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St. Paul's Hospital Millennium Medical College**

**PREVALENCE OF DEPRESSION AND ASSOCIATED
FACTORS AMONG CAREGIVERS OF CHRONICALLY ILL
PATIENTS AT TERTIARY HOSPITAL, ADDIS ABABA,
ETHIOPIA**

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**A RESEARCH THESIS SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH, ST. PAUL'S
HOSPITAL MILLENNIUM MEDICAL COLLEGE IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE UNDERGRADUATE DEGREE OF DOCTOR OF MEDICINE.**

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ADDIS ABABA, ETHIOPIA

**ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE SCHOOL
OF PUBLIC HEALTH**

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ETHIOPIA**

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Acronyms/ Abbreviations

- **ADL** - Activities of Daily Living
- **AOR** – Adjusted Odds Ratio
- **CI** – Confidence Interval
- **COR** – Crude Odds Ratio
- **ETB** – Ethiopian Birr
- **IRB** – Institutional Review Board
- **PHQ-9** – Patient Health Questionnaire-9
- **SPHMMC** – Saint Paul’s Hospital Millennium Medical College
- **SPSS** – Statistical Package for Social Sciences

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Abstract

Background

Caregiving for chronically ill patients imposes significant psychological and physical demands, often leading to mental health challenges such as depression. In Ethiopia, while studies exist for oncology and psychiatric contexts, there is a critical gap in understanding the mental health impact on caregivers supporting patients with other chronic illnesses like diabetes, renal failure, or cardiovascular diseases. Therefore, the aim of this study is to assess the prevalence and associated factors of depression among caregivers of chronically ill patients at tertiary hospital in Addis Ababa, Ethiopia.

Methods

An institution-based cross-sectional study was conducted from December 2 to December 31, 2025. Systematic random sampling was used to recruit 401 informal caregivers. Data were collected using a structured questionnaire and the validated Amharic version of the Patient Health Questionnaire-9 (PHQ-9), with a cutoff score of ≥ 10 indicating depression. Bivariate and multivariable logistic regression models were used to identify factors associated with depression.

Results

The prevalence of depression among caregivers was found to be 43.1%. Multivariable analysis revealed that caregivers spending more than 9 hours daily on caregiving duties had higher odds of depression (AOR = 2.65, 95% CI: 1.42–4.94).

Conclusion

Depression is highly prevalent among caregivers at St Paul's hospital. High daily caregiving hours are the sole factors associated with depressive symptoms. Integrating routine mental health screening and psychosocial support into chronic care services is essential to improve the well-being of caregivers and the quality of care they provide.

Keywords: Depression, Caregivers, Chronic illness, PHQ-9, Ethiopia, St. Paul's Hospital

1. Introduction

1.1 Background

Caregiving for chronically ill patients imposes significant psychological, emotional, and physical demands on caregivers, often leading to mental health challenges, particularly depression. Globally, the prevalence of depression among caregivers varies widely, ranging from 30% to over 70% (1). Locally the prevalence of depression among caregivers of chronically ill patients among cancer patients is around 42% (2).

A wide range of factors has been shown to increase vulnerability to depression among caregivers. The duration and intensity of caregiving are strong predictors; caregivers providing nine or more hours of daily care were reported to have nine times greater odds of depression in southern Ethiopia (3). Low socioeconomic status further exacerbates risk, with caregivers earning less than 600 ETB per month nearly three times more likely to be depressed compared to those with higher income (3). This aligns with findings from the United States, where caregivers with household incomes below \$15,000 had higher rates of depressive symptoms (4). According to the World Health Organization, poverty and mental health are closely linked, particularly in Low and Middle Income Countries, where 76–85% of people with mental disorders receive no treatment (5).

Caregivers' own health status and access to social support significantly affect their mental health. In China, caregivers with two or more comorbidities had a higher risk of developing depression (6). Low family support and anxiolytic use were also associated with increased depression in a Taiwanese study (7). Social support has consistently been shown to buffer the effects of caregiving stress, with stronger social networks linked to lower depression prevalence (3,8).

The nature and severity of the patient's illness also play a critical role. In mental health caregiving, severe symptoms and treatment noncompliance increase depressive symptoms among caregivers (9). Similarly, dementia caregiving studies have linked behavioral and cognitive challenges in patients to heightened caregiver depression (10). High levels of caregiver burden are strongly correlated with depression, as demonstrated in a meta-analysis of caregivers of mentally ill patients, which reported a pooled burden prevalence of 31.7% (11). African studies have

confirmed similar findings, with lower perceived burden associated with better psychological outcomes (12,13).

1.2 Statement of the problem

Caregivers play a vital role in supporting chronically ill patients, often providing around the clock assistance that is essential for recovery and quality of life. However, this responsibility comes with significant emotional, physical, and economic strain, placing caregivers at high risk for mental health problems such as depression (1,10). While global studies have extensively documented the psychological burden faced by caregivers, research on this issue in Ethiopia, especially for caregivers of patients with chronic conditions other than cancer or psychiatric illnesses remains limited (3).

Despite this growing global evidence, there remains a critical gap in the literature specific to caregivers of chronically ill patients in Ethiopia, particularly outside of oncology and mental health contexts. Most existing studies focus on psychiatric or cancer caregiving, leaving limited understanding of the mental health impact on caregivers supporting patients with other chronic illnesses such as diabetes, renal failure, or cardiovascular diseases. Given Ethiopia's resource limitations and the increasing burden of chronic diseases, it is likely that caregivers face substantial, yet under recognized, mental health challenges.

There is no comprehensive data on how widespread depression is among these caregivers, nor on the factors, such as caregiving burden, social support, or financial stress. That may be contributing to it at tertiary hospitals. Without this information, it is difficult to design effective interventions that support caregivers' mental well-being. Addressing this knowledge gap is crucial not only for improving the health of caregivers but also for ensuring better outcomes for the patients they care for. This study aims to address this gap by examining the prevalence and associated factors of depression among caregivers of chronically ill patients at tertiary hospital, thereby contributing valuable local evidence to inform targeted interventions and policy responses.

1.3 Justification of the Study

While global research on caregiver burden is expanding, Ethiopia faces a notable literature gap regarding those supporting patients with chronic illnesses outside of oncology and psychiatry. Most local studies center on caregivers of individuals with cancer or mental health disorders, leaving the psychological experiences of those managing conditions like diabetes, renal failure, and cardiovascular disease largely unexamined. Given Ethiopia's limited healthcare infrastructure and the increasing burden of non-communicable diseases, these caregivers likely face significant, yet under-reported, mental health challenges.

