነው።

ጥቅምና ተጋላጭነት ፡- በዚህ ጥናት በመሳተፍዎ የሚደረስብዎት ተጋላጭነት ወይም ጉዳት የለም። የሚያገኙትም የህክምና የአገልግሎት ጥራት በዚህ ጥናት ላይ በሚኖርዎ ተሳትፎ ምክንያት አይቀየርም። ጥናቱ ላይ በመሳተፍዎ የተለየ የሚያገኙት ጥቅም አይኖርም።

የስምምነት መስጫ ቅፅ

እርስዎ በዚህ ጥናት ላይ እጩ ተሳታፊ ነዎት ። በጥናቱ ላይ ለመሳተፍ ፈቃደኛ ካልሆኑ ያለመሳተፍ ሙሉ መብት አለዎት ፤ እንዲሁም በጥናቱ ሂደት ወቅት ሃሳብዎን ቢቀይሩ በየትኛውም የጥናቱ ደረጃ ላይ ተሳትፎዎን ማቋረጥ ይችላሉ። ለሚሰጡኝ መረጃ ሚስጥራዊነት ሲባል በመረጃ ስብሰባ ወቅት ስምዎን አልጠቀምም፤ ይልቁንም ለእርስዎ የሚሆን መለያ ኮድ እጠቀማለሁ በዚህም ሂደት ውስጥ ማንኛውንም አይነት እርስዎን ከጥናቱ ጋር የሚያስተሳስር ወይም የሚያገናኝ የጽሁፍም ሆነ የቃል አመለካከት ሪፖርት አይኖርም። በጥናቱ የሚገኘው ውጤት የጥናቱን ማህበረሰብ እንደ አጠቃላይ የሚወስድ እንጂ በግል ስለእያንዳንዱ ተሳታፊ ያለውን ውጤት አያንጸባርቅም።

ጥናቱ ላይ ለመሳተፍ ፈቃደኛ ነዎት ?

1. አዎ 2. አይደለሁም

በጣም አመሰግናለሁ።

መመሪያ:- እባክዎትን ለሚከተሉት ጥያቄዎች በሚመለከትዎት መልስ ላይ የ(✓) ምልክት ያድርጉ።

ክፍል 1:- የግል ሁኔታን የሚመለከቱ ጥያቄዎች።

መለያ ቁጥር: _____			
ተ.ቁ	ጥያቄ	መልስ	አስተያየት
1.	እድሜ		
2.	ፆታ	1. ወንድ 2. ሴት	
3	የጋብቻ ሁኔታ	1. ያላገባ/ች 2. ያገባ/ች 3. አግብቶ/ታ የፈታ/ች 4. ሚስት ወይም ባል የሞተበት/ባት	
4	የትምህርት ደረጃ	1. ማንበብና መጻፍ የማይችል 2. ማንበብና መጻፍ 3. አንደኛ ደረጃ ት/ት ቤት 4. ሁለተኛ ደረጃ ት/ት ቤት 5. ኮሌጅ እና ከዛ በላይ	
5	የስራ ሁኔታ	1.ስራ የሌለው 2.ተማሪ 3.ስራ ላይ ያለ 4.ሌላ ካለ _____	
6	አማካኝ የወር ገቢ (በብር)		

