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Original research

Depression and its associated factors among hypertensive patients who attend Public Hospitals in Nekemte Town, Western Ethiopia, 2025

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ABSTRACT

***Background**: Depression is a mental health illness characterized by a persistently low mood and diminished interest in activities over extended periods. It is particularly common among those with chronic illnesses like hypertension. There is a scarcity of research focusing on this specific population.*

Objective: to assess depression and factors associated with it among patients with hypertension who are visiting public hospitals in Nekemte town, East Wollega zone, in 2025.

***Methods**: This study employed a cross-sectional design, involving 379 participants chosen through systematic random sampling. Data gathered through interviewer-administered questionnaires were analyzed using SPSS version 26 after being entered into Epi Data version 3.1. Depression magnitude was estimated, and factors associated with it were identified using binary logistic regression with a significance level of 0.05. Multicollinearity was examined using the Variance Inflation Factor, and the Hosmer-Lemeshow test was used to assess model fitness.*

***Results**: The magnitude of depression was found to be 23.5%. Factors statistically associated with depression included having no formal education (AOR=4.66, 95% CI: 2.08-10.41), lack of health insurance (AOR=3.43, 95% CI: 1.74-6.75), comorbidity (AOR=3.15, 95% CI: 1.52-6.52), and low social support (AOR=5.59, 95% CI: 1.76-17.7).*

***Conclusion:** Nearly a quarter of the patients experienced depression, influenced by lack of formal education, absence of health insurance, comorbidity, and low social support. Implementing regular screening programs, encouraging insurance participation, and early detection of comorbidities could help reduce depression among hypertensive patients.*

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INTRODUCTION

Depression is a common mental illness marked by disinterest in routine activities and enduring feelings of despair. It often presents with symptoms such as lingering sadness, irritability, difficulty concentrating, guilt, hopelessness, and suicidal thoughts. Depressive disorders are typically classified into major depressive disorder, which can range from mild to severe episodes, and dysthymia, a chronic and milder form of depression that persists over time (1,2).

Although treatable, untreated depression can result in several issues, including eating disorders, school phobia, conduct disorder, criminality, panic attacks, substance misuse, and even suicide(3,4). Mental illnesses are prevalent worldwide and significantly impact socioeconomic development and growth. Over a quarter of the world's population will suffer from a mental illness at some point in their lives(5).

Hypertension is a condition characterized by elevated blood pressure, when the systolic blood pressure is at least 140 mmHg, or the diastolic blood pressure is at least 90 mmHg, or both, or reported use of antihypertensive medications(6). Effective management of hypertension and cardiovascular risk depends on individuals following prescribed measures to reduce behavioral risk factors and adhere to medication regimens (7). Non-compliance with medical advice poses a significant challenge in managing chronic conditions like hypertension. Patients with concurrent depression are less likely to follow medical treatment or recommendations, heightening their risk of disability and mortality (8). Uncontrolled hypertension can result in stroke, heart attack, heart failure, dementia, kidney failure, and blindness, placing substantial financial and service demands on healthcare systems (8,9).

Over 300 million people worldwide suffered from depressive illness in 2019. According to the 2019 Global Burden of Diseases, Injuries, and Risk Factors Study (GBD), the two most disabling mental illnesses are anxiety and depression. Major depressive illness was expected to be present in 31,529 instances per 100,000 people worldwide in 2021(10).

Female sex, marriage, the existence of chronic comorbid conditions, uncontrolled blood pressure, more than ten years of hypertension, family history of depression, alcohol use, youth, and inadequate social support are factors linked to depression in hypertensive patients (11-13).

The “Mental Health Gap Action Program (mhGAP)”, developed by the World Health Organization in 2008, aims to address the

impact of mental health insurance treatment gaps(14). There are extensive studies on depression among adults; however, there is no evidence on this specific population. Hence, this study will provide insight into implementing focused intervention on this specific population.