Currently, there is a lack of comprehensive data regarding the prevalence of depression among these caregivers and the specific drivers affecting those at tertiary hospitals: caregiving burden, social support, and financial strain. This evidence gap renders caregivers' needs invisible within the healthcare system, preventing the development of effective, targeted interventions. Bridging this gap is essential for both caregiver well-being and the quality of patient care. Consequently, this study aims to investigate the prevalence and determinants of depression in this population to provide the local evidence necessary for informed policy and clinical support.

This study is crucial in addressing the current gap in knowledge. By determining how common depression is and what factors contribute to it among caregivers of chronically ill patients at tertiary hospital, the results will offer important insights for healthcare providers, policymakers, and mental health initiatives. Supporting the mental well-being of caregivers is vital—not only for their own health, but also because it directly impacts the quality of care they deliver to patients.

2. Literature Review

2.1 Prevalence of depression among care givers

Depression is prevalent among caregivers of individuals with psychiatric and chronic conditions. In China, 53.5% of caregivers of patients with mental illness reported moderate to severe depression (9), whereas in India, 29.3% of informal caregivers experienced depressive symptoms compared to 27.6% among non-caregivers (14). These findings underscore the widespread and cross-cultural nature of the psychological burden faced by caregivers.

African context

Systematic review and meta-analysis done on Depression among caregivers of cancer patients from Africa showed the pooled prevalence of depression among caregivers of Cancer patients to be 42.08% (2), similarly another study done on caregivers of stroke patients estimated the pooled prevalence of depression among caregivers of stroke survivors as 48.75% However, the prevalence of depression ranged widely from 17.2%-76% (1).

Ethiopian Context

Ethiopian studies have shown a significant burden of depression among caregivers of patients with chronic and psychiatric illnesses: An institution based cross sectional study on primary caregivers of adult cancer patients at Northwest Amhara Regional States showed the prevalence of depression was 45.15% (15). Similarly, Institution-based cross-sectional study which was conducted among primary caregivers of children and adolescents with mental illness in Ethiopia has reported the overall prevalence of depression as 57.6% (16). Additional cross-sectional study conducted among primary caregivers of patients with severe mental illness in Jimma University Teaching Hospital, estimated overall prevalence of depression among primary caregivers of patients with mental illness as 19% (17).

2.2 Factors associated with depression among chronic patient care givers

Multiple factors have been identified that increase vulnerability to depression among caregivers. One of the most consistent predictors is the duration and intensity of caregiving. Caregivers providing care for nine or more hours per day were found to have nine times greater odds of

experiencing depression in a study from southern Ethiopia (3). Likewise, in stroke caregiving studies, longer caregiving duration was the most significant predictor of depression (1). Socioeconomic status also plays a major role, with low income associated with increased odds of depression. In the Sidama study, caregivers earning below 600 ETB per month were nearly three times as likely to experience depression compared to those with higher income (3). This is supported by findings from the U.S. where caregivers with household income below \$15,000 showed elevated rates of depressive symptoms (18). The World Health Organization emphasizes the strong association between poverty and mental health, particularly in LMICs where 76–85% of people with mental disorders receive no treatment (5).

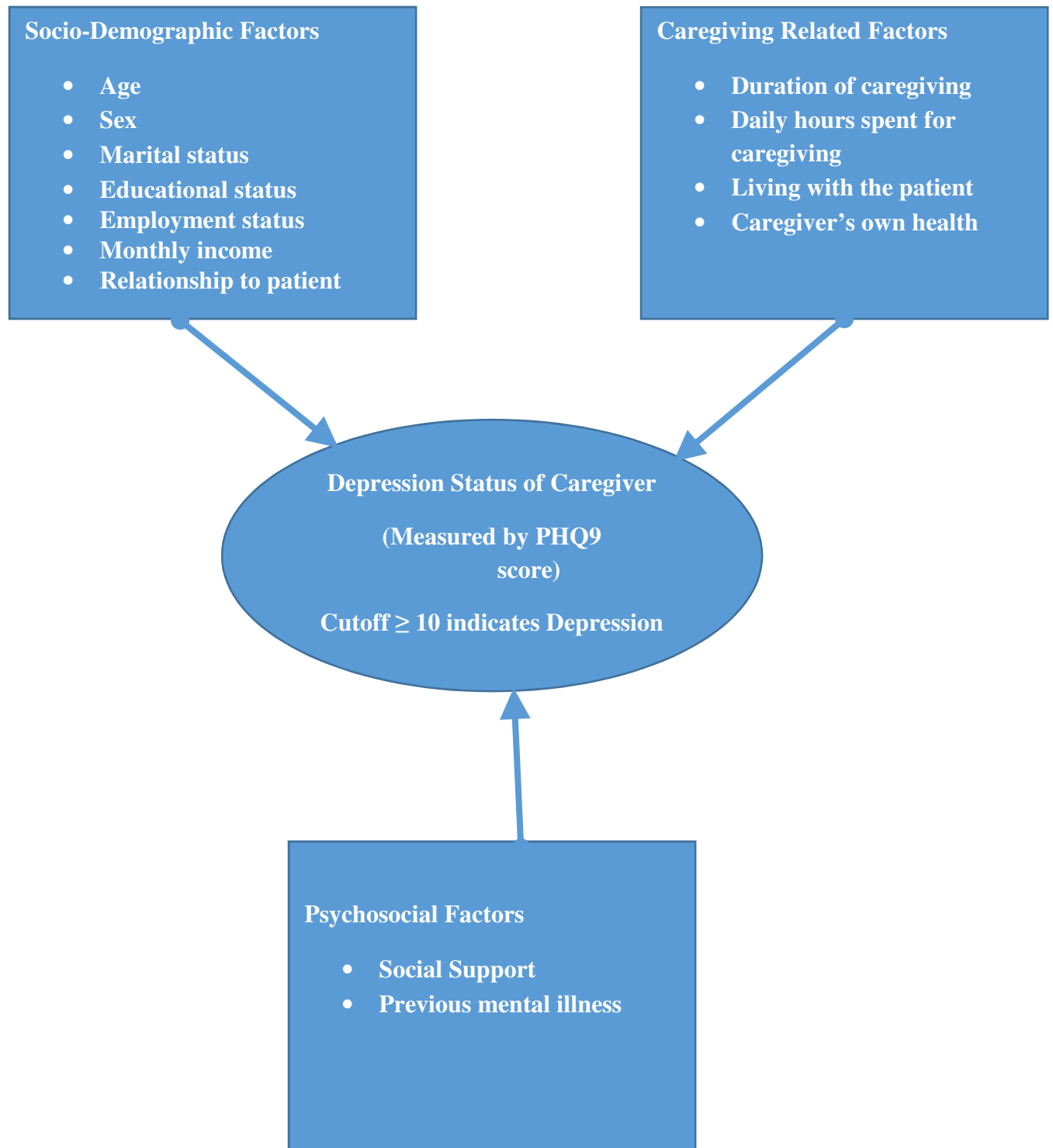
Gender and age also significantly influence caregiver mental health. Female caregivers consistently show higher risk for depression across cultures (10). A study in Iraq found that 80.6% of caregivers under 30 years old experienced depressive symptoms, compared to 55.2% among those over 40. In the same study, longer illness duration and frequent hospital admissions were also associated with higher depression rates (19). The relationship between the caregiver and patient is another contributing factor. A U.S.-based survey indicated that caregivers providing care for a live-in partner had a significantly higher likelihood of depression, while those caring for extended relatives like a mother-in-law had lower risk (4). In Ethiopia, mothers caring for their own children were nearly four times more likely to be depressed than other caregivers (8).