ክፍል 2:- የሱስ አምጭ ንጥረ-ነገርን አጠቃቀም እና የጤና ሁኔታን የሚመለከቱ ጥያቄዎች

ተ.ቁ	ጥያቄ	መልስ	አስተያየት
1.	በታካሚው የህክምና ካርድ ላይ የተገኘው የሱስ ህመም አይነት እና ደረጃ ?		
2.	በህይወትህ/ሽ የትኞቹን ሱስ አምጭ ንጥረ ነገሮች ተጠቅመህ/ሽ ታውቃለህ/ሽ? (ከአንድ በላይ መልስ ይቻላል)	1. አልኮል 2. ጫት 3. ኦፖይድ 4. ካናቢስ 5. ሲጋራ 6. ሴዳቲቭ/የእንቅልፍ ክኒን 7. ኢንሄላንትስ 8. ሀሉሲኖጅን 9. ሌሎች	
3.	በምን ያህል ድግግሞሽ ንጥረ ነገሮቹን ይጠቀማሉ?	1. በየቀኑ 2. በየሳምንቱ 3. በየወሩ 4. አልፎ አልፎ	
4.	በአንድ ጊዜ በምን ያህል መጠን ንጥረ ነገሩን ይጠቀማሉ?	1. አልኮል 2. ጫት 3. ኦፖይድ 4. ካናቢስ 5. ሲጋራ 6. ሴዳቲቭ/የእንቅልፍ ክኒን 7. ኢንሄላንትስ 8. ሀሉሲኖጅን 9. ሌሎች	
5.	በተደጋጋሚ ከአንድ በላይ ንጥረ ነገርን በተመሳሳይ ጊዜ ይጠቀማሉ?	1. አዎ 2. አይ	
6.	ሱስ አምጭ ንጥረ ነገሩን ለምን ያህል አመታት ተጠቅመዋል?	1. አልኮል 2. ጫት 3. ኦፖይድ 4. ካናቢስ 5. ሲጋራ	

		6. ሴዳቲቭ/የእንቅልፍ ክኒን 7. ኢንሄላንት 8. ሀሉሲኖጅን 9. ሌሎች	
7.	ለምን ያህል አመታት ሱስ አምጭ ንጥረ ነገሩን በመደበኛነት ተጠቅመዋል?	1. አልኮል 2. ጫት 3. አፖይድ 4. ካናቢስ 5. ሲጋራ 6. ሴዳቲቭ/የእንቅልፍ ክኒን 7. ኢንሄላንት 8. ሀሉሲኖጅን 9. ሌሎች	
8.	ሱስ አምጭ ንጥረ ነገሩን መጠቀም ያቆሙበት ጊዜ ኖሮ ያውቃል? ለምን ያህል ጊዜ?	1. አልኮል 2. ጫት 3. አፖይድ 4. ካናቢስ 5. ሲጋራ 6. ሴዳቲቭ/የእንቅልፍ ክኒን 7. ኢንሄላንት 8. ሀሉሲኖጅን 9. ሌሎች	
9.	ሱስ አምጭ ንጥረ ነገሩን መጠቀም የጀመሩት የትኛው እድሜ ላይ ነው?		
10.	ተጓዳኝ የሜዲካል/የስነ-አዕምሮ ህመሞች አሉብዎት?	1. አዎ 2. አይ	

11.	ለጥያቄ ቁጥር አስር ምላሽዎት አዎ ከሆነ፣ የተጓዳኝ የሜዲካል/የስነ-አዕምሮ ህመምዎን አይነት ይግለጹ።		
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ክፍል 3፡- የ GAD - 7 ምልክት መለያ ጥያቄዎች

ባለፉት ሁለት ሳምንታት ከታች በተዘረዘሩት ምልክቶች ምን ያህል ጊዜ ተቸግረዋል?					
		እርግጠኛ አይደለሁም	ብዙ ቀናት	ከግማሽ ቀናት በላይ	ሁል ጊዜ ሊባል በሚችል መልኩ
1.	የመጨነቅ ስሜት መኖር?				
2.	መጨነቅን መቆጣጠር ወይም ማቆም አለመቻል?				
3.	ስለተለያዩ ነገሮች በከፍተኛ ሁኔታ መብሰልሰል?				
4.	ለመረጋጋት መቸገር?				
5.	መቅበዝበዝና ተረጋግቶ መቀመጥ መሳን?				
6.	በቀላሉ መከፋት ወይም መናደድ?				
7.	ክፋ ነገር ሊደርስ ነው ብሎ መስጋት ወይም መፍራት?				