METHODS

Study period, design, and area

Between January 15 and February 15, 2025, a cross-sectional survey was conducted at two public hospitals in Nekemte town: Nekemte Specialized Hospital (NSH) and Wolllega University Comprehensive Specialized Hospital (WUCSH). Nekemte is situated in a western region, 333 kilometers from Ethiopia's capital, Addis Ababa. The hospital serves a population spanning four zones: East Wallaga, West Wallaga, Horro Guduru Wallaga, Kellem Wallaga, as well as the adjacent woredas of the West Shoa zone. At NSH, there were 2,296 hypertensive patients being monitored, while at WUCSH, the number was 1,030.

Population and sampling

All adult hypertension patients (≥18 years old) who visited Nekemte town's public hos pitals made up the source population. The study population comprised **a**ll selected adult hypertensive patients attending public hospitals in Nekemte town. Three patients were excluded because of having severe illness that made them unable to give reliable data.

Sample size was calculated using $n=\frac{(z\alpha/_2)^2 * p(1-p)}{d^2}$, with p (proportion of depression=37.8%) (15), 95% confidence level, and a 5% margin of error were used. With 5% margin of error, the final sample size of 379 was selected through systematic random sampling, with every ninth patient. The first patient was identified by the lottery method (Figure 1).

Study variables and measurement

Depression was the outcome variable. The independent variables were socio-demographic factors (age, sex, religion, marital status, education level, occupation, place of residence, monthly income, and health insurance participation). Clinical factors encompass family history of hypertension, family history of mental illness, comorbidities, and blood pressure management. Medical-related factors involve the number of antihypertensive medications, duration of hypertension, and medication adherence. Psycho-social factors include social support status and perceived stress levels. Behavior-related factors cover alcohol consumption, smoking, and physical activity. Knowledge-related factors pertain to awareness of hypertension disease.

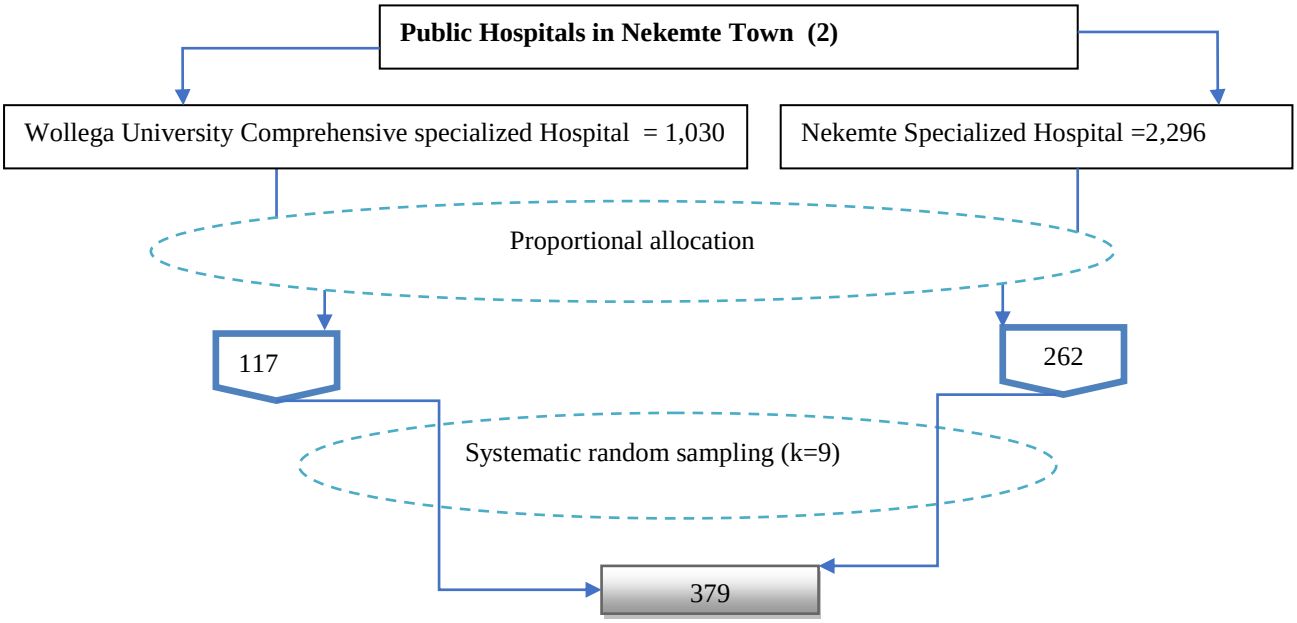

Figure 1: Schematic presentation of sampling Technique, Nekemte town, East Wallaga, Ethiopia, 2025.