Caregivers' own health status and their access to social support significantly impact their psychological well-being. In a Chinese study of caregivers for patients with atrial fibrillation, those with two or more comorbidities were more likely to develop depression (6). A Taiwanese study similarly found that anxiolytic use by caregivers and low family support were associated with significantly increased odds of depression (7). Social support has consistently been found to buffer the impact of caregiving stress, with stronger networks associated with lower depression rates across several studies (3)(8). The nature of the patient's illness and severity of symptoms can also contribute. In mental health caregiving, symptom severity and noncompliance with treatment were associated with higher depressive symptoms among caregivers (5). Similarly, dementia caregiving studies reported increased depression when patients exhibited behavioral or cognitive challenges (10).

In terms of caregiver burden, several systematic reviews have confirmed its strong correlation with depression. A meta-analysis examining mental illness caregiving found a pooled burden prevalence of 31.7%, with high burden strongly linked to depressive symptoms (11). In Africa, a regional meta-analysis confirmed similarly elevated burden levels among caregivers of mental health patients (12). Lower perceived burden was consistently associated with improved caregiver psychological outcomes, regardless of illness type (13).

Despite this growing body of evidence internationally, studies specific to caregivers of chronically ill patients in Ethiopia—especially outside oncology or mental health contexts—remain scarce. Little is known about the mental health of caregivers for conditions such as diabetes, renal failure, or cardiovascular disease. Given Ethiopia’s resource constraints and the high prevalence of chronic illness, it is likely that caregivers bear a significant and unaddressed mental health burden. This gap in the literature underscores the importance of the present study in generating local evidence that can inform caregiver support strategies at institutions like St. Paul’s hospital.

2.3 Conceptual Framework



3. Objectives

3.1 General Objective

To assess the prevalence and associated factors of depression among caregivers of chronically ill patients at tertiary hospital in Addis Ababa, Ethiopia.

3.2 Specific Objectives

1. To determine the prevalence of depression among caregivers of chronically ill patients
2. To identify factors associated with depression among caregivers of chronically ill patients

4. Methods and Materials

4.1 Study Design

Institution-based cross-sectional quantitative study.

4.2 Study Area and Period

The study was conducted at St Paul's hospital in Addis Ababa, Ethiopia from December 2, 2025–December 31, 2025. St Paul's is a major tertiary teaching and referral hospital with over 700 beds and extensive outpatient and inpatient services. It provides a wide range of specialized and chronic care services, attracting patients from across the country. The presence of multiple chronic illness clinics, where many patients are accompanied by family caregivers, makes St. Paul's Hospital an appropriate setting for assessing depression among caregivers of chronically ill patients.

4.3 Study Population

Informal caregivers (aged ≥ 18 years) of patients with chronic illnesses receiving outpatient or inpatient care at St. Paul's Hospital.

4.4 Inclusion and Exclusion Criteria

4.4.1 Inclusion Criteria

- Age ≥ 18 years
- Providing care for ≥ 1 months

4.4.2 Exclusion Criteria

- Paid professional caregivers (formal/paid nurses, attendants, home-care staff).
- Caregivers who have provided care for < 1 month
- Communication barrier due to illness or language

4.5 Sample Size Determination

The sample size was calculated using both single and double population proportion formulas to meet the two main objectives of this study. For the first objective (estimating the prevalence of

depression among caregivers) a single proportion population formula was used. A prevalence estimate of 45.15% was taken from a previous study conducted among caregivers of cancer patients in Northwest Ethiopia (15). Using a 95% confidence level ($Z = 1.96$) and 5% margin of error ($d = 0.05$):

Table 1- Sample size and response rate summary for assessment of depression among caregivers of chronically ill patients using single proportion formula at tertiary hospital, Addis Ababa, Ethiopia, 2025

Parameter	Value / Calculation
Initial Proportion (p)	0.45 (45%)
Confidence Level (Z)	1.96 (95%)
Margin of Error (d)	0.05 (5%)
Calculated Sample Size (no)	380
Non-Response Rate Contingency	10% (38)
Total Target Sample Size (n)	418

For the second objective (identifying factors associated with depression) a double population proportion formula, comparing two groups (exposed vs. unexposed) for key factor (i.e Caregiving Intensity) using manual calculation. The calculation is based on 80% power, a 95% confidence level, and a 1:1 ratio of unexposed to exposed. The final sample size was 432 which was larger than 420 and it was selected as it is the larger sample size.