ክፍል 4: የ PHQ-9 የድብርት ምልክቶች መለያ ጥያቄዎች

	ላለፉት ሁለት ሳምንታት ከታች ከተዘረዘሩት የህመም ምልክቶች ምን አስቸግሮዎት ነበር ?				
		የለም (0)	አልፎ ብቻ (1)	አልፎ በዛ ላለ ጊዜ (2)	ከሞላ ጎደል በየቀኑ (3)
1	ላለፉት ሁለት ሳምንታት የዕለት ተዕለት ተግባርዎን ለማከናወን ያለዎት ተነሳሽነት/ፍላጎት በጣም ቀንሶ ወይም ከዚህ በፊት ሲሰሩት እርካታ ያገኙበት የነበረ ነገር ሰልችቶዎት ነበር?				
2	የመደበኛ ወይም ተስፋ የመቁረጥ ስሜት ይሰማዎት ነበር?				
3	እንቅልፍ አልወስድ ብሎዎት ወይም በደንብ መተኛት አቅቶዎት ወይም ደግሞ እንቅልፍ ከመጠን በላይ በዝቶብዎት ይችገሩ ነበር?				
4	የድካም ወይም አቅም ማነስ ስሜት ይሰማዎት ነበር?				
5	የምግብ ፍላጎትዎ ቀንሶ ወይም ጨምሮ ነበር?				

6	በሚሰሩት ስራ ላይ ሃሳብዎን ለመሰብሰብ/ትኩረት ለመስጠት አስቸግሮዎት ነበር? ለምሳሌ ከሰዎች ጋር ሲጨዋወቱ ትኩረት ሰጥቶ ማዳመጥ/ቲቪ ማየት ወዘተ...				
7	ራስዎን የመጥላት ወይም ዋጋ የለኝም የማላት ወይም ለራሴም ሆነ ለቤተሰቤ ጥፋተኛ ነኝ የሚል ስሜት ተሰምቶዎት ነበር?				
8	ለሰዎች እስከሚታወቅ ድረስ በእንቅስቃሴዎ ወይም በንግግርዎ በጣም ቀስ ማላት ወይም ደግሞ በተቃራኒው ለሰዎች እስከሚታወቅ ድረስ መረጋጋት አቅቶዎት አንድ ቦታ አርፎ መ ቀመጥ ወይም መቆም እስከማይችሉ ሆነው ነበር?				
9	ላለፉት ሁለት ሳምንታት ከመኖር ብሞት ይሻለኛል ብለው አስበው ወይም እራስዎን በሆነ መንገድ ሊጎዱ አስበው ነበር?				
10	ከላይ የተጠቀሱት ምልክቶች በስራዎትና ከሰዎች ጋር ባለዎት ግንኙነት ላይ ምን ያህል ችግር አምጥተዋል?	0: የሚከብድ አይደለም			
		1: ትንሽ ይከብዳል			
		2: በጣም ይከብዳል			
		3: ከመጠን በላይ ከባድ ነው			

የሞንትሪያል የግንዛቤ ግምገማ

MONTREAL COGNITIVE ASSESSMENT (MoCA®)

ዕትም 8.3 አማርኛ

ስም፡

የትምህርት ደረጃ፡

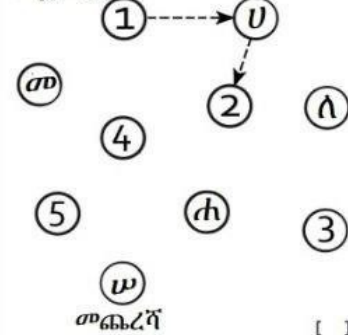
ጾታ፡

የትውልድ ቀን፡

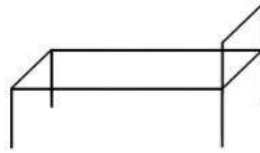
ቀን፡

ማየትና ቦታ/ከፍተኛ የአለም ሰነድ

መጀመሪያ



አልጋውን አስመስለው ይሳሉ

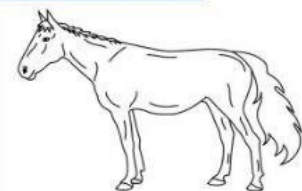


ሰዓት ይሳሉ (አስር ከአምስትን ይጠቁሙ) (3 ነጥብ)

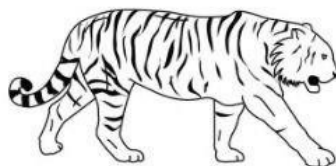
[] [] []
አቃፊ መስመር ቁጥሮች ዚራ ቀስቶች

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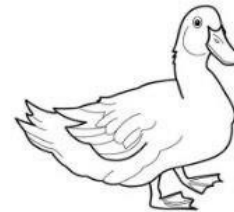
ስም መሰየም