Pre-tested "patient health questionnaires-9 (PHQ-9)" with nine validated items aimed at identifying depression. Each item was rated on a three-point scale (0 not at all, 1 several days, and 2 more). The total PHQ9 score ranged from 0 (no symptoms of depression) to 27 (severe symptoms of depression). The reaction was then categorized as either depressed (score ≥10) or not depressed (score <10). Depression was categorized as none (scores 0-4), mild (scores 5-9), moderate (scores 10-14), moderately severe (scores 15-19), and severe (scores 20-27) (16,17).

In the present study, twelve knowledge questions were utilized to assess knowledge. Participants' responses were marked as “Yes” for correct answers and “No” for incorrect ones. Those who scored above the median were classified as having good knowledge, whereas individuals with scores below the median were deemed to have poor knowledge.

Physically active indicates individuals who engage in at least 30 minutes of moderate-to-intense physical activity four or more days a week at work or in their free time.

The social support status was evaluated using the "Oslo-3 social support scale (OSS-3)." The total score goes from 3 to 14; scores between 3 and 8 indicate poor social support, scores between 9 and 11 indicate moderate social support, and scores between 12 and 14 indicate good social support (17).

The "10-item Perceived Stress Scale (PSS-10)" was used to measure perceived stress. Each item was rated on a five-point Likert scale from 0 (never) to 4 (very often). The total scores, which varied from 0 to 40,

were calculated by adding the replies to each item. According to standard scoring procedures, total scores were categorized into three levels: low stress (0 to 13), moderate stress (14 to 26), and severe stress (27 to 40) (18).

"The Morisky Medication Adherence Scale-8 (MMAS-8)" was used to assess medication adherence. This scale includes eight questions, with responses scored as 1 for "yes" and 0 for "no." The resulting score is then classified into three categories: low adherence (score of 5 or less), moderate adherence (score of 6 to 7), and high adherence (score of 8) (19).

Data Collection procedure

The data collection utilized structured, pre-tested interview questionnaires administered by two clinical nurses under the supervision of a public health officer. Sociodemographic information was gathered using structured questionnaires, while validated screening tools assessed key clinical variables: depression was evaluated using the PHQ-9, medication adherence with the MMAS-8, social support with the OSS-3, and stress with the PSS. Additionally, patients' medical records were reviewed to obtain information on comorbidities and behavioral factors. Data collectors and supervisors were trained, and then, on 5% of the sample, a pre-test was done at Arjo Primary Hospital. The investigator ensured the data's consistency and completeness.

Analysis

Data entry was done using EpiData version 3.1, and analysis was done using SPSS version 27. Data cleaning checked for missed values, followed by descriptive analyses like frequency, percentages, means, and dispersion measures. Tables and graphs presented data. The variables that had a p-value below 0.25 in the bivariable analysis were included in the final model. P-values < 0.05 on the final model, taking into account the 95% CI for the adjusted odds ratio, indicated significance. Variance inflation factor (VIF) and Hosmer-Lemeshow tests assessed multicollinearity and model fitness, respectively.

Ethics consideration

The zonal health department and the relevant health facilities granted permission to conduct the study there (WU/RO/568/2016). The study complied with the Declaration of Helsinki. Participants received a thorough explanation that data collection was solely for research without negative effects on them or others. Written consent was obtained, and confidentiality was maintained. The findings were presented in aggregate, not revealing respondents' identities.