Table 2 - Sample size and response rate summary for assessment of depression among caregivers of chronically ill patients using double proportion formula at tertiary hospital, Addis Ababa, Ethiopia, 2025

Parameter	Value / Calculation
P1: Proportion of depression in unexposed group (45.5%)	0.45 (45%)
P2: Proportion of depression in exposed group	59.5%
Confidence Level (Z)	1.96 (95%)
Z β : Power at 80%	0.84
Ratio of unexposed to exposed	1:1
Calculated Sample Size (n ₀)	392
Non-Response Rate Contingency	10% (39.2)
Total Target Sample Size (n)	432
Excluded (Non-responses)	31
Final Analyzed Sample	401
Response Rate	93%

4.6 Sampling Procedure

Eligible caregivers were selected using systematic random sampling from outpatient and inpatient departments. The sampling interval ($k=3/2$) was determined by dividing the estimated number of caregivers (627) during the study period by the required sample size ($n=418$). The first caregiver was chosen by lottery method, and thereafter, every k th caregiver was recruited until the sample size is achieved. The time period required to achieve the required sample size was 1 month.

4.7 Variables

4.7.1 Dependent Variable:

- Depression status of the caregiver (measured using PHQ-9 score; cut-off ≥ 10 indicating depression)

4.7.2 Independent Variables:

1. Socio-demographic factors: Age, sex, marital status, educational status, employment status, monthly income, relationship to the patient

2. Caregiving-related factors: Duration of caregiving (in months), daily hours spent on caregiving, whether the caregiver is living with the patient, caregiver's own health status (presence of chronic illness or disability)

3. Psychosocial factors: Presence of social support, history of mental illness in the caregiver

4.8 Data Collection tools and procedures

A structured interviewer-administered questionnaire was used.

Data collection tools

1. Structured socio-demographic and caregiving questionnaire
2. Patient Health Questionnaire (PHQ-9) – Amharic & English versions validated for Ethiopia

Data Collection Procedures

Trained data collectors conducted face-to-face interviews using printed tools. The PHQ-9 assessment questions are also included for depression severity (cutoff ≥ 10).

4.9 Operational Definitions

Caregiver: An individual (typically a family member) aged 18 years or older who provides unpaid, regular physical, emotional, or financial care to a chronically ill patient for at least the past 1 month (1).

Chronic Illness A medical condition that requires long-term management and persists for three months or more. This includes diseases such as diabetes mellitus, chronic kidney disease, cancer, heart failure, or other long-standing illnesses. Severity of the patient's illness will be considered as an independent variable, categorized by type of chronic condition and clinical status. Severity of illness will be categorized using the patient's level of dependence in Activities of Daily Living Katz ADLs, a validated measure of functional status: Patients with conditions requiring intensive care (e.g., advanced cancer, stroke with disability, dementia) will be coded as higher severity, while conditions with relatively less daily burden (e.g., stable diabetes, controlled hypertension) will be coded as lower severity. This classification will allow comparison of caregiver depression levels across varying illness severities (3).

Depression: A mental health condition characterized by persistent sadness, lack of interest or pleasure, and other emotional and physical symptoms, assessed using the Patient Health Questionnaire-9 (PHQ-9). A PHQ-9 score of ≥ 10 is considered indicative of clinically significant depression (2).

PHQ-9 (Patient Health Questionnaire-9): A standardized and validated 9-item screening tool used to assess the severity of depressive symptoms. Scores range from 0 to 27, with higher scores indicating more severe symptoms. A score ≥ 10 indicates presence of depression (15).

Social Support: The perceived level of emotional, informational, or practical assistance received from family, friends, or the community. (9)

Primary Caregiver: The main individual responsible for providing consistent daily care to the patient, whether during hospital visits or at home.(4)

Prevalence: The proportion of caregivers who screen positive for depression (PHQ-9 ≥ 10) at the time of data collection.

Duration of Caregiving: The length of time (in months or years) that a caregiver has been providing care to the chronically ill patient.

Hours of Care per Day: The average number of hours spent by the caregiver daily in providing assistance to the patient.

4.10 Data Quality Assurance

Pretest will be conducted on 5% of the calculated sample size (21) at a department different from the main study site. The site was chosen based on the comparable caregiver characteristics and similar patient flow rate. Based on the pretest findings, the questionnaire was revised for clarity, cultural appropriateness, and comprehension. Ambiguous questions were rephrased, missing items added, and the sequence of questions improved before actual data collection began.

Double data entry and coding was done and appropriate training for data collectors was given.

4.11. Data Processing and Analysis

The data processing and analysis followed a systematic approach, beginning with the meticulous handling of the raw information. Once data collection was complete, each questionnaire was manually screened for completeness and consistency. The verified data were then entered into EpiData version 4.6, a software chosen to minimize entry errors through its controlled data entry environment. Following the entry phase, the dataset was exported to IBM SPSS Statistics version 25 for comprehensive statistical cleaning and analysis. Throughout this process, data validation techniques, including double-entry checks and variable coding, were strictly implemented to ensure the integrity of the results.

The initial phase of the statistical analysis involved descriptive techniques to summarize the socio-demographic and caregiving characteristics of the 401 study participants. Frequencies and percentages were calculated for categorical variables, while measures of central tendency, such as means and medians, were applied to continuous data. The primary outcome (depression) was categorized using the Patient Health Questionnaire-9 (PHQ-9) diagnostic tool. Caregivers scoring 10 or higher were classified as having clinically significant depression, allowing for a clear prevalence rate to be established within the study population.

To identify factors associated with depression, a two-stage regression modeling strategy was employed. First, bivariate (binary) logistic regression was conducted to examine the crude association between each independent variable and the outcome. To ensure that potential predictors were not prematurely excluded, a generous p-value threshold of less than 0.25 was used to select candidate variables for the next stage. This approach accounts for variables that may not appear significant individually but contribute meaningfully to the model when adjusted for other factors.

The final stage of the analysis involved multivariable logistic regression, where all candidate variables from the bivariate analysis were entered into a single model. This allowed for the identification of independent predictors of depression while controlling for potential confounders. In this final model, statistical significance was strictly defined as a p-value of less than 0.05. The results were reported using Adjusted Odds Ratios (AOR) alongside 95% Confidence Intervals

(CI), providing a robust measure of the strength and direction of the associations found within the Ethiopian tertiary hospital context.

4.12 Ethical Considerations

Ethical clearance was obtained from the Institutional Review Board (IRB) of St. Paul's Hospital Millennium Medical College (SPHMMC). Written informed consent was secured from all participants after full explanation of the study's purpose, risks, and benefits. Participants were assured of confidentiality, and data was anonymized and stored securely. And Participants were informed that participation is voluntary, and they were told they may withdraw at any time without affecting the care of their patient. No personal identifiers were recorded, and the collected data was used only for research purposes.