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ማስታወስ

ቃላቶችን ያንበቡላቸው ተሳታፊው ቃላቶችን መደገም አለባቸው። የመጀመሪያው መከራ ቢሳካላቸውም ሁለት ጊዜ ያስደግግታቸው። ከ 5 ደቂቃ በኋላ ድጋሚ ይጠይቃቸው።

አግር

ጥጥ

ትምህርት ቤት

ቲማቲም

ነጭ

1ኛ መከራ

2ኛ መከራ

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ትኩረት

የቁጥሮችን ዝርዝር ማንበብ (በስድስት 1 ቁጥር)

ተሳታፊው ቁጥሮችን ከፊት ወደኋላ ይደግግታቸው። [] 2 4 8 1 5
ተሳታፊው ቁጥሮችን ከኋላ ወደፊት ይደግግታቸው። [] 4 2 7የፊደሎችን ዝርዝር ማንበብ፤ ተሳታፊው "አ" ን በስሙ ቁጥር በአጃቸው ቸብ ያድርጉ። ሁለት ወይም የበለጠ ስህተት ከተሰራ ነጥ አያስገኝም።
[] ፈ. በ አ ሰ ሙ ነ አ አ ጀ ከ ለ በ አ ፈ አ ከ ደ ረ አ አ አ ጀ አ መ ቀ ፈ አ አ በከ 60 ጀምሮ 7 እየቀነሱ ወደታች መቁጠር [] 53 [] 46 [] 39 [] 32 [] 25
4 ወይም 5 ትክክለኛ ትንሳ 3 ነጥብ፤ 2 ወይም 3 ትክክለኛ 2 ነጥብ፤ 1 ትክክለኛ 1 ነጥብ፤ 0 ትክክለኛ 0 ነጥብ።

ቋንቋ

ይደገም። እኩል ሌሊት ካለፈ በኋላ ፍየሎችን ወደ በረት አስገባቸው። []
ልብስ ሠፊው ቀሚሱን በጊዜው ለበዓሉ አደረሰላት። []

የቃላት ቅልጥፍና

ቃላት በፍጥነት መጥራት፤ በ "አ" የሚጀምሩ ቃላቶችን የቻሉትን ያክል በ 1 ደቂቃ መጥራት [] 11 ወይም በላይ ቃላቶች መሉ ነጥብ

ረቂቅ ግንዛቤ

ተመሳሳይነት፤ ለምሳሌ መዝና ብርቱካን ፍራፍሬ ወጥቶ ናቸው። [] መደሻ - የብሎን መፍቻ [] ከብራት - እምሯል

ቆይቶ ማስታወስ

አ.ጠ.ኃ. ቃላቶች ያለ አርዳታ መታወስ አለባቸው

አግር

ጥጥ

ትምህርት ቤት

ቲማቲም

ነጭ

X3

X2

X1

የምድብ አርዳታ

የምርጫ አርዳታ

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የጊዜና የቦታ ግንዛቤ

[] ቀን

[] ወር

[] ዓመት

[] ዕለት

[] ቦታ

[] ከተማ

___/6

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የአስታዋሽነት ጠቋሚ

ነጥብ (አ.ጠ.ኃ.)

ድምር

___/30

የፈታኝ ስም፡

ለትክክለኛ ፈተና እና ውጤት ስልጠና እና የምስክር ወረቀት ያስፈልጋሉ።

MoCA - Ethiopia/Amharic Version of June 14, 2020

translated by: Mulugeta Semework Abebe, PhD, Columbia University, New York - with partial support from the NIHR Global Health Research Group on Neurotrauma at the University of Cambridge.

ኮርትም፡ ዶ/ር መሐረታ ስመወርቅ አበበ፤ ኮሎምቢያ ዩኒቨርሲቲ፡ ኒው ዮርክ - ከፊል አርዳታ በኬምብሪድ ዩኒቨርሲቲ ላለው የአግላሊ ምንግስት ብሄራዊ ሙያ ምርምር ኢንቲቲቲቲ የአምራ ጉዳት ምርምር ቡድን

መደበኛ (ጤናማ) ውጤት 26/30 ወይም የበለጠ።

የ12 ዓመት ወይም ከዚያ ያነሰ መደበኛ ትምህርት ላላቸው ተሳታፊ እንድ ነጥብ ያክሉ።