RESULTS

Socio-demographic characteristics

A total of three hundred seventy hypertensive patients participated, having 97.6 % response rate. Participants' median age was 46.5 years (IQR: 39-59 years). A study involving 307.7 hypertensive patients with a response rate of 97.6% found that 56.8% were male. The majority were followers of the Protestant religion, with 193 (52.2%) being Protestant. The majority were educated, with 169 (45.7%) having completed college or above. The majority were government employees, with 34.6% being government employees and 4.6% being retired. The remaining 46.8% and 14.1% were private employees and self-employed. Most participants (84.9%) were married, and 71.1% were permanent residents of urban areas (Table 1).

Table 1: Socio-demographic study participant, Nekemte town public hospitals, 2025 (n=370)

Category		Frequency(n)	Percent (%)
Sex	Male	210	56.8
	Female	160	43.2
Age	<65	313	84.6
	≥65	57	15.4
Religion	Protestant	193	52.2
	Orthodox	123	33.2
	Muslim	50	13.5
	Others	4	1.1
Educational Status	Unable to read & write	100	27.0
	Elementary (Grade 1-8)	51	13.8
	Grade 9-12	50	13.5
	College and above> 12	169	45.7
Occupational status	Government employee	128	34.6
	Private employee	173	46.8
	Self-employed	52	14.1
	Retired	17	4.6
Marital status	Married	271	73.2
	Single	65	17.6
	Widowed	22	5.9
	Divorced	12	3.2
Residence	Urban	263	71.1
	Rural	107	28.9
Have health insurance	Yes	205	55.4
	No	165	44.6

Clinical and behavioral characteristics

Comorbid conditions,including diabetes, HIV/AIDS, arthritis, heart disease, asthma, l ung disease, and renal disease, were present i n 131 patients (35.4%). About 33.8% had controlled blood pressure, and 10.8% were on anti-hypertensive drugs for over 10 years. 55.4% and 19.7% had a family history of hypertension and depression, respectively.

Depression magnitude was found to be 87 (23.5%). Physical activity was reported by 14.5%, while smoking and alcohol consumption were reported by 5.9% and 12.2%, respectively. Out of three hundred seventy study participants, 218 (58.9%) have good knowledge of hypertension, while others have poor knowledge. Among the 370 participants in the study, 188 individuals (50.8%) had low social support, 87 participants (23.5%) experienced moderate support, and 90 individuals (25.7%) had strong support. Regarding medication adherence, 26 participants (7%) showed low adherence, while 344 participants (93%) demonstrated moderate adherence (Table 2).

Table 2: Clinical and behavioral characteristics of study participants, Nekemte town public hospitals, 2025 (n=370)

Category		**Frequency n)**	**Percent(%)**
Comorbidity	Yes	131	35.4
	No	239	64.6
Blood pressure status	Controlled	125	33.8
	Uncontrolled	245	66.2
Depression status	Yes	87	23.5
	No	283	76.5
Years since diagnosis of HTN	<5 years	162	43.8
	5-10 years	168	45.4
	>10 years	40	10.8
Number of antihypertensive medications	One	177	47.8
	More than one	193	52.2
Hypertension in Family	Yes	205	55.4
	No	165	44.6
Depression hx in family	Yes	73	19.7
	No	297	80.3
Ever smoke	Yes	56	15.1
	No	314	84.9
Currently smoke	Yes	22	5.9
	No	348	94.1
Ever drink	Yes	78	21.1
	No	292	78.9
Currently drink	Yes	45	12.2
	No	325	87.8
Physical activity	Yes	164	44.3
	No	206	55.7
Perceived stress status	Low	211	57.0
	Moderate	144	38.9
	High	15	4.1
Adherence status	Poor	26	7.0
	Moderate	344	93.0
Knowledge about Hypertension	Good	218	58.9
	Poor	152	41.1
Social support status	Strong	8	23.5
	Moderate	90	25.7
	Low	188	50.8

Associated factors of depression

Depression was the primary dependent variable. Initially, bivariable logistic regression was performed to screen for associations, with variables yielding a p-value <0.25, including age, sex, educational status, and social support, being selected for the final model. Multivariable logistic regression, no formal education (AOR = 4.66, 95% CI: 2.08-10.4), lack of health insurance (AOR = 3.43, 95% CI: 1.74–6.76), presence of comorbidities (AOR = 3.15, 95% CI: 1.52–6.52), and poor social support (AOR = 5.59, 95% CI: 1.76–17.7) were associated with depression (Table 3).