4.13. Dissemination of Results

The findings of this study will be disseminated to the Departmental Research Committee at SPHMMC; will be presented during final year student research seminars. A hard copy and electronic copy will be submitted to the medical library. If feasible, the paper will be submitted for publication in a local peer-reviewed journal.

5. Results

5.1 Sociodemographic characteristics of participants

A total of 401 caregivers with full response were included in this research while 31 participants whose responses were not fulfilled were discarded. This makes the response rate 93% (Sample size = 432).

As shown from the table 2 below, from the caregivers in this sample exhibited a mean age of 33.99 years (SD = 10.32), with a median age of 30 years, indicating a relatively young caregiver population. The age range spanned from 18 to 60 years and majority (70%) of them were below 40 years. The majority of the respondents were females (53.6%) About 67% of participants are married and 5.7 % are divorced. The mean monthly income of the study participants is 11,373 ETB while the median is 9,000 ETB. Majority (52.4%) of the participants have a monthly income less than 9,675 ETB. Regarding the relationship to the patient, most of the caregivers were first degree relatives (77.8%).

Table 3- Socio-demographic characteristics of caregivers attending Chronically Ill Patients at Saint Paul Hospital Millennium Medical College, Addis Ababa, Ethiopia, 2025 (n=401).

Variable	Category	Frequency (n)	Percentage (%)
Age Category	<20	12	3.0
	20–29	156	38.9
	30–39	114	28.4
	40–49	77	19.2
	>50	42	10.5
Sex	Female	215	53.6
	Male	186	46.4
Marital Status	Divorced	23	5.7
	Married	269	67.1
	Single	109	27.2
Education Category	No formal education	56	14.0
	Primary	110	27.4
	Secondary	133	33.2
	Tertiary	102	25.4
Occupation Category	Unemployed	143	35.7
	Employed	258	64.3

5.2- Prevalence of depression

The PHQ9 score was used to say whether the caregiver had depression or not. The total score of ≥ 10 is considered as depression and scores above 10 were classified based on their severity. The mean depression score is 8.75 with standard deviation of 5.2. The depression level among caregivers is 43.1% from which 0.7% of the total caregivers are severely depressed. As shown on the figure below the prevalence of depression among caregivers is 43%.

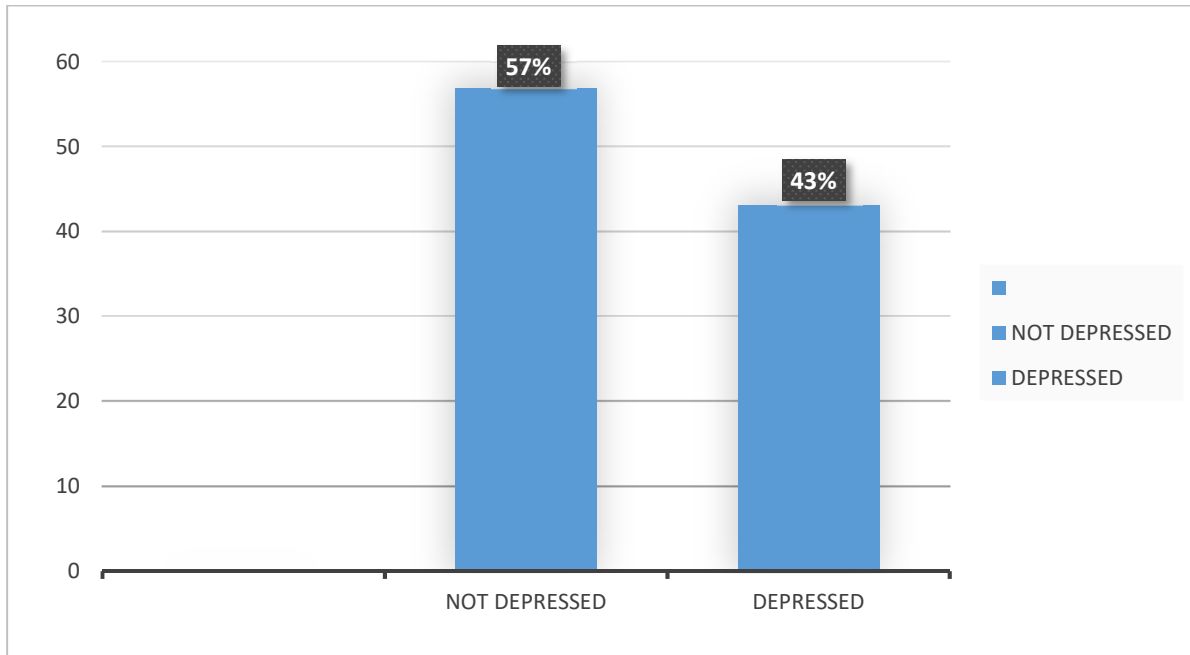


Figure 1 - Depression level of caregivers attending Chronically Ill Patients at Saint Paul Hospital Millennium Medical College, Addis Ababa, Ethiopia, 2025 (n=401).