Table 3*:* Factors associated with depression among hypertensive patients, at Nekemte town public hospitals, 2025

Variable	Category	COR (95% CI)	P-value	AOR (95% CI)	P-value
Sex	Female	0.62(0.37-1.02)	0.061	0.77 (0.41-1.45)	0.420
	Male	1		1	
Age	≥65	1.63(0.88-3.03)	0.121	1.06(0.47-2.42)	0.882
	<65	1		1	
Educational status	Unable to read & write	4.16(2.2-7.86)	0.022	4.66(2.08-10.4)	0.001**
	Elementary (Grade1-8	2.28(1.09-4.75)	0.515	3.19(1.23-8.28)	0.017**
	Grade 9-12	2.34(1.19-4.61)	0.202	3.67(1.573-8.62)	0.003**
	College and above	1		1	
Monthly income	0-1400	2.65(1.16-6.06)		2.16(0.75-6.27)	0.15
	1401-3500	2.49(1.35-4.62)		1.81(0.81-4.05)	0.15
	3501-5000	1.29(0.68-2.48)		1.39(0.61-3.18)	0.43
	≥5000	1		1	
CBHI member	No	4.04(2.40-6.78)	0.001	3.43(1.74-6.76)	0.001**
	Yes	1		1	
Comorbidities	Yes	5.75(3.42-9.67)	0.001	3.15(1.52-6.52)	0.002**
	No	1		1	
Blood pressure	Uncontrolled	0.59(0.34-1.02)	0.057	1.55(0.79-3.02)	0.197
	Controlled	1		1	
Family history of hypertension	Yes	2.61(1.54-4.41)	0.001	1.44(0.75-2.76)	0.278
	No	1		1	
Family history of depression	Yes	0.58(0.29-1.14)	0.115	1.11(0.57-2.18)	0.754
	No	1		1	
Smoking	Yes	3.58(1.49-8.57)		2.25(0.56-9.02)	0.342
	No	1		1	
Drink alcohol	Yes	2.76(1.44-5.29)	0.002	0.5(0.18-1.39)	0.187
	No	1		1	
Knowledge	Poor	0.39(0.23-0.68)	0.001	0.52(0.27-1.01)	0.128
	Good	1		1	
Social support status	Poor	14.44(5.08-40.99)	0.001	5.59(1.76-17.7)	0.003**
	Moderate	2.96(0.89-9.79	0.076	1.67(0.43-6.49)	0.457
	Strong	1		1	
Adherence to medication	Poor	3.65(1.62-8.21	0.002	2.59(0.93-7.25)	0.070
	Moderate	1		1	

DISCUSSION

The current study found that depression magnitude was 23.5%. This finding is almost similar to studies conducted in Saudi Arabia (20), Cameroon (10), and Hawassa (21), where the magnitude of depression was reported to be 19.6%, 30.6%, and 24.7%, respectively. However, it is much lower than the study findings in Ghana (41.7%)(22) and in Tamil Nadu (58%) in India (23). This could be attributed to the variations in socio-demographic and economic conditions across different nations. This difference might also be attributable to the inclusion of patients with mild depression in the Nigerian cohort, while a PHQ score of ≥10 was categorized as depression in our study. The other factor might be due to the difference in diagnostic criteria; the "depression anxiety stress scale (DASS)" was used for the diagnosis of depression in Tamil Nadu, and the PHQ-9 score was used as the diagnostic criterion for depression in our case.

In this study, hypertensive patients who have no formal education were 4.66 times more likely to develop depression than those with a diploma or higher. Research from Saudi Arabia (20) and Hawasa (21) supports this finding. This may be because individuals without formal education may not be well-informed about hypertension and may have inadequate coping strategies for stress and psychological issues. Low education limits health literacy and coping skills, and uses simplified education and prioritizes mental health screening for this group.