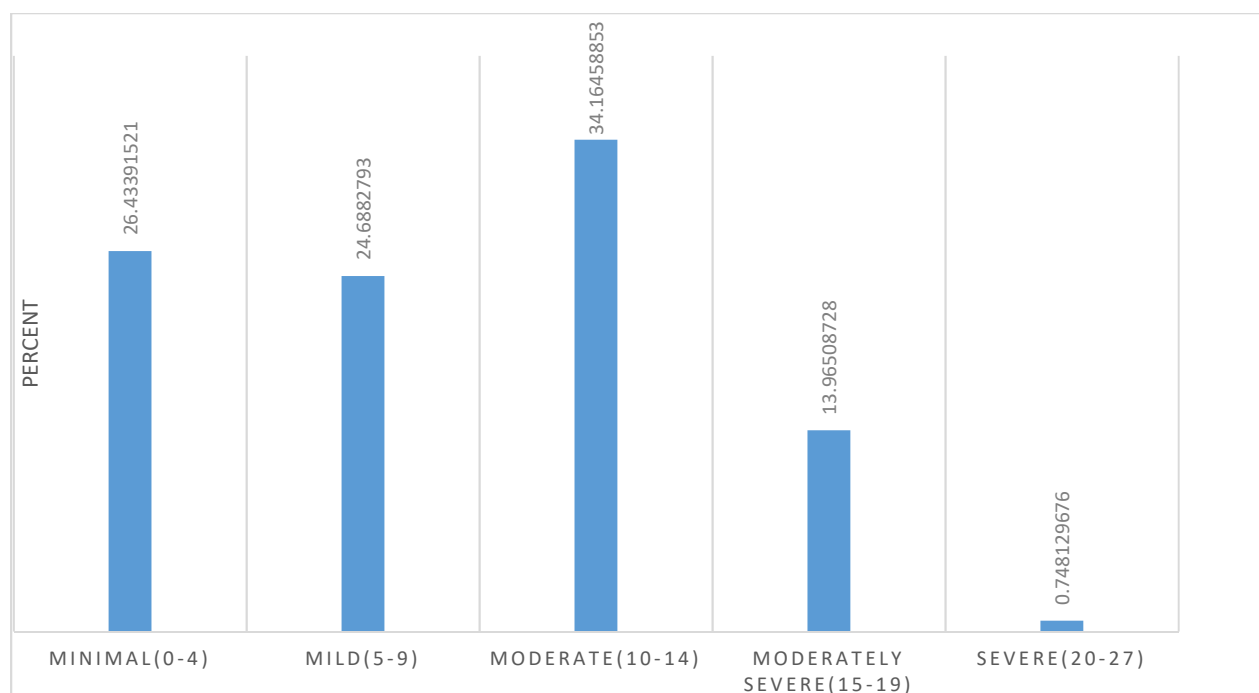


Figure 2 - Severity of depression caregivers attending Chronically Ill Patients at Saint Paul Hospital Millennium Medical College, Addis Ababa, Ethiopia, 2025 (n=401).

5.2 Factors associated with depression in caregivers

To identify independent factors associated with depression among caregivers of chronically ill patients, both binary and multiple logistic regression analyses were conducted. In the binary logistic regression, variables with a p-value < 0.25 were considered candidates for inclusion in the multiple logistic regression model. The variables that met this criterion included duration of caregiving, relationship to the patient, daily hours spent on caregiving, perceived social support, educational level, and living with the patient, all of which showed a significant association with caregiver depression.

Caregivers that spent more than 9 hours per day on caregiving chronically ill patients had higher odds of depression (AOR = 2.65, 95% CI: 1.42–4.94). Daily hours spent in caregiving is the strongest factor associated with depression after eliminating for confounding variables in multiple regression analysis. Living with the patient was significantly associated with depression (COR = 1.98, 95% CI: 1.21–3.24). But it didn't reach statistical significance after eliminating for confounding variables. The following table shows the factors associated with depression with their

COR (Crude Odds Ratio), AOR (Adjusted Odds Ratio), with 95%CI and p values for multivariate and bivariate logistic regression analysis.

Table 4 – Binary regression analysis of caregivers attending Chronically Ill Patients at Saint Paul Hospital Millennium Medical College, Addis Ababa, Ethiopia, 2025 (n=401).

Variable	Category	P- value (Binary)	COR(95% CI)
Age	Continuous	0.873	1.002(0.983-1.021)
Sex	Male(Ref)	-	1
	Female	0.879	0.970(0.652-1.441)
Marital Status	Married(Ref)	-	1
	Single	0.555	1.145(0.731-1.793)
	Divorced	0.329	1.529(0.651-3.590)
Education Level	Tertiary(Ref)	-	1
	No formal	0.923	0.968(0.504-1.859)
	Primary	0.187	0.693(0.402-1.195)
	Secondary	0.129	0.668(0.396-1.125)
Occupation	Employed(Ref)	-	1
	Unemployed	0.571	0.887(0.587-1.342)
Monthly Income	>30,825(Ref)	-	1
	<9,675	0.492	1.467(0.492-4.374)
	9,675-16,425	0.440	0.642(0.208-1.978)
	16,425-30,8265	0.427	0.615(0.186-2.037)
Relationship to the patient	Unrelated(Ref)	-	1
	1 st degree	0.117	0.172(0.019-1.553)
	2 nd degree	0.117	0.158(0.016-1.587)

	Spouse	0.337	0.326(0.034-3.118)
Duration of Care	<3 months(Ref)	-	1
	3-6 months	0.061	1.795(0.974-3.311)
	6-12 months	0.513	1.222(0.671-2.224)
	>12 months	0.797	1.055(0.609-1.827)
Daily Hours Spent for Care	<4 hours(Ref)	-	1
	4-9 hours	0.419	0.729(0.339-1.568)
	>9 hours	0.003	2.440(1.354-4.399)
Live with the Patient	No(Ref)		1
	Yes	0.006	1.980(1.211-3.238)
Chronic Illness?	No(Ref)	-	1
	Yes	0.848	1.055(0.609-1.827)
Receive Help	Yes(Ref)	-	1
	No	0.435	1.22(0.739-2.019)
Previous Mental Illness	No(Ref)		1
	Yes	0.909	1.057(0.408-2.737)
Perceived Social Support	Good(Ref)	-	1
	Moderate	0.331	1.234(0.808-1.886)
	Poor	0.241	1.488(0.765-2.894)

Table 5 - Multiple regression analysis of caregivers attending Chronically Ill Patients at Saint Paul Hospital Millennium Medical College, Addis Ababa, Ethiopia, 2025 (n=401).

Variable	Category	P-value (Multivariate)	AOR (95% CI)
Education Level	Tertiary(Ref)	-	1
	No formal	0.897	1.052(0.488-2.266)
	Primary	0.281	0.704(0.373-1.332)
	Secondary	0.147	0.653(0.367-1.162)
Relationship to the patient	Unrelated(Ref)	-	1
	1 st degree	0.129	0.168(0.017-1.679)
	2 nd degree	0.130	0.155(0.014-1.730)
	Spouse	0.301	0.289(0.028-3.028)
Duration of Care	<3 months(Ref)	-	1
	3-6 months	0.082	1.785(0.930-3.428)
	6-12 months	0.336	1.372(0.720-2.614)
	>12 months	0.751	1.087(0.650-1.819)
Daily Hours Spent for Care	<4 hours(Ref)	-	1
	4-9 hours	0.841	0.921(0.413-2.055)
	>9 hours	0.002	2.652(1.424-4.940)
Live with the Patient	No(Ref)	-	1
	Yes	0.249	1.414(0.785-2.548)
Perceived Social Support	Good(Ref)	-	1
	Moderate	0.424	1.366(0.636-2.933)
	Poor	0.714	1.100(0.661-1.829)

6. Discussion

This study determined the prevalence and associated factors of depression among caregivers of chronically ill patients at tertiary hospital. The overall prevalence of depression was found to be **43.1%**, which indicates that depression is a common public health problem in this population. The current study revealed that daily hours spent on caregiving emerged as a strong and independent factor of depression.

Globally, depression among caregivers is undeniably a heavy burden, with rates swinging wildly from 30% to over 70% depending on the specific illness and cultural context (1). The finding of 43.1% is within that global range. It is higher than the 29.3% observed in India, yet lower than the 53.5% reported among caregivers of mental health patients in China (14, 9).

Locally, the 43.1% rate is almost identical to the pooled African meta-analysis for cancer caregivers (42.08%) and matches the 45.15% found in Northwest Amhara (2, 15). This suggests that regardless of the specific chronic condition, the caregiving experience in Ethiopia carries a consistent psychological weight. However, the rate of this study is more than twice of the 19% reported in Jimma for caregivers of patients with severe mental illness (17).

Caregivers who spent >9 hours per day providing care had 2.65 times higher odds of depression compared to those who spent fewer than four hours per day. This finding is consistent with findings in Southern Ethiopia (3), where >9 hours of care led to 9x greater odds. The thesis confirms that "time-poverty" and physical exhaustion are universal drivers of caregiver depression in Ethiopia.

Living with the patient has higher odds ratio although it didn't reach statistical significance. Ethiopian studies (e.g., Northwest Amhara (15)) often find this to be a significant independent factor. The thesis's finding that it becomes non-significant suggests that in the tertiary hospital population, the hours spent are a more precise measure of burden than mere cohabitation. In the United States, living with the patient is a hallmark of "high-strain" caregiving, often independently associated with depression due to the lack of "escape" from the caregiving environment.

The perceived social support, relationship with the patient, gender and age of the caregiver did not reach statistical significance. Although defined on the operational definitions part, severity of illness was not included in final analysis due to data limitations.

8. Strengths and Limitations of the study

8.1 Strengths

- While most local research has focused on caregivers in oncology or mental health, this study broadens the scope to include caregivers of patients with other chronic illnesses like diabetes, renal failure, and cardiovascular diseases in general. By targeting these often-overlooked groups, the thesis provides a more comprehensive understanding of the caregiver burden within the Ethiopian healthcare system
- Use of the PHQ-9, a standardized and validated screening tool, strengthens the reliability and comparability of the findings.
- Identified the main factor associated with caregiver depression which is essential for future intervention in caregiver depression.

8.2 Limitations

- The cross-sectional design limits the ability to establish causal relationships between caregiving factors and depression.
- Depression was assessed using a screening tool rather than clinical diagnosis, which may overestimate or underestimate true prevalence.
- The study was conducted in a single tertiary hospital, which may limit the generalizability of the findings to caregivers in community or rural settings.
- Potential recall and social desirability bias may have influenced self-reported information such as caregiving hours and social support.

7. Conclusion

This study aimed to assess the prevalence of depression and its associated factors among caregivers of chronically ill patients attending Saint Paul's Hospital Millennium Medical College (SPHMMC) in Addis Ababa, Ethiopia. The findings reveal a high prevalence of depression among

this vulnerable population, with 43.1% of caregivers experiencing clinically significant depressive symptoms. This rate is comparable to, and in some cases higher than, figures reported in similar populations both locally within Ethiopia and globally, underscoring the substantial mental health burden faced by these caregivers.

In relation to the specific objectives, the study identified daily hours spent on caregiving as the sole independent factor significantly associated with caregiver depression. Specifically, caregivers who dedicated more than nine hours per day to caregiving duties were found to be more than twice as likely to experience depression compared to those who spent fewer than four hours. This highlights a critical threshold effect, where the intensity and duration of daily caregiving responsibilities are overwhelming predictors of psychological distress.

While other factors such as living with the patient, duration of care, education level, relationship to the patient, and perceived social did not reach statistical significance. This suggests that in the context of a tertiary hospital setting like St. Paul's Hospital, where patients may present with more severe and complex chronic conditions, the sheer demand of intensive daily caregiving appears to be the predominant driver of depression. The study thus reinforces the critical need for targeted interventions focusing on alleviating the daily burden of care to safeguard the mental well-being of these essential caregivers.

9. Recommendations

Based on the findings of this study, the following recommendations are proposed:

9.1 Recommendations for Healthcare Providers

- Since nearly half of the caregivers at St. Paul's Hospital meet the criteria for depression, clinicians should integrate the PHQ-9 tool into the routine follow-up of patients with chronic illnesses (diabetes, renal, and cardiovascular diseases).
- Nurses and physicians should specifically ask about the time demands on the caregiver and prioritize those individuals with caregiving more than 9 hours for psychological counseling or social work referrals.

9.2 Recommendations for Hospital Management and Policymakers

- St. Paul's Hospital should consider establishing caregiver support programs, including counseling services and referral pathways for mental health care.
- Policies should be developed to recognize caregivers as an at-risk group within the healthcare system.
- Expansion of community-based mental health services and social support mechanisms for caregivers is essential.

9.3 Recommendations for Future Research

- Longitudinal studies are recommended to establish a clear temporal relationship between caregiving duration and the onset of depressive symptoms.
- Future research should explore qualitative experiences of caregivers to better understand contextual stressors.
- Studies involving multiple healthcare institutions and community settings are recommended to improve generalizability.

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11. Annexes

Annex I: Information Sheet

Information Sheet

Title of the Research: Prevalence and Associated Factors of Depression among Caregivers of Chronically Ill Patients at SPHMMC, Addis Ababa, Ethiopia

Principal Investigator: Abubaker Beshir

St. Paul's Hospital Millennium Medical College (SPHMMC)

Purpose of the Study:

This study aims to determine how common depression is among caregivers of chronically ill patients and to identify factors associated with it. Understanding these factors can help improve support and mental health services for caregivers.

Procedure:

You are invited to participate in this study. If you agree, you will be asked a series of questions about your background, your caregiving experience, and how you have been feeling over the past two weeks. It will take about 15–20 minutes.