Having a health insurance service has been found to decrease the odds of depression in hypertensive patients. Hypertensive patients who have no health insurance are 3.43 times more likely to develop depression than hypertensive patients participating in a health insurance program. Research conducted in Ghana (22) supports this finding, which identified health insurance as the key factor in relieving the depression of chronic disease patients. It will be justified as health insurance improves the quality of health services and also significantly alleviates depression in chronic disease patients, by managing their financial stress. Financial stress from healthcare costs worsens mental health, and expanding insurance coverage can help connect uninsured patients with financial counselors.

This study revealed that the presence of comorbidity is related to increased odds of depression. Those who have a comorbid illness have 3.15 times higher odds of depression than those who have no comorbidity. This result is in line with several studies carried out in various nations, including Addis Ababa (15) and Hawasa,

Ethiopia(21). This may be caused by the direct pathophysiological impact of metabolic and inflammatory variables on the autonomic nervous system and hypothalamic-pituitary axis, as well as the load of symptoms and functional impairment from various illnesses, which can be important contributors to depression. Multiple illnesses create biological and functional burdens that trigger depression, and implementing integrated care models that treat physical and mental health together.

In this study, perceived social support status shows a statistically significant association with depression. Hypertensive Patients with low social support were 5.6 times more likely to develop depression than those with strong social support. Social support is the assistance that a person gets from their relationships with other people, organizations, and the greater community. Previous studies conducted in China (24) and Ethiopia (15,21) support this finding. This may be because having a physical illness (such as hypertension) and feeling alone and unsupported both raise psychosocial stress; on the other hand, having strong social support lowers the risk of depression.

Limitations of the study

Since the respondents responded to the last one-month situation and due to subjective assessments of some factors, it was prone to recall bias.

CONCLUSION

Depressive symptoms are common among hypertensive patients receiving treatment at the public hospitals in Nekemt Town. Approximately one in four hypertensive patients who visited public hospitals in Nekemte Town were found to exhibit depressive symptoms. Having no formal education, not participating in a health insurance program, having a comorbid illness, and having a perceived low social support status were among the factors positively associated with depression in patients with hypertension.

Recommendations

To health facilities: The hypertension follow-up case team, in collaboration with the psychiatric case team, should establish a mechanism of screening for mental health, particularly depression. Attention could be directed towards the identification of patients with low social support and patients who are illiterate to help them cope with the stressful impact of hypertension. Early detection and prompt treatment of co-morbid chronic medical illnesses might reduce the risk of complications and the development of depression.

To Woreda health offices: Encouraging community participation in the community-based health insurance (CBHI) programme to share and reduce the risk of financial burden related to medical expenses.

To future researchers: To support and expand these results, more long-term studies on depression risk factors should be carried out. It would be beneficial to research how health insurance affects mental health outcomes.

Declarations

Data availability

Relevant data can be available from the corresponding author on reasonable request.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests

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REFERENCES

1. Abdisa l, letta s, nigussie k. Depression and anxiety among people with hypertension on follow-up in eastern Ethiopia: a multi-center cross-sectional study. Front psychiatry. 2022;13(november):1–10.
2. Depressive disorder (depression) [internet]. [cited 2023 nov 25]. Available from: https://www.who.int/news-room/fact-sheets/detail/depression.
3. Depression and other common mental disorders: global health estimates. Geneva: World Health Organization. Licence: cc by-nc-sa 3.0 igo. 2017. 5 p.
4. Az s, mz s, jbs a, hypertension lnf. Hypertension and depression. 2005;60(3):241–50.
5. Bacon sl, campbell ts, arsenault a, lavoie kl. The impact of mood and anxiety disorders on incident hypertension at one year. Int J Hypertens. 2014;2014.
6. Federal democratic republic of ethiopia ministry of health. Guidelines on clinical and programmatic management of major non-communicable diseases. Researchgate. 2016. 220 p.
7. Guideline for the pharmacological treatment of hypertension in adults. Geneva: World Health Organization. Geneva; 2021. 48 p.
8. Marina Marcus, m. Taghi Yasamy, Mark van Ommeren, and Dan Chisholm ss. Depression: a global public health concern; who department of Mental Health and Substance Abuse. 2017;(December):5–8.
9. D f santomauro, A M Mantilla Herrera, J Shadid, P Zheng, C Ashbaugh, D Pigott, S I Hay, t vos, H A Whiteford, h a whiteford and AJF. Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. Lancet. 2021;398(10312):1700–12.
10. Ngasa sn, sama cb, dzekem bs, nforchu kn, tindong m, aroke d, et al. Prevalence and factors associated with depression among medical students in Cameroon: a cross-sectional study. BMC Psychiatry. 2017;17(1):1–7.
11. Liu a, peng y, zhu w, zhang y, ge s, zhou y, et al. Analysis of factors associated with depression in community-dwelling older adults in Wuhan, China. Front Aging Neurosci. 2021;13(november):1–7.
12. Girma s, tsehay m, mamaru a, abera m. Depression and its determinants among adolescents in Jimma town, southwest Ethiopia. Plos one. 2021;16(5 may):1–13.
13. Mental health gap action programme (MHGAP) guideline for mental, neurological and

substance use disorders. Geneva: World Health Organization; 2023. Licence: cc by-nc-sa 3.0 igo. Cataloguing-in-publication.
14. National mental health strategy 2020-2025 (2013-2017 efy): Federal Ministry of Health, Addis Ababa, Ethiopia. National mental health strategy. 2020. 95 p.
15. Asmare Y, Ali A, Belachew A. Magnitude and associated factors of depression among people with hypertension in Addis Ababa, Ethiopia: a hospital-based cross-sectional study. BMC Psychiatry. 2022;22(1):1–9.
16. Neupane d, panthi b, mclachlan cs, mishra sr. Prevalence of undiagnosed depression among persons with hypertension and associated risk factors : a cross-sectional study in urban Nepal. 2015;1–11.
17. Kocalevent Rd, Berg L, Beutel M, Hinz A, zenger m, härter m, et al. Social support in the general population: standardization of the Oslo Social Support Scale (OSSS-3). BMC Psychol. 2018 jul;6(1):1–8.
18. Lee e-h. Review of the psychometric evidence of the perceived stress scale.
19. Morisky de, ang a, krousel-wood m, ward hj. Predictive validity of a medication adherence measure in an outpatient setting. 2008;10(5).
20. Albasara sa, haneef ms, zafar m, moinuddin kg. Depression and associated risk factors among hypertensive patients in primary health care centers in Dammam, Kingdom of Saudi Arabia. Pan afr med j. 2021;38.
21. Gebre bb, Deribe B, Abedo M. Magnitude and associated factors of depression among hypertensive patients attending treatment follow-up in chronic opd at hawassa university comprehensive specialized hospital, hawassa, southern ethiopia. Integrate blood pressure control. 2020;13:31–9.
22. Ademola ad, boima v, odusola ao, agyekum f, nwafor ce, salako bl. Prevalence and determinants of depression among patients with hypertension: a cross-sectional comparison study in Ghana and Nigeria. Niger J Clin Pract. 2019 apr;22(4):558-565. Doi: 10.4103/njcp.njcp_351_18. Pmid: 30975963.
23. Indra b. Sundarrajan, muthukumar t, raja vp ts. Mental health of hypertensive patients and its association with their blood pressure in a rural area of Kancheepuram district, Tamil Nadu. J fam med prim care [internet]. 2022;11(5):1761–4.
24. Zhang y, fan x, li s, wang y, shi s, lu h, yan f, ma y. Prevalence and risk factors of hypertension among Hui population in China: a systematic review and meta-analysis based on 30,565 study participants. Medicine (Baltimore). 2021 may 7;100(18):e25192. Doi: 10.1097/md. 0000000000025192. Pmid: 33950917; pmcid: pmc8104273.