Voluntary Participation:

Participation in this study is entirely voluntary. You may decline to answer any question or withdraw from the study at any time without affecting the care your patient receives.

Risks and Benefits:

There are no physical risks. If you are found to have symptoms of depression, you will be referred to the Psychiatry Department at SPHMMC for appropriate counseling and care. While you may not benefit directly, your participation will help improve services for caregivers in the future.

Confidentiality:

All information you provide will be kept strictly confidential. Your name and any personal identifiers will not be recorded. The data will only be used for academic and research purposes.

Contact Information:

If you have any questions about this study, you can contact:

Abubaker Beshir

Phone: 0940819381

Email: drabubekerb@gmail.com

Annex II: Informed Consent Form

Title: Prevalence and Associated Factors of Depression among Caregivers of Chronically Ill Patients at SPHMMC

Principal Investigator: Abubaker Beshir

Institution: St. Paul's Hospital Millennium Medical College (SPHMMC)

Date: Sep 12, 2025 GC

Introduction:

You are invited to participate in a research study. The purpose of the study is to assess the prevalence and contributing factors of depression among caregivers like yourself.

Procedure:

If you agree to participate, you will be asked questions about your background, your caregiving role, and how you've been feeling over the past two weeks. The questionnaire will take approximately 15–20 minutes.

Confidentiality:

Your information will be kept strictly confidential. Your name will not be used in any reports. All data will be stored securely and only used for academic purposes.

Risks and Benefits:

There are no physical risks. If you score high on depression screening, we will refer you to the SPHMMC mental health unit for support. Your participation may help others in similar situations in the future.

Voluntary Participation:

Participation is voluntary. You may decline to answer any question or withdraw at any time.

Consent Statement (to be signed):

I have read or been told the purpose and nature of the study. I understand that my participation is voluntary, and I may withdraw at any time.

Name of Participant: _____

Signature: _____ Date: _____

Name of Data Collector: _____

Signature: _____ Date: _____

Annex III: Questionnaire

A. Socio-demographic and Caregiving Information

1. Age: _____
2. Sex: ☐ Male ☐ Female
3. Marital Status: ☐ Single ☐ Married ☐ Divorced ☐ Widowed
4. Education Level: ☐ No formal education ☐ Primary ☐ Secondary ☐ Tertiary
5. Occupation: _____
6. Monthly Income (ETB): _____
7. Relationship to the Patient: ☐ Spouse ☐ Child ☐ Parent ☐ Sibling ☐ Other: _____
8. Duration of Caregiving: _____ months
9. Daily Hours Spent on Caregiving: _____ hours

10. Do you live with the patient? ☐ Yes ☐ No

11. Do you have any chronic illness? ☐ Yes ☐ No

12. Do you receive help with caregiving? ☐ Yes ☐ No

13. Have you previously been diagnosed with any mental illness? ☐ Yes ☐ No

14. Perceived Social Support:
☐ Poor ☐ Moderate ☐ Good

B. PHQ-9 Depression Screening Tool

Instructions: Over the last two weeks, how often have you been bothered by the following problems?

(0 = Not at all, 1 = several days, 2 = More than half the days, 3 = nearly every day)

No.	Question	0	1	2	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				
7.	Trouble concentrating on things				
8.	Moving or speaking so slowly or being fidgety/restles s				
9.	Thoughts of self-harm or suicide				

Total Score: _____

Interpretation:

- 0–4: Minimal
- 5–9: Mild
- 10–14: Moderate

- 15–19: Moderately Severe
- 20–27: Severe

Cut-off for clinical depression: PHQ-9 $\geq$ 10

Annex IV: Ethical Clearance Request Letter

To: SPHMMC Institutional Review Board (IRB)

Addis Ababa, Ethiopia

Subject: Request for Ethical Clearance to Conduct Research

Dear IRB Committee Members, I am writing to respectfully request ethical approval for my research proposal entitled:

"Prevalence and Associated Factors of Depression among Caregivers of Chronically Ill Patients at SPHMMC, Addis Ababa, Ethiopia"

This study aims to assess the burden and contributing factors of depression among informal caregivers of chronically ill patients at SPHMMC. The research will use a cross-sectional design and involve face-to-face interviews using a structured questionnaire including the PHQ-9 screening tool.

Participation will be entirely voluntary, with informed consent obtained from each participant. Confidentiality and anonymity will be strictly maintained throughout data collection and analysis. Any caregiver scoring high on the PHQ-9 will be referred to the Psychiatry Department for appropriate support. The findings from this research are expected to provide valuable insight into caregiver mental health and inform future interventions.

Thank you for considering this request. I look forward to your approval and support.

Sincerely, Abubaker Beshir- Medical Intern |SPHMMC

Phone: 0940813981

Email: drabubekerb@gmail.com

Translated Amharic Version Questionnaire

ምልክቶች	0 – ከሁሉም አይደለም	1 – በጥቂት ቀናት	2 – ከጊዜው በኋላ በየቀኑ	3 – በየቀኑ
1. ነገሮችን ለማድረግ ፍላጎት ማጣት				
2. የመሰበር፣ ወይም ተስፋ የመኩረጥመስሎ መስማት				
3. መተኛት ላይ መቸገር ወይም በጣም ብዙ መተኛት				
4. የድካም ስሙት መስማት ወይም ሃይል ማጣት				
5. መብላት መከነስ ወይም በጣም ብዙ መብላት				
6. እኔ እንደ ማይቻለኝ፣ እንደ ማልሆን ሰው መስማት				
7. ትኩረት ላይ ችግር መኖር				
8. ከነሱ በላይ በጭንቅ መሆን ወይም ከሰዎች መለየት				
9. ከዚህ ሕይወት መውጣት ወይም ራሴን ለማጥፋት ማሰብ				

መለያየት: PHQ-9 ≥ 10 እኩል ወይም ከዚያ በላይ = የመካከለኛ ደረጃ እና ከፍተኛ ደረጃ የእምነት ጉዳት

Annex IV: Declaration

Assurance of Investigator

The undersigned agrees to accept responsibility for the scientific, ethical and Technical conduct of the research Project and for provision of required progress reports as per terms and conditions of the Research and Publication Directorate or /and Department of Public Health of St Paul's Hospital Millennium Medical College.

Name of the student: _____

Date: _____ Signature: _____

Approval of Advisors

Advisor	signature	date
1. _____	_____	_____
2. _____	_____	_____